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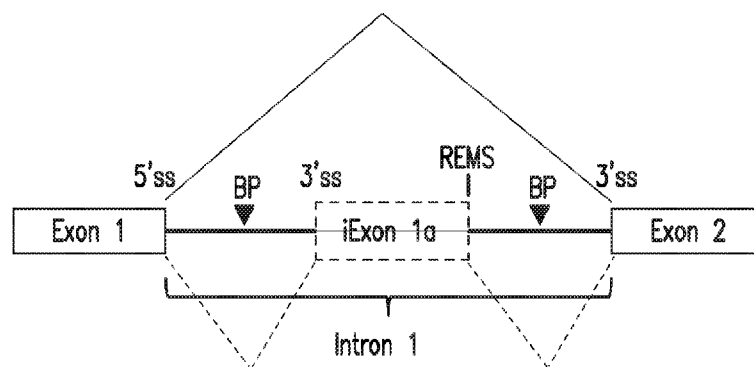


FIG. 1A

(57) Abstract: In one aspect, described herein is an intronic recognition element for splicing modifier (iREMS) that can be recognized by a compound provided herein. In another aspect, described herein are methods for modulating the amount of a product of a gene, wherein a precursor RNA transcript transcribed from the gene contains an intronic REMS, and the methods utilizing a compound described herein. More particularly, described herein are methods for modulating the amount of an RNA transcript or protein product encoded by a gene, wherein a precursor RNA transcript transcribed from the gene comprises an intronic REMS, and the methods utilizing a compound described herein. In another aspect, provided herein are artificial gene constructs comprising an intronic REMS, and uses of those artificial gene constructs to modulate protein production. In another aspect, provided herein are methods for altering endogenous genes to comprise an intronic REMS, and the use of a compound described herein to modulate protein produced from such altered endogenous genes.

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Methods for Modulating RNA Splicing

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of provisional application No. 62/426,619, filed on November 28, 2016, which is incorporated by reference herein in its entirety.

REFERENCE TO SEQUENCE LISTING SUBMITTED ELECTRONICALLY

[0002] This application incorporates by reference a Sequence Listing submitted with this application as a text file entitled “10589-275-228_Sequence_Listing.txt” created on November 18, 2017 and having a size of 1,112 kilobytes.

INTRODUCTION

[0003] In one aspect, described herein is a recognition element for splicing modifier (REMS) present in an intron (i.e., an “intronic REMS” or iREMS) that can be recognized as a 5’ splice site by the U1 snRNP and/or other components of the pre-mRNA splicing machinery in the presence of a small molecule splicing modifier, wherein gene expression is modulated by inducing alternative splicing of intronic exons (iExons) in the transcribed RNA. In another aspect, described herein are methods for modulating the amount of a product of a gene, wherein a precursor RNA transcript transcribed from the gene contains an intronic REMS, a branch point and a 3’ splice site, and the methods utilize a small molecule compound described herein to induce alternative splicing of iExons. More particularly, described herein are methods for modulating the amount of an RNA transcript or protein product encoded by a gene via alternative splicing of iExons, wherein a precursor RNA transcript transcribed from the gene comprises an endogenous or non-endogenous intronic REMS, and the methods utilize a compound described herein to induce iExon alternative splicing. In another aspect, provided herein are artificial gene constructs comprising an intronic REMS (including an endogenous or non-endogenous intronic REMS), and uses of those artificial gene constructs to modulate protein production via iExon alternative splicing in the presence of a small molecule splicing modifier compound. In another aspect, provided herein are methods for altering genes to comprise an endogenous or non-endogenous intronic REMS, and the use of a small molecule compound described herein to induce alternative splicing of iExons, subsequently modulating the amount and type of protein produced from such altered endogenous or non-endogenous gene transcripts.

BACKGROUND

[0004] Diseases associated with expression of an aberrant gene product (*e.g.*, where the production of an aberrant RNA transcript or protein causes a disease) are often treated with a focus on affecting aberrant protein expression. However, targeting components of the splicing process responsible for production of aberrant RNA before the aberrant protein is expressed by using a small molecule may affect the underlying cause of a disease or disorder, and thus more efficiently prevent or ameliorate the disease or disorder caused by expression of the aberrant gene product. Accordingly, there is a need for methods of modulating the expression of aberrant RNA transcripts encoded by certain genes using small molecules to prevent or treat diseases associated with expression of aberrant RNA transcripts or associated proteins.

SUMMARY

[0005] In one aspect, provided herein is a recognition element for splicing modifier (otherwise referred to as “REMS”) present in an intron (*i.e.*, an “intronic REMS”) capable of being recognized by the U1 snRNP and/or other components of the pre-mRNA splicing machinery in the presence of a small molecule splicing modifier, whereby elements of the splicing reaction are affected as further described herein. In a specific embodiment, the intronic REMS comprises the nucleotide sequence GAgurngn (SEQ ID NO: 2) at the RNA level, wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n is any nucleotide. In another specific embodiment, the intronic REMS comprises the nucleotide sequence GAguragu (SEQ ID NO: 3866) at the RNA level, wherein r is adenine or guanine. In a specific embodiment, the intronic REMS comprises the nucleotide sequence NNGAgurngn (SEQ ID NO: 1) at the RNA level, wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n or N is any nucleotide. In another specific embodiment, the intronic REMS comprises the nucleotide sequence NNGAguragu (SEQ ID NO: 3862) at the RNA level, wherein r is adenine or guanine and N is any nucleotide. In one or more of such specific embodiments provided herein, N is adenine or guanine.

[0006] In another aspect, in addition to the intronic REMS sequence, the RNA transcript comprises an upstream branch point and a functional upstream iExon 3' splice site. In certain embodiments including, but not limited to, iExons, an exon 5' splice site, a branch point and the functional iExon 3' splice site upstream from the intronic REMS are further linked to a

downstream branch point and 3' splice site of a downstream exon (see, for example, Figure 1A). In other embodiments including, but not limited to, extended exons, the branch point and the functional 3' splice site for an exon are downstream from the intronic REMS sequences (see, for example, Figures 1B and 1C). In a particular embodiment, an RNA sequence comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, and wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site (also referred to as an iExon 3' splice site), an iREMS, a second branch point, and a second 3' splice site. In the presence of a compound described herein, the iREMS sequence functions as a 5' splice site, causing the NNGA (SEQ ID NO: 3863) nucleotides of the iREMS and the intronic nucleotides downstream of the first 3' splice site to be retained and spliced as an intronic exon to provide a non-wild-type mRNA. In other words, the nucleotides between the iREMS and the first 3' splice site are retained and form the intronic exon, which results in the expression of a non-wild-type mRNA sequence. In the presence of a compound described herein, the iREMS sequence functions as a 5' splice site, causing the NNGA (SEQ ID NO: 3863) nucleotides of the iREMS and the intronic nucleotides between the 3' iExon splice site to be retained and spliced as an intronic exon to provide a non-wild-type mRNA. In other aspects, in the presence of a compound described herein and a downstream branch point, the intronic REMS will undergo splicing with the 3' splice site of a downstream exon. In this aspect, the intronic REMS is located downstream of an exon such that there is no intervening upstream branch point and iExon 3' splice site between the exon and the REMS sequence. In the presence of a compound described herein, the exon 5' splice site does not undergo splicing with the downstream 3' splice site. Instead, functioning as a 5' splice site in the presence of a compound described herein, the iREMS sequence undergoes splicing with the downstream 3' splice site. In other embodiments, in the presence of a compound described herein, an upstream exon 5' splice site, an upstream branch point, and a functional iExon 3' splice site upstream from the intronic REMS, will undergo splicing. In certain embodiments, one or more sequence elements necessary to form an iExon splice junction may be present endogenously or non-endogenously. For example, one or more of the following sequence elements may be present naturally in an intron or an intron may be engineered to comprise one or more of the following sequences in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point, and a second 3' splice site. In certain

embodiments, one or more snRNPs and trans factor elements necessary for splicing may be present beyond endogenous levels as a result of the presence of a compound described herein at various splice inducing sequence combinations. Without being bound by any theory or mechanism, the small molecule compounds described herein, in conjunction with the iREMS sequence, initiate the assembly of a splicing-competent spliceosome around a weak or incompletely defined exon (i.e., a nascent iExon). Splicing modifier compounds most likely enable a functional U1 snRNP – REMS interaction and, at least, have been shown to increase the affinity of one or more snRNPs and trans factor elements necessary for splicing, including U1, U2, U4, U5 and U6, whereby the interaction between the U1 snRNP, as well as other components of the pre-mRNA splicing machinery, and the nucleotides NNGA (SEQ ID NO: 3863) of the REMS are enhanced. In fact, we have discovered that the interaction of the U1 snRNP, the iREMS and the small molecule splicing modifier compounds described herein serve to define nascent exons by increasing the binding affinity of the pre-mRNA splicing machinery to the iREMS sequence, stabilizing U1 binding with the iREMS sequence, activating a 3' splice site and a branch point upstream from the iREMS and recruiting U2 snRNP and other trans-acting splicing factors such as U2AF (U2AF65 and U2AF35) and SF3A (SF3A1, SF3A2 and SF3A3) to the upstream branch point and 3' splice site. The branch point and 3' splice site may or may not be fully occupied in the absence of the compound but have been shown to become occupied after the compound has enabled the formation of a functional U1 snRNP – REMS complex. We have elaborated on the interaction of these key splicing machinery elements, showing that, in the presence of small molecule splicing modifier compounds such as, but certainly not limited to, those described herein, the mechanism of intronic spliceosome assembly can be mediated by iREMS interaction with such compounds, such that the intronic REMS sequence functions as a U1 snRNP binding site, resulting in intronic nucleotides spliced in the mature RNA transcript as an intronic exon.

[0007] In Figure 1A, the intronic REMS is located in Intron 1 downstream from an Exon 1 5' splice site (*i.e.*, a 5' splice site at the 3' end of Exon 1), a first branch point (BP) sequence and a first 3' splice site sequence and upstream from a second branch point sequence and a second 3' splice site sequence of Exon 2 in an RNA transcript (*i.e.*, the precursor mRNA). In the presence of a small molecule splicing modifier compound described herein the intronic REMS functions as a 5' splice site, whereby the nucleotides between the Exon 1 5' splice site

and the first 3' splice site are removed to form a splice junction between Exon 1 and a nascent intronic exon and the nucleotides between the intronic REMS and the second 3' splice site sequence are removed to form a splice junction between iExon 1a and Exon 2, and allowing Exon 2 and the portion of the intron comprising nucleotides from the first 3' splice site up to and including NNGA (SEQ ID NO: 3863) of the intronic REMS to be joined, thus introducing an intron-derived iExon 1a, generating a non-wildtype mRNA. In certain embodiments of Figure 1A, one or more elements necessary to form a splice junction may be present endogenously or introduced, wherein the one or more elements are selected from the group consisting of the first branch point, the first 3' splice site, the intronic REMS, the second branch point and the second 3' splice site. While illustrated for Intron 1 here, this concept is generally applicable to any other intron in a pre-mRNA transcript.

[0008] In Figure 1B, the intronic REMS is located in an intron of an RNA transcript downstream from an Exon 1 5' splice site (*i.e.*, a 5' splice site at the 3' end of Exon 1) and upstream from an Intron 1 branch point sequence and a 3' splice site sequence of Exon 2 (*i.e.*, a 3' splice site at the 5' end of Exon 2). In the presence of a small molecule splicing modifier compound described herein, the nucleotides between the Exon 1 5' splice site and the intronic REMS are retained and those between the intronic REMS and the Intron 1 3' splice site sequence (except the NNGA (SEQ ID NO: 3863) nucleotides of the intronic REMS) are removed, allowing Exon 1 and the portion of the intron comprising nucleotides from those adjacent to the Exon 1 5' splice site up to and including NNGA (SEQ ID NO: 3863) of the intronic REMS and the Exon 2 nucleotides to be joined. The scope of the invention described herein is merely illustrated in this configuration for Exon 1 but is generally applicable to any other nascent iExon in an intronic sequence. The elements necessary to induce splicing of an iExon may be present in any configuration capable of recognition by the splicing machinery as an "exon." Accordingly, in the presence of a splicing modifier compound, the spliceosome recognizes the elements as exonic boundaries for removal of intervening intronic nucleotides between those boundaries. The configuration in this instance results in an iExon spliced between at least one upstream exon and one downstream exon of the same pre-mRNA transcript.

[0009] In Figure 1C, the intronic REMS is located in Intron 2 downstream from an Exon 2 5' splice site (*i.e.*, a 5' splice site at the 3' end of Exon 2) and upstream from an Intron 2 branch point sequence and a 3' splice site sequence of Exon 3 (*i.e.*, a 3' splice site at the 5' end of Exon

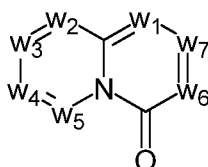
3) in an RNA transcript. In the presence of a small molecule splicing modifier compound described herein, the nucleotides between the intronic REMS and the Exon 3 3' splice site sequence are removed, allowing Exon 3 and the portion of the intron comprising nucleotides from those adjacent to the Exon 2 5' splice site up to and including NNGA (SEQ ID NO: 3863) of the intronic REMS to be joined. In this example, the endogenous splicing reaction between Exon 1 and Exon 2 is unaffected by the presence of a compound described herein, resulting in the complete removal of Intron 1. While illustrated for Exon 2 here, this concept is generally applicable to any other internal nascent intronic exon, i.e., an exon that is located between at least one upstream exon and one downstream exon of the same pre-mRNA transcript.

[0010] As used herein, an "exon 5' splice site", a "5' splice site of an exon" or the like refers to a 5' splice site at the 3' end of the exon, while an "exon 3' splice site", a "3' splice site of an exon" or the like refers to a 3' splice site at the 5' end of the exon.

[0011] In the presence of a small molecule splicing modifier compound described herein, the iREMS nucleotides retained in the formation of an iExon are selected from the group consisting of ANGGA (SEQ ID NO: 5), CNGGA (SEQ ID NO: 11), GNGGA (SEQ ID NO: 17), UNGGA (SEQ ID NO: 23), NAGGA (SEQ ID NO: 6), NCGGA (SEQ ID NO: 12), NGGGA (SEQ ID NO: 18), NUGGA (SEQ ID NO: 24), AAGGA (SEQ ID NO: 7), ACGGA (SEQ ID NO: 13), AGGGA (SEQ ID NO: 19), AUGGA (SEQ ID NO: 25), CAGGA (SEQ ID NO: 8), CCGGA (SEQ ID NO: 14), CGGGA (SEQ ID NO: 20), CUGGA (SEQ ID NO: 26), GAGGA (SEQ ID NO: 9), GCGGA (SEQ ID NO: 15), GGGGA (SEQ ID NO: 21), GUGGA (SEQ ID NO: 27), UAGGA (SEQ ID NO: 10), UCGGA (SEQ ID NO: 16), UGGGA (SEQ ID NO: 22) and UUGGA (SEQ ID NO: 28). The formation of an iExon may result in an RNA transcript having a non-functional open reading frame due to the inclusion of a frameshift, premature stop codon or internal deletions within the open reading frame. In other embodiments, the inclusion of an iExon may result in the mature mRNA having a functional open reading frame, producing a novel protein which may or may not be functional. RNA transcripts having a non-functional open reading frame due to the inclusion of a frameshift, premature stop codon or internal deletions within the open reading frame can be substrates for nonsense-mediated decay and thus have low abundance. Any intronic REMS-mediated alternative splicing modified RNA transcripts may also have altered stability, altered intracellular transport, altered 3' end formation efficiency and altered translation efficiency.

[0012] Accordingly, in one aspect, provided herein are methods for modulating the amount of RNA transcripts produced from precursor RNA containing an endogenous or non-endogenous intronic REMS. In another aspect, provided herein are artificial gene constructs comprising an endogenous or non-endogenous intronic REMS, which may be used in the context of, *e.g.*, gene therapy or reporter assays. In another aspect, provided herein are methods for altering endogenous genes so that they contain an intronic REMS or an additional intronic REMS.

[0013] In another aspect, provided herein are methods for modulating the amount of one or more RNA transcripts (*e.g.*, mRNA transcripts) or proteins thereof expressed as the product of one or more genes, wherein precursor RNA transcripts transcribed by the one or more genes comprise an intronic REMS, the methods comprising contacting a cell with a compound of Formula (I)



(I)

or a form thereof, wherein w_1 , w_2 , w_3 , w_4 , w_5 , w_6 and w_7 are as defined herein. In one embodiment, provided herein is a method for modulating the amount of an RNA transcript produced from precursor RNA containing an intronic recognition element for splicing modifier (REMS), the method comprising contacting a cell containing the precursor RNA with a compound of Formula (I) or a form thereof, wherein the intronic REMS comprises the sequence NNGAgurngn (SEQ ID NO: 1), wherein r is adenine or guanine and n or N is any nucleotide, wherein the precursor RNA is a gene in Table 1. In certain embodiments, the precursor RNA is a gene in Table 7. In another embodiment, provided herein is a method for modulating the amount of an RNA transcript produced from precursor RNA containing an intronic recognition element for splicing modifier (REMS), the method comprising contacting the precursor RNA with a compound of Formula (I) or a form thereof, wherein the intronic REMS comprises the sequence NNGAgurngn (SEQ ID NO: 1), wherein r is adenine or guanine and n or N is any nucleotide, wherein the precursor RNA is a gene in Table 1. In some embodiments, the intronic REMS comprises the sequence NNGAguragu (SEQ ID NO: 3862) at the RNA level, wherein r is adenine or guanine and N is any nucleotide. In certain embodiments, the intronic REMS

comprises a sequence selected from the group consisting of ANGAgurngn (SEQ ID NO: 29), CNGAgurngn (SEQ ID NO: 35), GNGAgurngn (SEQ ID NO: 41), UNGAgurngn (SEQ ID NO: 47), NAGAgurngn (SEQ ID NO: 30), NCGAgurngn (SEQ ID NO: 36), NGGAgurngn (SEQ ID NO: 42), NUGAgurngn (SEQ ID NO: 48), AAGAgurngn (SEQ ID NO: 31), ACGAgurngn (SEQ ID NO: 37), AGGAgurngn (SEQ ID NO: 43), AUGAgurngn (SEQ ID NO: 49), CAGAgurngn (SEQ ID NO: 32), CCGAgurngn (SEQ ID NO: 38), CGGAgurngn (SEQ ID NO: 44), CUGAgurngn (SEQ ID NO: 50), GAGAgurngn (SEQ ID NO: 33), GCGAgurngn (SEQ ID NO: 39), GGGAgurngn (SEQ ID NO: 45), GUGAgurngn (SEQ ID NO: 51), UAGAgurngn (SEQ ID NO: 34), UCGAgurngn (SEQ ID NO: 40), UGGAgurngn (SEQ ID NO: 46) and UUGAgurngn (SEQ ID NO: 52), wherein r is adenine or guanine and n or N is any nucleotide.

In some embodiments, the intronic REMS comprises a sequence selected from the group consisting of ANGAguragu (SEQ ID NO: 437), CNGAguragu (SEQ ID NO: 443), GNGAguragu (SEQ ID NO: 449), UNGAguragu (SEQ ID NO: 455), NAGAguragu (SEQ ID NO: 438), NCGAguragu (SEQ ID NO: 444), NGGAguragu (SEQ ID NO: 450), NUGAguragu (SEQ ID NO: 456), AAGAguragu (SEQ ID NO: 439), ACGAguragu (SEQ ID NO: 445), AGGAguragu (SEQ ID NO: 451), AUGAguragu (SEQ ID NO: 457), CAGAguragu (SEQ ID NO: 440), CCGAguragu (SEQ ID NO: 446), CGGAguragu (SEQ ID NO: 452), CUGAguragu (SEQ ID NO: 458), GAGAguragu (SEQ ID NO: 441), GCGAguragu (SEQ ID NO: 447), GGGAguragu (SEQ ID NO: 453), GUGAguragu (SEQ ID NO: 459), UAGAguragu (SEQ ID NO: 442), UCGAguragu (SEQ ID NO: 448), UGGAguragu (SEQ ID NO: 454) and UUGAguragu (SEQ ID NO: 460) at the RNA level, wherein r is adenine or guanine, and N is any nucleotide. In one or more embodiments provided herein, N is adenine or guanine.

[0014] In a specific embodiment, the intronic REMS referred to in a method or artificial gene construct described herein comprises, at the RNA level, a sequence presented in the following table (wherein r is adenine or guanine, and n or N is any nucleotide):

[0015] Table 13. Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
29	ANGAgurngn	35	CNGAgurngn	41	GNGAgurngn	47	UNGAgurngn
30	NAGAgurngn	36	NCGAgurngn	42	NGGAgurngn	48	NUGAgurngn
31	AAGAgurngn	37	ACGAgurngn	43	AGGAgurngn	49	AUGAgurngn
32	CAGAgurngn	38	CCGAgurngn	44	CGGAgurngn	50	CUGAgurngn
33	GAGAgurngn	39	GCGAgurngn	45	GGGAgurngn	51	GUGAgurngn
34	UAGAgurngn	40	UCGAgurngn	46	UGGAgurngn	52	UUGAgurngn

[0016] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
53	ANGAguragn	77	ANGAgurcgn	101	ANGAgurggn	125	ANGAgurugn
54	NAGAguragn	78	NAGAgurcgn	102	NAGAgurggn	126	NAGAgurugn
55	AAGAguragn	79	AAGAgurcgn	103	AAGAgurggn	127	AAGAgurugn
56	CAGAguragn	80	CAGAgurcgn	104	CAGAgurggn	128	CAGAgurugn
57	GAGAguragn	81	GAGAgurcgn	105	GAGAgurggn	129	GAGAgurugn
58	UAGAguragn	82	UAGAgurcgn	106	UAGAgurggn	130	UAGAgurugn
59	CNGAguragn	83	CNGAgurcgn	107	CNGAgurggn	131	CNGAgurugn
60	NCGAguragn	84	NCGAgurcgn	108	NCGAgurggn	132	NCGAgurugn
61	ACGAguragn	85	ACGAgurcgn	109	ACGAgurggn	133	ACGAgurugn
62	CCGAguragn	86	CCGAgurcgn	110	CCGAgurggn	134	CCGAgurugn
63	GCGAguragn	87	GCGAgurcgn	111	GCGAgurggn	135	GCGAgurugn
64	UCGAguragn	88	UCGAgurcgn	112	UCGAgurggn	136	UCGAgurugn
65	GNGAguragn	89	GNGAgurcgn	113	GNGAgurggn	137	GNGAgurugn
66	NGGAguragn	90	NGGAgurcgn	114	NGGAgurggn	138	NGGAgurugn
67	AGGAguragn	91	AGGAgurcgn	115	AGGAgurggn	139	AGGAgurugn
68	CGGAguragn	92	CGGAgurcgn	116	CGGAgurggn	140	CGGAgurugn
69	GGGAguragn	93	GGGAgurcgn	117	GGGAgurggn	141	GGGAgurugn
70	UGGAguragn	94	UGGAgurcgn	118	UGGAgurggn	142	UGGAgurugn
71	UNGAguragn	95	UNGAgurcgn	119	UNGAgurggn	143	UNGAgurugn
72	NUGAguragn	96	NUGAgurcgn	120	NUGAgurggn	144	NUGAgurugn
73	AUGAguragn	97	AUGAgurcgn	121	AUGAgurggn	145	AUGAgurugn
74	CUGAguragn	98	CUGAgurcgn	122	CUGAgurggn	146	CUGAgurugn
75	GUGAguragn	99	GUGAgurcgn	123	GUGAgurggn	147	GUGAgurugn
76	UUGAguragn	100	UUGAgurcgn	124	UUGAgurggn	148	UUGAgurugn

[0017] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
149	ANGAguraga	173	ANGAgurcga	197	ANGAgurgga	221	ANGAguruga
150	NAGAguraga	174	NAGAgurcga	198	NAGAgurgga	222	NAGAguruga
151	AAGAguraga	175	AAGAgurcga	199	AAGAgurgga	223	AAGAguruga
152	CAGAguraga	176	CAGAgurcga	200	CAGAgurgga	224	CAGAguruga
153	GAGAguraga	177	GAGAgurcga	201	GAGAgurgga	225	GAGAguruga
154	UAGAguraga	178	UAGAgurcga	202	UAGAgurgga	226	UAGAguruga
155	CNGAguraga	179	CNGAgurcga	203	CNGAgurgga	227	CNGAguruga
156	NCGAguraga	180	NCGAgurcga	204	NCGAgurgga	228	NCGAguruga
157	ACGAguraga	181	ACGAgurcga	205	ACGAgurgga	229	ACGAguruga
158	CCGAguraga	182	CCGAgurcga	206	CCGAgurgga	230	CCGAguruga
159	GCGAguraga	183	GCGAgurcga	207	GCGAgurgga	231	GCGAguruga
160	UCGAguraga	184	UCGAgurcga	208	UCGAgurgga	232	UCGAguruga
161	GNGAguraga	185	GNGAgurcga	209	GNGAgurgga	233	GNGAguruga
162	NGGAguraga	186	NGGAgurcga	210	NGGAgurgga	234	NGGAguruga
163	AGGAguraga	187	AGGAgurcga	211	AGGAgurgga	235	AGGAguruga
164	CGGAguraga	188	CGGAgurcga	212	CGGAgurgga	236	CGGAguruga
165	GGGAguraga	189	GGGAgurcga	213	GGGAgurgga	237	GGGAguruga
166	UGGAguraga	190	UGGAgurcga	214	UGGAgurgga	238	UGGAguruga
167	UNGAguraga	191	UNGAgurcga	215	UNGAgurgga	239	UNGAguruga
168	NUGAguraga	192	NUGAgurcga	216	NUGAgurgga	240	NUGAguruga
169	AUGAguraga	193	AUGAgurcga	217	AUGAgurgga	241	AUGAguruga
170	CUGAguraga	194	CUGAgurcga	218	CUGAgurgga	242	CUGAguruga
171	GUGAguraga	195	GUGAgurcga	219	GUGAgurgga	243	GUGAguruga
172	UUGAguraga	196	UUGAgurcga	220	UUGAgurgga	244	UUGAguruga

[0018] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
245	ANGAguragc	269	ANGAgurcgc	293	ANGAgurggc	317	ANGAgurugc
246	NAGAguragc	270	NAGAgurcgc	294	NAGAgurggc	318	NAGAgurugc
247	AAGAguragc	271	AAGAgurcgc	295	AAGAgurggc	319	AAGAgurugc
248	CAGAguragc	272	CAGAgurcgc	296	CAGAgurggc	320	CAGAgurugc
249	GAGAguragc	273	GAGAgurcgc	297	GAGAgurggc	321	GAGAgurugc
250	UAGAguragc	274	UAGAgurcgc	298	UAGAgurggc	322	UAGAgurugc
251	CNGAguragc	275	CNGAgurcgc	299	CNGAgurggc	323	CNGAgurugc
252	NCGAguragc	276	NCGAgurcgc	300	NCGAgurggc	324	NCGAgurugc
253	ACGAguragc	277	ACGAgurcgc	301	ACGAgurggc	325	ACGAgurugc
254	CCGAguragc	278	CCGAgurcgc	302	CCGAgurggc	326	CCGAgurugc
255	GCGAguragc	279	GCGAgurcgc	303	GCGAgurggc	327	GCGAgurugc
256	UCGAguragc	280	UCGAgurcgc	304	UCGAgurggc	328	UCGAgurugc
257	GNGAguragc	281	GNGAgurcgc	305	GNGAgurggc	329	GNGAgurugc
258	NGGAguragc	282	NGGAgurcgc	306	NGGAgurggc	330	NGGAgurugc
259	AGGAguragc	283	AGGAgurcgc	307	AGGAgurggc	331	AGGAgurugc
260	CGGAguragc	284	CGGAgurcgc	308	CGGAgurggc	332	CGGAgurugc
261	GGGAguragc	285	GGGAgurcgc	309	GGGAgurggc	333	GGGAgurugc
262	UGGAguragc	286	UGGAgurcgc	310	UGGAgurggc	334	UGGAgurugc
263	UNGAguragc	287	UNGAgurcgc	311	UNGAgurggc	335	UNGAgurugc
264	NUGAguragc	288	NUGAgurcgc	312	NUGAgurggc	336	NUGAgurugc
265	AUGAguragc	289	AUGAgurcgc	313	AUGAgurggc	337	AUGAgurugc
266	CUGAguragc	290	CUGAgurcgc	314	CUGAgurggc	338	CUGAgurugc
267	GUGAguragc	291	GUGAgurcgc	315	GUGAgurggc	339	GUGAgurugc
268	UUGAguragc	292	UUGAgurcgc	316	UUGAgurggc	340	UUGAgurugc

[0019] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
341	ANGAguragg	365	ANGAgurcgg	389	ANGAgurggg	413	ANGAgurugg
342	NAGAguragg	366	NAGAgurcgg	390	NAGAgurggg	414	NAGAgurugg
343	AAGAguragg	367	AAGAgurcgg	391	AAGAgurggg	415	AAGAgurugg
344	CAGAguragg	368	CAGAgurcgg	392	CAGAgurggg	416	CAGAgurugg
345	GAGAguragg	369	GAGAgurcgg	393	GAGAgurggg	417	GAGAgurugg
346	UAGAguragg	370	UAGAgurcgg	394	UAGAgurggg	418	UAGAgurugg
347	CNGAguragg	371	CNGAgurcgg	395	CNGAgurggg	419	CNGAgurugg
348	NCGAguragg	372	NCGAgurcgg	396	NCGAgurggg	420	NCGAgurugg
349	ACGAguragg	373	ACGAgurcgg	397	ACGAgurggg	421	ACGAgurugg
350	CCGAguragg	374	CCGAgurcgg	398	CCGAgurggg	422	CCGAgurugg
351	GCGAguragg	375	GCGAgurcgg	399	GCGAgurggg	423	GCGAgurugg
352	UCGAguragg	376	UCGAgurcgg	400	UCGAgurggg	424	UCGAgurugg
353	GNGAguragg	377	GNGAgurcgg	401	GNGAgurggg	425	GNGAgurugg
354	NGGAguragg	378	NGGAgurcgg	402	NGGAgurggg	426	NGGAgurugg
355	AGGAguragg	379	AGGAgurcgg	403	AGGAgurggg	427	AGGAgurugg
356	CGGAguragg	380	CGGAgurcgg	404	CGGAgurggg	428	CGGAgurugg
357	GGGAguragg	381	GGGAgurcgg	405	GGGAgurggg	429	GGGAgurugg
358	UGGAguragg	382	UGGAgurcgg	406	UGGAgurggg	430	UGGAgurugg
359	UNGAguragg	383	UNGAgurcgg	407	UNGAgurggg	431	UNGAgurugg
360	NUGAguragg	384	NUGAgurcgg	408	NUGAgurggg	432	NUGAgurugg
361	AUGAguragg	385	AUGAgurcgg	409	AUGAgurggg	433	AUGAgurugg
362	CUGAguragg	386	CUGAgurcgg	410	CUGAgurggg	434	CUGAgurugg
363	GUGAguragg	387	GUGAgurcgg	411	GUGAgurggg	435	GUGAgurugg
364	UUGAguragg	388	UUGAgurcgg	412	UUGAgurggg	436	UUGAgurugg

[0020] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
437	ANGAguragu	461	ANGAgurcgu	485	ANGAgurggu	509	ANGAgurugu
438	NAGAguragu	462	NAGAgurcgu	486	NAGAgurggu	510	NAGAgurugu
439	AAGAguragu	463	AAGAgurcgu	487	AAGAgurggu	511	AAGAgurugu
440	CAGAguragu	464	CAGAgurcgu	488	CAGAgurggu	512	CAGAgurugu
441	GAGAguragu	465	GAGAgurcgu	489	GAGAgurggu	513	GAGAgurugu
442	UAGAguragu	466	UAGAgurcgu	490	UAGAgurggu	514	UAGAgurugu
443	CNGAguragu	467	CNGAgurcgu	491	CNGAgurggu	515	CNGAgurugu
444	NCGAguragu	468	NCGAgurcgu	492	NCGAgurggu	516	NCGAgurugu
445	ACGAguragu	469	ACGAgurcgu	493	ACGAgurggu	517	ACGAgurugu
446	CCGAguragu	470	CCGAgurcgu	494	CCGAgurggu	518	CCGAgurugu
447	GCGAguragu	471	GCGAgurcgu	495	GCGAgurggu	519	GCGAgurugu
448	UCGAguragu	472	UCGAgurcgu	496	UCGAgurggu	520	UCGAgurugu
449	GNGAguragu	473	GNGAgurcgu	497	GNGAgurggu	521	GNGAgurugu
450	NGGAguragu	474	NGGAgurcgu	498	NGGAgurggu	522	NGGAgurugu
451	AGGAguragu	475	AGGAgurcgu	499	AGGAgurggu	523	AGGAgurugu
452	CGGAguragu	476	CGGAgurcgu	500	CGGAgurggu	524	CGGAgurugu
453	GGGAguragu	477	GGGAgurcgu	501	GGGAgurggu	525	GGGAgurugu
454	UGGAguragu	478	UGGAgurcgu	502	UGGAgurggu	526	UGGAgurugu
455	UNGAguragu	479	UNGAgurcgu	503	UNGAgurggu	527	UNGAgurugu
456	NUGAguragu	480	NUGAgurcgu	504	NUGAgurggu	528	NUGAgurugu
457	AUGAguragu	481	AUGAgurcgu	505	AUGAgurggu	529	AUGAgurugu
458	CUGAguragu	482	CUGAgurcgu	506	CUGAgurggu	530	CUGAgurugu
459	GUGAguragu	483	GUGAgurcgu	507	GUGAgurggu	531	GUGAgurugu
460	UUGAguragu	484	UUGAgurcgu	508	UUGAgurggu	532	UUGAgurugu

[0021] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
533	ANGAgurnga	557	ANGAgurngc	581	ANGAgurngg	605	ANGAgurngu
534	NAGAgurnga	558	NAGAgurngc	582	NAGAgurngg	606	NAGAgurngu
535	AAGAgurnga	559	AAGAgurngc	583	AAGAgurngg	607	AAGAgurngu
536	CAGAgurnga	560	CAGAgurngc	584	CAGAgurngg	608	CAGAgurngu
537	GAGAgurnga	561	GAGAgurngc	585	GAGAgurngg	609	GAGAgurngu
538	UAGAgurnga	562	UAGAgurngc	586	UAGAgurngg	610	UAGAgurngu
539	CNGAgurnga	563	CNGAgurngc	587	CNGAgurngg	611	CNGAgurngu
540	NCGAgurnga	564	NCGAgurngc	588	NCGAgurngg	612	NCGAgurngu
541	ACGAgurnga	565	ACGAgurngc	589	ACGAgurngg	613	ACGAgurngu
542	CCGAgurnga	566	CCGAgurngc	590	CCGAgurngg	614	CCGAgurngu
543	GCGAgurnga	567	GCGAgurngc	591	GCGAgurngg	615	GCGAgurngu
544	UCGAgurnga	568	UCGAgurngc	592	UCGAgurngg	616	UCGAgurngu
545	GNGAgurnga	569	GNGAgurngc	593	GNGAgurngg	617	GNGAgurngu
546	NGGAgurnga	570	NGGAgurngc	594	NGGAgurngg	618	NGGAgurngu
547	AGGAgurnga	571	AGGAgurngc	595	AGGAgurngg	619	AGGAgurngu
548	CGGAgurnga	572	CGGAgurngc	596	CGGAgurngg	620	CGGAgurngu
549	GGGAgurnga	573	GGGAgurngc	597	GGGAgurngg	621	GGGAgurngu
550	UGGAgurnga	574	UGGAgurngc	598	UGGAgurngg	622	UGGAgurngu
551	UNGAgurnga	575	UNGAgurngc	599	UNGAgurngg	623	UNGAgurngu
552	NUGAgurnga	576	NUGAgurngc	600	NUGAgurngg	624	NUGAgurngu
553	AUGAgurnga	577	AUGAgurngc	601	AUGAgurngg	625	AUGAgurngu
554	CUGAgurnga	578	CUGAgurngc	602	CUGAgurngg	626	CUGAgurngu
555	GUGAgurnga	579	GUGAgurngc	603	GUGAgurngg	627	GUGAgurngu
556	UUGAgurnga	580	UUGAgurngc	604	UUGAgurngg	628	UUGAgurngu

[0022] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
629	ANGAguangn	653	ANGAguaagn	677	ANGAguacgn	701	ANGAguaggn
630	NAGAguangn	654	NAGAguaagn	678	NAGAguacgn	702	NAGAguaggn
631	AAGAguangn	655	AAGAguaagn	679	AAGAguacgn	703	AAGAguaggn
632	CAGAguangn	656	CAGAguaagn	680	CAGAguacgn	704	CAGAguaggn
633	GAGAguangn	657	GAGAguaagn	681	GAGAguacgn	705	GAGAguaggn
634	UAGAguangn	658	UAGAguaagn	682	UAGAguacgn	706	UAGAguaggn
635	CNGAguangn	659	CNGAguaagn	683	CNGAguacgn	707	CNGAguaggn
636	NCGAguangn	660	NCGAguaagn	684	NCGAguacgn	708	NCGAguaggn
637	ACGAguangn	661	ACGAguaagn	685	ACGAguacgn	709	ACGAguaggn
638	CCGAguangn	662	CCGAguaagn	686	CCGAguacgn	710	CCGAguaggn
639	GCGAguangn	663	GCGAguaagn	687	GCGAguacgn	711	GCGAguaggn
640	UCGAguangn	664	UCGAguaagn	688	UCGAguacgn	712	UCGAguaggn
641	GNGAguangn	665	GNGAguaagn	689	GNGAguacgn	713	GNGAguaggn
642	NGGAguangn	666	NGGAguaagn	690	NGGAguacgn	714	NGGAguaggn
643	AGGAguangn	667	AGGAguaagn	691	AGGAguacgn	715	AGGAguaggn
644	CGGAguangn	668	CGGAguaagn	692	CGGAguacgn	716	CGGAguaggn
645	GGGAguangn	669	GGGAguaagn	693	GGGAguacgn	717	GGGAguaggn
646	UGGAguangn	670	UGGAguaagn	694	UGGAguacgn	718	UGGAguaggn
647	UNGAguangn	671	UNGAguaagn	695	UNGAguacgn	719	UNGAguaggn
648	NUGAguangn	672	NUGAguaagn	696	NUGAguacgn	720	NUGAguaggn
649	AUGAguangn	673	AUGAguaagn	697	AUGAguacgn	721	AUGAguaggn
650	CUGAguangn	674	CUGAguaagn	698	CUGAguacgn	722	CUGAguaggn
651	GUGAguangn	675	GUGAguaagn	699	GUGAguacgn	723	GUGAguaggn
652	UUGAguangn	676	UUGAguaagn	700	UUGAguacgn	724	UUGAguaggn

[0023] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
725	ANGAguaugn	749	ANGAguaaaga	773	ANGAguacga	797	ANGAguagga
726	NAGAguaugn	750	NAGAguaaaga	774	NAGAguacga	798	NAGAguagga
727	AAGAguaugn	751	AAGAguaaaga	775	AAGAguacga	799	AAGAguagga
728	CAGAguaugn	752	CAGAguaaaga	776	CAGAguacga	800	CAGAguagga
729	GAGAguaugn	753	GAGAguaaaga	777	GAGAguacga	801	GAGAguagga
730	UAGAguaugn	754	UAGAguaaaga	778	UAGAguacga	802	UAGAguagga
731	CNGAguaugn	755	CNGAguaaaga	779	CNGAguacga	803	CNGAguagga
732	NCGAguaugn	756	NCGAguaaaga	780	NCGAguacga	804	NCGAguagga
733	ACGAguaugn	757	ACGAguaaaga	781	ACGAguacga	805	ACGAguagga
734	CCGAguaugn	758	CCGAguaaaga	782	CCGAguacga	806	CCGAguagga
735	GCGAguaugn	759	GCGAguaaaga	783	GCGAguacga	807	GCGAguagga
736	UCGAguaugn	760	UCGAguaaaga	784	UCGAguacga	808	UCGAguagga
737	GNGAguaugn	761	GNGAguaaaga	785	GNGAguacga	809	GNGAguagga
738	NGGAguaugn	762	NGGAguaaaga	786	NGGAguacga	810	NGGAguagga
739	AGGAguaugn	763	AGGAguaaaga	787	AGGAguacga	811	AGGAguagga
740	CGGAguaugn	764	CGGAguaaaga	788	CGGAguacga	812	CGGAguagga
741	GGGAguaugn	765	GGGAguaaaga	789	GGGAguacga	813	GGGAguagga
742	UGGAguaugn	766	UGGAguaaaga	790	UGGAguacga	814	UGGAguagga
743	UNGAguaugn	767	UNGAguaaaga	791	UNGAguacga	815	UNGAguagga
744	NUGAguaugn	768	NUGAguaaaga	792	NUGAguacga	816	NUGAguagga
745	AUGAguaugn	769	AUGAguaaaga	793	AUGAguacga	817	AUGAguagga
746	CUGAguaugn	770	CUGAguaaaga	794	CUGAguacga	818	CUGAguagga
747	GUGAguaugn	771	GUGAguaaaga	795	GUGAguacga	819	GUGAguagga
748	UUGAguaugn	772	UUGAguaaaga	796	UUGAguacga	820	UUGAguagga

[0024] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
821	ANGAguauga	845	ANGAguaaagc	869	ANGAguacgc	893	ANGAguaggc
822	NAGAguauga	846	NAGAguaaagc	870	NAGAguacgc	894	NAGAguaggc
823	AAGAguauga	847	AAGAguaaagc	871	AAGAguacgc	895	AAGAguaggc
824	CAGAguauga	848	CAGAguaaagc	872	CAGAguacgc	896	CAGAguaggc
825	GAGAguauga	849	GAGAguaaagc	873	GAGAguacgc	897	GAGAguaggc
826	UAGAguauga	850	UAGAguaaagc	874	UAGAguacgc	898	UAGAguaggc
827	CNGAguauga	851	CNGAguaaagc	875	CNGAguacgc	899	CNGAguaggc
828	NCGAguauga	852	NCGAguaaagc	876	NCGAguacgc	900	NCGAguaggc
829	ACGAguauga	853	ACGAguaaagc	877	ACGAguacgc	901	ACGAguaggc
830	CCGAguauga	854	CCGAguaaagc	878	CCGAguacgc	902	CCGAguaggc
831	GCGAguauga	855	GCGAguaaagc	879	GCGAguacgc	903	GCGAguaggc
832	UCGAguauga	856	UCGAguaaagc	880	UCGAguacgc	904	UCGAguaggc
833	GNGAguauga	857	GNGAguaaagc	881	GNGAguacgc	905	GNGAguaggc
834	NGGAguauga	858	NGGAguaaagc	882	NGGAguacgc	906	NGGAguaggc
835	AGGAguauga	859	AGGAguaaagc	883	AGGAguacgc	907	AGGAguaggc
836	CGGAguauga	860	CGGAguaaagc	884	CGGAguacgc	908	CGGAguaggc
837	GGGAguauga	861	GGGAguaaagc	885	GGGAguacgc	909	GGGAguaggc
838	UGGAguauga	862	UGGAguaaagc	886	UGGAguacgc	910	UGGAguaggc
839	UNGAguauga	863	UNGAguaaagc	887	UNGAguacgc	911	UNGAguaggc
840	NUGAguauga	864	NUGAguaaagc	888	NUGAguacgc	912	NUGAguaggc
841	AUGAguauga	865	AUGAguaaagc	889	AUGAguacgc	913	AUGAguaggc
842	CUGAguauga	866	CUGAguaaagc	890	CUGAguacgc	914	CUGAguaggc
843	GUGAguauga	867	GUGAguaaagc	891	GUGAguacgc	915	GUGAguaggc
844	UUGAguauga	868	UUGAguaaagc	892	UUGAguacgc	916	UUGAguaggc

[0025] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
917	ANGAguaucg	941	ANGAguaaagg	965	ANGAguacgg	989	ANGAguagggg
918	NAGAguaucg	942	NAGAguaaagg	966	NAGAguacgg	990	NAGAguagggg
919	AAGAguaucg	943	AAGAguaaagg	967	AAGAguacgg	991	AAGAguagggg
920	CAGAguaucg	944	CAGAguaaagg	968	CAGAguacgg	992	CAGAguagggg
921	GAGAguaucg	945	GAGAguaaagg	969	GAGAguacgg	993	GAGAguagggg
922	UAGAguaucg	946	UAGAguaaagg	970	UAGAguacgg	994	UAGAguagggg
923	CNGAguaucg	947	CNGAguaaagg	971	CNGAguacgg	995	CNGAguagggg
924	NCGAguaucg	948	NCGAguaaagg	972	NCGAguacgg	996	NCGAguagggg
925	ACGAguaucg	949	ACGAguaaagg	973	ACGAguacgg	997	ACGAguagggg
926	CCGAguaucg	950	CCGAguaaagg	974	CCGAguacgg	998	CCGAguagggg
927	GCGAguaucg	951	GCGAguaaagg	975	GCGAguacgg	999	GCGAguagggg
928	UCGAguaucg	952	UCGAguaaagg	976	UCGAguacgg	1000	UCGAguagggg
929	GNGAguaucg	953	GNGAguaaagg	977	GNGAguacgg	1001	GNGAguagggg
930	NGGAguaucg	954	NGGAguaaagg	978	NGGAguacgg	1002	NGGAguagggg
931	AGGAguaucg	955	AGGAguaaagg	979	AGGAguacgg	1003	AGGAguagggg
932	CGGAguaucg	956	CGGAguaaagg	980	CGGAguacgg	1004	CGGAguagggg
933	GGGAguaucg	957	GGGAguaaagg	981	GGGAguacgg	1005	GGGAguagggg
934	UGGAguaucg	958	UGGAguaaagg	982	UGGAguacgg	1006	UGGAguagggg
935	UNGAguaucg	959	UNGAguaaagg	983	UNGAguacgg	1007	UNGAguagggg
936	NUGAguaucg	960	NUGAguaaagg	984	NUGAguacgg	1008	NUGAguagggg
937	AUGAguaucg	961	AUGAguaaagg	985	AUGAguacgg	1009	AUGAguagggg
938	CUGAguaucg	962	CUGAguaaagg	986	CUGAguacgg	1010	CUGAguagggg
939	GUGAguaucg	963	GUGAguaaagg	987	GUGAguacgg	1011	GUGAguagggg
940	UUGAguaucg	964	UUGAguaaagg	988	UUGAguacgg	1012	UUGAguagggg

[0026] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1013	ANGAguauagg	1037	ANGAguaaagu	1061	ANGAguuacgu	1085	ANGAguaggu
1014	NAGAguauagg	1038	NAGAguaaagu	1062	NAGAguuacgu	1086	NAGAguaggu
1015	AAGAguauagg	1039	AAGAguaaagu	1063	AAGAguuacgu	1087	AAGAguaggu
1016	CAGAguauagg	1040	CAGAguaaagu	1064	CAGAguuacgu	1088	CAGAguaggu
1017	GAGAguauagg	1041	GAGAguaaagu	1065	GAGAguuacgu	1089	GAGAguaggu
1018	UAGAguauagg	1042	UAGAguaaagu	1066	UAGAguuacgu	1090	UAGAguaggu
1019	CNGAguauagg	1043	CNGAguaaagu	1067	CNGAguuacgu	1091	CNGAguaggu
1020	NCGAguauagg	1044	NCGAguaaagu	1068	NCGAguuacgu	1092	NCGAguaggu
1021	ACGAguauagg	1045	ACGAguaaagu	1069	ACGAguuacgu	1093	ACGAguaggu
1022	CCGAguauagg	1046	CCGAguaaagu	1070	CCGAguuacgu	1094	CCGAguaggu
1023	GCGAguauagg	1047	GCGAguaaagu	1071	GCGAguuacgu	1095	GCGAguaggu
1024	UCGAguauagg	1048	UCGAguaaagu	1072	UCGAguuacgu	1096	UCGAguaggu
1025	GNGAguauagg	1049	GNGAguaaagu	1073	GNGAguuacgu	1097	GNGAguaggu
1026	NGGAguauagg	1050	NGGAguaaagu	1074	NGGAguuacgu	1098	NGGAguaggu
1027	AGGAguauagg	1051	AGGAguaaagu	1075	AGGAguuacgu	1099	AGGAguaggu
1028	CGGAguauagg	1052	CGGAguaaagu	1076	CGGAguuacgu	1100	CGGAguaggu
1029	GGGAguauagg	1053	GGGAguaaagu	1077	GGGAguuacgu	1101	GGGAguaggu
1030	UGGAguauagg	1054	UGGAguaaagu	1078	UGGAguuacgu	1102	UGGAguaggu
1031	UNGAguauagg	1055	UNGAguaaagu	1079	UNGAguuacgu	1103	UNGAguaggu
1032	NUGAguauagg	1056	NUGAguaaagu	1080	NUGAguuacgu	1104	NUGAguaggu
1033	AUGAguauagg	1057	AUGAguaaagu	1081	AUGAguuacgu	1105	AUGAguaggu
1034	CUGAguauagg	1058	CUGAguaaagu	1082	CUGAguuacgu	1106	CUGAguaggu
1035	GUGAguauagg	1059	GUGAguaaagu	1083	GUGAguuacgu	1107	GUGAguaggu
1036	UUGAguauagg	1060	UUGAguaaagu	1084	UUGAguuacgu	1108	UUGAguaggu

[0027] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1109	ANGAguaugu	1133	ANGAguanga	1157	ANGAguangc	1181	ANGAguanggg
1110	NAGAguaugu	1134	NAGAguanga	1158	NAGAguangc	1182	NAGAguanggg
1111	AAGAguaugu	1135	AAGAguanga	1159	AAGAguangc	1183	AAGAguanggg
1112	CAGAguaugu	1136	CAGAguanga	1160	CAGAguangc	1184	CAGAguanggg
1113	GAGAguaugu	1137	GAGAguanga	1161	GAGAguangc	1185	GAGAguanggg
1114	UAGAguaugu	1138	UAGAguanga	1162	UAGAguangc	1186	UAGAguanggg
1115	CNGAguaugu	1139	CNGAguanga	1163	CNGAguangc	1187	CNGAguanggg
1116	NCGAguaugu	1140	NCGAguanga	1164	NCGAguangc	1188	NCGAguanggg
1117	ACGAguaugu	1141	ACGAguanga	1165	ACGAguangc	1189	ACGAguanggg
1118	CCGAguaugu	1142	CCGAguanga	1166	CCGAguangc	1190	CCGAguanggg
1119	GCGAguaugu	1143	GCGAguanga	1167	GCGAguangc	1191	GCGAguanggg
1120	UCGAguaugu	1144	UCGAguanga	1168	UCGAguangc	1192	UCGAguanggg
1121	GNGAguaugu	1145	GNGAguanga	1169	GNGAguangc	1193	GNGAguanggg
1122	NGGAguaugu	1146	NGGAguanga	1170	NGGAguangc	1194	NGGAguanggg
1123	AGGAguaugu	1147	AGGAguanga	1171	AGGAguangc	1195	AGGAguanggg
1124	CGGAguaugu	1148	CGGAguanga	1172	CGGAguangc	1196	CGGAguanggg
1125	GGGAguaugu	1149	GGGAguanga	1173	GGGAguangc	1197	GGGAguanggg
1126	UGGAguaugu	1150	UGGAguanga	1174	UGGAguangc	1198	UGGAguanggg
1127	UNGAguaugu	1151	UNGAguanga	1175	UNGAguangc	1199	UNGAguanggg
1128	NUGAguaugu	1152	NUGAguanga	1176	NUGAguangc	1200	NUGAguanggg
1129	AUGAguaugu	1153	AUGAguanga	1177	AUGAguangc	1201	AUGAguanggg
1130	CUGAguaugu	1154	CUGAguanga	1178	CUGAguangc	1202	CUGAguanggg
1131	GUGAguaugu	1155	GUGAguanga	1179	GUGAguangc	1203	GUGAguanggg
1132	UUGAguaugu	1156	UUGAguanga	1180	UUGAguangc	1204	UUGAguanggg

[0028] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1205	ANGAguangu	1229	ANGAgugngn	1253	ANGAgugagn	1277	ANGAgugcgn
1206	NAGAguangu	1230	NAGAguangn	1254	NAGAguagn	1278	NAGAguccgn
1207	AAGAguangu	1231	AAGAguangn	1255	AAGAguagn	1279	AAGAguccgn
1208	CAGAguangu	1232	CAGAguangn	1256	CAGAguagn	1280	CAGAguccgn
1209	GAGAguangu	1233	GAGAguangn	1257	GAGAguagn	1281	GAGAguccgn
1210	UAGAguangu	1234	UAGAguangn	1258	UAGAguagn	1282	UAGAguccgn
1211	CNGAguangu	1235	CNGAguangn	1259	CNGAguagn	1283	CNGAguccgn
1212	NCGAguangu	1236	NCGAguangn	1260	NCGAguagn	1284	NCGAguccgn
1213	ACGAguangu	1237	ACGAguangn	1261	ACGAguagn	1285	ACGAguccgn
1214	CCGAguangu	1238	CCGAguangn	1262	CCGAguagn	1286	CCGAguccgn
1215	GCGAguangu	1239	GCGAguangn	1263	GCGAguagn	1287	GCGAguccgn
1216	UCGAguangu	1240	UCGAguangn	1264	UCGAguagn	1288	UCGAguccgn
1217	GNGAguangu	1241	GNGAguangn	1265	GNGAguagn	1289	GNGAguccgn
1218	NGGAguangu	1242	NGGAguangn	1266	NGGAguagn	1290	NGGAguccgn
1219	AGGAguangu	1243	AGGAguangn	1267	AGGAguagn	1291	AGGAguccgn
1220	CGGAguangu	1244	CGGAguangn	1268	CGGAguagn	1292	CGGAguccgn
1221	GGGAguangu	1245	GGGAguangn	1269	GGGAguagn	1293	GGGAguccgn
1222	UGGAguangu	1246	UGGAguangn	1270	UGGAguagn	1294	UGGAguccgn
1223	UNGAguangu	1247	UNGAguangn	1271	UNGAguagn	1295	UNGAguccgn
1224	NUGAguangu	1248	NUGAguangn	1272	NUGAguagn	1296	NUGAguccgn
1225	AUGAguangu	1249	AUGAguangn	1273	AUGAguagn	1297	AUGAguccgn
1226	CUGAguangu	1250	CUGAguangn	1274	CUGAguagn	1298	CUGAguccgn
1227	GUGAguangu	1251	GUGAguangn	1275	GUGAguagn	1299	GUGAguccgn
1228	UUGAguangu	1252	UUGAguangn	1276	UUGAguagn	1300	UUGAguccgn

[0029] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1301	ANGAgugggn	1325	ANGAgugugn	1349	ANGAgugaga	1373	ANGAgugcga
1302	NAGAgugggn	1326	NAGAgugugn	1350	NAGAgugaga	1374	NAGAgugcga
1303	AAGAgugggn	1327	AAGAgugugn	1351	AAGAgugaga	1375	AAGAgugcga
1304	CAGAgugggn	1328	CAGAgugugn	1352	CAGAgugaga	1376	CAGAgugcga
1305	GAGAgugggn	1329	GAGAgugugn	1353	GAGAgugaga	1377	GAGAgugcga
1306	UAGAgugggn	1330	UAGAgugugn	1354	UAGAgugaga	1378	UAGAgugcga
1307	CNGAgugggn	1331	CNGAgugugn	1355	CNGAgugaga	1379	CNGAgugcga
1308	NCGAgugggn	1332	NCGAgugugn	1356	NCGAgugaga	1380	NCGAgugcga
1309	ACGAgugggn	1333	ACGAgugugn	1357	ACGAgugaga	1381	ACGAgugcga
1310	CCGAgugggn	1334	CCGAgugugn	1358	CCGAgugaga	1382	CCGAgugcga
1311	GCGAgugggn	1335	GCGAgugugn	1359	GCGAgugaga	1383	GCGAgugcga
1312	UCGAgugggn	1336	UCGAgugugn	1360	UCGAgugaga	1384	UCGAgugcga
1313	GNGAgugggn	1337	GNGAgugugn	1361	GNGAgugaga	1385	GNGAgugcga
1314	NGGAgugggn	1338	NGGAgugugn	1362	NGGAgugaga	1386	NGGAgugcga
1315	AGGAgugggn	1339	AGGAgugugn	1363	AGGAgugaga	1387	AGGAgugcga
1316	CGGAgugggn	1340	CGGAgugugn	1364	CGGAgugaga	1388	CGGAgugcga
1317	GGGAgugggn	1341	GGGAgugugn	1365	GGGAgugaga	1389	GGGAgugcga
1318	UGGAgugggn	1342	UGGAgugugn	1366	UGGAgugaga	1390	UGGAgugcga
1319	UNGAgugggn	1343	UNGAgugugn	1367	UNGAgugaga	1391	UNGAgugcga
1320	NUGAgugggn	1344	NUGAgugugn	1368	NUGAgugaga	1392	NUGAgugcga
1321	AUGAgugggn	1345	AUGAgugugn	1369	AUGAgugaga	1393	AUGAgugcga
1322	CUGAgugggn	1346	CUGAgugugn	1370	CUGAgugaga	1394	CUGAgugcga
1323	GUGAgugggn	1347	GUGAgugugn	1371	GUGAgugaga	1395	GUGAgugcga
1324	UUGAgugggn	1348	UUGAgugugn	1372	UUGAgugaga	1396	UUGAgugcga

[0030] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1397	ANGAguggga	1421	ANGAguguga	1445	ANGAgugagc	1469	ANGAgugcgc
1398	NAGAguggga	1422	NAGAguguga	1446	NAGAgugagc	1470	NAGAgugcgc
1399	AAGAguggga	1423	AAGAguguga	1447	AAGAgugagc	1471	AAGAgugcgc
1400	CAGAguggga	1424	CAGAguguga	1448	CAGAgugagc	1472	CAGAgugcgc
1401	GAGAguggga	1425	GAGAguguga	1449	GAGAgugagc	1473	GAGAgugcgc
1402	UAGAguggga	1426	UAGAguguga	1450	UAGAgugagc	1474	UAGAgugcgc
1403	CNGAguggga	1427	CNGAguguga	1451	CNGAgugagc	1475	CNGAgugcgc
1404	NCGAguggga	1428	NCGAguguga	1452	NCGAgugagc	1476	NCGAgugcgc
1405	ACGAguggga	1429	ACGAguguga	1453	ACGAgugagc	1477	ACGAgugcgc
1406	CCGAguggga	1430	CCGAguguga	1454	CCGAgugagc	1478	CCGAgugcgc
1407	GCGAguggga	1431	GCGAguguga	1455	GCGAgugagc	1479	GCGAgugcgc
1408	UCGAguggga	1432	UCGAguguga	1456	UCGAgugagc	1480	UCGAgugcgc
1409	GNGAguggga	1433	GNGAguguga	1457	GNGAgugagc	1481	GNGAgugcgc
1410	NGGAguggga	1434	NGGAguguga	1458	NGGAgugagc	1482	NGGAgugcgc
1411	AGGAguggga	1435	AGGAguguga	1459	AGGAgugagc	1483	AGGAgugcgc
1412	CGGAguggga	1436	CGGAguguga	1460	CGGAgugagc	1484	CGGAgugcgc
1413	GGGAguggga	1437	GGGAguguga	1461	GGGAgugagc	1485	GGGAgugcgc
1414	UGGAguggga	1438	UGGAguguga	1462	UGGAgugagc	1486	UGGAgugcgc
1415	UNGAguggga	1439	UNGAguguga	1463	UNGAgugagc	1487	UNGAgugcgc
1416	NUGAguggga	1440	NUGAguguga	1464	NUGAgugagc	1488	NUGAgugcgc
1417	AUGAguggga	1441	AUGAguguga	1465	AUGAgugagc	1489	AUGAgugcgc
1418	CUGAguggga	1442	CUGAguguga	1466	CUGAgugagc	1490	CUGAgugcgc
1419	GUGAguggga	1443	GUGAguguga	1467	GUGAgugagc	1491	GUGAgugcgc
1420	UUGAguggga	1444	UUGAguguga	1468	UUGAgugagc	1492	UUGAgugcgc

[0031] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1493	ANGAgugggc	1517	ANGAgugugc	1541	ANGAgugagg	1565	ANGAgugcgg
1494	NAGAgugggc	1518	NAGAgugugc	1542	NAGAgugagg	1566	NAGAgugcgg
1495	AAGAgugggc	1519	AAGAgugugc	1543	AAGAgugagg	1567	AAGAgugcgg
1496	CAGAgugggc	1520	CAGAgugugc	1544	CAGAgugagg	1568	CAGAgugcgg
1497	GAGAgugggc	1521	GAGAgugugc	1545	GAGAgugagg	1569	GAGAgugcgg
1498	UAGAgugggc	1522	UAGAgugugc	1546	UAGAgugagg	1570	UAGAgugcgg
1499	CNGAgugggc	1523	CNGAgugugc	1547	CNGAgugagg	1571	CNGAgugcgg
1500	NCGAgugggc	1524	NCGAgugugc	1548	NCGAgugagg	1572	NCGAgugcgg
1501	ACGAgugggc	1525	ACGAgugugc	1549	ACGAgugagg	1573	ACGAgugcgg
1502	CCGAgugggc	1526	CCGAgugugc	1550	CCGAgugagg	1574	CCGAgugcgg
1503	GCGAgugggc	1527	GCGAgugugc	1551	GCGAgugagg	1575	GCGAgugcgg
1504	UCGAgugggc	1528	UCGAgugugc	1552	UCGAgugagg	1576	UCGAgugcgg
1505	GNGAgugggc	1529	GNGAgugugc	1553	GNGAgugagg	1577	GNGAgugcgg
1506	NGGAgugggc	1530	NGGAgugugc	1554	NGGAgugagg	1578	NGGAgugcgg
1507	AGGAgugggc	1531	AGGAgugugc	1555	AGGAgugagg	1579	AGGAgugcgg
1508	CGGAgugggc	1532	CGGAgugugc	1556	CGGAgugagg	1580	CGGAgugcgg
1509	GGGAgugggc	1533	GGGAgugugc	1557	GGGAgugagg	1581	GGGAgugcgg
1510	UGGAgugggc	1534	UGGAgugugc	1558	UGGAgugagg	1582	UGGAgugcgg
1511	UNGAgugggc	1535	UNGAgugugc	1559	UNGAgugagg	1583	UNGAgugcgg
1512	NUGAgugggc	1536	NUGAgugugc	1560	NUGAgugagg	1584	NUGAgugcgg
1513	AUGAgugggc	1537	AUGAgugugc	1561	AUGAgugagg	1585	AUGAgugcgg
1514	CUGAgugggc	1538	CUGAgugugc	1562	CUGAgugagg	1586	CUGAgugcgg
1515	GUGAgugggc	1539	GUGAgugugc	1563	GUGAgugagg	1587	GUGAgugcgg
1516	UUGAgugggc	1540	UUGAgugugc	1564	UUGAgugagg	1588	UUGAgugcgg

[0032] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1589	ANGAgugggg	1613	ANGAgugugg	1637	ANGAgugagu	1661	ANGAgugcgu
1590	NAGAgugggg	1614	NAGAgugugg	1638	NAGAgugagu	1662	NAGAgugcgu
1591	AAGAgugggg	1615	AAGAgugugg	1639	AAGAgugagu	1663	AAGAgugcgu
1592	CAGAgugggg	1616	CAGAgugugg	1640	CAGAgugagu	1664	CAGAgugcgu
1593	GAGAgugggg	1617	GAGAgugugg	1641	GAGAgugagu	1665	GAGAgugcgu
1594	UAGAgugggg	1618	UAGAgugugg	1642	UAGAgugagu	1666	UAGAgugcgu
1595	CNGAgugggg	1619	CNGAgugugg	1643	CNGAgugagu	1667	CNGAgugcgu
1596	NCGAgugggg	1620	NCGAgugugg	1644	NCGAgugagu	1668	NCGAgugcgu
1597	ACGAgugggg	1621	ACGAgugugg	1645	ACGAgugagu	1669	ACGAgugcgu
1598	CCGAgugggg	1622	CCGAgugugg	1646	CCGAgugagu	1670	CCGAgugcgu
1599	GCGAgugggg	1623	GCGAgugugg	1647	GCGAgugagu	1671	GCGAgugcgu
1600	UCGAgugggg	1624	UCGAgugugg	1648	UCGAgugagu	1672	UCGAgugcgu
1601	GNGAgugggg	1625	GNGAgugugg	1649	GNGAgugagu	1673	GNGAgugcgu
1602	NGGAgugggg	1626	NGGAgugugg	1650	NGGAgugagu	1674	NGGAgugcgu
1603	AGGAgugggg	1627	AGGAgugugg	1651	AGGAgugagu	1675	AGGAgugcgu
1604	CGGAgugggg	1628	CGGAgugugg	1652	CGGAgugagu	1676	CGGAgugcgu
1605	GGGAgugggg	1629	GGGAgugugg	1653	GGGAgugagu	1677	GGGAgugcgu
1606	UGGAgugggg	1630	UGGAgugugg	1654	UGGAgugagu	1678	UGGAgugcgu
1607	UNGAgugggg	1631	UNGAgugugg	1655	UNGAgugagu	1679	UNGAgugcgu
1608	NUGAgugggg	1632	NUGAgugugg	1656	NUGAgugagu	1680	NUGAgugcgu
1609	AUGAgugggg	1633	AUGAgugugg	1657	AUGAgugagu	1681	AUGAgugcgu
1610	CUGAgugggg	1634	CUGAgugugg	1658	CUGAgugagu	1682	CUGAgugcgu
1611	GUGAgugggg	1635	GUGAgugugg	1659	GUGAgugagu	1683	GUGAgugcgu
1612	UUGAgugggg	1636	UUGAgugugg	1660	UUGAgugagu	1684	UUGAgugcgu

[0033] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1685	ANGAgugggu	1709	ANGAgugugu	1733	ANGAgugnga	1757	ANGAgugngc
1686	NAGAgugggu	1710	NAGAgugugu	1734	NAGAgugnga	1758	NAGAgugngc
1687	AAGAgugggu	1711	AAGAgugugu	1735	AAGAgugnga	1759	AAGAgugngc
1688	CAGAgugggu	1712	CAGAgugugu	1736	CAGAgugnga	1760	CAGAgugngc
1689	GAGAgugggu	1713	GAGAgugugu	1737	GAGAgugnga	1761	GAGAgugngc
1690	UAGAgugggu	1714	UAGAgugugu	1738	UAGAgugnga	1762	UAGAgugngc
1691	CNGAgugggu	1715	CNGAgugugu	1739	CNGAgugnga	1763	CNGAgugngc
1692	NCGAgugggu	1716	NCGAgugugu	1740	NCGAgugnga	1764	NCGAgugngc
1693	ACGAgugggu	1717	ACGAgugugu	1741	ACGAgugnga	1765	ACGAgugngc
1694	CCGAgugggu	1718	CCGAgugugu	1742	CCGAgugnga	1766	CCGAgugngc
1695	GCGAgugggu	1719	GCGAgugugu	1743	GCGAgugnga	1767	GCGAgugngc
1696	UCGAgugggu	1720	UCGAgugugu	1744	UCGAgugnga	1768	UCGAgugngc
1697	GNGAgugggu	1721	GNGAgugugu	1745	GNGAgugnga	1769	GNGAgugngc
1698	NGGAgugggu	1722	NGGAgugugu	1746	NGGAgugnga	1770	NGGAgugngc
1699	AGGAgugggu	1723	AGGAgugugu	1747	AGGAgugnga	1771	AGGAgugngc
1700	CGGAgugggu	1724	CGGAgugugu	1748	CGGAgugnga	1772	CGGAgugngc
1701	GGGAgugggu	1725	GGGAgugugu	1749	GGGAgugnga	1773	GGGAgugngc
1702	UGGAgugggu	1726	UGGAgugugu	1750	UGGAgugnga	1774	UGGAgugngc
1703	UNGAgugggu	1727	UNGAgugugu	1751	UNGAgugnga	1775	UNGAgugngc
1704	NUGAgugggu	1728	NUGAgugugu	1752	NUGAgugnga	1776	NUGAgugngc
1705	AUGAgugggu	1729	AUGAgugugu	1753	AUGAgugnga	1777	AUGAgugngc
1706	CUGAgugggu	1730	CUGAgugugu	1754	CUGAgugnga	1778	CUGAgugngc
1707	GUGAgugggu	1731	GUGAgugugu	1755	GUGAgugnga	1779	GUGAgugngc
1708	UUGAgugggu	1732	UUGAgugugu	1756	UUGAgugnga	1780	UUGAgugngc

[0034] Table 13 (cont). Intronic REMS RNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1781	ANGAgugngg	1793	GNGAgugngg	1805	ANGAgugngu	1817	GNGAgugngu
1782	NAGAgugngg	1794	NGGAgugngg	1806	NAGAgugngu	1818	NGGAgugngu
1783	AAGAgugngg	1795	AGGAgugngg	1807	AAGAgugngu	1819	AGGAgugngu
1784	CAGAgugngg	1796	CGGAgugngg	1808	CAGAgugngu	1820	CGGAgugngu
1785	GAGAgugngg	1797	GGGAgugngg	1809	GAGAgugngu	1821	GGGAgugngu
1786	UAGAgugngg	1798	UGGAgugngg	1810	UAGAgugngu	1822	UGGAgugngu
1787	CNGAgugngg	1799	UNGAgugngg	1811	CNGAgugngu	1823	UNGAgugngu
1788	NCGAgugngg	1800	NUGAgugngg	1812	NCGAgugngu	1824	NUGAgugngu
1789	ACGAgugngg	1801	AUGAgugngg	1813	ACGAgugngu	1825	AUGAgugngu
1790	CCGAgugngg	1802	CUGAgugngg	1814	CCGAgugngu	1826	CUGAgugngu
1791	GCGAgugngg	1803	GUGAgugngg	1815	GCGAgugngu	1827	GUGAgugngu
1792	UCGAgugngg	1804	UUGAgugngg	1816	UCGAgugngu	1828	UUGAgugngu

[0035] In one embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, by way of nonlimiting example, disclosed in Table 1, *infra*, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Table 16 or Tables 2-7, *infra*, wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No.

PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof.

[0036] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Table 1, *infra*, wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene disclosed in Table 7, *infra*, comprising contacting a cell with a compound of Formula (I) or a form thereof. *See* the example section for additional information regarding the genes in Table 7. In certain embodiments, the cell is contacted with the compound of Formula (I) or a form thereof in a cell culture. In other embodiments, the cell is contacted with the compound of Formula (I) or a form thereof in a subject (*e.g.*, a non-human animal subject or a human subject). In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described *infra*. In some embodiments, a compound of Formula (I) is a compound selected from a compound described herein.

[0037] In another aspect, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In one embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, by way of nonlimiting example, disclosed in Table 1, *infra*, the methods comprising administering to a human or non-human subject thereof a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0038] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Tables 2-7, *infra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject thereof a compound of Formula (I)

or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0039] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Table 1, *infra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0040] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene disclosed in Table 7, *infra*, comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. *See* the example section for additional information regarding the genes in Table 7. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described *infra*. In some embodiments, a compound of Formula (I) is a compound selected from a compound described herein.

[0041] In another embodiment, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), and wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer).

[0042] In another embodiment, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: a first branch point, a first 3' splice site, and an iREMS, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), and wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer).

[0043] In another embodiment, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises two exons and an intron, and wherein the RNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1A, the method comprising contacting the RNA transcript with a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer).

[0044] In another embodiment, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises two exons and an intron, and wherein the RNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1B, the method comprising contacting the RNA transcript with a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer).

[0045] In another embodiment, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises three exons and two introns, and wherein the RNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1C, the method comprising contacting the RNA transcript with a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer).

[0046] In a specific embodiment, the RNA transcript is the RNA transcript of a gene described in a table in this disclosure.

[0047] In another embodiment, provided herein is a method for modulating the amount of the product of a gene (such as an RNA transcript or a protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, a nucleotide sequence encoding an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0048] In another embodiment, provided herein is a method for modulating the amount of the product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence of the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, and a nucleotide sequence encoding an iREMS, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the

method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0049] In another embodiment, provided herein is a method for modulating the amount of the product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1A, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0050] In another embodiment, provided herein is a method for modulating the amount of the product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1B, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0051] In another embodiment, provided herein is a method for modulating the amount of the product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1C, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0052] In a specific embodiment, the gene is a gene described in a table in this disclosure.

[0053] In another aspect, provided herein are methods for preventing and/or treating a disease associated with the aberrant expression of a product of a gene (e.g., an mRNA transcript or protein), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In one embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (e.g., an mRNA, RNA transcript or protein), by way of nonlimiting example, disclosed in Table 1, *infra*, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a

form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), disclosed in Tables 2-7, *infra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), by way of nonlimiting example, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), by way of nonlimiting example, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), disclosed in Table 1, *infra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated

with aberrant expression of a product of a gene disclosed in Table 7, *infra*, (e.g., an mRNA, RNA transcript or protein), comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. See the example section for additional information regarding the genes in Table 7. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described *infra*. In some embodiments, a compound of Formula (I) is a compound selected from a compound described herein.

[0054] In another aspect, provided herein are methods for preventing and/or treating a disease in which a change in the level of expression of one, two, three or more RNA isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In one embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (e.g., increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, by way of nonlimiting example, disclosed in Table 1, *infra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0055] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (e.g., increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in Tables 2-7, *infra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical

composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0056] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in Table 1, *infra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene disclosed in Table 1, *infra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a

compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, one, two, three or more RNA isoforms encoded by a gene disclosed in Table 7, *infra*, are decreased following administration of a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. *See* the example section for additional information regarding the genes in Table 7. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described *infra*. In some embodiments, a compound of Formula (I) is a compound selected from a compound described herein.

[0057] In another aspect, provided herein are methods for preventing and/or treating a disease in which a change in the level of expression of one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In one embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, by way of nonlimiting example, disclosed in Table 1, *infra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0058] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in Tables 2-7, *infra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically

acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in Table 1, *infra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent.

[0059] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in Table 1, *infra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically

acceptable carrier, excipient or diluent. In a specific embodiment, one, two, three or more RNA isoforms encoded by a gene, disclosed in Table 7, *infra*, are decreased following administration of a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. See the example section for additional information regarding the genes in Table 7. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described *infra*. In some embodiments, a compound of Formula (I) is a compound selected from a compound described herein.

[0060] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, a nucleotide sequence encoding an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0061] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA

nucleotide sequence of the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, and a nucleotide sequence encoding an iREMS, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0062] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1A, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0063] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1B, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0064] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1C, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof or another splicing inducer) to the subject.

[0065] In a specific embodiment, the gene is a gene described in a table in this disclosure.

[0066] In another aspect, provided herein are artificial gene constructs. In one embodiment, provided herein is an artificial gene construct comprising endogenous DNA is modified to introduce a non-endogenous nucleotide sequence encoding an intron comprising a 3' splice site(s) and a branch point(s) and an intronic REMS. In another embodiment, provided herein is an artificial gene construct comprising DNA encoding exons and one, two or more introns, wherein a nucleotide sequence encoding an intronic REMS, functioning as a 5' splice site in the presence of a compound described herein, which may be upstream of an endogenous nucleotide sequence encoding a branch point and an endogenous nucleotide sequence encoding a 3' splice site, is modified to introduce a nucleotide sequence encoding a non-endogenous branch point and a non-endogenous 3' splice site further upstream from the endogenous intronic REMS. In another embodiment, provided herein is an artificial gene construct comprising DNA encoding exons and one, two or more introns, wherein a nucleotide sequence encoding an intronic REMS 5' splice site, which may be downstream of an endogenous nucleotide sequence encoding a branch point and an endogenous nucleotide sequence encoding a 3' splice site, is modified to introduce a nucleotide sequence encoding a non-endogenous branch point and a non-endogenous 3' splice site further downstream from the endogenous intronic REMS. In another embodiment, provided herein is an artificial gene construct comprising DNA encoding an intronic REMS, comprising nucleotides encoding an intronic REMS having one or more 5' splice site(s), 3' splice site(s) and branch point(s). In certain embodiments, the artificial gene construct encodes a frameshift or premature stop codon or internal insertions or deletions within the open reading frame. In other embodiments, the artificial gene construct encodes a mature mRNA having a functional open reading frame, producing a novel protein which may or may not be functional. In some embodiments, the artificial gene construct encodes a detectable reporter protein. RNA transcripts having a non-functional open reading frame due to the inclusion of a frameshift, premature stop codon or internal insertions or deletions within the open reading frame can be substrates for nonsense-mediated decay and thus have low abundance. Any intronic REMS-mediated alternative splicing modified RNA transcripts may also have altered stability, altered intracellular transport, altered 3' end formation efficiency and altered translation efficiency.

[0067] In a specific embodiment, the nucleotide sequence of the intronic REMS introduced into the nucleotide sequence of the artificial gene construct comprises the sequence NNGAgtrnqn (SEQ ID NO: 3), wherein r is adenine or guanine and n or N is any nucleotide. In

a specific embodiment, in the context of DNA, the nucleotide sequence encoding the intronic REMS comprises a sequence selected from the group consisting of

ANGAgtrngn (SEQ ID NO: 1829), CNGAgtrngn (SEQ ID NO: 1835), GNGAgtrngn (SEQ ID NO: 1841), TNGAgtrngn (SEQ ID NO: 1847), NAGAgtrngn (SEQ ID NO: 1830), NCGAgtrngn (SEQ ID NO: 1836), NGGAgtrngn (SEQ ID NO: 1842), NTGAgtrngn (SEQ ID NO: 1848), AAGAgtrngn (SEQ ID NO: 1831), ACGAgtrngn (SEQ ID NO: 1837), AGGAgtrngn (SEQ ID NO: 1843), ATGAgtrngn (SEQ ID NO: 1849), CAGAgtrngn (SEQ ID NO: 1832), CCGAgtrngn (SEQ ID NO: 1838), CGGAgtrngn (SEQ ID NO: 1844), CTGAgtrngn (SEQ ID NO: 1850), GAGAgtrngn (SEQ ID NO: 1833), GCGAgtrngn (SEQ ID NO: 1839), GGGAgtrngn (SEQ ID NO: 1845), GTGAgtrngn (SEQ ID NO: 1851), TAGAgtrngn (SEQ ID NO: 1834), TCGAgtrngn (SEQ ID NO: 1840), TGGAgtrngn (SEQ ID NO: 1846) and TTGAgtrngn (SEQ ID NO: 1852), wherein r is adenine or guanine and n or N is any nucleotide.

[0068] In a further specific embodiment, in the context of DNA, the nucleotide sequence encoding the intronic REMS comprises a sequence selected from the group consisting of

ANGAgtragt (SEQ ID NO: 2237), CNGAgtragt (SEQ ID NO: 2243), GNGAgtragt (SEQ ID NO: 2249), TNGAgtragt (SEQ ID NO: 2255), NAGAgtragt (SEQ ID NO: 2238), NCGAgtragt (SEQ ID NO: 2244), NGGAgtragt (SEQ ID NO: 2250), NTGAgtragt (SEQ ID NO: 2256), AAGAgtragt (SEQ ID NO: 2239), ACGAgtragt (SEQ ID NO: 2245), AGGAgtragt (SEQ ID NO: 2251), ATGAgtragt (SEQ ID NO: 2257), CAGAgtragt (SEQ ID NO: 2240), CCGAgtragt (SEQ ID NO: 2246), CGGAgtragt (SEQ ID NO: 2252), CTGAgtragt (SEQ ID NO: 2258), GAGAgtragt (SEQ ID NO: 2241), GCGAgtragt (SEQ ID NO: 2247), GGGAgtragt (SEQ ID NO: 2253), GTGAgtragt (SEQ ID NO: 2259), TAGAgtragt (SEQ ID NO: 2242), TCGAgtragt (SEQ ID NO: 2248), TGGAgtragt (SEQ ID NO: 2254) and TTGAgtragt (SEQ ID NO: 2260), wherein r is adenine or guanine and N is any nucleotide. In one or more embodiments provided herein, N is adenine or guanine. In various specific embodiments, the nucleotide sequence encoding the intronic REMS

is a nucleotide sequence encoding a non-endogenous intronic REMS, i.e., a precursor RNA transcript comprising the non-endogenous intronic REMS not naturally found in the DNA sequence of the artificial construct.

[0069] In a specific embodiment, the intronic REMS referred to in a method or artificial gene construct described herein comprises, at the DNA level, a sequence presented in the following table (wherein r is adenine or guanine, and n or N is any nucleotide):

[0070] Table 14. Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1829	ANGAgtrngn	1835	CNGAgtrngn	1841	GNGAgtrngn	1847	TNGAgtrngn
1830	NAGAgtrngn	1836	NCGAgtrngn	1842	NGGAgtrngn	1848	NTGAgtrngn
1831	AAGAgtrngn	1837	ACGAgtrngn	1843	AGGAgtrngn	1849	ATGAgtrngn
1832	CAGAgtrngn	1838	CCGAgtrngn	1844	CGGAgtrngn	1850	CTGAgtrngn
1833	GAGAgtrngn	1839	GCGAgtrngn	1845	GGGAgtrngn	1851	GTGAgtrngn
1834	TAGAgtrngn	1840	TCGAgtrngn	1846	TGGAgtrngn	1852	TTGAgtrngn

[0071] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1853	ANGAgtragn	1877	ANGAgtrcgn	1901	ANGAgtrggn	1925	ANGAgtrtgn
1854	NAGAgtragn	1878	NAGAgtrcgn	1902	NAGAgtrggn	1926	NAGAgtrtgn
1855	AAGAgtragn	1879	AAGAgtrcgn	1903	AAGAgtrggn	1927	AAGAgtrtgn
1856	CAGAgtragn	1880	CAGAgtrcgn	1904	CAGAgtrggn	1928	CAGAgtrtgn
1857	GAGAgtragn	1881	GAGAgtrcgn	1905	GAGAgtrggn	1929	GAGAgtrtgn
1858	TAGAgtragn	1882	TAGAgtrcgn	1906	TAGAgtrggn	1930	TAGAgtrtgn
1859	CNGAgtragn	1883	CNGAgtrcgn	1907	CNGAgtrggn	1931	CNGAgtrtgn
1860	NCGAgtragn	1884	NCGAgtrcgn	1908	NCGAgtrggn	1932	NCGAgtrtgn
1861	ACGAgtragn	1885	ACGAgtrcgn	1909	ACGAgtrggn	1933	ACGAgtrtgn
1862	CCGAgtragn	1886	CCGAgtrcgn	1910	CCGAgtrggn	1934	CCGAgtrtgn
1863	GCGAgtragn	1887	GCGAgtrcgn	1911	GCGAgtrggn	1935	GCGAgtrtgn
1864	TCGAgtragn	1888	TCGAgtrcgn	1912	TCGAgtrggn	1936	TCGAgtrtgn
1865	GNGAgtragn	1889	GNGAgtrcgn	1913	GNGAgtrggn	1937	GNGAgtrtgn
1866	NGGAgtragn	1890	NGGAgtrcgn	1914	NGGAgtrggn	1938	NGGAgtrtgn
1867	AGGAgtragn	1891	AGGAgtrcgn	1915	AGGAgtrggn	1939	AGGAgtrtgn
1868	CGGAgtragn	1892	CGGAgtrcgn	1916	CGGAgtrggn	1940	CGGAgtrtgn
1869	GGGAgtragn	1893	GGGAgtrcgn	1917	GGGAgtrggn	1941	GGGAgtrtgn
1870	TGGAgtragn	1894	TGGAgtrcgn	1918	TGGAgtrggn	1942	TGGAgtrtgn
1871	TNGAgtragn	1895	TNGAgtrcgn	1919	TNGAgtrggn	1943	TNGAgtrtgn
1872	NTGAgtragn	1896	NTGAgtrcgn	1920	NTGAgtrggn	1944	NTGAgtrtgn
1873	ATGAgtragn	1897	ATGAgtrcgn	1921	ATGAgtrggn	1945	ATGAgtrtgn
1874	CTGAgtragn	1898	CTGAgtrcgn	1922	CTGAgtrggn	1946	CTGAgtrtgn
1875	GTGAgtragn	1899	GTGAgtrcgn	1923	GTGAgtrggn	1947	GTGAgtrtgn
1876	TTGAgtragn	1900	TTGAgtrcgn	1924	TTGAgtrggn	1948	TTGAgtrtgn

[0072] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
1949	ANGAgtraga	1973	ANGAgtrcga	1997	ANGAgtrgga	2021	ANGAgtrtga
1950	NAGAgtraga	1974	NAGAgtrcga	1998	NAGAgtrgga	2022	NAGAgtrtga
1951	AAGAgtraga	1975	AAGAgtrcga	1999	AAGAgtrgga	2023	AAGAgtrtga
1952	CAGAgtraga	1976	CAGAgtrcga	2000	CAGAgtrgga	2024	CAGAgtrtga
1953	GAGAgtraga	1977	GAGAgtrcga	2001	GAGAgtrgga	2025	GAGAgtrtga
1954	TAGAgtraga	1978	TAGAgtrcga	2002	TAGAgtrgga	2026	TAGAgtrtga
1955	CNGAgtraga	1979	CNGAgtrcga	2003	CNGAgtrgga	2027	CNGAgtrtga
1956	NCGAgtraga	1980	NCGAgtrcga	2004	NCGAgtrgga	2028	NCGAgtrtga
1957	ACGAgtraga	1981	ACGAgtrcga	2005	ACGAgtrgga	2029	ACGAgtrtga
1958	CCGAgtraga	1982	CCGAgtrcga	2006	CCGAgtrgga	2030	CCGAgtrtga
1959	GCGAgtraga	1983	GCGAgtrcga	2007	GCGAgtrgga	2031	GCGAgtrtga
1960	TCGAgtraga	1984	TCGAgtrcga	2008	TCGAgtrgga	2032	TCGAgtrtga
1961	GNGAgtraga	1985	GNGAgtrcga	2009	GNGAgtrgga	2033	GNGAgtrtga
1962	NGGAgtraga	1986	NGGAgtrcga	2010	NGGAgtrgga	2034	NGGAgtrtga
1963	AGGAgtraga	1987	AGGAgtrcga	2011	AGGAgtrgga	2035	AGGAgtrtga
1964	CGGAgtraga	1988	CGGAgtrcga	2012	CGGAgtrgga	2036	CGGAgtrtga
1965	GGGAgtraga	1989	GGGAgtrcga	2013	GGGAgtrgga	2037	GGGAgtrtga
1966	TGGAgtraga	1990	TGGAgtrcga	2014	TGGAgtrgga	2038	TGGAgtrtga
1967	TNGAgtraga	1991	TNGAgtrcga	2015	TNGAgtrgga	2039	TNGAgtrtga
1968	NTGAgtraga	1992	NTGAgtrcga	2016	NTGAgtrgga	2040	NTGAgtrtga
1969	ATGAgtraga	1993	ATGAgtrcga	2017	ATGAgtrgga	2041	ATGAgtrtga
1970	CTGAgtraga	1994	CTGAgtrcga	2018	CTGAgtrgga	2042	CTGAgtrtga
1971	GTGAgtraga	1995	GTGAgtrcga	2019	GTGAgtrgga	2043	GTGAgtrtga
1972	TTGAgtraga	1996	TTGAgtrcga	2020	TTGAgtrgga	2044	TTGAgtrtga

[0073] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2045	ANGAgtragc	2069	ANGAgtrcgc	2093	ANGAgtrggc	2117	ANGAgtrtgc
2046	NAGAgtragc	2070	NAGAgtrcgc	2094	NAGAgtrggc	2118	NAGAgtrtgc
2047	AAGAgtragc	2071	AAGAgtrcgc	2095	AAGAgtrggc	2119	AAGAgtrtgc
2048	CAGAgtragc	2072	CAGAgtrcgc	2096	CAGAgtrggc	2120	CAGAgtrtgc
2049	GAGAgtragc	2073	GAGAgtrcgc	2097	GAGAgtrggc	2121	GAGAgtrtgc
2050	TAGAgtragc	2074	TAGAgtrcgc	2098	TAGAgtrggc	2122	TAGAgtrtgc
2051	CNGAgtragc	2075	CNGAgtrcgc	2099	CNGAgtrggc	2123	CNGAgtrtgc
2052	NCGAgtragc	2076	NCGAgtrcgc	2100	NCGAgtrggc	2124	NCGAgtrtgc
2053	ACGAgtragc	2077	ACGAgtrcgc	2101	ACGAgtrggc	2125	ACGAgtrtgc
2054	CCGAgtragc	2078	CCGAgtrcgc	2102	CCGAgtrggc	2126	CCGAgtrtgc
2055	GCGAgtragc	2079	GCGAgtrcgc	2103	GCGAgtrggc	2127	GCGAgtrtgc
2056	TCGAgtragc	2080	TCGAgtrcgc	2104	TCGAgtrggc	2128	TCGAgtrtgc
2057	GNGAgtragc	2081	GNGAgtrcgc	2105	GNGAgtrggc	2129	GNGAgtrtgc
2058	NGGAgtragc	2082	NGGAgtrcgc	2106	NGGAgtrggc	2130	NGGAgtrtgc
2059	AGGAgtragc	2083	AGGAgtrcgc	2107	AGGAgtrggc	2131	AGGAgtrtgc
2060	CGGAgtragc	2084	CGGAgtrcgc	2108	CGGAgtrggc	2132	CGGAgtrtgc
2061	GGGAgtragc	2085	GGGAgtrcgc	2109	GGGAgtrggc	2133	GGGAgtrtgc
2062	TGGAgtragc	2086	TGGAgtrcgc	2110	TGGAgtrggc	2134	TGGAgtrtgc
2063	TNGAgtragc	2087	TNGAgtrcgc	2111	TNGAgtrggc	2135	TNGAgtrtgc
2064	NTGAgtragc	2088	NTGAgtrcgc	2112	NTGAgtrggc	2136	NTGAgtrtgc
2065	ATGAgtragc	2089	ATGAgtrcgc	2113	ATGAgtrggc	2137	ATGAgtrtgc
2066	CTGAgtragc	2090	CTGAgtrcgc	2114	CTGAgtrggc	2138	CTGAgtrtgc
2067	GTGAgtragc	2091	GTGAgtrcgc	2115	GTGAgtrggc	2139	GTGAgtrtgc
2068	TTGAgtragc	2092	TTGAgtrcgc	2116	TTGAgtrggc	2140	TTGAgtrtgc

[0074] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2141	ANGAgtragg	2165	ANGAgtrcgg	2189	ANGAgtrggg	2213	ANGAgtrtgg
2142	NAGAgtragg	2166	NAGAgtrcgg	2190	NAGAgtrggg	2214	NAGAgtrtgg
2143	AAGAgtragg	2167	AAGAgtrcgg	2191	AAGAgtrggg	2215	AAGAgtrtgg
2144	CAGAgtragg	2168	CAGAgtrcgg	2192	CAGAgtrggg	2216	CAGAgtrtgg
2145	GAGAgtragg	2169	GAGAgtrcgg	2193	GAGAgtrggg	2217	GAGAgtrtgg
2146	TAGAgtragg	2170	TAGAgtrcgg	2194	TAGAgtrggg	2218	TAGAgtrtgg
2147	CNGAgtragg	2171	CNGAgtrcgg	2195	CNGAgtrggg	2219	CNGAgtrtgg
2148	NCGAgtragg	2172	NCGAgtrcgg	2196	NCGAgtrggg	2220	NCGAgtrtgg
2149	ACGAgtragg	2173	ACGAgtrcgg	2197	ACGAgtrggg	2221	ACGAgtrtgg
2150	CCGAgtragg	2174	CCGAgtrcgg	2198	CCGAgtrggg	2222	CCGAgtrtgg
2151	GCGAgtragg	2175	GCGAgtrcgg	2199	GCGAgtrggg	2223	GCGAgtrtgg
2152	TCGAgtragg	2176	TCGAgtrcgg	2200	TCGAgtrggg	2224	TCGAgtrtgg
2153	GNGAgtragg	2177	GNGAgtrcgg	2201	GNGAgtrggg	2225	GNGAgtrtgg
2154	NGGAgtragg	2178	NGGAgtrcgg	2202	NGGAgtrggg	2226	NGGAgtrtgg
2155	AGGAgtragg	2179	AGGAgtrcgg	2203	AGGAgtrggg	2227	AGGAgtrtgg
2156	CGGAgtragg	2180	CGGAgtrcgg	2204	CGGAgtrggg	2228	CGGAgtrtgg
2157	GGGAgtragg	2181	GGGAgtrcgg	2205	GGGAgtrggg	2229	GGGAgtrtgg
2158	TGGAgtragg	2182	TGGAgtrcgg	2206	TGGAgtrggg	2230	TGGAgtrtgg
2159	TNGAgtragg	2183	TNGAgtrcgg	2207	TNGAgtrggg	2231	TNGAgtrtgg
2160	NTGAgtragg	2184	NTGAgtrcgg	2208	NTGAgtrggg	2232	NTGAgtrtgg
2161	ATGAgtragg	2185	ATGAgtrcgg	2209	ATGAgtrggg	2233	ATGAgtrtgg
2162	CTGAgtragg	2186	CTGAgtrcgg	2210	CTGAgtrggg	2234	CTGAgtrtgg
2163	GTGAgtragg	2187	GTGAgtrcgg	2211	GTGAgtrggg	2235	GTGAgtrtgg
2164	TTGAgtragg	2188	TTGAgtrcgg	2212	TTGAgtrggg	2236	TTGAgtrtgg

[0075] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2237	ANGAgtragt	2261	ANGAgtrcgt	2285	ANGAgtrggt	2309	ANGAgtrtgt
2238	NAGAgtragt	2262	NAGAgtrcgt	2286	NAGAgtrggt	2310	NAGAgtrtgt
2239	AAGAgtragt	2263	AAGAgtrcgt	2287	AAGAgtrggt	2311	AAGAgtrtgt
2240	CAGAgtragt	2264	CAGAgtrcgt	2288	CAGAgtrggt	2312	CAGAgtrtgt
2241	GAGAgtragt	2265	GAGAgtrcgt	2289	GAGAgtrggt	2313	GAGAgtrtgt
2242	TAGAgtragt	2266	TAGAgtrcgt	2290	TAGAgtrggt	2314	TAGAgtrtgt
2243	CNGAgtragt	2267	CNGAgtrcgt	2291	CNGAgtrggt	2315	CNGAgtrtgt
2244	NCGAgtragt	2268	NCGAgtrcgt	2292	NCGAgtrggt	2316	NCGAgtrtgt
2245	ACGAgtragt	2269	ACGAgtrcgt	2293	ACGAgtrggt	2317	ACGAgtrtgt
2246	CCGAgtragt	2270	CCGAgtrcgt	2294	CCGAgtrggt	2318	CCGAgtrtgt
2247	GCGAgtragt	2271	GCGAgtrcgt	2295	GCGAgtrggt	2319	GCGAgtrtgt
2248	TCGAgtragt	2272	TCGAgtrcgt	2296	TCGAgtrggt	2320	TCGAgtrtgt
2249	GNGAgtragt	2273	GNGAgtrcgt	2297	GNGAgtrggt	2321	GNGAgtrtgt
2250	NGGAgtragt	2274	NGGAgtrcgt	2298	NGGAgtrggt	2322	NGGAgtrtgt
2251	AGGAgtragt	2275	AGGAgtrcgt	2299	AGGAgtrggt	2323	AGGAgtrtgt
2252	CGGAgtragt	2276	CGGAgtrcgt	2300	CGGAgtrggt	2324	CGGAgtrtgt
2253	GGGAgtragt	2277	GGGAgtrcgt	2301	GGGAgtrggt	2325	GGGAgtrtgt
2254	TGGAgtragt	2278	TGGAgtrcgt	2302	TGGAgtrggt	2326	TGGAgtrtgt
2255	TNGAgtragt	2279	TNGAgtrcgt	2303	TNGAgtrggt	2327	TNGAgtrtgt
2256	NTGAgtragt	2280	NTGAgtrcgt	2304	NTGAgtrggt	2328	NTGAgtrtgt
2257	ATGAgtragt	2281	ATGAgtrcgt	2305	ATGAgtrggt	2329	ATGAgtrtgt
2258	CTGAgtragt	2282	CTGAgtrcgt	2306	CTGAgtrggt	2330	CTGAgtrtgt
2259	GTGAgtragt	2283	GTGAgtrcgt	2307	GTGAgtrggt	2331	GTGAgtrtgt
2260	TTGAgtragt	2284	TTGAgtrcgt	2308	TTGAgtrggt	2332	TTGAgtrtgt

[0076] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2333	ANGAgtrnga	2357	ANGAgtrngc	2381	ANGAgtrngg	2405	ANGAgtrngt
2334	NAGAgtrnga	2358	NAGAgtrngc	2382	NAGAgtrngg	2406	NAGAgtrngt
2335	AAGAgtrnga	2359	AAGAgtrngc	2383	AAGAgtrngg	2407	AAGAgtrngt
2336	CAGAgtrnga	2360	CAGAgtrngc	2384	CAGAgtrngg	2408	CAGAgtrngt
2337	GAGAgtrnga	2361	GAGAgtrngc	2385	GAGAgtrngg	2409	GAGAgtrngt
2338	TAGAgtrnga	2362	TAGAgtrngc	2386	TAGAgtrngg	2410	TAGAgtrngt
2339	CNGAgtrnga	2363	CNGAgtrngc	2387	CNGAgtrngg	2411	CNGAgtrngt
2340	NCGAgtrnga	2364	NCGAgtrngc	2388	NCGAgtrngg	2412	NCGAgtrngt
2341	ACGAgtrnga	2365	ACGAgtrngc	2389	ACGAgtrngg	2413	ACGAgtrngt
2342	CCGAgtrnga	2366	CCGAgtrngc	2390	CCGAgtrngg	2414	CCGAgtrngt
2343	GCGAgtrnga	2367	GCGAgtrngc	2391	GCGAgtrngg	2415	GCGAgtrngt
2344	TCGAgtrnga	2368	TCGAgtrngc	2392	TCGAgtrngg	2416	TCGAgtrngt
2345	GNGAgtrnga	2369	GNGAgtrngc	2393	GNGAgtrngg	2417	GNGAgtrngt
2346	NGGAgtrnga	2370	NGGAgtrngc	2394	NGGAgtrngg	2418	NGGAgtrngt
2347	AGGAgtrnga	2371	AGGAgtrngc	2395	AGGAgtrngg	2419	AGGAgtrngt
2348	CGGAgtrnga	2372	CGGAgtrngc	2396	CGGAgtrngg	2420	CGGAgtrngt
2349	GGGAgtrnga	2373	GGGAgtrngc	2397	GGGAgtrngg	2421	GGGAgtrngt
2350	TGGAgtrnga	2374	TGGAgtrngc	2398	TGGAgtrngg	2422	TGGAgtrngt
2351	TNGAgtrnga	2375	TNGAgtrngc	2399	TNGAgtrngg	2423	TNGAgtrngt
2352	NTGAgtrnga	2376	NTGAgtrngc	2400	NTGAgtrngg	2424	NTGAgtrngt
2353	ATGAgtrnga	2377	ATGAgtrngc	2401	ATGAgtrngg	2425	ATGAgtrngt
2354	CTGAgtrnga	2378	CTGAgtrngc	2402	CTGAgtrngg	2426	CTGAgtrngt
2355	GTGAgtrnga	2379	GTGAgtrngc	2403	GTGAgtrngg	2427	GTGAgtrngt
2356	TTGAgtrnga	2380	TTGAgtrngc	2404	TTGAgtrngg	2428	TTGAgtrngt

[0077] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2429	ANGAgtangn	2453	ANGAgtagn	2477	ANGAgtacgn	2501	ANGAgtagg
2430	NAGAgtangn	2454	NAGAgtagn	2478	NAGAgtacgn	2502	NAGAgtagg
2431	AAGAgtangn	2455	AAGAgtagn	2479	AAGAgtacgn	2503	AAGAgtagg
2432	CAGAgtangn	2456	CAGAgtagn	2480	CAGAgtacgn	2504	CAGAgtagg
2433	GAGAgtangn	2457	GAGAgtagn	2481	GAGAgtacgn	2505	GAGAgtagg
2434	TAGAgtangn	2458	TAGAgtagn	2482	TAGAgtacgn	2506	TAGAgtagg
2435	CNGAgtangn	2459	CNGAgtagn	2483	CNGAgtacgn	2507	CNGAgtagg
2436	NCGAgtangn	2460	NCGAgtagn	2484	NCGAgtacgn	2508	NCGAgtagg
2437	ACGAgtangn	2461	ACGAgtagn	2485	ACGAgtacgn	2509	ACGAgtagg
2438	CCGAgtangn	2462	CCGAgtagn	2486	CCGAgtacgn	2510	CCGAgtagg
2439	GCGAgtangn	2463	GCGAgtagn	2487	GCGAgtacgn	2511	GCGAgtagg
2440	TCGAgtangn	2464	TCGAgtagn	2488	TCGAgtacgn	2512	TCGAgtagg
2441	GNGAgtangn	2465	GNGAgtagn	2489	GNGAgtacgn	2513	GNGAgtagg
2442	NGGAgtangn	2466	NGGAgtagn	2490	NGGAgtacgn	2514	NGGAgtagg
2443	AGGAgtangn	2467	AGGAgtagn	2491	AGGAgtacgn	2515	AGGAgtagg
2444	CGGAgtangn	2468	CGGAgtagn	2492	CGGAgtacgn	2516	CGGAgtagg
2445	GGGAgtangn	2469	GGGAgtagn	2493	GGGAgtacgn	2517	GGGAgtagg
2446	TGGAgtangn	2470	TGGAgtagn	2494	TGGAgtacgn	2518	TGGAgtagg
2447	TNGAgtangn	2471	TNGAgtagn	2495	TNGAgtacgn	2519	TNGAgtagg
2448	NTGAgtangn	2472	NTGAgtagn	2496	NTGAgtacgn	2520	NTGAgtagg
2449	ATGAgtangn	2473	ATGAgtagn	2497	ATGAgtacgn	2521	ATGAgtagg
2450	CTGAgtangn	2474	CTGAgtagn	2498	CTGAgtacgn	2522	CTGAgtagg
2451	GTGAgtangn	2475	GTGAgtagn	2499	GTGAgtacgn	2523	GTGAgtagg
2452	TTGAgtangn	2476	TTGAgtagn	2500	TTGAgtacgn	2524	TTGAgtagg

[0078] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2525	ANGAgtatgn	2549	ANGAgttaaga	2573	ANGAgttacga	2597	ANGAgttagga
2526	NAGAgtatgn	2550	NAGAgttaaga	2574	NAGAgttacga	2598	NAGAgttagga
2527	AAGAgtatgn	2551	AAGAgttaaga	2575	AAGAgttacga	2599	AAGAgttagga
2528	CAGAgtatgn	2552	CAGAgttaaga	2576	CAGAgttacga	2600	CAGAgttagga
2529	GAGAgtatgn	2553	GAGAgttaaga	2577	GAGAgttacga	2601	GAGAgttagga
2530	TAGAgtatgn	2554	TAGAgttaaga	2578	TAGAgttacga	2602	TAGAgttagga
2531	CNGAgtatgn	2555	CNGAgttaaga	2579	CNGAgttacga	2603	CNGAgttagga
2532	NCGAgtatgn	2556	NCGAgttaaga	2580	NCGAgttacga	2604	NCGAgttagga
2533	ACGAgtatgn	2557	ACGAgttaaga	2581	ACGAgttacga	2605	ACGAgttagga
2534	CCGAgtatgn	2558	CCGAgttaaga	2582	CCGAgttacga	2606	CCGAgttagga
2535	GCGAgtatgn	2559	GCGAgttaaga	2583	GCGAgttacga	2607	GCGAgttagga
2536	TCGAgtatgn	2560	TCGAgttaaga	2584	TCGAgttacga	2608	TCGAgttagga
2537	GNGAgtatgn	2561	GNGAgttaaga	2585	GNGAgttacga	2609	GNGAgttagga
2538	NGGAgtatgn	2562	NGGAgttaaga	2586	NGGAgttacga	2610	NGGAgttagga
2539	AGGAgtatgn	2563	AGGAgttaaga	2587	AGGAgttacga	2611	AGGAgttagga
2540	CGGAgtatgn	2564	CGGAgttaaga	2588	CGGAgttacga	2612	CGGAgttagga
2541	GGGAgtatgn	2565	GGGAgttaaga	2589	GGGAgttacga	2613	GGGAgttagga
2542	TGGAgtatgn	2566	TGGAgttaaga	2590	TGGAgttacga	2614	TGGAgttagga
2543	TNGAgtatgn	2567	TNGAgttaaga	2591	TNGAgttacga	2615	TNGAgttagga
2544	NTGAgtatgn	2568	NTGAgttaaga	2592	NTGAgttacga	2616	NTGAgttagga
2545	ATGAgtatgn	2569	ATGAgttaaga	2593	ATGAgttacga	2617	ATGAgttagga
2546	CTGAgtatgn	2570	CTGAgttaaga	2594	CTGAgttacga	2618	CTGAgttagga
2547	GTGAgtatgn	2571	GTGAgttaaga	2595	GTGAgttacga	2619	GTGAgttagga
2548	TTGAgtatgn	2572	TTGAgttaaga	2596	TTGAgttacga	2620	TTGAgttagga

[0079] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2621	ANGAgtatga	2645	ANGAgtaagc	2669	ANGAgtacgc	2693	ANGAgtaggc
2622	NAGAgtatga	2646	NAGAgtaagc	2670	NAGAgtacgc	2694	NAGAgtaggc
2623	AAGAgtatga	2647	AAGAgtaagc	2671	AAGAgtacgc	2695	AAGAgtaggc
2624	CAGAgtatga	2648	CAGAgtaagc	2672	CAGAgtacgc	2696	CAGAgtaggc
2625	GAGAgtatga	2649	GAGAgtaagc	2673	GAGAgtacgc	2697	GAGAgtaggc
2626	TAGAgtatga	2650	TAGAgtaagc	2674	TAGAgtacgc	2698	TAGAgtaggc
2627	CNGAgtatga	2651	CNGAgtaagc	2675	CNGAgtacgc	2699	CNGAgtaggc
2628	NCGAgtatga	2652	NCGAgtaagc	2676	NCGAgtacgc	2700	NCGAgtaggc
2629	ACGAgtatga	2653	ACGAgtaagc	2677	ACGAgtacgc	2701	ACGAgtaggc
2630	CCGAgtatga	2654	CCGAgtaagc	2678	CCGAgtacgc	2702	CCGAgtaggc
2631	GCGAgtatga	2655	GCGAgtaagc	2679	GCGAgtacgc	2703	GCGAgtaggc
2632	TCGAgtatga	2656	TCGAgtaagc	2680	TCGAgtacgc	2704	TCGAgtaggc
2633	GNGAgtatga	2657	GNGAgtaagc	2681	GNGAgtacgc	2705	GNGAgtaggc
2634	NGGAgtatga	2658	NGGAgtaagc	2682	NGGAgtacgc	2706	NGGAgtaggc
2635	AGGAgtatga	2659	AGGAgtaagc	2683	AGGAgtacgc	2707	AGGAgtaggc
2636	CGGAgtatga	2660	CGGAgtaagc	2684	CGGAgtacgc	2708	CGGAgtaggc
2637	GGGAgtatga	2661	GGGAgtaagc	2685	GGGAgtacgc	2709	GGGAgtaggc
2638	TGGAgtatga	2662	TGGAgtaagc	2686	TGGAgtacgc	2710	TGGAgtaggc
2639	TNGAgtatga	2663	TNGAgtaagc	2687	TNGAgtacgc	2711	TNGAgtaggc
2640	NTGAgtatga	2664	NTGAgtaagc	2688	NTGAgtacgc	2712	NTGAgtaggc
2641	ATGAgtatga	2665	ATGAgtaagc	2689	ATGAgtacgc	2713	ATGAgtaggc
2642	CTGAgtatga	2666	CTGAgtaagc	2690	CTGAgtacgc	2714	CTGAgtaggc
2643	GTGAgtatga	2667	GTGAgtaagc	2691	GTGAgtacgc	2715	GTGAgtaggc
2644	TTGAgtatga	2668	TTGAgtaagc	2692	TTGAgtacgc	2716	TTGAgtaggc

[0080] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2717	ANGAgtatgc	2741	ANGAgtaagg	2765	ANGAgtacgg	2789	ANGAgtaggg
2718	NAGAgtatgc	2742	NAGAgtaagg	2766	NAGAgtacgg	2790	NAGAgtaggg
2719	AAGAgtatgc	2743	AAGAgtaagg	2767	AAGAgtacgg	2791	AAGAgtaggg
2720	CAGAgtatgc	2744	CAGAgtaagg	2768	CAGAgtacgg	2792	CAGAgtaggg
2721	GAGAgtatgc	2745	GAGAgtaagg	2769	GAGAgtacgg	2793	GAGAgtaggg
2722	TAGAgtatgc	2746	TAGAgtaagg	2770	TAGAgtacgg	2794	TAGAgtaggg
2723	CNGAgtatgc	2747	CNGAgtaagg	2771	CNGAgtacgg	2795	CNGAgtaggg
2724	NCGAgtatgc	2748	NCGAgtaagg	2772	NCGAgtacgg	2796	NCGAgtaggg
2725	ACGAgtatgc	2749	ACGAgtaagg	2773	ACGAgtacgg	2797	ACGAgtaggg
2726	CCGAgtatgc	2750	CCGAgtaagg	2774	CCGAgtacgg	2798	CCGAgtaggg
2727	GCGAgtatgc	2751	GCGAgtaagg	2775	GCGAgtacgg	2799	GCGAgtaggg
2728	TCGAgtatgc	2752	TCGAgtaagg	2776	TCGAgtacgg	2800	TCGAgtaggg
2729	GNGAgtatgc	2753	GNGAgtaagg	2777	GNGAgtacgg	2801	GNGAgtaggg
2730	NGGAgtatgc	2754	NGGAgtaagg	2778	NGGAgtacgg	2802	NGGAgtaggg
2731	AGGAgtatgc	2755	AGGAgtaagg	2779	AGGAgtacgg	2803	AGGAgtaggg
2732	CGGAgtatgc	2756	CGGAgtaagg	2780	CGGAgtacgg	2804	CGGAgtaggg
2733	GGGAgtatgc	2757	GGGAgtaagg	2781	GGGAgtacgg	2805	GGGAgtaggg
2734	TGGAgtatgc	2758	TGGAgtaagg	2782	TGGAgtacgg	2806	TGGAgtaggg
2735	TNGAgtatgc	2759	TNGAgtaagg	2783	TNGAgtacgg	2807	TNGAgtaggg
2736	NTGAgtatgc	2760	NTGAgtaagg	2784	NTGAgtacgg	2808	NTGAgtaggg
2737	ATGAgtatgc	2761	ATGAgtaagg	2785	ATGAgtacgg	2809	ATGAgtaggg
2738	CTGAgtatgc	2762	CTGAgtaagg	2786	CTGAgtacgg	2810	CTGAgtaggg
2739	GTGAgtatgc	2763	GTGAgtaagg	2787	GTGAgtacgg	2811	GTGAgtaggg
2740	TTGAgtatgc	2764	TTGAgtaagg	2788	TTGAgtacgg	2812	TTGAgtaggg

[0081] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2813	ANGAgtatgg	2837	ANGAgtaagt	2861	ANGAgtacgt	2885	ANGAgtaggt
2814	NAGAgtatgg	2838	NAGAgtaagt	2862	NAGAgtacgt	2886	NAGAgtaggt
2815	AAGAgtatgg	2839	AAGAgtaagt	2863	AAGAgtacgt	2887	AAGAgtaggt
2816	CAGAgtatgg	2840	CAGAgtaagt	2864	CAGAgtacgt	2888	CAGAgtaggt
2817	GAGAgtatgg	2841	GAGAgtaagt	2865	GAGAgtacgt	2889	GAGAgtaggt
2818	TAGAgtatgg	2842	TAGAgtaagt	2866	TAGAgtacgt	2890	TAGAgtaggt
2819	CNGAgtatgg	2843	CNGAgtaagt	2867	CNGAgtacgt	2891	CNGAgtaggt
2820	NCGAgtatgg	2844	NCGAgtaagt	2868	NCGAgtacgt	2892	NCGAgtaggt
2821	ACGAgtatgg	2845	ACGAgtaagt	2869	ACGAgtacgt	2893	ACGAgtaggt
2822	CCGAgtatgg	2846	CCGAgtaagt	2870	CCGAgtacgt	2894	CCGAgtaggt
2823	GCGAgtatgg	2847	GCGAgtaagt	2871	GCGAgtacgt	2895	GCGAgtaggt
2824	TCGAgtatgg	2848	TCGAgtaagt	2872	TCGAgtacgt	2896	TCGAgtaggt
2825	GNGAgtatgg	2849	GNGAgtaagt	2873	GNGAgtacgt	2897	GNGAgtaggt
2826	NGGAgtatgg	2850	NGGAgtaagt	2874	NGGAgtacgt	2898	NGGAgtaggt
2827	AGGAgtatgg	2851	AGGAgtaagt	2875	AGGAgtacgt	2899	AGGAgtaggt
2828	CGGAgtatgg	2852	CGGAgtaagt	2876	CGGAgtacgt	2900	CGGAgtaggt
2829	GGGAgtatgg	2853	GGGAgtaagt	2877	GGGAgtacgt	2901	GGGAgtaggt
2830	TGGAgtatgg	2854	TGGAgtaagt	2878	TGGAgtacgt	2902	TGGAgtaggt
2831	TNGAgtatgg	2855	TNGAgtaagt	2879	TNGAgtacgt	2903	TNGAgtaggt
2832	NTGAgtatgg	2856	NTGAgtaagt	2880	NTGAgtacgt	2904	NTGAgtaggt
2833	ATGAgtatgg	2857	ATGAgtaagt	2881	ATGAgtacgt	2905	ATGAgtaggt
2834	CTGAgtatgg	2858	CTGAgtaagt	2882	CTGAgtacgt	2906	CTGAgtaggt
2835	GTGAgtatgg	2859	GTGAgtaagt	2883	GTGAgtacgt	2907	GTGAgtaggt
2836	TTGAgtatgg	2860	TTGAgtaagt	2884	TTGAgtacgt	2908	TTGAgtaggt

[0082] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
2909	ANGAgtatgt	2933	ANGAgtanga	2957	ANGAgtangc	2981	ANGAgtangg
2910	NAGAgtatgt	2934	NAGAgtanga	2958	NAGAgtangc	2982	NAGAgtangg
2911	AAGAgtatgt	2935	AAGAgtanga	2959	AAGAgtangc	2983	AAGAgtangg
2912	CAGAgtatgt	2936	CAGAgtanga	2960	CAGAgtangc	2984	CAGAgtangg
2913	GAGAgtatgt	2937	GAGAgtanga	2961	GAGAgtangc	2985	GAGAgtangg
2914	TAGAgtatgt	2938	TAGAgtanga	2962	TAGAgtangc	2986	TAGAgtangg
2915	CNGAgtatgt	2939	CNGAgtanga	2963	CNGAgtangc	2987	CNGAgtangg
2916	NCGAgtatgt	2940	NCGAgtanga	2964	NCGAgtangc	2988	NCGAgtangg
2917	ACGAgtatgt	2941	ACGAgtanga	2965	ACGAgtangc	2989	ACGAgtangg
2918	CCGAgtatgt	2942	CCGAgtanga	2966	CCGAgtangc	2990	CCGAgtangg
2919	GCGAgtatgt	2943	GCGAgtanga	2967	GCGAgtangc	2991	GCGAgtangg
2920	TCGAgtatgt	2944	TCGAgtanga	2968	TCGAgtangc	2992	TCGAgtangg
2921	GNGAgtatgt	2945	GNGAgtanga	2969	GNGAgtangc	2993	GNGAgtangg
2922	NGGAgtatgt	2946	NGGAgtanga	2970	NGGAgtangc	2994	NGGAgtangg
2923	AGGAgtatgt	2947	AGGAgtanga	2971	AGGAgtangc	2995	AGGAgtangg
2924	CGGAgtatgt	2948	CGGAgtanga	2972	CGGAgtangc	2996	CGGAgtangg
2925	GGGAgtatgt	2949	GGGAgtanga	2973	GGGAgtangc	2997	GGGAgtangg
2926	TGGAgtatgt	2950	TGGAgtanga	2974	TGGAgtangc	2998	TGGAgtangg
2927	TNGAgtatgt	2951	TNGAgtanga	2975	TNGAgtangc	2999	TNGAgtangg
2928	NTGAgtatgt	2952	NTGAgtanga	2976	NTGAgtangc	3000	NTGAgtangg
2929	ATGAgtatgt	2953	ATGAgtanga	2977	ATGAgtangc	3001	ATGAgtangg
2930	CTGAgtatgt	2954	CTGAgtanga	2978	CTGAgtangc	3002	CTGAgtangg
2931	GTGAgtatgt	2955	GTGAgtanga	2979	GTGAgtangc	3003	GTGAgtangg
2932	TTGAgtatgt	2956	TTGAgtanga	2980	TTGAgtangc	3004	TTGAgtangg

[0083] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3005	ANGAgtangt	3029	ANGAgtgngn	3053	ANGAgtgagn	3077	ANGAgtgcgn
3006	NAGAgtangt	3030	NAGAgtgngn	3054	NAGAgtgagn	3078	NAGAgtgcgn
3007	AAGAgtangt	3031	AAGAgtgngn	3055	AAGAgtgagn	3079	AAGAgtgcgn
3008	CAGAgtangt	3032	CAGAgtgngn	3056	CAGAgtgagn	3080	CAGAgtgcgn
3009	GAGAgtangt	3033	GAGAgtgngn	3057	GAGAgtgagn	3081	GAGAgtgcgn
3010	TAGAgtangt	3034	TAGAgtgngn	3058	TAGAgtgagn	3082	TAGAgtgcgn
3011	CNGAgtangt	3035	CNGAgtgngn	3059	CNGAgtgagn	3083	CNGAgtgcgn
3012	NCGAgtangt	3036	NCGAgtgngn	3060	NCGAgtgagn	3084	NCGAgtgcgn
3013	ACGAgtangt	3037	ACGAgtgngn	3061	ACGAgtgagn	3085	ACGAgtgcgn
3014	CCGAgtangt	3038	CCGAgtgngn	3062	CCGAgtgagn	3086	CCGAgtgcgn
3015	GCGAgtangt	3039	GCGAgtgngn	3063	GCGAgtgagn	3087	GCGAgtgcgn
3016	TCGAgtangt	3040	TCGAgtgngn	3064	TCGAgtgagn	3088	TCGAgtgcgn
3017	GNGAgtangt	3041	GNGAgtgngn	3065	GNGAgtgagn	3089	GNGAgtgcgn
3018	NGGAgtangt	3042	NGGAgtgngn	3066	NGGAgtgagn	3090	NGGAgtgcgn
3019	AGGAgtangt	3043	AGGAgtgngn	3067	AGGAgtgagn	3091	AGGAgtgcgn
3020	CGGAgtangt	3044	CGGAgtgngn	3068	CGGAgtgagn	3092	CGGAgtgcgn
3021	GGGAgtangt	3045	GGGAgtgngn	3069	GGGAgtgagn	3093	GGGAgtgcgn
3022	TGGAgtangt	3046	TGGAgtgngn	3070	TGGAgtgagn	3094	TGGAgtgcgn
3023	TNGAgtangt	3047	TNGAgtgngn	3071	TNGAgtgagn	3095	TNGAgtgcgn
3024	NTGAgtangt	3048	NTGAgtgngn	3072	NTGAgtgagn	3096	NTGAgtgcgn
3025	ATGAgtangt	3049	ATGAgtgngn	3073	ATGAgtgagn	3097	ATGAgtgcgn
3026	CTGAgtangt	3050	CTGAgtgngn	3074	CTGAgtgagn	3098	CTGAgtgcgn
3027	GTGAgtangt	3051	GTGAgtgngn	3075	GTGAgtgagn	3099	GTGAgtgcgn
3028	TTGAgtangt	3052	TTGAgtgngn	3076	TTGAgtgagn	3100	TTGAgtgcgn

[0084] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3101	ANGAgtgggn	3125	ANGAgtgtgn	3149	ANGAgtgaga	3173	ANGAgtgcga
3102	NAGAgtgggn	3126	NAGAgtgtgn	3150	NAGAgtgaga	3174	NAGAgtgcga
3103	AAGAgtgggn	3127	AAGAgtgtgn	3151	AAGAgtgaga	3175	AAGAgtgcga
3104	CAGAgtgggn	3128	CAGAgtgtgn	3152	CAGAgtgaga	3176	CAGAgtgcga
3105	GAGAgtgggn	3129	GAGAgtgtgn	3153	GAGAgtgaga	3177	GAGAgtgcga
3106	TAGAgtgggn	3130	TAGAgtgtgn	3154	TAGAgtgaga	3178	TAGAgtgcga
3107	CNGAgtgggn	3131	CNGAgtgtgn	3155	CNGAgtgaga	3179	CNGAgtgcga
3108	NCGAgtgggn	3132	NCGAgtgtgn	3156	NCGAgtgaga	3180	NCGAgtgcga
3109	ACGAgtgggn	3133	ACGAgtgtgn	3157	ACGAgtgaga	3181	ACGAgtgcga
3110	CCGAgtgggn	3134	CCGAgtgtgn	3158	CCGAgtgaga	3182	CCGAgtgcga
3111	GCGAgtgggn	3135	GCGAgtgtgn	3159	GCGAgtgaga	3183	GCGAgtgcga
3112	TCGAgtgggn	3136	TCGAgtgtgn	3160	TCGAgtgaga	3184	TCGAgtgcga
3113	GNGAgtgggn	3137	GNGAgtgtgn	3161	GNGAgtgaga	3185	GNGAgtgcga
3114	NGGAgtgggn	3138	NGGAgtgtgn	3162	NGGAgtgaga	3186	NGGAgtgcga
3115	AGGAgtgggn	3139	AGGAgtgtgn	3163	AGGAgtgaga	3187	AGGAgtgcga
3116	CGGAgtgggn	3140	CGGAgtgtgn	3164	CGGAgtgaga	3188	CGGAgtgcga
3117	GGGAgtgggn	3141	GGGAgtgtgn	3165	GGGAgtgaga	3189	GGGAgtgcga
3118	TGGAgtgggn	3142	TGGAgtgtgn	3166	TGGAgtgaga	3190	TGGAgtgcga
3119	TNGAgtgggn	3143	TNGAgtgtgn	3167	TNGAgtgaga	3191	TNGAgtgcga
3120	NTGAgtgggn	3144	NTGAgtgtgn	3168	NTGAgtgaga	3192	NTGAgtgcga
3121	ATGAgtgggn	3145	ATGAgtgtgn	3169	ATGAgtgaga	3193	ATGAgtgcga
3122	CTGAgtgggn	3146	CTGAgtgtgn	3170	CTGAgtgaga	3194	CTGAgtgcga
3123	GTGAgtgggn	3147	GTGAgtgtgn	3171	GTGAgtgaga	3195	GTGAgtgcga
3124	TTGAgtgggn	3148	TTGAgtgtgn	3172	TTGAgtgaga	3196	TTGAgtgcga

[0085] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3197	ANGAgtggga	3221	ANGAgtgtga	3245	ANGAgtgagc	3269	ANGAgtgcgc
3198	NAGAgtggga	3222	NAGAgtgtga	3246	NAGAgtgagc	3270	NAGAgtgcgc
3199	AAGAgtggga	3223	AAGAgtgtga	3247	AAGAgtgagc	3271	AAGAgtgcgc
3200	CAGAgtggga	3224	CAGAgtgtga	3248	CAGAgtgagc	3272	CAGAgtgcgc
3201	GAGAgtggga	3225	GAGAgtgtga	3249	GAGAgtgagc	3273	GAGAgtgcgc
3202	TAGAgtggga	3226	TAGAgtgtga	3250	TAGAgtgagc	3274	TAGAgtgcgc
3203	CNGAgtggga	3227	CNGAgtgtga	3251	CNGAgtgagc	3275	CNGAgtgcgc
3204	NCGAgtggga	3228	NCGAgtgtga	3252	NCGAgtgagc	3276	NCGAgtgcgc
3205	ACGAgtggga	3229	ACGAgtgtga	3253	ACGAgtgagc	3277	ACGAgtgcgc
3206	CCGAgtggga	3230	CCGAgtgtga	3254	CCGAgtgagc	3278	CCGAgtgcgc
3207	GCGAgtggga	3231	GCGAgtgtga	3255	GCGAgtgagc	3279	GCGAgtgcgc
3208	TCGAgtggga	3232	TCGAgtgtga	3256	TCGAgtgagc	3280	TCGAgtgcgc
3209	GNGAgtggga	3233	GNGAgtgtga	3257	GNGAgtgagc	3281	GNGAgtgcgc
3210	NGGAgtggga	3234	NGGAgtgtga	3258	NGGAgtgagc	3282	NGGAgtgcgc
3211	AGGAgtggga	3235	AGGAgtgtga	3259	AGGAgtgagc	3283	AGGAgtgcgc
3212	CGGAgtggga	3236	CGGAgtgtga	3260	CGGAgtgagc	3284	CGGAgtgcgc
3213	GGGAgtggga	3237	GGGAgtgtga	3261	GGGAgtgagc	3285	GGGAgtgcgc
3214	TGGAgtggga	3238	TGGAgtgtga	3262	TGGAgtgagc	3286	TGGAgtgcgc
3215	TNGAgtggga	3239	TNGAgtgtga	3263	TNGAgtgagc	3287	TNGAgtgcgc
3216	NTGAgtggga	3240	NTGAgtgtga	3264	NTGAgtgagc	3288	NTGAgtgcgc
3217	ATGAgtggga	3241	ATGAgtgtga	3265	ATGAgtgagc	3289	ATGAgtgcgc
3218	CTGAgtggga	3242	CTGAgtgtga	3266	CTGAgtgagc	3290	CTGAgtgcgc
3219	GTGAgtggga	3243	GTGAgtgtga	3267	GTGAgtgagc	3291	GTGAgtgcgc
3220	TTGAgtggga	3244	TTGAgtgtga	3268	TTGAgtgagc	3292	TTGAgtgcgc

[0086] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3293	ANGAgtgggc	3317	ANGAgtgtgc	3341	ANGAgtgagg	3365	ANGAgtgcgg
3294	NAGAgtgggc	3318	NAGAgtgtgc	3342	NAGAgtgagg	3366	NAGAgtgcgg
3295	AAGAgtgggc	3319	AAGAgtgtgc	3343	AAGAgtgagg	3367	AAGAgtgcgg
3296	CAGAgtgggc	3320	CAGAgtgtgc	3344	CAGAgtgagg	3368	CAGAgtgcgg
3297	GAGAgtgggc	3321	GAGAgtgtgc	3345	GAGAgtgagg	3369	GAGAgtgcgg
3298	TAGAgtgggc	3322	TAGAgtgtgc	3346	TAGAgtgagg	3370	TAGAgtgcgg
3299	CNGAgtgggc	3323	CNGAgtgtgc	3347	CNGAgtgagg	3371	CNGAgtgcgg
3300	NCGAgtgggc	3324	NCGAgtgtgc	3348	NCGAgtgagg	3372	NCGAgtgcgg
3301	ACGAgtgggc	3325	ACGAgtgtgc	3349	ACGAgtgagg	3373	ACGAgtgcgg
3302	CCGAgtgggc	3326	CCGAgtgtgc	3350	CCGAgtgagg	3374	CCGAgtgcgg
3303	GCGAgtgggc	3327	GCGAgtgtgc	3351	GCGAgtgagg	3375	GCGAgtgcgg
3304	TCGAgtgggc	3328	TCGAgtgtgc	3352	TCGAgtgagg	3376	TCGAgtgcgg
3305	GNGAgtgggc	3329	GNGAgtgtgc	3353	GNGAgtgagg	3377	GNGAgtgcgg
3306	NGGAgtgggc	3330	NGGAgtgtgc	3354	NGGAgtgagg	3378	NGGAgtgcgg
3307	AGGAgtgggc	3331	AGGAgtgtgc	3355	AGGAgtgagg	3379	AGGAgtgcgg
3308	CGGAgtgggc	3332	CGGAgtgtgc	3356	CGGAgtgagg	3380	CGGAgtgcgg
3309	GGGAgtgggc	3333	GGGAgtgtgc	3357	GGGAgtgagg	3381	GGGAgtgcgg
3310	TGGAgtgggc	3334	TGGAgtgtgc	3358	TGGAgtgagg	3382	TGGAgtgcgg
3311	TNGAgtgggc	3335	TNGAgtgtgc	3359	TNGAgtgagg	3383	TNGAgtgcgg
3312	NTGAgtgggc	3336	NTGAgtgtgc	3360	NTGAgtgagg	3384	NTGAgtgcgg
3313	ATGAgtgggc	3337	ATGAgtgtgc	3361	ATGAgtgagg	3385	ATGAgtgcgg
3314	CTGAgtgggc	3338	CTGAgtgtgc	3362	CTGAgtgagg	3386	CTGAgtgcgg
3315	GTGAgtgggc	3339	GTGAgtgtgc	3363	GTGAgtgagg	3387	GTGAgtgcgg
3316	TTGAgtgggc	3340	TTGAgtgtgc	3364	TTGAgtgagg	3388	TTGAgtgcgg

[0087] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3389	ANGAgtgggg	3413	ANGAgtgtgg	3437	ANGAgtgagt	3461	ANGAgtgcgt
3390	NAGAgtgggg	3414	NAGAgtgtgg	3438	NAGAgtgagt	3462	NAGAgtgcgt
3391	AAGAgtgggg	3415	AAGAgtgtgg	3439	AAGAgtgagt	3463	AAGAgtgcgt
3392	CAGAgtgggg	3416	CAGAgtgtgg	3440	CAGAgtgagt	3464	CAGAgtgcgt
3393	GAGAgtgggg	3417	GAGAgtgtgg	3441	GAGAgtgagt	3465	GAGAgtgcgt
3394	TAGAgtgggg	3418	TAGAgtgtgg	3442	TAGAgtgagt	3466	TAGAgtgcgt
3395	CNGAgtgggg	3419	CNGAgtgtgg	3443	CNGAgtgagt	3467	CNGAgtgcgt
3396	NCGAgtgggg	3420	NCGAgtgtgg	3444	NCGAgtgagt	3468	NCGAgtgcgt
3397	ACGAgtgggg	3421	ACGAgtgtgg	3445	ACGAgtgagt	3469	ACGAgtgcgt
3398	CCGAgtgggg	3422	CCGAgtgtgg	3446	CCGAgtgagt	3470	CCGAgtgcgt
3399	GCGAgtgggg	3423	GCGAgtgtgg	3447	GCGAgtgagt	3471	GCGAgtgcgt
3400	TCGAgtgggg	3424	TCGAgtgtgg	3448	TCGAgtgagt	3472	TCGAgtgcgt
3401	GNGAgtgggg	3425	GNGAgtgtgg	3449	GNGAgtgagt	3473	GNGAgtgcgt
3402	NGGAgtgggg	3426	NGGAgtgtgg	3450	NGGAgtgagt	3474	NGGAgtgcgt
3403	AGGAgtgggg	3427	AGGAgtgtgg	3451	AGGAgtgagt	3475	AGGAgtgcgt
3404	CGGAgtgggg	3428	CGGAgtgtgg	3452	CGGAgtgagt	3476	CGGAgtgcgt
3405	GGGAgtgggg	3429	GGGAgtgtgg	3453	GGGAgtgagt	3477	GGGAgtgcgt
3406	TGGAgtgggg	3430	TGGAgtgtgg	3454	TGGAgtgagt	3478	TGGAgtgcgt
3407	TNGAgtgggg	3431	TNGAgtgtgg	3455	TNGAgtgagt	3479	TNGAgtgcgt
3408	NTGAgtgggg	3432	NTGAgtgtgg	3456	NTGAgtgagt	3480	NTGAgtgcgt
3409	ATGAgtgggg	3433	ATGAgtgtgg	3457	ATGAgtgagt	3481	ATGAgtgcgt
3410	CTGAgtgggg	3434	CTGAgtgtgg	3458	CTGAgtgagt	3482	CTGAgtgcgt
3411	GTGAgtgggg	3435	GTGAgtgtgg	3459	GTGAgtgagt	3483	GTGAgtgcgt
3412	TTGAgtgggg	3436	TTGAgtgtgg	3460	TTGAgtgagt	3484	TTGAgtgcgt

[0088] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3485	ANGAgtgggt	3509	ANGAgtgtgt	3533	ANGAgtgnga	3557	ANGAgtgngc
3486	NAGAgtgggt	3510	NAGAgtgtgt	3534	NAGAgtgnga	3558	NAGAgtgngc
3487	AAGAgtgggt	3511	AAGAgtgtgt	3535	AAGAgtgnga	3559	AAGAgtgngc
3488	CAGAgtgggt	3512	CAGAgtgtgt	3536	CAGAgtgnga	3560	CAGAgtgngc
3489	GAGAgtgggt	3513	GAGAgtgtgt	3537	GAGAgtgnga	3561	GAGAgtgngc
3490	TAGAgtgggt	3514	TAGAgtgtgt	3538	TAGAgtgnga	3562	TAGAgtgngc
3491	CNGAgtgggt	3515	CNGAgtgtgt	3539	CNGAgtgnga	3563	CNGAgtgngc
3492	NCGAgtgggt	3516	NCGAgtgtgt	3540	NCGAgtgnga	3564	NCGAgtgngc
3493	ACGAgtgggt	3517	ACGAgtgtgt	3541	ACGAgtgnga	3565	ACGAgtgngc
3494	CCGAgtgggt	3518	CCGAgtgtgt	3542	CCGAgtgnga	3566	CCGAgtgngc
3495	GCGAgtgggt	3519	GCGAgtgtgt	3543	GCGAgtgnga	3567	GCGAgtgngc
3496	TCGAgtgggt	3520	TCGAgtgtgt	3544	TCGAgtgnga	3568	TCGAgtgngc
3497	GNGAgtgggt	3521	GNGAgtgtgt	3545	GNGAgtgnga	3569	GNGAgtgngc
3498	NGGAgtgggt	3522	NGGAgtgtgt	3546	NGGAgtgnga	3570	NGGAgtgngc
3499	AGGAgtgggt	3523	AGGAgtgtgt	3547	AGGAgtgnga	3571	AGGAgtgngc
3500	CGGAgtgggt	3524	CGGAgtgtgt	3548	CGGAgtgnga	3572	CGGAgtgngc
3501	GGGAgtgggt	3525	GGGAgtgtgt	3549	GGGAgtgnga	3573	GGGAgtgngc
3502	TGGAgtgggt	3526	TGGAgtgtgt	3550	TGGAgtgnga	3574	TGGAgtgngc
3503	TNGAgtgggt	3527	TNGAgtgtgt	3551	TNGAgtgnga	3575	TNGAgtgngc
3504	NTGAgtgggt	3528	NTGAgtgtgt	3552	NTGAgtgnga	3576	NTGAgtgngc
3505	ATGAgtgggt	3529	ATGAgtgtgt	3553	ATGAgtgnga	3577	ATGAgtgngc
3506	CTGAgtgggt	3530	CTGAgtgtgt	3554	CTGAgtgnga	3578	CTGAgtgngc
3507	GTGAgtgggt	3531	GTGAgtgtgt	3555	GTGAgtgnga	3579	GTGAgtgngc
3508	TTGAgtgggt	3532	TTGAgtgtgt	3556	TTGAgtgnga	3580	TTGAgtgngc

[0089] Table 14 (cont). Intronic REMS DNA sequence (wherein r is adenine or guanine, and n or N is any nucleotide)

SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence	SEQ ID NO.	Sequence
3581	ANGAgtgngg	3593	GNGAgtgngg	3605	ANGAgtgngt	3617	GNGAgtgngt
3582	NAGAgtgngg	3594	NGGAgtgngg	3606	NAGAgtgngt	3618	NGGAgtgngt
3583	AAGAgtgngg	3595	AGGAgtgngg	3607	AAGAgtgngt	3619	AGGAgtgngt
3584	CAGAgtgngg	3596	CGGAgtgngg	3608	CAGAgtgngt	3620	CGGAgtgngt
3585	GAGAgtgngg	3597	GGGAgtgngg	3609	GAGAgtgngt	3621	GGGAgtgngt
3586	TAGAgtgngg	3598	TGGAgtgngg	3610	TAGAgtgngt	3622	TGGAgtgngt
3587	CNGAgtgngg	3599	TNGAgtgngg	3611	CNGAgtgngt	3623	TNGAgtgngt
3588	NCGAgtgngg	3600	NTGAgtgngg	3612	NCGAgtgngt	3624	NTGAgtgngt
3589	ACGAgtgngg	3601	ATGAgtgngg	3613	ACGAgtgngt	3625	ATGAgtgngt
3590	CCGAgtgngg	3602	CTGAgtgngg	3614	CCGAgtgngt	3626	CTGAgtgngt
3591	GCGAgtgngg	3603	GTGAgtgngg	3615	GCGAgtgngt	3627	GTGAgtgngt
3592	TCGAgtgngg	3604	TTGAgtgngg	3616	TCGAgtgngt	3628	TTGAgtgngt

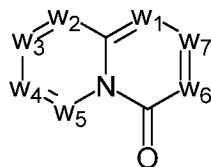
[0090] In certain embodiments, provided herein is a vector comprising the artificial gene construct described herein. In some embodiments, provided herein is a cell comprising an artificial gene construct described herein or a vector comprising an artificial gene construct described herein.

[0091] In another aspect, provided herein is a method of modulating the amount and type of a protein produced by a cell containing an artificial gene construct described herein. In one embodiment, provided herein is a method of modulating the amount and type of a protein produced by a cell containing an artificial gene construct described herein, the method comprising contacting the cell with a compound of Formula (I) or a form thereof. In certain embodiments, the artificial gene construct encodes a therapeutic protein. In certain embodiments, the artificial gene construct encodes a non-functional protein. In some embodiments producing a therapeutic protein, the artificial gene construct may also encode a detectable reporter protein. In some embodiments producing a non-functional protein, the artificial gene construct may also encode a detectable reporter protein.

[0092] In another aspect, provided herein is a method of modulating the amount of a protein produced by a subject, wherein the subject is or was administered an artificial gene construct described herein. In one embodiment, provided herein is method of regulating the amount of a protein produced by a subject, the method comprising: (a) administering an artificial gene

construct or a vector comprising the artificial gene construct described herein to the subject; and (b) administering a compound of Formula (I) or a form thereof to the subject. In another embodiment, provided herein is a method of regulating the amount of a protein produced by a subject, the method comprising administering a compound of Formula (I) or a form thereof to a subject carrying a gene containing a nucleotide sequence encoding an intronic REMS. In another embodiment, provided herein is a method of regulating the amount of a protein produced by a subject, the method comprising administering a compound of Formula (I) to the subject, wherein the subject was previously administered an artificial gene construct described herein. In certain embodiments, the artificial gene construct may encode a therapeutic or a non-functional protein. In some embodiments, the artificial gene construct encodes a detectable reporter protein. In certain embodiments, the subject is a non-human. In specific embodiments, the subject is a human.

[0093] In another aspect, provided herein is a method for modulating the amount of an RNA transcript produced from precursor RNA containing an endogenous or non-endogenous intronic recognition element for splicing modifier (REMS), the method comprising contacting the precursor RNA with a compound of Formula (I) or a form thereof, wherein the endogenous or non-endogenous intronic REMS comprises the sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein Formula (I) is



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w_3 is C-R₂, then w_6 is C-R₁ and w_4 and w_7 are independently C-R_a or N; or,
 when w_4 is C-R₁, then w_7 is C-R₂ and w_3 is C-R_a or N and w_6 is C-R_c or N; or,
 when w_4 is C-R₂, then w_7 is C-R₁ and w_3 is C-R_a or N and w_6 is C-R_c or N; and,
 wherein any one, two or three of w_1 , w_2 , w_3 , w_4 , w_5 , w_6 and w_7 may optionally be N;
 R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,
 (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,
 C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,
 (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,
 C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,

(heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
(heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
(heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
(heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
(aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
(aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
(heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
(heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
(heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

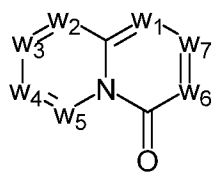
R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[0094] In another aspect, provided herein is a method for modulating the amount of an RNA transcript produced from precursor RNA containing an endogenous or non-endogenous intronic recognition element for splicing modifier (REMS), the method comprising contacting the precursor RNA with a compound of Formula (I) or a form thereof, wherein the endogenous or non-endogenous intronic REMS comprises the sequence NNGAgurngn (SEQ ID NO: 1), wherein r is adenine or guanine and n or N is any nucleotide, and wherein Formula (I) is



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy, C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl, C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl, C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino, (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

(hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

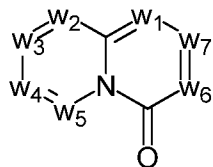
R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[0095] In another aspect, provided herein is a method of regulating the amount and type of a protein produced by a gene comprising a nucleotide sequence encoding an endogenous or non-endogenous intronic REMS in a subject, wherein the nucleotide sequence encoding the endogenous or non-endogenous intronic REMS comprises the sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound of Formula (I) to the subject, wherein Formula (I) is



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,
 C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or

(heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl,

aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or

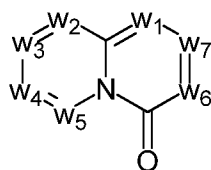
heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[0096] In another aspect, provided herein is a method of regulating the amount and type of a protein produced by a gene comprising a nucleotide sequence encoding an endogenous or non-endogenous intronic REMS in a subject, wherein the nucleotide sequence encoding the endogenous or non-endogenous intronic REMS comprises the sequence NNGAgtrngn (SEQ ID NO: 3), wherein r is adenine or guanine and n or N is any nucleotide, the method comprising administering a compound of Formula (I) to the subject, wherein Formula (I) is



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R_1 is C_{1-8} alkyl, amino, C_{1-8} alkyl-amino, $(C_{1-8}alkyl)_2$ -amino, $C_{1-8}alkoxy-C_{1-8}alkyl$ -amino, $(C_{1-8}alkoxy-C_{1-8}alkyl)_2$ -amino, $(C_{1-8}alkoxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, amino- $C_{1-8}alkyl$, $C_{1-8}alkyl$ -amino- $C_{1-8}alkyl$, $(C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl$, $C_{1-8}alkoxy-C_{1-8}alkyl$ -amino- $C_{1-8}alkyl$, $(C_{1-8}alkoxy-C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl$, $(C_{1-8}alkoxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino- $C_{1-8}alkyl$, amino- $C_{1-8}alkyl$ -amino, $(amino-C_{1-8}alkyl)_2$ -amino, $(amino-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, $C_{1-8}alkyl$ -amino- $C_{1-8}alkyl$ -amino, $(C_{1-8}alkyl$ -amino- $C_{1-8}alkyl)_2$ -amino, $(C_{1-8}alkyl$ -amino- $C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, $(C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl$ -amino, $[(C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl](C_{1-8}alkyl)$ amino, amino- $C_{1-8}alkoxy$, $C_{1-8}alkyl$ -amino- $C_{1-8}alkoxy$, $(C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkoxy$, $C_{1-8}alkoxy-C_{1-8}alkyl$ -amino- $C_{1-8}alkoxy$, $C_{1-8}alkoxy-C_{1-8}alkyl$ -amino- $C_{1-8}alkoxy$, $(C_{1-8}alkoxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino- $C_{1-8}alkoxy$, amino- $C_{2-8}alkenyl$, $C_{1-8}alkyl$ -amino- $C_{2-8}alkenyl$, $(C_{1-8}alkyl)_2$ -amino- $C_{2-8}alkenyl$, amino- $C_{2-8}alkynyl$, $C_{1-8}alkyl$ -amino- $C_{2-8}alkynyl$, $(C_{1-8}alkyl)_2$ -amino- $C_{2-8}alkynyl$, halo- $C_{1-8}alkyl$ -amino, $(halo-C_{1-8}alkyl)_2$ -amino, $(halo-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, hydroxy- $C_{1-8}alkyl$, hydroxy- $C_{1-8}alkoxy-C_{1-8}alkyl$, hydroxy- $C_{1-8}alkyl$ -amino, $(hydroxy-C_{1-8}alkyl)_2$ -amino, $(hydroxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, hydroxy- $C_{1-8}alkyl$ -amino- $C_{1-8}alkyl$, $(hydroxy-C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl$, $(hydroxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino- $C_{1-8}alkyl$, hydroxy- $C_{1-8}alkyl$ -amino- $C_{1-8}alkoxy$, $(hydroxy-C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkoxy$, $(hydroxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino- $C_{1-8}alkoxy$, hydroxy- $C_{1-8}alkyl$ -amino- $C_{1-8}alkyl$ -amino, $(hydroxy-C_{1-8}alkyl$ -amino- $C_{1-8}alkyl)_2$ -amino, $(hydroxy-C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl$ -amino, $(hydroxy-C_{1-8}alkyl$ -amino- $C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, $(hydroxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino- $C_{1-8}alkyl$ -amino, $[(hydroxy-C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl](C_{1-8}alkyl)$ amino, $[(hydroxy-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino- $C_{1-8}alkyl](C_{1-8}alkyl)$ amino, heterocyclyl, heterocyclyl- $C_{1-8}alkyl$, heterocyclyl- $C_{1-8}alkoxy$, heterocyclyl-amino, $(heterocyclyl)(C_{1-8}alkyl)$ amino, heterocyclyl-amino- $C_{1-8}alkyl$, heterocyclyl- $C_{1-8}alkyl$ -amino, $(heterocyclyl-C_{1-8}alkyl)_2$ -amino, $(heterocyclyl-C_{1-8}alkyl)(C_{1-8}alkyl)$ amino, heterocyclyl- $C_{1-8}alkyl$ -amino- $C_{1-8}alkyl$, $(heterocyclyl-C_{1-8}alkyl)_2$ -amino- $C_{1-8}alkyl$,

(heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent; R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[0097] In specific embodiments of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCA1, ABCA10, ABCB7, ABCB8, ABCC1, ABCC3, ABHD10, ABL2, ABLIM3, ACACA, ACADVL, ACAT2, ACTA2, ADAL, ADAM12, ADAM15, ADAM17, ADAM33, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF2, AFF3, AGK, AGPAT3, AGPAT4, AGPS, AHCYL2, AHDC1, AHRR, AJUBA, AK021888, AK310472, AKAP1, AKAP3, AKAP9, AKNA, ALCAM, ALDH4A1, AMPD2, ANK1, ANK2, ANK3, ANKFY1, ANKHD1-EIF4EBP3, ANKRA2, ANKRD17, ANKRD33B, ANKRD36, ANKS6, ANP32A, ANXA11, ANXA6, AP2B1, AP4B1-AS1, APAF1, APIP, APLP2, APP, APPL2, APTX, ARHGAP1, ARHGAP12, ARHGAP22, ARHGEF16, ARID1A, ARID2, ARID5B, ARL9, ARL15, ARMCX3, ARMCX6, ASAP1, ASIC1, ASL, ASNS, ASPH, ATAD2B, ATF7IP, ATG5, ATG9A, ATMIN, ATP2A3, ATP2C1, ATXN1, ATXN3, AURKA, AXIN1, B3GALT2, B3GNT6, B4GALT2, BACE1, BAG2, BASP1, BC033281, BCAR3, BCL2L15, BCYRN1, BECN1, BEND6, BHMT2, BICD1, BIN1, BIN3-IT1, BIRC3, BIRC6, BNC1, BRD2, BRPF1, BSCL2, BTBD10, BTG2, BTN3A1, BZW1, C1orf86, C10orf54, C11orf30, C11orf70, C11orf73, C11orf94, C12orf4, C12orf56, C14orf132, C17orf76-AS1, C19orf47, C3, C4orf27, C5orf24, C6orf48, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, C9orf69, CA13, CA3, CAB39, CACNA2D2, CACNB1,

CADM1, CALU, CAMKK1, CAND2, CAPNS1, CASC3, CASP7, CASP8AP2, CAV1, CCAR1, CCDC77, CCDC79, CCDC88A, CCDC92, CCDC122, CCER2, CCNF, CCT6A, CD276, CD46, CDC25B, CDC40, CDC42BPA, CDCA7, CDH11, CDH13, CDK11B, CDK16, CDKAL1, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CEP68, CFH, CFLAR, CHD8, CHEK1, CIITA, CIZ1, CLDN23, CLIC1, CLK4, CLTA, CMAHP, CNGA4, CNOT1, CNRIP1, CNTD1, COG1, COL1A1, COL11A1, COL12A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A1, COL6A6, COL8A1, COLEC12, COMP, COPS7B, CPA4, CPEB2, CPQ, CPSF4, CREB5, CRISPLD2, CRLF1, CRLS1, CRTAP, CRYBG3, CRYL1, CSDE1, CSNK1A1, CSNK1E, CSNK1G1, CTDSP2, CTNND1, CUL2, CUL4A, CUX1, CYB5B, CYB5R2, CYBRD1, CYGB, CYP1B1, CYP51A1, DAB2, DACT1, DAGLB, DARS, DAXX, DCAF10, DCAF11, DCAF17, DCBLD2, DCLK1, DCN, DCUN1D4, DDAH1, DDAH2, DDHD2, DDIT4L, DDR1, DDX39B, DDX42, DDX50, DEGS1, DENND1A, DENND1B, DENND5A, DEPTOR, DFNB59, DGCR2, DGKA, DHCR24, DHCR7, DHFR, DHX9, DIAPH1, DIAPH3, DIRAS3, DIS3L, DKFZp434M1735, DKK3, DLC1, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNM2, DNMBP, DOCK1, DOCK11, DPP8, DSEL, DST, DSTN, DYNC1I1, DYRK1A, DZIP1L, EBF1, EEA1, EEF1A1, EFCAB14, EFEMP1, EGR1, EGR3, EHMT2, EIF2B3, EIF4G1, EIF4G2, EIF4G3, ELF2, ELN, ELP4, EMX2OS, ENAH, ENG, ENPP1, ENPP2, ENSA, EP300, EPN1, EPT1, ERC1, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, ETV5, EVC, EVC2, EXO1, EXTL2, EYA3, F2R, FADS1, FADS2, FAF1, FAIM, FAM111A, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM198B, FAM20A, FAM219A, FAM219B, FAM3C, FAM46B, FAM65A, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FBXL6, FBXO10, FBXO18, FBXO31, FBXO34, FBXO9, FCHO1, FDFT1, FDPS, FER, FEZ1, FGD5-AS1, FGFR2, FGFR1L, FGL2, FHOD3, FLII, FLNB, FLT1, FN1, FNBP1, FOCAD, FOS, FOSB, FOSL1, FOXP1, FOXP2, FRAS1, FSCN2, FUS, FYN, GABPB1, GAL3ST4, GALC, GALNT1, GALNT15, GAS7, GATA6, GBA2, GBGT1, GCFC2, GCNT1, GDF6, GGACT, GGCT, GHDC, GIGYF2, GJC1, GLCE, GMIP, GNA13, GNAQ, GNAS, GNL3L, GOLGA2, GOLGA4, GOLGB1, GORASP1, GPR1, GPR183, GPR50, GPR89A, GPRC5A, GPRC5B, GPSM2, GREM1, GRK6, GRTP1, GSE1, GTF2H2B, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS2, HAS3, HAT1, HAUS3, HAUS6, HAVCR2, HDAC5, HDAC7, HDX, HECTD2-AS1, HEG1, HEPH, HEY1, HLA-A, HLA-E, HLTF, HMGA1, HMGA2, HMGB1, HMGCR, HMGN3-AS1, HMGCS1, HOOK3, HMOX1, HNMT, HNRNPR,

HNRNPUL1, HP1BP3, HPS1, HRH1, HSD17B12, HSD17B4, HSPA1L, HTATIP2, HTT, IARS, IDH1, IDI1, IFT57, IGDCC4, IGF2BP2, IGF2R, IGFBP3, IL16, IL6ST, INA, INHBA, INPP5K, INSIG1, INTU, IQCE, IQCG, ITGA11, ITGA8, ITGAV, ITGB5, ITGB8, ITIH1, ITM2C, ITPKA, ITS1N1, IVD, KANSL3, KAT6B, KCNK2, KCNS1, KCNS2, KDM6A, KDSR, KIAA1033, KIAA1143, KIAA1199, KIAA1456, KIAA1462, KIAA1522, KIAA1524, KIAA1549, KIAA1715, KIAA1755, KIF14, KIF2A, KIF3A, KIT, KLC1, KLC2, KLF17, KLF6, KLHL7, KLRG1, KMT2D, KRT7, KRT18, KRT19, KRT34, KRTAP1-1, KRTAP1-5, KRTAP2-3, L3MBTL2, LAMA2, LAMB1, LAMB2P1, LARP4, LARP7, LATS2, LDLR, LEMD3, LETM2, LGALS8, LIG1, LIG2, LGR4, LHX9, LIMS1, LINC00341, LINC00472, LINC00570, LINC00578, LINC00607, LINC00657, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMAN2L, LMO7, LMOD1, LOC400927, LONP1, LOX, LRBA, LRCH4, LRIG1, LRP4, LRP8, LRRC32, LRRC39, LRRC42, LRRC8A, LSAMP, LSS, LTBR, LUC7L2, LUM, LYPD1, LYRM1, LZTS2, MADD, MAFB, MAGED4, MAGED4B, MAMDC2, MAN1A2, MAN2A1, MAN2C1, MAP4K4, MAPK13, MASP1, MB, MB21D2, MBD1, MBOAT7, MC4R, MCM10, MDM2, MED1, MED13L, MEDAG, MEF2D, MEGF6, MEIS2, MEMO1, MEPCE, MFGE8, MFN2, MIAT, MICAL2, MINPP1, MIR612, MKL1, MKLN1, MKNK2, MLLT4, MLLT10, MLST8, MMAB, MMP10, MMP24, MMS19, MMS22L, MN1, MOXD1, MPPE1, MPZL1, MRPL3, MRPL45, MRPL55, MRPS28, MRV11, MSANTD3, MSC, MSH2, MSH4, MSH6, MSL3, MSMO1, MSRB3, MTAP, MTERF3, MTERFD1, MTHFD1L, MTMR9, MTRR, MUM1, MVD, MVK, MXRA5, MYADM, MYCBP2, MYLK, MYO1D, MYO9B, MYOF, NA, NAA35, NAALADL2, NADK, NAE1, NAGS, NASP, NAV1, NAV2, NCOA1, NCOA3, NCOA4, NCSTN, NDNF, NELFA, NEO1, NEURL1B, NF2, NFE2L1, NFX1, NGF, NGFR, NHLH1, NID1, NID2, NIPA1, NKX3-1, NLN, NOL10, NOMO3, NOTCH3, NOTUM, NOVA2, NOX4, NPEPPS, NRD1, NREP, NRG1, NRROS, NSUN4, NT5C2, NT5E, NTNG1, NUDT4, NUP153, NUP35, NUP50, NUPL1, NUSAP1, OCLN, ODF2, OLR1, OS9, OSBPL6, OSBPL10, OSMR, OXCT1, OXCT2, P4HA1, P4HB, PABPC1, PAIP2B, PAK4, PAPD4, PARD3, PARN, PARP14, PARP4, PARVB, PBLD, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PCNXL2, PCSK9, PDE1C, PDE4A, PDE5A, PDE7A, PDGFD, PDGFRB, PDLIM7, PDS5B, PDXDC1, PEAR1, PEPD, PEX5, PFKP, PHACTR3, PHF19, PHF8, PHRF1, PHTF2, PI4K2A, PIEZO1, PIGN, PIGU, PIK3C2B, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNA, PITPNB, PITPNM1, PITPNM3, PLAU, PLEC,

PLEK2, PLEKHA1, PLEKHA6, PLEKHB2, PLEKHH2, PLSCR1, PLSCR3, PLXNB2, PLXNC1, PMS1, PNISR, PODN, POLE3, POLN, POLR1A, POLR3D, POMT2, POSTN, POU2F1, PPAPDC1A, PPARA, PPARG, PPHLN1, PPIP5K1, PPIP5K2, PPM1E, PPP1R12A, PPP1R26, PPP3CA, PPP6R1, PPP6R2, PRKACB, PRKCA, PRKDC, PRKG1, PRMT1, PRNP, PRPF31, PRPH2, PRRG4, PRSS23, PRUNE2, PSMA4, PSMC1, PSMD6, PSMD6-AS2, PTGIS, PTK2B, PTPN14, PTX3, PUF60, PUS7, PVR, PXX, PXN, QKI, RAB23, RAB2B, RAB30, RAB34, RAB38, RAB44, RAD1, RAD9B, RAD23B, RAF1, RALB, RAP1A, RAP1GDS1, RAPGEF1, RARG, RARS, RARS2, RASSF8, RBBP8, RBCK1, RBFOX2, RBKS, RBM10, RCC1, RDX, RERE, RFTN1, RFWD2, RFX3-AS1, RGCC, RGS10, RGS3, RIF1, RNF14, RNF19A, RNF38, RNFT1, ROR1, ROR2, RPA1, RPL10, RPS10, RPS6KB2, RPS6KC1, RRBP1, RWDD4, SAMD4A, SAMD9, SAMD9L, SAR1A, SART3, SCAF4, SCAF8, SCARNA9, SCD, SCLT1, SCO1, SDCBP, SEC14L1, SEC22A, SEC24A, SEC24B, SEC61A1, SENP6, SEPT9, SERGEF, SERPINE2, SF1, SGK3, SGOL2, SH3RF1, SH3YL1, SHROOM3, SIGLEC10, SKA2, SKIL, SLC12A2, SLC24A3, SLC25A17, SLC35F3, SLC39A3, SLC39A10, SLC4A4, SLC4A11, SLC41A1, SLC44A2, SLC46A2, SLC6A15, SLC7A6, SLC7A8, SLC7A11, SLC9A3, SLIT3, SMARCA4, SMARCC2, SMC4, SMC6, SMCHD1, SMG1, SMG1P3, SMN2, SMPD4, SMTN, SMYD3, SMYD5, SNAP23, SNED1, SNHG16, SNX7, SNX14, SOCS2, SON, SORBS2, SORCS2, SOS2, SOX7, SPATA18, SPATA20, SPATA5, SPATS2, SPDYA, SPEF2, SPG20, SPIDR, SPRED2, SPRYD7, SQLE, SQRDL, SQSTM1, SRCAP, SREBF1, SREK1, SRGAP1, SRRM1, SRSF3, STAC2, STARD4, STAT1, STAT3, STAT4, STAU1, STC2, STEAP2, STK32B, STRIP1, STRN3, STRN4, STS, STX16, STXBP6, SULF1, SUPT20H, SVEP1, SYNE1, SYNE2, SYNGR2, SYNPO, SYNPO2, SYNPO2L, SYT15, SYTL2, TACC1, TAF2, TAGLN3, TANC2, TANGO6, TARBP1, TARS, TASP1, TBC1D15, TBL2, TCF12, TCF4, TCF7L2, TENC1, TENM2, TEP1, TET3, TEX21P, TFCP2, TGFA, TGFB2, TGFB3, TGFBI, TGFBR1, TGFBRAP1, TGM2, THADA, THAP4, THBS2, THRB, TIAM1, TIMP2, TJP2, TLE3, TLK1, TMC3, TMEM102, TMEM119, TMEM134, TMEM154, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM47, TMEM50B, TMEM63A, TNC, TNFAIP3, TNFAIP8L3, TNFRSF12A, TNFRSF14, TNIP1, TNKS1BP1, TNPO3, TNRC18P1, TNRC6A, TNS1, TNS3, TNXB, TOE1, TOMM40, TOMM5, TOPORS, TP53AIP1, TP53INP1, TPRG1, TRAF3, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM26, TRIM28, TRIM65, TRIM66, TRMT1L, TRPC4, TRPS1, TSC2, TSHZ1,

TSHZ2, TSPAN11, TSPAN18, TSPAN2, TSPAN7, TSSK3, TTC7A, TTC7B, TUBB2C, TUBB3, TUBE1, TXNIP, TXNL1, TXNRD1, TYW5, U2SURP, UBAP2L, UBE2G2, UBE2V1, UBQLN4, UCHL5, UHMK1, UHRF1BP1L, UNC5B, URGCP, USP19, USP7, USP27X, UVRAG, VANGL1, VARS2, VAV2, VCL, VIM-AS1, VIPAS39, VPS13A, VPS29, VPS41, VPS51, VSTM2L, VWA8, VWF, WDR19, WDR27, WDR37, WDR48, WDR91, WIPF1, WISP1, WNK1, WNT5B, WNT10B, WSB1, WWTR1, XIAP, XRN2, YAP1, YDJC, YES1, YPEL5, YTHDF3, Z24749, ZAK, ZBTB10, ZBTB24, ZBTB26, ZBTB7A, ZC3H12C, ZC3H14, ZC3H18, ZCCHC5, ZCCHC8, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZFP82, ZHX3, ZMIZ1, ZMIZ1-AS1, ZMYM2, ZNF12, ZNF138, ZNF148, ZNF212, ZNF219, ZNF227, ZNF232, ZNF24, ZNF268, ZNF28, ZNF281, ZNF335, ZNF350, ZNF37A, ZNF37BP, ZNF395, ZNF431, ZNF583, ZNF621, ZNF652, ZNF655, ZNF660, ZNF674, ZNF680, ZNF74, ZNF764, ZNF778, ZNF780A, ZNF79, ZNF827, ZNF837, ZNF839 or ZNF91.

[0098] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1I1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15,

GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRVI1, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRA3, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B,

YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837.

[0099] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is not described in International Publication No. WO 2015/105657. In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is not described in International Publication No. WO 2016/196386. In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is not described in International Publication No. WO 2015/105657 and not described in International Publication No. WO 2016/196386.

[00100] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCA1, ABCB7, ABCC1, ABHD10, ABL2, ABLIM3, ACACA, ACADVL, ACAT2, ADAM12, ADAM15, ADAM17, ADAM33, AFF2, AGK, AGPAT3, AGPS, AHCYL2, AHDC1, AHRR, AJUBA, AK021888, AK310472, AKAP1, AKAP9, AKNA, ALCAM, ALDH4A1, AMPD2, ANK2, ANKFY1, ANKHD1-EIF4EBP3, ANKRD17, ANKS6, ANP32A, ANXA11, ANXA6, AP2B1, APAF1, APLP2, APP, APPL2, APTX, ARHGAP22, ARID1A, ARID2, ARMCX3, ASAP1, ASL, ASNS, ASPH, ATAD2B, ATF7IP, ATG9A, ATMIN, ATP2C1, ATXN3, AURKA, AXIN1, B4GALT2, BACE1, BAG2, BASP1, BC033281, BCAR3, BEND6, BICD1, BIN1, BNC1, BRD2, BRPF1, BSCL2, BTBD10, BZW1, C11orf30, C11orf73, C17orf76-AS1, C4orf27, C5orf24, C6orf48, C9orf69, CAB39, CALU, CAMKK1, CAPNS1, CASC3, CASP8AP2, CAV1, CCAR1, CCDC77, CCDC88A, CCDC92, CCT6A, CD276, CD46, CDC25B, CDC40, CDC42BPA, CDCA7, CDH11, CDH13, CDK11B, CDK16, CDKAL1, CEP68, CFLAR, CHD8, CIZ1, CLIC1, CLK4, CNOT1, COG1, COL12A1, COL1A1, COL6A1, COPS7B, CPEB2, CREB5, CRLS1, CRTAP, CSDE1, CSNK1A1, CTDSP2, CTNND1, CUL2, CUL4A, CUX1, CYB5B, CYBRD1, CYP51A1, DAB2, DACT1, DARS, DAXX, DCAF10, DCAF11, DCBLD2, DCUN1D4, DDAH1, DDAH2, DDHD2, DDR1, DDX39B, DDX42, DENND1A, DENND1B, DENND5A, DGCR2, DGKA, DHCR24, DHCR7, DHFR, DHX9, DIAPH1, DIAPH3, DIS3L, DKFZp434M1735, DKK3, DLC1, DNM2, DOCK1, DPP8, DSEL, DST, DSTN, EBF1, EEA1, EEF1A1, EFCAB14, EGR1, EHMT2, EIF2B3, EIF4G1, EIF4G2, EIF4G3, ELF2, ENG, ENPP2, ENSA, EPN1, EPT1, ERC1, ERGIC3, ETV5, EXO1, EXTL2,

EYA3, FADS1, FADS2, FAF1, FAM111A, FAM198B, FAM219A, FAM219B, FAM3C, FAM65A, FBXO10, FBXO18, FBXO31, FBXO34, FBXO9, FDFT1, FDPS, FER, FEZ1, FGD5-AS1, FGFR1, FHOD3, FLII, FLNB, FN1, FNBP1, FOCAD, FOS, FOSB, FOSL1, FOXK1, FOXM1, FUS, FYN, GABPB1, GALC, GALNT1, GAS7, GBA2, GCFC2, GGCT, GHDC, GIGYF2, GJC1, GMIP, GNA13, GNAS, GNL3L, GOLGA2, GOLGA4, GOLGB1, GORASP1, GPR1, GPR89A, GPSM2, GREM1, GRK6, GSE1, GTF2H2B, HAS2, HAT1, HAUS3, HAUS6, HDAC7, HEG1, HLA-A, HLA-E, HLTf, HMGA1, HMGB1, HMGCR, HMGCS1, HMOX1, HNRNPR, HNRNPUL1, HP1BP3, HRH1, HSD17B12, HSD17B4, HTT, IARS, IDH1, IDI1, IGF2BP2, IL6ST, INHBA, INSIG1, IQCE, ITGAV, ITGB5, ITM2C, ITSN1, KANSL3, KCNK2, KIAA1033, KIAA1143, KIAA1199, KIAA1522, KIAA1524, KIAA1549, KIAA1715, KIF14, KIF2A, KIF3A, KLC1, KLC2, KLF6, KLHL7, KRT18, KRT19, KRT34, KRTAP2-3, LAMA2, LAMB1, LARP4, LARP7, LATS2, LDLR, LEMD3, LGALS8, LIMS1, LINC00341, LINC00657, LMAN2L, LMO7, LONP1, LOX, LRCH4, LRIG1, LRP8, LRRC8A, LSS, LTBR, LUC7L2, LZTS2, MADD, MAGED4, MAGED4B, MAN1A2, MAP4K4, MBD1, MBOAT7, MDM2, MED1, MEDAG, MEF2D, MEIS2, MEMO1, MEPCE, MFGE8, MICAL2, MINPP1, MKL1, MKLN1, MKNK2, MLLT4, MLST8, MMAB, MMS19, MMS22L, MPPE1, MPZL1, MRPL3, MSANTD3, MSC, MSH2, MSH6, MSL3, MSMO1, MSRB3, MTAP, MTERFD1, MTHFD1L, MTMR9, MTRR, MUM1, MVD, MVK, MYADM, MYLK, MYO1D, MYO9B, MYOF, NAA35, NADK, NASP, NAV1, NAV2, NCOA1, NCOA3, NCOA4, NCSTN, NELFA, NEO1, NEURL1B, NF2, NFE2L1, NFX1, NID1, NID2, NIPA1, NKX3-1, NOL10, NOMO3, NPEPPS, NRD1, NREP, NRG1, NSUN4, NT5C2, NT5E, NTNG1, NUDT4, NUP153, NUP35, NUP50, NUPL1, NUSAP1, ODF2, OS9, OSBPL6, OSMR, P4HA1, P4HB, PABPC1, PAK4, PAPD4, PARD3, PARN, PARP14, PARP4, PARVB, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PCNXL2, PCSK9, PDE4A, PDE7A, PDLIM7, PDXDC1, PEPD, PEX5, PFKP, PHF19, PHF8, PHRF1, PHTF2, PI4K2A, PIEZO1, PIGU, PIK3C2B, PITPNA, PITPNB, PITPNM1, PLAUI, PLEC, PLEKHB2, PLSCR3, PLXNB2, PLXNC1, PMS1, POLE3, POLR3D, POSTN, POU2F1, PPAPDC1A, PPARA, PPHLN1, PPIP5K1, PPP1R12A, PPP6R1, PPP6R2, PRKACB, PRKDC, PRMT1, PRNP, PRSS23, PSMA4, PSMC1, PSMD6, PTK2B, PTPN14, PUF60, PUS7, PVR, PXN, QKI, RAB23, RAB2B, RAB34, RAD1, RAD23B, RALB, RAP1A, RAP1GDS1, RARG, RASSF8, RBCK1, RBFOX2, RBM10, RCC1, RFTN1, RFWD2, RGS10, RGS3, RIF1, RNF14, RNF19A, RNF38, RNFT1, RPL10, RPS6KC1, RRBP1, RWDD4,

SAMD9, SAMD9L, SAR1A, SART3, SCAF4, SCAF8, SCD, SCLT1, SCO1, SDCBP, SEC14L1, SEC22A, SEC24B, SEC61A1, SEPT9, SERPINE2, SF1, SGOL2, SH3RF1, SKIL, SLC25A17, SLC39A3, SLC41A1, SLC4A4, SLC7A6, SLC7A8, SMARCA4, SMARCC2, SMC4, SMC6, SMCHD1, SMG1, SMN2, SMPD4, SMYD3, SMYD5, SNAP23, SNHG16, SNX14, SOCS2, SON, SOS2, SPATA20, SPATS2, SPG20, SPRED2, SQLE, SQRD, SQSTM1, SRCAP, SREBF1, SREK1, SRSF3, STARD4, STAT1, STAT3, STAU1, STC2, STEAP2, STRIP1, STRN3, STX16, SUPT20H, SYNE1, SYNE2, SYT15, SYTL2, TACC1, TAF2, TANC2, TARBP1, TARS, TBC1D15, TBL2, TCF7L2, TENC1, TENM2, TEP1, TET3, TFPC2, TGFBI, TGFB1, TGFB1, TGFB1, THADA, THAP4, THRB, TIMP2, TJP2, TLE3, TLK1, TMEM154, TMEM47, TMEM63A, TNC, TNFAIP3, TNFRSF12A, TNIP1, TNKS1BP1, TNPO3, TNS1, TNS3, TOE1, TOMM40, TOMM5, TOPORS, TP53INP1, TRAF3, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM26, TRIM28, TRIM65, TRMT1L, TRPS1, TSC2, TSHZ1, TSPAN2, TTC7A, TUBB2C, TUBB3, TXNL1, TXNRD1, U2SURP, UBAP2L, UBE2G2, UBE2V1, UBQLN4, UCHL5, UHMK1, UHRF1BP1L, UNC5B, USP19, USP7, VANGL1, VARS2, VCL, VIPAS39, VPS13A, VPS29, VPS51, VWA8, WDR19, WDR37, WDR48, WIPF1, WNT5B, WSB1, WWTR1, XIAP, XRN2, YAP1, YES1, YPEL5, YTHDF3, Z24749, ZAK, ZBTB10, ZBTB24, ZBTB7A, ZC3H12C, ZC3H14, ZC3H18, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZHX3, ZMIZ1, ZMYM2, ZNF12, ZNF148, ZNF219, ZNF227, ZNF24, ZNF268, ZNF28, ZNF281, ZNF335, ZNF37A, ZNF37BP, ZNF395, ZNF583, ZNF621, ZNF652, ZNF655, ZNF674, ZNF74, ZNF764, ZNF778, ZNF780A, ZNF827, ZNF839 or ZNF91.

[00101] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCB8, ANKRD36, APLP2, ARHGAP12, ARMCX6, ASAP1, ATG5, AXIN1, BIRC6, C1orf86, CDC42BPA, CLTA, DYRK1A, ERGIC3, FBXL6, FOXM1, GGCT, KAT6B, KDM6A, KIF3A, KMT2D, LARP7, LYRM1, MADD, MAN2C1, MRPL55, MYCBP2, MYO9B, PNISR, RAP1A, RAPGEF1, SENP6, SH3YL1, SLC25A17, SMN2, SREK1, STRN3, TAF2, TMEM134, VPS29, ZFAND1 or ZNF431.

[00102] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCB8, ANKRD36, ARHGAP12, ARMCX6, ATG5, BIRC6, C1orf86, CLTA, DYRK1A, FBXL6,

KAT6B, KDM6A, KMT2D, LYRM1, MAN2C1, MRPL55, MYCBP2, PNISR, RAPGEF1, SENP6, SH3YL1, TMEM134 or ZNF431.

[00103] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCA10, ABCC1, ACTA2, ADAL, ADAM12, ADAMTS1, ADAMTS5, ADD1, ADGRG6, ADH6, ADHFE1, AFF2, AFF3, AGK, AGPS, AKAP3, ANK1, ANK2, ANK3, ANKRD33B, ANXA11, ANXA6, AP4B1-AS1, ARHGEF16, ARID5B, ARL9, ARMCX3, ASAP1, ASIC1, ATP2A3, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BIN3-IT1, BIRC3, BTG2, C10orf54, C11orf70, C11orf73, C11orf94, C12orf56, C19orf47, C3, C4orf27, C7orf31, C8orf34, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CCDC79, CCER2, CCNF, CDCA7, CDKAL1, CELSR1, CEMIP, CEP170, CFH, CIITA, CLDN23, CMAHP, CNGA4, CNTD1, COL11A1, COL12A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CRISPLD2, CRLF1, CRYL1, CUX1, CYB5B, CYB5R2, CYGB, CYP1B1, DCLK1, DCN, DDIT4L, DDX42, DDX50, DEGS1, DENND1A, DENND5A, DEPTOR, DFNB59, DGKA, DHFR, DIAPH3, DIRAS3, DIS3L, DLG5, DNAH8, DNAJC27, DOCK1, DOCK11, DYNC1I1, DZIP1L, EBF1, EFEMP1, EGR3, EIF2B3, ELN, ELP4, EMX2OS, ENPP1, ERCC8, ESM1, EVC2, F2R, FAM160A1, FAM198B, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FCHO1, FER, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALC, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GNAQ, GOLGB1, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HECTD2-AS1, HEPH, HEY1, HLTF, HMGN3-AS1, HMOX1, HOOK3, HSD17B12, HSPA1L, HTATIP2, HTT, IGDCC4, IGF2R, IGFBP3, IL16, INA, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1524, KIAA1715, KIAA1755, KIT, KLF17, KLRG1, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LRBA, LRP4, LRRC32, LRRC39, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN1A2, MAN2A1, MAPK13, MASP1, MB, MC4R, MEDAG, MEGF6, MEMO1, MIAT, MIR612, MLLT10, MMP10, MMP24, MMS19, MN1, MOXD1, MRV11, MSH4, MTERF3, MXRA5, MYO1D, NA, NAALADL2, NAE1, NAGS, NDNF, NEURL1B, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, NTNG1,

OCLN, OLR1, OSBPL10, OXCT2, PAIP2B, PAPD4, PBLD, PCM1, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PDXDC1, PEAR1, PEPD, PHACTR3, PI4K2B, PIK3R1, PIM2, PITPNB, PITPNM3, PLAUI, PLEK2, PLEKHA6, PLEKHH2, PLXNC1, PMS1, PODN, POLN, POLR1A, POSTN, PPM1E, PPP3CA, PRKCA, PRKDC, PRKG1, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, RAB30, RAB38, RAB44, RAD9B, RARS, RBBP8, RBKS, RCC1, RDX, RFWD2, RFX3-AS1, RGCC, RNFT1, ROR1, ROR2, RWDD4, SCARNA9, SCO1, SEC22A, SHROOM3, SIGLEC10, SLC24A3, SLC35F3, SLC39A10, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SMYD3, SNED1, SORBS2, SORCS2, SOX7, SPDYA, SPEF2, SQRDL, STAC2, STAT1, STAT4, STEAP2, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TARBP1, TEX21P, TGFA, TGFB2, TGFB3, TGM2, THADA, THBS2, THRB, TMEM102, TMEM119, TMEM256-PLSCR3, TMEM50B, TNC, TNFAIP8L3, TNFRSF14, TNRC18P1, TNS3, TNXB, TP53AIP1, TPRG1, TRAF3, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TXNIP, UNC5B, USP27X, UVRAG, VIM-AS1, VPS41, VSTM2L, VWA8, VWF, WDR91, WISP1, WNT10B, XRN2, YDJC, ZBTB26, ZCCHC5, ZFP82, ZMIZ1-AS1, ZNF212, ZNF350, ZNF660, ZNF79 or ZNF837.

[00104] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCA10, ACTA2, ADAL, ADAMTS1, ADAMTS5, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AKAP3, ANK1, ANK3, ANKRD33B, AP4B1-AS1, ARHGEF16, ARID5B, ARL9, ASIC1, ATP2A3, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BIN3-IT1, BIRC3, BTG2, C10orf54, C11orf70, C11orf94, C12orf56, C19orf47, C3, C7orf31, C8orf34, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CCDC79, CCER2, CCNF, CELSR1, CEMIP, CEP170, CFH, CIITA, CLDN23, CMAHP, CNGA4, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CRISPLD2, CRLF1, CRYL1, CYB5R2, CYGB, CYP1B1, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DNAH8, DNAJC27, DOCK11, DYNC1I1, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENPP1, ERCC8, ESM1, EVC2, F2R, FAM160A1, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5,

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[00105] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APLP2, APLP2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, AXIN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DLGAP4, DNAJC13, DNMBP, DOCK1,

DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERCC1, ERGIC3, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FAM198B, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GGCT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HAT1, HDX, HLTF, HMGA2, HNMT, HPS1, HSD17B12, HSD17B4, HTT, IFT57, INPP5K, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MADD, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCMI, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPHLN1, PPIP5K2, PPP1R26, PRPF31, PRSS23, PRUNE2, PSMA4, PXX, RAF1, RAP1A, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RNFT1, RPA1, RPS10, RPS6KB2, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STRN3, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TRIM65, TSPAN2, TTC7B, TUBE1, TYW5, UBAP2L, UBE2V1, URGCP, VAV2, VPS29, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232, ZNF37BP or ZNF680.

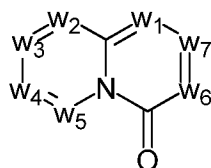
[00106] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTF, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45,

MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP.

[00107] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: APLP2, AXIN1, CECR7, DAGLB, DLGAP4, ERCC1, ERGIC3, FAM198B, GGCT, HAT1, HPS1, INPP5K, MADD, PPHLN1, PRUNE2, RAP1A, RNFT1, RPS6KB2, SH3YL1, SKA2, SPATA18, STRN3, TMEM189-UBE2V1, TRIM65, TUBE1, UBE2V1, VPS29 or ZNF680.

[00108] In another specific embodiment of the aspects and embodiments described herein, the gene is, or the RNA transcript is transcribed from a gene that is selected from: ABCB8, ABCC3, ADCY3, AGPAT4, ANKRA2, APIP, ARHGAP1, ARL15, ATXN1, BECN1, BHMT2, BTN3A1, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASP7, CCDC122, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DLGAP4, DNAJC13, DNMBP, DYRK1A, ENAH, EP300, ERCC1, ERLIN2, ERFFI1, EVC, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, GGACT, GLCE, GULP1, GXYLT1, HDX, HMGA2, HNMT, HPS1, IFT57, INPP5K, IVD, KDM6A, LETM2, LOC400927, LRRC42, LYRM1, MB21D2, MCM10, MED13L, MFN2, MRPL45, MRPS28, MTERF3, MYCBP2, NGF, OXCT1, PDS5B, PIGN, PIK3CD, PIK3R1, PIKFYVE, PLEKHA1, PLSCR1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRUNE2, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RPA1, RPS10, RPS6KB2, SAMD4A, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC44A2, SNX7, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STXBP6, TASP1, TCF12, TCF4, TIAM1, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TTC7B, TUBE1, TYW5, URGCP, VAV2, WDR27, WDR91, WNK1, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF680.

[00109] In another aspect, provide herein is a method of modulating the amount and type of a protein produced by a cell containing the artificial gene construct as described above, the method comprising contacting the cell with a compound of Formula (I) or a form thereof, wherein Formula (I) is



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl,

aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or

heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino,

(C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00110] In a specific embodiment, in the context of DNA, the nucleotide sequence encoding the intronic REMS comprises a sequence selected from the group consisting of ANGAgtrngn (SEQ ID NO: 1829), CNGAgtrngn (SEQ ID NO: 1835), GNGAgtrngn (SEQ ID NO: 1841), TNGAgtrngn (SEQ ID NO: 1847), NAGAgtrngn (SEQ ID NO: 1830), NCGAgtrngn (SEQ ID NO: 1836), NGGAgtrngn (SEQ ID NO: 1842), NTGAgtrngn (SEQ ID NO: 1848), AAGAgtrngn (SEQ ID NO: 1831), ACGAgtrngn (SEQ ID NO: 1837), AGGAgtrngn (SEQ ID NO: 1843), ATGAgtrngn (SEQ ID NO: 1849), CAGAgtrngn (SEQ ID NO: 1832), CCGAgtrngn (SEQ ID NO: 1838), CGGAgtrngn (SEQ ID NO: 1844), CTGAgtrngn (SEQ ID NO: 1850), GAGAgtrngn (SEQ ID NO: 1833), GCGAgtrngn (SEQ ID NO: 1839), GGGAgtrngn (SEQ ID NO: 1845), GTGAgtrngn (SEQ ID NO: 1851), TAGAgtrngn (SEQ ID NO: 1834), TCGAgtrngn (SEQ ID NO: 1840), TGGAgtrngn (SEQ ID NO: 1846) and TTGAgtrngn (SEQ ID NO: 1852), wherein r is adenine or guanine and n or N is any nucleotide.

[00111] In a further specific embodiment, in the context of DNA, the nucleotide sequence encoding the intronic REMS comprises a sequence selected from the group consisting of ANGAgtragt (SEQ ID NO: 2237), CNGAgtragt (SEQ ID NO: 2243), GNGAgtragt (SEQ ID NO: 2249), TNGAgtragt (SEQ ID NO: 2255), NAGAgtragt (SEQ ID NO: 2238), NCGAgtragt (SEQ ID NO: 2244), NGGAgtragt (SEQ ID NO: 2250), NTGAgtragt (SEQ ID NO: 2256), AAGAgtragt (SEQ ID NO: 2239), ACGAgtragt (SEQ ID NO: 2245), AGGAgtragt (SEQ ID NO: 2251), ATGAgtragt (SEQ ID NO: 2257), CAGAgtragt (SEQ ID NO: 2240), CCGAgtragt (SEQ ID NO: 2246), CGGAgtragt (SEQ ID NO: 2252), CTGAgtragt (SEQ ID NO: 2258), GAGAgtragt (SEQ ID NO: 2241), GCGAgtragt (SEQ ID NO: 2247),

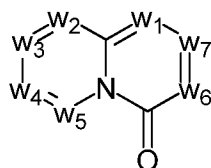
GGGAgtragt (SEQ ID NO: 2253), GTGAgtragt (SEQ ID NO: 2259), TAGAgtragt (SEQ ID NO: 2242), TCGAgtragt (SEQ ID NO: 2248), TGGAgtragt (SEQ ID NO: 2254) and TTGAgtragt (SEQ ID NO: 2260), wherein r is adenine or guanine and N is any nucleotide. In one or more embodiments provided herein, N is adenine or guanine.

[00112] In various specific embodiments, the nucleotide sequence encoding the intronic REMS is a nucleotide sequence encoding a non-endogenous intronic REMS, i.e., a precursor RNA transcript comprising the non-endogenous intronic REMS not naturally found in the DNA sequence of the artificial construct.

[00113] In one aspect, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence comprising in 5' to 3' order: a branch point, a 3' splice site and an endogenous intronic recognition element for splicing modifier (iREMS), wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the RNA transcript is an RNA transcript of a gene that is selected from: ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARM CX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPL, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC11I, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1,

FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRV11, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27,

WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837; the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl,

aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or

heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

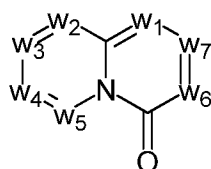
R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino,

(C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00114] In another aspect, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence comprising in 5' to 3' order: a branch point, a 3' splice site and an endogenous intronic recognition element for splicing modifier (iREMS); wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the RNA transcript is an RNA transcript of a gene not disclosed in either International Publication No. WO 2015/105657, International Publication No. WO 2016/196386, or both; the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,

C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,
 (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,
 C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,

(aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

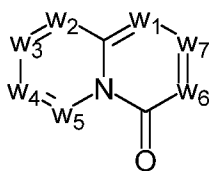
R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00115] In another aspect, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence comprising in 5' to 3' order: a branch point, a 3' splice site and a non-endogenous intronic recognition element for splicing modifier (iREMS),; wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w_4 is C-R₁, then w_7 is C-R₂ and w_3 is C-R_a or N and w_6 is C-R_c or N; or,
 when w_4 is C-R₂, then w_7 is C-R₁ and w_3 is C-R_a or N and w_6 is C-R_c or N; and,
 wherein any one, two or three of w_1 , w_2 , w_3 , w_4 , w_5 , w_6 and w_7 may optionally be N;
 R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,
 (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,
 C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,
 (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,
 C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,

heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

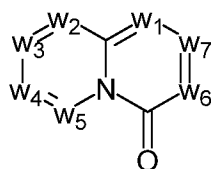
R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00116] In certain embodiments, the iREMS comprises an RNA sequence GAguragu (SEQ ID NO: 3866), wherein r is adenine or guanine and n is any nucleotide. In some embodiments, the iREMS comprises an RNA sequence NNGAgurngn (SEQ ID NO: 1), wherein r is adenine or guanine and n or N is any nucleotide. In a specific embodiment, the RNA sequence NNGAgurngn (SEQ ID NO: 1) is selected from the group consisting of ANGAgurngn (SEQ ID NO: 29), CNGAgurngn (SEQ ID NO: 35), GNGAgurngn (SEQ ID NO: 41), UNGAgurngn (SEQ ID NO: 47), NAGAgurngn (SEQ ID NO: 30), NCGAgurngn (SEQ ID NO: 36), NGGAgurngn (SEQ ID NO: 42), NUGAgurngn (SEQ ID NO: 48), AAGAgurngn (SEQ ID NO: 31), ACGAgurngn (SEQ ID NO: 37), AGGAgurngn (SEQ ID NO: 43), AUGAgurngn (SEQ ID NO: 49), CAGAgurngn (SEQ ID NO: 32), CCGAgurngn (SEQ ID NO: 38), CGGAgurngn (SEQ ID NO: 44), CUGAgurngn (SEQ ID NO: 50), GAGAgurngn (SEQ ID NO: 33), GCGAgurngn (SEQ ID NO: 39), GGGAgurngn (SEQ ID NO: 45), GUGAgurngn (SEQ ID NO: 51), UAGAgurngn (SEQ ID NO: 34),

UCGAgurngn (SEQ ID NO: 40), UGGAgurngn (SEQ ID NO: 46) and UUGAgurngn (SEQ ID NO: 52), wherein r is adenine or guanine and n or N is any nucleotide. In certain embodiments, n is adenine or guanine.

[00117] In certain embodiments, the iREMS comprises an RNA sequence NNGAguragu (SEQ ID NO: 3862), wherein r is adenine or guanine and N is any nucleotide. In a specific embodiment, the RNA sequence NNGAguragu (SEQ ID NO: 3862) is selected from the group consisting of ANGAguragu (SEQ ID NO: 437), CNGAguragu (SEQ ID NO: 443), GNGAguragu (SEQ ID NO: 449), UNGAguragu (SEQ ID NO: 455), NAGAguragu (SEQ ID NO: 438), NCGAguragu (SEQ ID NO: 444), NGGAguragu (SEQ ID NO: 450), NUGAguragu (SEQ ID NO: 456), AAGAguragu (SEQ ID NO: 439), ACGAguragu (SEQ ID NO: 445), AGGAguragu (SEQ ID NO: 451), AUGAguragu (SEQ ID NO: 457), CAGAguragu (SEQ ID NO: 440), CCGAguragu (SEQ ID NO: 446), CGGAguragu (SEQ ID NO: 452), CUGAguragu (SEQ ID NO: 458), GAGAguragu (SEQ ID NO: 441), GCGAguragu (SEQ ID NO: 447), GGGAguragu (SEQ ID NO: 453), GUGAguragu (SEQ ID NO: 459), UAGAguragu (SEQ ID NO: 442), UCGAguragu (SEQ ID NO: 448), UGGAguragu (SEQ ID NO: 454) and UUGAguragu (SEQ ID NO: 460), wherein r is adenine or guanine, and N is any nucleotide. the iREMS comprises an RNA sequence presented in Table 13. In certain embodiments, n is adenine or guanine.

[00118] In another aspect, provided herein is a method for modulating the amount of an RNA transcript produced from a DNA sequence comprising a DNA nucleotide sequence encoding exons and one or more introns, comprising in 5' to 3' order: a branch point, a 3' splice site and an endogenous iREMS; wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

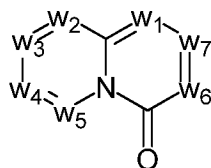
R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00119] In a specific embodiment, the DNA sequence is in a gene selected from: ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARM CX6, ASIC1,

ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1H1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LIG2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRVI1, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG,

PIIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837. In another specific embodiment, the DNA sequence is a gene not disclosed in either International Publication No. WO 2015/105657, International Publication No. WO 2016/196386, or both.

[00120] In another aspect, provided herein is a method for modulating the amount of an RNA transcript produced from a DNA sequence comprising a DNA nucleotide sequence encoding exons and one or more introns, comprising in 5' to 3' order: a branch point, a 3' splice site and a non-endogenous iREMS; wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂,
provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,
(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,
C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino, [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00121] In certain embodiments, the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide. In certain embodiments, n is adenine or guanine. In certain embodiments, the iREMS comprises a DNA sequence NNGAgtrngn (SEQ ID NO: 3), wherein r is adenine or guanine and n or N is any nucleotide. In a specific embodiment, the DNA sequence NNGAgtrngn (SEQ ID NO: 3) is selected from the group consisting of ANGAgtrngn (SEQ ID NO: 1829), CNGAgtrngn (SEQ ID NO: 1835), GNGAgtrngn (SEQ ID NO: 1841), TNGAgtrngn (SEQ ID NO: 1847),

NAGAgtrngn (SEQ ID NO: 1830), NCGAgtrngn (SEQ ID NO: 1836),
 NGGAgtrngn (SEQ ID NO: 1842), NTGAgtrngn (SEQ ID NO: 1848),
 AAGAgtrngn (SEQ ID NO: 1831), ACGAgtrngn (SEQ ID NO: 1837),
 AGGAgtrngn (SEQ ID NO: 1843), ATGAgtrngn (SEQ ID NO: 1849),
 CAGAgtrngn (SEQ ID NO: 1832), CCGAgtrngn (SEQ ID NO: 1838),
 CGGAgtrngn (SEQ ID NO: 1844), CTGAgtrngn (SEQ ID NO: 1850),
 GAGAgtrngn (SEQ ID NO: 1833), GCGAgtrngn (SEQ ID NO: 1839),
 GGGAgtrngn (SEQ ID NO: 1845), GTGAgtrngn (SEQ ID NO: 1851),
 TAGAgtrngn (SEQ ID NO: 1834), TCGAgtrngn (SEQ ID NO: 1840),
 TGGAgtrngn (SEQ ID NO: 1846) and TTGAgtrngn (SEQ ID NO: 1852). In certain
 embodiments, n is adenine or guanine.

[00122] In certain embodiments, the iREMS comprises a DNA sequence NNGAgtragt (SEQ ID NO: 3864), wherein r is adenine or guanine and N is any nucleotide. In a specific embodiment, the DNA sequence NNGAgtragt (SEQ ID NO: 3864) is selected from the group consisting of ANGAgtragt (SEQ ID NO: 2237), CNGAgtragt (SEQ ID NO: 2243), GNGAgtragt (SEQ ID NO: 2249), TNGAgtragt (SEQ ID NO: 2255), NAGAgtragt (SEQ ID NO: 2238), NCGAgtragt (SEQ ID NO: 2244), NGGAgtragt (SEQ ID NO: 2250), NTGAgtragt (SEQ ID NO: 2256), AAGAgtragt (SEQ ID NO: 2239), ACGAgtragt (SEQ ID NO: 2245), AGGAgtragt (SEQ ID NO: 2251), ATGAgtragt (SEQ ID NO: 2257), CAGAgtragt (SEQ ID NO: 2240), CCGAgtragt (SEQ ID NO: 2246), CGGAgtragt (SEQ ID NO: 2252), CTGAgtragt (SEQ ID NO: 2258), GAGAgtragt (SEQ ID NO: 2241), GCGAgtragt (SEQ ID NO: 2247), GGGAgtragt (SEQ ID NO: 2253), GTGAgtragt (SEQ ID NO: 2259), TAGAgtragt (SEQ ID NO: 2242), TCGAgtragt (SEQ ID NO: 2248), TGGAgtragt (SEQ ID NO: 2254) and TTGAgtragt (SEQ ID NO: 2260), wherein r is adenine or guanine, and N is any nucleotide. In a specific embodiment, the iREMS comprises a DNA sequence presented in Table 14. In certain embodiments, n is adenine or guanine. In certain embodiments of the aspects and embodiments described herein, n is adenine or guanine.

[00123] In certain embodiments of a method for modulating the amount of an RNA transcript described herein, modulation of the amount of the RNA transcript is modulation of the amount of

the RNA transcript in a cell or a lysate of the cell, the method comprising contacting the compound of Formula (I) or a form thereof with the cell or the cell lysate. In a specific embodiment of a method for modulating the amount of an RNA transcript described herein, modulation of the amount of the RNA transcript is modulation of the amount of the RNA transcript in a cell, the method comprising contacting the compound of Formula (I) or a form thereof with the cell. In certain embodiments of a method of modulating the amount of an RNA transcript described herein, the modulation modulates the amount and/or type of a protein translated from the RNA transcript and produced in the cell or lysate of the cell.

[00124] In certain embodiments of a method for modulating the amount of an RNA transcript described herein, modulation of the amount of the RNA transcript is modulation of the amount of the RNA transcript in a subject, the method comprising administering the compound of Formula (I) or a form thereof to the subject. In certain embodiments of a method for modulating the amount of an RNA transcript described herein, the modulation modulates the amount and/or type of a protein translated from the RNA transcript and produced in the subject. In a specific embodiment, the subject is a non-human subject. In another specific embodiment, the subject is a human subject.

[00125] In certain embodiments, the RNA transcript encodes a detectable reporter protein.

[00126] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising exons and one or more introns, wherein at least one intron comprises an iREMS that is downstream of a branch point and a 3' splice site and wherein the iREMS comprises the sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In certain embodiments, n is adenine or guanine. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are non-endogenous. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are endogenous.

[00127] In another aspect, provided herein is an artificial gene construct comprising a DNA sequence encoding exons and one or more introns, wherein the nucleotide sequence encoding at least one intron comprises an iREMS that is downstream of the nucleotide sequence encoding a branch point and the nucleotide sequence encoding a 3' splice site, and wherein the iREMS comprises the sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide. In certain embodiments, n is adenine or guanine. In certain embodiments, one, two,

or all of the iREMS, the branch point, and the 3' splice site are non-endogenous. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are endogenous.

[00128] In another aspect, provided herein is a cell comprising an RNA sequence comprising exons and one or more introns, wherein at least one intron comprises an iREMS that is downstream of a branch point and a 3' splice site and wherein the iREMS comprises the sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In certain embodiments, n is adenine or guanine. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are non-endogenous. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are endogenous.

[00129] In another aspect, provided herein is a cell comprising a DNA sequence encoding exons and one or more introns, wherein the nucleotide sequence encoding at least one intron comprises an iREMS that is downstream of the nucleotide sequence encoding a branch point and the nucleotide sequence encoding a 3' splice site, and wherein the iREMS comprises the sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are non-endogenous. In certain embodiments, one, two, or all of the iREMS, the branch point, and the 3' splice site are endogenous.

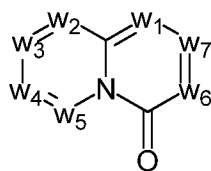
[00130] In another aspect, provided herein is a cell comprising an artificial gene construct described herein.

[00131] In another aspect, provided herein is a cell comprising a vector comprising an artificial gene construct described herein.

[00132] In another aspect, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence comprising in 5' to 3' order: a branch point, a 3' splice site, and an endogenous intronic recognition element for splicing modifier (iREMS), wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the RNA transcript is an RNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARM CX6, ASIC1, ATG5, ATP2A3, ATXN1,

B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPL, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1I1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRV11, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA,

PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837; the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,
 when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,
 wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;
 R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,
 (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,
 C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,
 (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,
 C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,

heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo,

C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

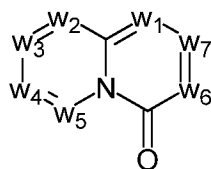
[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00133] In another aspect provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence comprising in 5' to 3' order: a branch point, a 3' splice site and an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS); wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

(hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

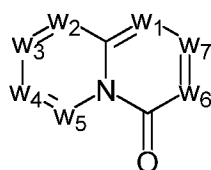
R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00134] In certain embodiments, the RNA transcript is an RNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APLP2, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, AXIN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DLGAP4, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERCC1, ERGIC3, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FAM198B, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GGCT,

GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HAT1, HDX, HLTF, HMGA2, HNMT, HPS1, HSD17B12, HSD17B4, HTT, IFT57, INPP5K, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MADD, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPHLN1, PPIP5K2, PPP1R26, PRPF31, PRSS23, PRUNE2, PSMA4, P XK, RAF1, RAP1A, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RNFT1, RPA1, RPS10, RPS6KB2, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STRN3, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TRIM65, TSPAN2, TTC7B, TUBE1, TYW5, UBAP2L, UBE2V1, URGCP, VAV2, VPS29, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232, ZNF37BP or ZNF680.

[00135] In another aspect, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

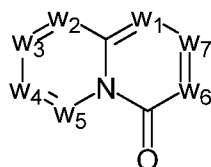
R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00136] In another aspect, provided herein is a method for modulating the amount of an RNA transcript comprising a RNA nucleotide sequence, wherein the RNA nucleotide sequence comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a first branch point and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n

is any nucleotide, the method comprising contacting the RNA transcript with a compound of Formula (I) or a form thereof, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;
 wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally
 substituted with one, two or three R₃ substituents and optionally, with one additional R₄
 substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

[00137] In certain embodiments, the iREMS is an endogenous iREMS, and the RNA transcript is an RNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1I1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFF1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10,

MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRV11, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837.

[00138] In certain embodiments, the iREMS is an endogenous iREMS, and the RNA transcript is an RNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APLP2, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, AXIN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DLGAP4, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERCC1, ERGIC3, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FAM198B, FBN2, FER, FHOD3,

FOCAD, GALC, GCFC2, GGACT, GGCT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HAT1, HDX, HLTf, HMGA2, HNMT, HPS1, HSD17B12, HSD17B4, HTT, IFT57, INPP5K, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MADD, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPHLN1, PPIP5K2, PPP1R26, PRPF31, PRSS23, PRUNE2, PSMA4, PPK, RAF1, RAP1A, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RNFT1, RPA1, RPS10, RPS6KB2, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STRN3, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TRIM65, TSPAN2, TTC7B, TUBE1, TYW5, UBAP2L, UBE2V1, URGCP, VAV2, VPS29, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232, ZNF37BP or ZNF680.

[00139] In certain embodiments, the iREMS is a non-endogenous iREMS. In a specific embodiment, the iREMS is a non-endogenous iREMS and the RNA transcript is an RNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APLP2, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, AXIN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DLGAP4, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERCC1, ERGIC3, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FAM198B, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GGCT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HAT1, HDX, HLTf, HMGA2, HNMT, HPS1, HSD17B12, HSD17B4, HTT, IFT57, INPP5K, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MADD, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19,

MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPHLN1, PPIP5K2, PPP1R26, PRPF31, PRSS23, PRUNE2, PSMA4, PXK, RAF1, RAP1A, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RNFT1, RPA1, RPS10, RPS6KB2, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STRN3, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TRIM65, TSPAN2, TTC7B, TUBE1, TYW5, UBAP2L, UBE2V1, URGCP, VAV2, VPS29, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232, ZNF37BP or ZNF680.

[00140] In one aspect, provided herein is a method for producing a mature mRNA transcript comprising iExon from a pre-mRNA transcript, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In one embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In another embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a cell or cell lysate containing a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form

thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In some embodiments, the pre-mRNA transcript is encoded by a gene disclosed herein (e.g., in a table herein).

[00141] In a particular embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTF, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE,

PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PPK, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP. In another particular embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a cell or cell lysate containing a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTf, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1,

PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP.

[00142] In another aspect, provided herein is a method modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In one embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In another embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting a cell or cell lysate containing the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence

GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In some embodiments, the intron further comprises a first 5' splice site, a second branch point, and a second 3' splice site upstream of the iREMS. In some embodiments, the pre-mRNA transcript is encoded by a gene disclosed herein (e.g., in a table herein).

[00143] In a particular embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1I1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1,

GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRVI1, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, P XK, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-

AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837. In a particular embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting a cell or cell lysate containing the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFN59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC11I, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3,

HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRV11, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKIFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837. In some embodiments, the intron

further comprises a first 5' splice site, a second branch point, and a second 3' splice site upstream of the iREMS.

[00144] In one aspect, provided herein is a method for preventing, treating or preventing and treating a disease or disorder in which a change in the level of expression of one, two, three or more RNA isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, the method comprising administering a compound described herein to a subject in need thereof, wherein the one, two, three or more RNA isoforms are produced from a pre-mRNA transcript comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

[00145] In one aspect, provided herein is a method for preventing, treating or preventing and treating a disease or disorder in which a change in the level of expression of one, two, three or more RNA isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, the method comprising administering a compound described herein to a subject in need thereof, wherein the one, two, three or more RNA isoforms are produced from a pre-mRNA transcript comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

[00146] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising exons and one or more introns, wherein at least one intron comprises an iREMS that is downstream of a branch point and a 3' splice site, and wherein the iREMS comprises the sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

[00147] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron

comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

[00148] In another aspect, provide herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a first branch point and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

[00149] In various embodiments of the aspects and embodiments described herein, the iREMS comprises an RNA sequence GAguragu, wherein r is adenine or guanine.

[00150] In various embodiments of the aspects and embodiments described herein, the iREMS comprises an RNA sequence NNGAgurngn (SEQ ID NO: 1), wherein r is adenine or guanine and n or N is any nucleotide. In a specific embodiment, the RNA sequence

NNGAgurngn (SEQ ID NO: 1) is selected from the group consisting of

ANGAgurngn (SEQ ID NO: 29), CNGAgurngn (SEQ ID NO: 35),

GNGAgurngn (SEQ ID NO: 41), UNGAgurngn (SEQ ID NO: 47),

NAGAgurngn (SEQ ID NO: 30), NCGAgurngn (SEQ ID NO: 36),

NGGAgurngn (SEQ ID NO: 42), NUGAgurngn (SEQ ID NO: 48),

AAGAgurngn (SEQ ID NO: 31), ACGAgurngn (SEQ ID NO: 37),

AGGAgurngn (SEQ ID NO: 43), AUGAgurngn (SEQ ID NO: 49),

CAGAgurngn (SEQ ID NO: 32), CCGAgurngn (SEQ ID NO: 38),

CGGAgurngn (SEQ ID NO: 44), CUGAgurngn (SEQ ID NO: 50),

GAGAgurngn (SEQ ID NO: 33), GCGAgurngn (SEQ ID NO: 39),

GGGAgurngn (SEQ ID NO: 45), GUGAgurngn (SEQ ID NO: 51),

UAGAgurngn (SEQ ID NO: 34), UCGAgurngn (SEQ ID NO: 40),

UGGAgurngn (SEQ ID NO: 46) and UUGAgurngn (SEQ ID NO: 52), wherein r is adenine or guanine and n or N is any nucleotide.

[00151] In various embodiments of the aspects and embodiments described herein, the iREMS comprises an RNA sequence NNGAguragu (SEQ ID NO: 3862), wherein r is adenine or guanine

and N is any nucleotide. In a specific embodiment, the RNA sequence NNGAguragu (SEQ ID NO: 3862) is selected from the group consisting of ANGAguragu (SEQ ID NO: 437), CNGAguragu (SEQ ID NO: 443), GNGAguragu (SEQ ID NO: 449), UNGAguragu (SEQ ID NO: 455), NAGAguragu (SEQ ID NO: 438), NCGAguragu (SEQ ID NO: 444), NGGAguragu (SEQ ID NO: 450), NUGAguragu (SEQ ID NO: 456), AAGAguragu (SEQ ID NO: 439), ACGAguragu (SEQ ID NO: 445), AGGAguragu (SEQ ID NO: 451), AUGAguragu (SEQ ID NO: 457), CAGAguragu (SEQ ID NO: 440), CCGAguragu (SEQ ID NO: 446), CGGAguragu (SEQ ID NO: 452), CUGAguragu (SEQ ID NO: 458), GAGAguragu (SEQ ID NO: 441), GCGAguragu (SEQ ID NO: 447), GGGAguragu (SEQ ID NO: 453), GUGAguragu (SEQ ID NO: 459), UAGAguragu (SEQ ID NO: 442), UCGAguragu (SEQ ID NO: 448), UGGAguragu (SEQ ID NO: 454) and UUGAguragu (SEQ ID NO: 460), wherein r is adenine or guanine, and N is any nucleotide.

[00152] In various embodiments of the method for modulating the amount of an RNA transcript described herein, modulation of the amount of the RNA transcript is modulation of the amount of the RNA transcript in a cell or a lysate of the cell, and the method comprises contacting the compound of Formula (I) or a form thereof with the cell or cell lysate. In a specific embodiment, modulation of the amount of the RNA transcript is modulation of the amount of the RNA transcript in a cell, and the method comprises contacting the compound of Formula (I) or a form thereof with the cell. In a specific embodiment, the modulation modulates the amount and/or type of a protein translated from the RNA transcript and produced in the cell or lysate of the cell.

[00153] In various embodiments of the method for modulating the amount of an RNA transcript described herein, the RNA transcript encodes a detectable reporter protein.

[00154] In another aspect, provided herein is an artificial gene construct comprising a DNA sequence encoding exons and one or more introns, wherein the nucleotide sequence encoding at least one intron comprises an iREMS that is downstream of the nucleotide sequence encoding a branch point and the nucleotide sequence encoding a 3' splice site, and wherein the iREMS

comprises the sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide.

[00155] In another aspect, provided herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the nucleotide sequence encoding the intron comprises in 5' to 3' order: the nucleotide sequence encoding a first 5' splice site, the nucleotide sequence encoding a first branch point, the nucleotide sequence encoding a first 3' splice site, an iREMS, the nucleotide sequence encoding a second branch point and the nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide.

[00156] In another aspect, provide herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the nucleotide sequence encoding the intron comprises in 5' to 3' order: an iREMS, the nucleotide sequence encoding a first branch point and the nucleotide sequence encoding a first 3' splice site, wherein the iREMS comprises an DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide.

[00157] In various embodiments of the aspects and embodiments described herein, the iREMS comprises a DNA sequence GAgtragt, wherein r is adenine or guanine.

[00158] In various embodiments of the aspects and embodiments described herein, the iREMS comprises a DNA sequence NNGAgtrngn (SEQ ID NO: 1), wherein r is adenine or guanine and n or N is any nucleotide. In a specific embodiment, the DNA sequence NNGAgtrngn (SEQ ID NO: 1) is selected from the group consisting of ANGAgtrngn (SEQ ID NO: 29), CNGAgtrngn (SEQ ID NO: 35), GNGAgtrngn (SEQ ID NO: 41), TNGAgtrngn (SEQ ID NO: 47), NAGAgtrngn (SEQ ID NO: 30), NCGAgtrngn (SEQ ID NO: 36), NGGAgtrngn (SEQ ID NO: 42), NTGAgtrngn (SEQ ID NO: 48), AAGAgtrngn (SEQ ID NO: 31), ACGAgtrngn (SEQ ID NO: 37),

AGGAgtrngn (SEQ ID NO: 43), ATGAgtrngn (SEQ ID NO: 49), CAGAgtrngn (SEQ ID NO: 32), CCGAgtrngn (SEQ ID NO: 38), CGGAgtrngn (SEQ ID NO: 44), CTGAgtrngn (SEQ ID NO: 50), GAGAgtrngn (SEQ ID NO: 33), GCGAgtrngn (SEQ ID NO: 39), GGGAgtrngn (SEQ ID NO: 45), GTGAgtrngn (SEQ ID NO: 51), TAGAgtrngn (SEQ ID NO: 34), TCGAgtrngn (SEQ ID NO: 40), TGGAgtrngn (SEQ ID NO: 46) and TTGAgtrngn (SEQ ID NO: 52), wherein r is adenine or guanine and n or N is any nucleotide.

[00159] In various embodiments of the aspects and embodiments described herein, the iREMS comprises a DNA sequence NNGAgtragt (SEQ ID NO: 3862), wherein r is adenine or guanine and N is any nucleotide. In a specific embodiment, the DNA sequence NNGAgtragt (SEQ ID NO: 3862) is selected from the group consisting of ANGAgtragt (SEQ ID NO: 437), CNGAgtragt (SEQ ID NO: 443), GNGAgtragt (SEQ ID NO: 449), TNGAgtragt (SEQ ID NO: 455), NAGAgtragt (SEQ ID NO: 438), NCGAgtragt (SEQ ID NO: 444), NGGAgtragt (SEQ ID NO: 450), NTGAgtragt (SEQ ID NO: 456), AAGAgtragt (SEQ ID NO: 439), ACGAgtragt (SEQ ID NO: 445), AGGAgtragt (SEQ ID NO: 451), ATGAgtragt (SEQ ID NO: 457), CAGAgtragt (SEQ ID NO: 440), CCGAgtragt (SEQ ID NO: 446), CGGAgtragt (SEQ ID NO: 452), CTGAgtragt (SEQ ID NO: 458), GAGAgtragt (SEQ ID NO: 441), GCGAgtragt (SEQ ID NO: 447), GGGAgtragt (SEQ ID NO: 453), GTGAgtragt (SEQ ID NO: 459), TAGAgtragt (SEQ ID NO: 442), TCGAgtragt (SEQ ID NO: 448), TGGAgtragt (SEQ ID NO: 454) and TTGAgtragt (SEQ ID NO: 460), wherein r is adenine or guanine, and N is any nucleotide.

BRIEF DESCRIPTION OF THE DRAWINGS

[00160] **Figures 1A-1C.** Representative schematics of intronic exon splicing mediated by an intronic REMS, where 5'ss represents a 5' splice site, 3'ss represents a 3' splice site and BP represents a splicing branch point. Exon 1e and Exon 2e represent extended exons. iExon 1a

represents an intronic exon. Splicing events mediated by an intronic REMS in the absence of a compound described herein are illustrated by solid lines, splicing events mediated by an intronic REMS in the presence of a compound described herein are illustrated by dashed lines.

[00161] Figures 2A-2D, 3, 4, 5, 6A. The dose dependent production of iExons for certain genes (as specified in the figures) in the presence of certain compounds or control (DMSO) are shown, each of which represent aspects of the operation of an intronic REMS and compounds as described herein. Compounds used in the experiments depicted in Figures 3, 4, 5, and 6A are described herein. Compound 774 was used for the experiments depicted in Figures 2A-2D.

[00162] Figures 6B and 6C. Figure 6B illustrates the production of exon isoforms with control (DMSO). Figure 6C illustrates the production of certain intronic Exon isoforms for ELMO2 in the presence of a compound described herein, each of which represent aspects of the interactions of an intronic REMS, one or more branch points, one or more 3' splice sites and compounds as described herein.

DETAILED DESCRIPTION

INTRONIC RECOGNITION ELEMENT FOR SPLICING MODIFIER (REMS)

[00163] In one aspect, provided herein is an intronic recognition element for splicing modifier (otherwise referred to as “iREMS”) recognized by a small molecule splicing modifier, whereby elements of the associated iREMS complex affect interactions with the spliceosome as further described herein. In a specific embodiment, the intronic REMS has the nucleotide sequence GAgurngn (SEQ ID NO: 2) at the RNA level, wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n is any nucleotide. In another specific embodiment, the intronic REMS has the nucleotide sequence GAguragu (SEQ ID NO: 3866) at the RNA level, wherein r is adenine or guanine. In one or more of such specific embodiments provided herein, n is adenine or guanine. In a more specific embodiment, the intronic REMS has the nucleotide sequence NNGAgurngn (SEQ ID NO: 1) at the RNA level, wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n or N is any nucleotide. In another more specific embodiment, the intronic REMS has the nucleotide sequence NNGAguragu (SEQ ID NO: 3862) at the RNA level, wherein r is adenine or guanine and N is any nucleotide. In one or more of such more specific embodiments provided herein, N is adenine or guanine.

[00164] In another specific embodiment, the intronic REMS is downstream of an intronic branch point and a functional intronic 3' splice site, wherein the intronic REMS comprises a nucleotide sequence selected from the group consisting of ANGAgurngn (SEQ ID NO: 29), CNGAgurngn (SEQ ID NO: 35), GNGAgurngn (SEQ ID NO: 41), UNGAgurngn (SEQ ID NO: 47), NAGAgurngn (SEQ ID NO: 30), NCGAgurngn (SEQ ID NO: 36), NGGAgurngn (SEQ ID NO: 42), NUGAgurngn (SEQ ID NO: 48), AAGAgurngn (SEQ ID NO: 31), ACGAgurngn (SEQ ID NO: 37), AGGAgurngn (SEQ ID NO: 43), AUGAgurngn (SEQ ID NO: 49), CAGAgurngn (SEQ ID NO: 32), CCGAgurngn (SEQ ID NO: 38), CGGAgurngn (SEQ ID NO: 44), CUGAgurngn (SEQ ID NO: 50), GAGAgurngn (SEQ ID NO: 33), GCGAgurngn (SEQ ID NO: 39), GGGAgurngn (SEQ ID NO: 45), GUGAgurngn (SEQ ID NO: 51), UAGAgurngn (SEQ ID NO: 34), UCGAgurngn (SEQ ID NO: 40), UGGAgurngn (SEQ ID NO: 46) and UUGAgurngn (SEQ ID NO: 52) at the RNA level, wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n or N is any nucleotide, by which the intronic REMS, in the presence of a compound described herein, functions as an intronic 5' splice site, causing the NNGA (SEQ ID NO: 3863) nucleotides of the REMS and the intronic nucleotide sequence between the intronic 3' splice site down to and including the NNGA (SEQ ID NO: 3863) nucleotides to be spliced into the mature RNA as an intronic exon to provide a non-wild-type, nonfunctional mRNA.

[00165] In a preferred embodiment, the REMS has a nucleotide sequence selected from the group consisting of ANGAguragu (SEQ ID NO: 437), CNGAguragu (SEQ ID NO: 443), GNGAguragu (SEQ ID NO: 449), UNGAguragu (SEQ ID NO: 455), NAGAguragu (SEQ ID NO: 438), NCGAguragu (SEQ ID NO: 444), NGGAguragu (SEQ ID NO: 450), NUGAguragu (SEQ ID NO: 456), AAGAguragu (SEQ ID NO: 439), ACGAguragu (SEQ ID NO: 445), AGGAguragu (SEQ ID NO: 451), AUGAguragu (SEQ ID NO: 457), CAGAguragu (SEQ ID NO: 440), CCGAguragu (SEQ ID NO: 446), CGGAguragu (SEQ ID NO: 452), CUGAguragu (SEQ ID NO: 458), GAGAguragu (SEQ ID NO: 441), GCGAguragu (SEQ ID NO: 447),

GGGAguragu (SEQ ID NO: 453), GUGAguragu (SEQ ID NO: 459), UAGAguragu (SEQ ID NO: 442), UCGAguragu (SEQ ID NO: 448), UGGAguragu (SEQ ID NO: 454) and UUGAguragu (SEQ ID NO: 460) at the RNA level, wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and N is any nucleotide. In one or more embodiments provided herein, N is A or G.

[00166] In the context of DNA, in a specific embodiment, the nucleotide sequence encoding an intronic REMS has the sequence GAgtrngn (SEQ ID NO: 4), wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n is any nucleotide. In another specific embodiment, in the context of DNA, the nucleotide sequence encoding an intronic REMS has the sequence GAgtragt (SEQ ID NO: 3865), wherein r is A or G. In a specific embodiment, in the context of DNA, the nucleotide sequence encoding an intronic REMS has the sequence NNGAgtrngn (SEQ ID NO: 3), wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n or N is any nucleotide. In another specific embodiment, in the context of DNA, the nucleotide sequence encoding an intronic REMS has the sequence NNGAgtragt (SEQ ID NO: 3864), wherein r is A or G and N is any nucleotide.

[00167] In a specific embodiment, in the context of DNA, the nucleotide sequence encoding an intronic REMS comprises a sequence selected from the group consisting of ANGAgtrngn (SEQ ID NO: 1829), CNGAgtrngn (SEQ ID NO: 1835), GNGAgtrngn (SEQ ID NO: 1841), TNGAgtrngn (SEQ ID NO: 1847), NAGAgtrngn (SEQ ID NO: 1830), NCGAgtrngn (SEQ ID NO: 1836), NGGAgtrngn (SEQ ID NO: 1842), NTGAgtrngn (SEQ ID NO: 1848), AAGAgtrngn (SEQ ID NO: 1831), ACGAgtrngn (SEQ ID NO: 1837), AGGAgtrngn (SEQ ID NO: 1843), ATGAgtrngn (SEQ ID NO: 1849), CAGAgtrngn (SEQ ID NO: 1832), CCGAgtrngn (SEQ ID NO: 1838), CGGAgtrngn (SEQ ID NO: 1844), CTGAgtrngn (SEQ ID NO: 1850), GAGAgtrngn (SEQ ID NO: 1833), GCGAgtrngn (SEQ ID NO: 1839), GGGAgtrngn (SEQ ID NO: 1845), GTGAgtrngn (SEQ ID NO: 1851), TAGAgtrngn (SEQ ID NO: 1834), TCGAgtrngn (SEQ ID NO: 1840), TGGAgtrngn (SEQ ID NO: 1846) and TTGAgtrngn (SEQ ID NO: 1852), wherein r is A or G (*i.e.*, a purine nucleotide adenine or guanine) and n or N is any nucleotide.

[00168] In a preferred embodiment, in the context of DNA, the nucleotide sequence encoding the intronic REMS comprises a sequence selected from the group consisting of ANGAgtragt (SEQ ID NO: 2237), CNGAgtragt (SEQ ID NO: 2243), GNGAgtragt (SEQ ID NO: 2249), TNGAgtragt (SEQ ID NO: 2255), NAGAgtragt (SEQ ID NO: 2238), NCGAgtragt (SEQ ID NO: 2244), NGGAgtragt (SEQ ID NO: 2250), NTGAgtragt (SEQ ID NO: 2256), AAGAgtragt (SEQ ID NO: 2239), ACGAgtragt (SEQ ID NO: 2245), AGGAgtragt (SEQ ID NO: 2251), ATGAgtragt (SEQ ID NO: 2257), CAGAgtragt (SEQ ID NO: 2240), CCGAgtragt (SEQ ID NO: 2246), CGGAgtragt (SEQ ID NO: 2252), CTGAgtragt (SEQ ID NO: 2258), GAGAgtragt (SEQ ID NO: 2241), GCGAgtragt (SEQ ID NO: 2247), GGGAgtragt (SEQ ID NO: 2253), GTGAgtragt (SEQ ID NO: 2259), TAGAgtragt (SEQ ID NO: 2242), TCGAgtragt (SEQ ID NO: 2248), TGGAgtragt (SEQ ID NO: 2254) and TTGAgtragt (SEQ ID NO: 2260), wherein r is A or G and N is any nucleotide. In one or more embodiments provided herein, N is A or G.

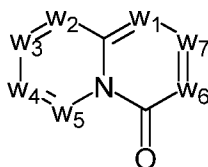
[00169] An intronic REMS can be part of an endogenous RNA or can be introduced into an RNA sequence that does not naturally contain the intronic REMS sequence (in which case, the introduced intronic REMS is a non-endogenous intronic REMS, i.e., an intronic REMS not naturally present in the corresponding RNA. A nucleotide sequence encoding an intronic REMS can also be part of an endogenous DNA sequence, or a nucleotide sequence encoding the intronic REMS can be introduced into a DNA sequence that does not naturally contain the nucleotide sequence encoding an intronic REMS.

[00170] In a specific embodiment, the intronic REMS is located in an intron which further comprises is downstream of a branch point and a functional 3' splice site which, in the presence of a small molecule splicing modifier, enables the REMS to function as a 5' splice site. In a specific embodiment, the intronic REMS is located in an intron and is downstream of a branch point and a functional 3' splice site which, in the presence of a small molecule splicing modifier, enables the REMS to function as a 5' splice site. Without being bound by any theory or mechanism, the small molecule compounds described herein have been shown to increase the affinity of the interaction between the U1 snRNP, as well as other components of the pre-mRNA splicing machinery, and the nucleotides NNGA (SEQ ID NO: 3863) of the REMS whereby, in

the presence of the compound, the intronic REMS functions as a U1 snRNP binding site, causing the intronic nucleotides to be spliced as an intronic exon.

COMPOUNDS

[00171] Provided herein are compounds of Formula (I) for use in the methods described herein:



(I)

[00172] or a form thereof, wherein:

[00173] w_1 and w_5 are independently C- R_a or N;

[00174] w_2 is C- R_b or N;

[00175] w_3 , w_4 and w_7 are independently C- R_1 , C- R_2 , C- R_a or N;

[00176] w_6 is C- R_1 , C- R_2 , C- R_c or N;

[00177] wherein one of w_3 , w_4 , w_6 and w_7 is C- R_1 and one other of w_3 , w_4 , w_6 and w_7 is C- R_2 , provided that,

[00178] when w_3 is C- R_1 , then w_6 is C- R_2 and w_4 and w_7 are independently C- R_a or N; or,

[00179] when w_3 is C- R_2 , then w_6 is C- R_1 and w_4 and w_7 are independently C- R_a or N; or,

[00180] when w_4 is C- R_1 , then w_7 is C- R_2 and w_3 is C- R_a or N and w_6 is C- R_c or N; or,

[00181] when w_4 is C- R_2 , then w_7 is C- R_1 and w_3 is C- R_a or N and w_6 is C- R_c or N; and,

[00182] wherein any one, two or three of w_1 , w_2 , w_3 , w_4 , w_5 , w_6 and w_7 may optionally be N;

[00183] R_1 is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl,

(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,

amino-C₁₋₈alkyl-amino, (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy, C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 amino-C₂₋₈alkenyl, C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl,
 amino-C₂₋₈alkynyl, C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl,
 halo-C₁₋₈alkyl-amino, (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino,
 (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl,
 heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino,
 (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino,
 (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

[00184] wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

[00185] wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

[00186] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

[00187] wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

[00188] R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

[00189] R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

[00190] R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

[00191] R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

[00192] R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

[00193] R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

[00194] R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and,

- [00195] R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.
- [00196] In one embodiment of the use of a compound of Formula (I), w₁ is C-R_a.
- [00197] In another embodiment of the use of a compound of Formula (I), w₁ is N.
- [00198] In one embodiment of the use of a compound of Formula (I), w₂ is C-R_b.
- [00199] In another embodiment of the use of a compound of Formula (I), w₂ is N.
- [00200] In one embodiment of the use of a compound of Formula (I), w₃ is C-R_a.
- [00201] In another embodiment of the use of a compound of Formula (I), w₃ is N.
- [00202] In one embodiment of the use of a compound of Formula (I), w₄ is C-R_a.
- [00203] In another embodiment of the use of a compound of Formula (I), w₄ is N.
- [00204] In one embodiment of the use of a compound of Formula (I), w₅ is C-R_a.
- [00205] In another embodiment of the use of a compound of Formula (I), w₅ is N.
- [00206] In one embodiment of the use of a compound of Formula (I), w₆ is C-R_c.
- [00207] In another embodiment of the use of a compound of Formula (I), w₆ is N.
- [00208] In one embodiment of the use of a compound of Formula (I), w₇ is C-R_a.
- [00209] In another embodiment of the use of a compound of Formula (I), w₇ is N.
- [00210] In one embodiment of the use of a compound of Formula (I), w₃ is C-R₁ and w₆ is C-R₂.
- [00211] In another embodiment of the use of a compound of Formula (I), w₃ is C-R₂ and w₆ is C-R₁.
- [00212] In one embodiment of the use of a compound of Formula (I), w₄ is C-R₁ and w₇ is C-R₂.
- [00213] In another embodiment of the use of a compound of Formula (I), w₄ is C-R₂ and w₇ is C-R₁.
- [00214] In one embodiment of the use of a compound of Formula (I), w₃ is C-R₁, w₆ is C-R₂ and w₁, w₄, w₅ and w₇ are independently C-R_a or N and w₂ is C-R_b or N.
- [00215] In another embodiment of the use of a compound of Formula (I), w₃ is C-R₂, w₆ is C-R₁ and w₁, w₄, w₅ and w₇ are independently C-R_a or N and w₂ is C-R_b or N.
- [00216] In one embodiment of the use of a compound of Formula (I), w₄ is C-R₁, w₇ is C-R₂, w₁, w₃ and w₅ are independently C-R_a or N, w₂ is C-R_b or N and w₆ is C-R_c or N.
- [00217] In another embodiment of the use of a compound of Formula (I), w₄ is C-R₂, w₇ is C-R₁, w₁, w₃ and w₅ are independently C-R_a or N, w₂ is C-R_b or N and w₆ is C-R_c or N.

- [00218] In one embodiment of the use of a compound of Formula (I), w_1 and w_2 are N.
- [00219] In one embodiment of the use of a compound of Formula (I), w_1 and w_3 are N.
- [00220] In one embodiment of the use of a compound of Formula (I), w_1 and w_4 are N.
- [00221] In one embodiment of the use of a compound of Formula (I), w_1 and w_5 are N.
- [00222] In one embodiment of the use of a compound of Formula (I), w_1 and w_6 are N.
- [00223] In one embodiment of the use of a compound of Formula (I), w_1 and w_7 are N.
- [00224] In one embodiment of the use of a compound of Formula (I),
- [00225] R_1 is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy, C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl, C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl, C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino, (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino, [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,

[(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00226] In another embodiment of the use of a compound of Formula (I),

[00227] R₁ is amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy, C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl, C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl, C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino, (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino, [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00228] In another embodiment of the use of a compound of Formula (I),

[00229] R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy, C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 amino-C₂₋₈alkenyl, C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl,
 amino-C₂₋₈alkynyl, C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl,
 halo-C₁₋₈alkyl-amino, (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino or
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino.

[00230] In another embodiment of the use of a compound of Formula (I),

[00231] R₁ is heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy,
 heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl,
 aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl,
 heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino,
 (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl,
 C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00232] In another embodiment of the use of a compound of Formula (I),

[00233] R₁ is heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl or heterocyclyl-carbonyl-oxy; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00234] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl optionally substituted with R₃ and R₄ substituents.

[00235] In another embodiment of the use of a compound of Formula (I), R₁ is C₃₋₁₄cycloalkyl optionally substituted with R₃ and R₄ substituents.

[00236] In another embodiment of the use of a compound of Formula (I),

[00237] R₁ is aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of aryl is optionally substituted with R₃ and R₄ substituents.

[00238] In another embodiment of the use of a compound of Formula (I), R₁ is aryl-C₁₋₈alkyl-amino optionally substituted with R₃ and R₄ substituents.

[00239] In another embodiment of the use of a compound of Formula (I),

[00240] R₁ is heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00241] In another embodiment of the use of a compound of Formula (I), R₁ is heteroaryl optionally substituted with R₃ and R₄ substituents.

[00242] In one embodiment of the use of a compound of Formula (I),

[00243] R₁ is heterocyclyl selected from azetidiny, tetrahydrofurany, pyrrolidinyl, piperidinyl, piperazinyl, 1,4-diazepanyl, 1,2,5,6-tetrahydropyridinyl, 1,2,3,6-tetrahydropyridinyl,

hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, (3*aR*,6*aR*)-hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, hexahydropyrrolo[3,4-*b*]pyrrol-(2*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-(2*H*)-yl, hexahydropyrrolo[3,4-*c*]pyrrol-(1*H*)-yl, (3*aR*,6*aS*)-hexahydropyrrolo[3,4-*c*]pyrrol-(1*H*)-yl, octahydro-5*H*-pyrrolo[3,2-*c*]pyridinyl, octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, (4*aR*,7*aR*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, (4*aS*,7*aS*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, hexahydropyrrolo[1,2-*a*]pyrazin-(2*H*)-one, hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (7*R*,8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aR*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aS*)-octahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aR*)-octahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, octahydro-2*H*-pyrido[1,2-*a*]pyrazinyl, 3-azabicyclo[3.1.0]hexyl, (1*R*,5*S*)-3-azabicyclo[3.1.0]hexyl, 8-azabicyclo[3.2.1]octyl, (1*R*,5*S*)-8-azabicyclo[3.2.1]octyl, 8-azabicyclo[3.2.1]oct-2-enyl, (1*R*,5*S*)-8-azabicyclo[3.2.1]oct-2-enyl, 9-azabicyclo[3.3.1]nonyl, (1*R*,5*S*)-9-azabicyclo[3.3.1]nonyl, 2,5-diazabicyclo[2.2.1]heptyl, (1*S*,4*S*)-2,5-diazabicyclo[2.2.1]heptyl, 2,5-diazabicyclo[2.2.2]octyl, 3,8-diazabicyclo[3.2.1]octyl, (1*R*,5*S*)-3,8-diazabicyclo[3.2.1]octyl, 1,4-diazabicyclo[3.2.2]nonyl, azaspiro[3.3]heptyl, 2,6-diazaspiro[3.3]heptyl, 2,7-diazaspiro[3.5]nonyl, 5,8-diazaspiro[3.5]nonyl, 2,7-diazaspiro[4.4]nonyl or 6,9-diazaspiro[4.5]decyl; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00244] In another embodiment of the use of a compound of Formula (I),

[00245] R₁ is heterocyclyl selected from azetidin-1-yl, tetrahydrofuran-3-yl, pyrrolidin-1-yl, piperidin-1-yl, piperidin-4-yl, piperazin-1-yl, 1,4-diazepan-1-yl, 1,2,5,6-tetrahydropyridin-5-yl, 1,2,3,6-tetrahydropyridin-4-yl, hexahydropyrrolo[3,4-*b*]pyrrol-1(2*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-1(2*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-5(1*H*)-yl, (3*aR*,6*aR*)-hexahydropyrrolo[3,4-*b*]pyrrol-5(1*H*)-yl, hexahydropyrrolo[3,4-*c*]pyrrol-2(1*H*)-yl, (3*aR*,6*aS*)-hexahydropyrrolo[3,4-*c*]pyrrol-2(1*H*)-yl, octahydro-5*H*-pyrrolo[3,2-*c*]pyridin-5-yl, octahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl, (4*aR*,7*aR*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl, (4*aS*,7*aS*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl, hexahydropyrrolo[1,2-*a*]pyrazin-6(2*H*)-one, hexahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl, (7*R*,8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl, (8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl, (8*aR*)-hexahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl,

(8a*S*)-octahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl, (8a*R*)-octahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl, octahydro-2*H*-pyrido[1,2-*a*]pyrazin-2-yl, 3-azabicyclo[3.1.0]hex-3-yl, 8-azabicyclo[3.2.1]oct-3-yl, (1*R*,5*S*)-8-azabicyclo[3.2.1]oct-3-yl, 8-azabicyclo[3.2.1]oct-2-en-3-yl, (1*R*,5*S*)-8-azabicyclo[3.2.1]oct-2-en-3-yl, 9-azabicyclo[3.3.1]non-3-yl, (1*R*,5*S*)-9-azabicyclo[3.3.1]non-3-yl, 2,5-diazabicyclo[2.2.1]hept-2-yl, (1*S*,4*S*)-2,5-diazabicyclo[2.2.1]hept-2-yl, 2,5-diazabicyclo[2.2.2]oct-2-yl, 3,8-diazabicyclo[3.2.1]oct-3-yl, (1*R*,5*S*)-3,8-diazabicyclo[3.2.1]oct-3-yl, 1,4-diazabicyclo[3.2.2]non-4-yl, azaspiro[3.3]hept-2-yl, 2,6-diazaspiro[3.3]hept-2-yl, 2,7-diazaspiro[3.5]non-7-yl, 5,8-diazaspiro[3.5]non-8-yl, 2,7-diazaspiro[4.4]non-2-yl or 6,9-diazaspiro[4.5]dec-9-yl; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00246] In another embodiment of the use of a compound of Formula (I),

[00247] R₁ is substituted heterocyclyl selected from 4-methyl-1,4-diazepan-1-yl,

(3a*S*,6a*S*)-1-methylhexahydropyrrolo[3,4-*b*]pyrrol-5(1*H*)-yl,

(3a*S*,6a*S*)-5-methylhexahydropyrrolo[3,4-*b*]pyrrol-1(2*H*)-yl,

(3a*R*,6a*R*)-1-methylhexahydropyrrolo[3,4-*b*]pyrrol-5(1*H*)-yl,

(3a*R*,6a*S*)-5-methylhexahydropyrrolo[3,4-*c*]pyrrol-2(1*H*)-yl,

(3a*R*,6a*S*)-5-(2-hydroxyethyl)hexahydropyrrolo[3,4-*c*]pyrrol-2(1*H*)-yl,

(3a*R*,6a*S*)-5-(propan-2-yl)hexahydropyrrolo[3,4-*c*]pyrrol-2(1*H*)-yl,

(3a*R*,6a*S*)-5-ethylhexahydropyrrolo[3,4-*c*]pyrrol-2(1*H*)-yl,

(4a*R*,7a*R*)-1-methyloctahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl,

(4a*R*,7a*R*)-1-ethyloctahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl,

(4a*R*,7a*R*)-1-(2-hydroxyethyl)octahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl,

(4a*S*,7a*S*)-1-methyloctahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl,

(4a*S*,7a*S*)-1-(2-hydroxyethyl)octahydro-6*H*-pyrrolo[3,4-*b*]pyridin-6-yl,

(7*R*,8a*S*)-7-hydroxyhexahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl,

(8a*S*)-8a-methyloctahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl,

(8a*R*)-8a-methyloctahydropyrrolo[1,2-*a*]pyrazin-2(1*H*)-yl,

(1*R*,5*S*,6*s*)-6-(dimethylamino)-3-azabicyclo[3.1.0]hex-3-yl,

(1*R*,5*S*)-8-methyl-8-azabicyclo[3.2.1]oct-3-yl, 9-methyl-9-azabicyclo[3.3.1]non-3-yl,

(3-*exo*)-9-methyl-9-azabicyclo[3.3.1]non-3-yl, (1*R*,5*S*)-9-methyl-9-azabicyclo[3.3.1]non-3-yl,

(1*S*,4*S*)-5-methyl-2,5-diazabicyclo[2.2.1]hept-2-yl or
(1*S*,4*S*)-5-ethyl-2,5-diazabicyclo[2.2.1]hept-2-yl.

[00248] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-C₁₋₈alkyl, wherein heterocyclyl is selected from morpholinyl, piperidinyl, piperazinyl, imidazolyl or pyrrolidinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00249] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-C₁₋₈alkyl selected from morpholin-4-yl-methyl, morpholin-4-yl-ethyl, morpholin-4-yl-propyl, piperidin-1-yl-methyl, piperazin-1-yl-methyl, piperazin-1-yl-ethyl, piperazin-1-yl-propyl, piperazin-1-yl-butyl, imidazol-1-yl-methyl, imidazol-1-yl-ethyl, imidazol-1-yl-propyl, imidazol-1-yl-butyl, pyrrolidin-1-yl-methyl, pyrrolidin-1-yl-ethyl, pyrrolidin-1-yl-propyl or pyrrolidin-1-yl-butyl; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00250] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-C₁₋₈alkoxy, wherein heterocyclyl is selected from pyrrolidinyl, piperidinyl or morpholinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00251] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-C₁₋₈alkoxy selected from pyrrolidin-2-yl-methoxy, pyrrolidin-2-yl-ethoxy, pyrrolidin-1-yl-methoxy, pyrrolidin-1-yl-ethoxy, piperidin-1-yl-methoxy, piperidin-1-yl-ethoxy, morpholin-4-yl-methoxy or morpholin-4-yl-ethoxy; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00252] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-amino, wherein heterocyclyl is selected from azetidiny, pyrrolidinyl, piperidinyl, 9-azabicyclo[3.3.1]nonyl or (1*R*,5*S*)-9-azabicyclo[3.3.1]nonyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00253] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-amino selected from azetidin-3-yl-amino, pyrrolidin-3-yl-amino, piperidin-4-yl-amino, 9-azabicyclo[3.3.1]non-3-yl-amino, (1*R*,5*S*)-9-azabicyclo[3.3.1]non-3-yl-amino, 9-methyl-9-azabicyclo[3.3.1]non-3-yl-amino, (3-*exo*)-9-methyl-9-azabicyclo[3.3.1]non-3-yl-amino or (1*R*,5*S*)-9-methyl-9-

azabicyclo[3.3.1]non-3-yl-amino; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00254] In one embodiment of the use of a compound of Formula (I), R₁ is (heterocyclyl)(C₁₋₈alkyl)amino, wherein heterocyclyl is selected from pyrrolidinyl or piperidinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00255] In another embodiment of the use of a compound of Formula (I), R₁ is (heterocyclyl)(C₁₋₈alkyl)amino selected from (pyrrolidin-3-yl)(methyl)amino or (piperidin-4-yl)(methyl)amino; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00256] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-amino-C₁₋₈alkyl, wherein heterocyclyl is selected from tetrahydrofuranyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00257] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-amino-C₁₋₈alkyl, selected from 3-(tetrahydrofuran-3-yl-amino)propyl; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00258] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, wherein heterocyclyl is selected from tetrahydrofuranyl, thienyl or pyridinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00259] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, selected from 3-[(tetrahydrofuran-2-ylmethyl)amino]propyl, 3-[(thienyl-3-ylmethyl)amino]propyl, 3-[(pyridin-2-ylmethyl)amino]propyl or 3-[(pyridin-4-ylmethyl)amino]propyl; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00260] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-oxy, wherein heterocyclyl is selected from pyrrolidinyl or piperidinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00261] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-oxy selected from pyrrolidin-3-yl-oxy or piperidin-4-yl-oxy; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00262] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-carbonyl, wherein heterocyclyl is selected from piperazinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00263] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-carbonyl selected from piperazin-1-yl-carbonyl; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00264] In one embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-carbonyl-oxy, wherein heterocyclyl is selected from piperazinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00265] In another embodiment of the use of a compound of Formula (I), R₁ is heterocyclyl-carbonyl-oxy selected from piperazin-1-yl-carbonyl-oxy; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents.

[00266] In one embodiment of the use of a compound of Formula (I), R₁ is C₃₋₁₄cycloalkyl selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cyclohexenyl or cycloheptyl; wherein, each instance of C₃₋₁₄cycloalkyl is optionally substituted with R₃ and R₄ substituents.

[00267] In another embodiment of the use of a compound of Formula (I), R₁ is C₃₋₈cycloalkyl selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cyclohexenyl or cycloheptyl; wherein, each instance of C₃₋₈cycloalkyl is optionally substituted with R₃ and R₄ substituents.

[00268] In one embodiment of the use of a compound of Formula (I), R₁ is aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, wherein aryl is selected from phenyl; and, wherein, each instance of aryl is optionally substituted with R₃ and R₄ substituents.

[00269] In another embodiment of the use of a compound of Formula (I), R₁ is aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl selected from 3-(benzylamino)propyl; wherein, each instance of aryl is optionally substituted with R₃ and R₄ substituents.

[00270] In one embodiment of the use of a compound of Formula (I), R₁ is heteroaryl, wherein heteroaryl is selected from pyridinyl; and, wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00271] In another embodiment of the use of a compound of Formula (I), R₁ is heteroaryl selected from pyridin-4-yl; wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00272] In one embodiment of the use of a compound of Formula (I), R₁ is heteroaryl-C₁₋₈alkyl, wherein heteroaryl is selected from 1*H*-imidazolyl; and, wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00273] In another embodiment of the use of a compound of Formula (I), R₁ is heteroaryl-C₁₋₈alkyl selected from 1*H*-imidazol-1-yl-methyl; wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00274] In one embodiment of the use of a compound of Formula (I), R₁ is (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, wherein heteroaryl is selected from pyridinyl; and, wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00275] In another embodiment of the use of a compound of Formula (I), R₁ is (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino selected from (pyridin-3-ylmethyl)(methyl)amino; wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00276] In one embodiment of the use of a compound of Formula (I), R₁ is heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, wherein heteroaryl is selected from thienyl or pyridinyl; and, wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00277] In another embodiment of the use of a compound of Formula (I), R₁ is heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl selected from thien-3-yl-methyl-amino-propyl, pyridin-2-yl-methyl-amino-propyl, pyridin-3-yl-methyl-amino-propyl or pyridin-4-yl-methyl-amino-propyl; wherein, each instance of heteroaryl is optionally substituted with R₃ and R₄ substituents.

[00278] In one embodiment of the use of a compound of Formula (I), R₃ is selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino.

[00279] In another embodiment of the use of a compound of Formula (I), R₃ is selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl,

C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino.

[00280] In one embodiment of the use of a compound of Formula (I), R₃ is C₁₋₈alkyl selected from methyl, ethyl, propyl, isopropyl or tert-butyl.

[00281] In another embodiment of the use of a compound of Formula (I), R₃ is C₁₋₈alkyl selected from ethyl, propyl, isopropyl or tert-butyl.

[00282] In one embodiment of the use of a compound of Formula (I), R₃ is halo-C₁₋₈alkyl selected from trihalo-methyl, dihalo-methyl, halo-methyl, trihalo-ethyl, dihalo-ethyl, halo-ethyl, trihalo-propyl, dihalo-propyl or halo-propyl; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00283] In another embodiment of the use of a compound of Formula (I), R₃ is halo-C₁₋₈alkyl selected from trihalo-methyl, dihalo-methyl, halo-methyl, trihalo-ethyl, dihalo-ethyl, trihalo-propyl or dihalo-propyl; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00284] In one embodiment of the use of a compound of Formula (I), R₃ is hydroxy-C₁₋₈alkyl selected from hydroxy-methyl, hydroxy-ethyl, hydroxy-propyl, dihydroxy-propyl, hydroxy-butyl or dihydroxy-butyl.

[00285] In another embodiment of the use of a compound of Formula (I), R₃ is hydroxy-C₁₋₈alkyl selected from hydroxy-methyl, dihydroxy-propyl, hydroxy-butyl or dihydroxy-butyl.

[00286] In one embodiment of the use of compound of Formula (I), R₃ is C₁₋₈alkoxy selected from methoxy, ethoxy, propoxy or isopropoxy.

[00287] In one embodiment of the use of a compound of Formula (I), R₃ is halo-C₁₋₈alkoxy selected from trihalo-methoxy, dihalo-methoxy, halo-methoxy, trihalo-ethoxy, dihalo-ethoxy, halo-ethoxy, trihalo-propoxy, dihalo-propoxy or halo-propoxy; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00288] In one embodiment of the use of a compound of Formula (I), R₃ is C₁₋₈alkoxy-carbonyl-amino selected from methoxy-carbonyl-amino, ethoxy-carbonyl-amino, propoxy-carbonyl-amino, isopropoxy-carbonyl-amino, tert-butoxy-carbonyl-amino.

[00289] In one embodiment of the use of a compound of Formula (I), R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl.

[00290] In one embodiment of the use of a compound of Formula (I), R_a is, in each instance, optionally and independently deuterium.

[00291] In one embodiment of the use of a compound of Formula (I), R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy.

[00292] In one embodiment of the use of a compound of Formula (I), R_c is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl.

[00293] In one embodiment of the use of a compound of Formula (I), R_c is, in each instance, optionally and independently deuterium.

[00294] In one embodiment of the use of a compound of Formula (I), R_b is deuterium.

[00295] In one embodiment of the use of a compound of Formula (I), R₄ is C₃₋₁₄cycloalkyl selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl; wherein, each instance of C₃₋₁₄cycloalkyl is optionally substituted with R₅ substituents.

[00296] In another embodiment of the use of a compound of Formula (I), R₄ is C₃₋₈cycloalkyl selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl; wherein, each instance of C₃₋₈cycloalkyl is optionally substituted with R₅ substituents.

[00297] In one embodiment of the use of a compound of Formula (I), R₄ is C₃₋₁₄cycloalkyl-C₁₋₈alkyl, wherein C₃₋₁₄cycloalkyl is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl; and, wherein, each instance of C₃₋₁₄cycloalkyl is optionally substituted with R₅ substituents.

[00298] In another embodiment of the use of a compound of Formula (I), R₄ is C₃₋₈cycloalkyl-C₁₋₈alkyl, wherein C₃₋₈cycloalkyl is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl; and, wherein, each instance of C₃₋₈cycloalkyl is optionally substituted with R₅ substituents.

[00299] In one embodiment of the use of a compound of Formula (I), R₄ is C₃₋₁₄cycloalkyl-amino, wherein C₃₋₁₄cycloalkyl is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl; and, wherein, each instance of C₃₋₁₄cycloalkyl is optionally substituted with R₅ substituents.

[00300] In another embodiment of the use of a compound of Formula (I), R₄ is C₃₋₈cycloalkyl-amino, wherein C₃₋₈cycloalkyl is selected from cyclopropyl, cyclobutyl,

cyclopentyl, cyclohexyl or cycloheptyl; and, wherein, each instance of C₃₋₈cycloalkyl is optionally substituted with R₅ substituents.

[00301] In one embodiment of the use of a compound of Formula (I), R₄ is aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl or aryl-sulfonyloxy-C₁₋₈alkyl, wherein aryl is selected from phenyl; and, wherein, each instance of aryl is optionally substituted with R₅ substituents.

[00302] In another embodiment of the use of a compound of Formula (I), R₄ is aryl-C₁₋₈alkyl or aryl-C₁₋₈alkoxy-carbonyl, wherein each instance of aryl is optionally substituted with R₅ substituents.

[00303] In one embodiment of the use of a compound of Formula (I), R₄ is heterocyclyl selected from oxetanyl, pyrrolidinyl, piperidinyl, piperazinyl, 1,3-dioxanyl or morpholinyl, wherein each instance of heterocyclyl is optionally substituted with R₅ substituents.

[00304] In another embodiment of the use of a compound of Formula (I), R₄ is heterocyclyl selected from oxetan-3-yl, pyrrolidin-1-yl, piperidin-1-yl, piperazin-1-yl, 1,3-dioxan-5-yl or morpholin-4-yl, wherein each instance of heterocyclyl is optionally substituted with R₅ substituents.

[00305] In one embodiment of the use of a compound of Formula (I), R₄ is heterocyclyl-C₁₋₈alkyl, wherein each instance of heterocyclyl is selected from pyrrolidinyl or piperidinyl; and, wherein, each instance of heterocyclyl is optionally substituted with R₅ substituents.

[00306] In another embodiment of the use of a compound of Formula (I), R₄ is heterocyclyl-C₁₋₈alkyl selected from pyrrolidin-1-yl-C₁₋₈alkyl or piperidin-1-yl-C₁₋₈alkyl, wherein each instance of heterocyclyl is optionally substituted with R₅ substituents.

[00307] In one embodiment of the use of a compound of Formula (I), R₅ is selected from halogen, hydroxy, cyano, nitro, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; wherein, halogen and halo is selected from fluoro, chloro, bromo or iodo.

[00308] In one embodiment of the use of a compound of Formula (I), R₅ is hydroxy.

[00309] In one embodiment of the use of a compound of Formula (I), R₅ is C₁₋₈alkyl selected from methyl, ethyl, propyl, isopropyl, n-butyl or tert-butyl.

[00310] In another embodiment of the use of a compound of Formula (I), R₅ is C₁₋₈alkyl selected from ethyl, propyl, isopropyl or tert-butyl.

[00311] In one embodiment of the use of a compound of Formula (I), R₅ is halo-C₁₋₈alkyl selected from trihalo-methyl, dihalo-methyl, halo-methyl, trihalo-ethyl, dihalo-ethyl, halo-ethyl, trihalo-propyl, dihalo-propyl or halo-propyl; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00312] In one embodiment of the use of a compound of Formula (I), R₅ is C₁₋₈alkoxy selected from methoxy, ethoxy, propoxy or isopropoxy.

[00313] In one embodiment of the use of a compound of Formula (I), R₅ is halo-C₁₋₈alkoxy selected from trihalo-methoxy, dihalo-methoxy, halo-methoxy, trihalo-ethoxy, dihalo-ethoxy, halo-ethoxy, trihalo-propoxy, dihalo-propoxy or halo-propoxy; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00314] In one embodiment of the use of a compound of Formula (I), R₂ is aryl selected from phenyl optionally substituted with R₆ and R₇ substituents.

[00315] In one embodiment of the use of a compound of Formula (I), R₂ is aryl-amino, wherein aryl is selected from phenyl; and, wherein, each instance of aryl is optionally substituted with R₆ and R₇ substituents.

[00316] In another embodiment of the use of a compound of Formula (I), R₂ is aryl-amino selected from phenyl-amino; wherein, each instance of aryl is optionally substituted with R₆ and R₇ substituents.

[00317] In one embodiment of the use of a compound of Formula (I), R₂ is aryl-amino-carbonyl, wherein aryl is selected from phenyl; and, wherein, each instance of aryl is optionally substituted with R₆ and R₇ substituents.

[00318] In another embodiment of the use of a compound of Formula (I), R₂ is aryl-amino-carbonyl selected from phenyl-amino-carbonyl; wherein, each instance of aryl is optionally substituted with R₆ and R₇ substituents.

[00319] In one embodiment of the use of a compound of Formula (I),

[00320] R₂ is heterocyclyl selected from 1,2,3,6-tetrahydropyridinyl, 1,3-benzodioxolyl or 2,3-dihydro-1,4-benzodioxinyl; wherein, each instance of heterocyclyl is optionally substituted with R₆ and R₇ substituents.

[00321] In another embodiment of the use of a compound of Formula (I),

[00322] R₂ is heterocyclcyl selected from 1,2,3,6-tetrahydropyridin-4-yl, 1,3-benzodioxol-5-yl or 2,3-dihydro-1,4-benzodioxin-6-yl; wherein, each instance of heterocyclcyl is optionally substituted with R₆ and R₇ substituents.

[00323] In one embodiment of the use of a compound of Formula (I),

[00324] R₂ is heteroaryl selected from thienyl, 1*H*-pyrazolyl, 1*H*-imidazolyl, 1,3-thiazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, pyridinyl, pyrimidinyl, 1*H*-indolyl, 2*H*-indolyl, 1*H*-indazolyl, 2*H*-indazolyl, indoliziny, benzofuranyl, benzothienyl, 1*H*-benzimidazolyl, 1,3-benzothiazolyl, 1,3-benzoxazolyl, 9*H*-purinyl, furo[3,2-*b*]pyridinyl, furo[3,2-*c*]pyridinyl, furo[2,3-*c*]pyridinyl, thieno[3,2-*c*]pyridinyl, thieno[2,3-*d*]pyrimidinyl, 1*H*-pyrrolo[2,3-*b*]pyridinyl, 1*H*-pyrrolo[2,3-*c*]pyridinyl, pyrrolo[1,2-*a*]pyrimidinyl, pyrrolo[1,2-*a*]pyrazinyl, pyrrolo[1,2-*b*]pyridazinyl, pyrazolo[1,5-*a*]pyridinyl, pyrazolo[1,5-*a*]pyrazinyl, imidazo[1,2-*a*]pyridinyl, imidazo[1,2-*a*]pyrimidinyl, imidazo[1,2-*c*]pyrimidinyl, imidazo[1,2-*b*]pyridazinyl, imidazo[1,2-*a*]pyrazinyl, imidazo[2,1-*b*][1,3]thiazolyl, imidazo[2,1-*b*][1,3,4]thiadiazolyl, [1,3]oxazolo[4,5-*b*]pyridinyl or quinoxalinyl; wherein, each instance of heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00325] In another embodiment of the use of a compound of Formula (I),

[00326] R₂ is heteroaryl selected from thien-2-yl, thien-3-yl, 1*H*-pyrazol-3-yl, 1*H*-pyrazol-4-yl, 1*H*-pyrazol-5-yl, 1*H*-imidazol-1-yl, 1*H*-imidazol-4-yl, 1,3-thiazol-2-yl, 1,2,4-oxadiazol-3-yl, 1,3,4-oxadiazol-2-yl, pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyrimidin-4-yl, 1*H*-indol-3-yl, 1*H*-indol-4-yl, 1*H*-indol-5-yl, 1*H*-indol-6-yl, 1*H*-indazol-5-yl, 2*H*-indazol-5-yl, indolizin-2-yl, benzofuran-2-yl, benzofuran-5-yl, benzothien-2-yl, benzothien-3-yl, 1*H*-benzimidazol-2-yl, 1*H*-benzimidazol-6-yl, 1,3-benzoxazol-2-yl, 1,3-benzoxazol-5-yl, 1,3-benzoxazol-6-yl, 1,3-benzothiazol-2-yl, 1,3-benzothiazol-5-yl, 1,3-benzothiazol-6-yl, 9*H*-purin-8-yl, furo[3,2-*b*]pyridin-2-yl, furo[3,2-*c*]pyridin-2-yl, furo[2,3-*c*]pyridin-2-yl, thieno[3,2-*c*]pyridin-2-yl, thieno[2,3-*d*]pyrimidin-6-yl, 1*H*-pyrrolo[2,3-*b*]pyridin-5-yl, 1*H*-pyrrolo[2,3-*c*]pyridin-4-yl, pyrrolo[1,2-*a*]pyrimidin-7-yl, pyrrolo[1,2-*a*]pyrazin-7-yl, pyrrolo[1,2-*b*]pyridazin-2-yl, pyrazolo[1,5-*a*]pyridin-2-yl, pyrazolo[1,5-*a*]pyrazin-2-yl, imidazo[1,2-*a*]pyridin-2-yl, imidazo[1,2-*a*]pyridin-6-yl, imidazo[1,2-*a*]pyrimidin-2-yl, imidazo[1,2-*a*]pyrimidin-6-yl, imidazo[1,2-*c*]pyrimidin-2-yl, imidazo[1,2-*b*]pyridazin-2-yl, imidazo[1,2-*a*]pyrazin-2-yl, imidazo[2,1-*b*][1,3]thiazol-6-yl,

imidazo[2,1-*b*][1,3,4]thiadiazol-6-yl, [1,3]oxazolo[4,5-*b*]pyridin-2-yl or quinoxalin-2-yl; wherein, each instance of heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00327] In another embodiment of the use of a compound of Formula (I),

[00328] R₂ is substituted heteroaryl selected from 4-methylthien-2-yl, 1-methyl-1*H*-pyrazol-3-yl, 4-methyl-1*H*-pyrazol-3-yl, 1-phenyl-1*H*-pyrazol-3-yl, 1-phenyl-1*H*-imidazol-4-yl, 2-methyl-1-(pyridin-2-yl)-1*H*-imidazol-4-yl, 4-methyl-1,3-thiazol-2-yl, 4-(trifluoromethyl)-1,3-thiazol-2-yl, 4-phenyl-1,3-thiazol-2-yl, 5-phenyl-1,2,4-oxadiazol-3-yl, 3-fluoropyridin-4-yl, 6-fluoropyridin-2-yl, 2-chloropyridin-4-yl, 4-chloropyridin-3-yl, 5-chloropyridin-2-yl, 6-methylpyridin-3-yl, 2-(trifluoromethyl)pyridin-3-yl, 4-(trifluoromethyl)pyridin-2-yl, 6-(trifluoromethyl)pyridin-2-yl, 2-methoxypyridin-4-yl, 4-methoxypyridin-3-yl, 6-methoxypyridin-2-yl, 2-ethoxypyridin-3-yl, 6-ethoxypyridin-2-yl, 6-(propan-2-yloxy)pyridin-2-yl, 6-(dimethylamino)pyridin-3-yl, 6-(methylsulfanyl)pyridin-2-yl, 6-(cyclobutyloxy)pyridin-2-yl, 6-(pyrrolidin-1-yl)pyridin-2-yl, 2-methylpyrimidin-4-yl, 2-(propan-2-yl)pyrimidin-4-yl, 2-cyclopropylpyrimidin-4-yl, 1-methyl-1*H*-indol-3-yl, 2-methyl-2*H*-indazol-5-yl, 2-methyl-1-benzofuran-5-yl, 1-methyl-1*H*-benzimidazol-2-yl, 4-methyl-1*H*-benzimidazol-2-yl, 5-fluoro-1*H*-benzimidazol-2-yl, 4-fluoro-1,3-benzoxazol-2-yl, 5-fluoro-1,3-benzoxazol-2-yl, 4-chloro-1,3-benzoxazol-2-yl, 4-iodo-1,3-benzoxazol-2-yl, 2-methyl-1,3-benzoxazol-6-yl, 4-methyl-1,3-benzoxazol-2-yl, 4-(trifluoromethyl)-1,3-benzoxazol-2-yl, 7-(trifluoromethyl)-1,3-benzoxazol-2-yl, 2-methyl-1,3-benzothiazol-2-yl, 2-methyl-1,3-benzothiazol-5-yl, 2-methyl-1,3-benzothiazol-6-yl, 4-chloro-1,3-benzothiazol-2-yl, 7-chloro-1,3-benzothiazol-2-yl, 4-(trifluoromethyl)-1,3-benzothiazol-2-yl, 5-methylfuro[3,2-*b*]pyridin-2-yl, 4,6-dimethylfuro[3,2-*c*]pyridin-2-yl, 5,7-dimethylfuro[2,3-*c*]pyridin-2-yl, 4,6-dimethylthieno[3,2-*c*]pyridin-2-yl, 2,4-dimethylthieno[2,3-*d*]pyrimidin-6-yl, 1-methylpyrrolo[1,2-*a*]pyrazin-7-yl, 3-methylpyrrolo[1,2-*a*]pyrazin-7-yl, 1,3-dimethylpyrrolo[1,2-*a*]pyrazin-7-yl, 2-methylpyrrolo[1,2-*b*]pyridazin-2-yl, 4,6-dimethylpyrazolo[1,5-*a*]pyrazin-2-yl, 5-methylpyrazolo[1,5-*a*]pyridin-2-yl, 4,6-dimethylpyrazolo[1,5-*a*]pyrazin-2-yl, 2-chloroimidazo[2,1-*b*][1,3]thiazol-6-yl, 2-methylimidazo[2,1-*b*][1,3]thiazol-6-yl, 3-methylimidazo[2,1-*b*][1,3]thiazol-6-yl, 2-ethylimidazo[2,1-*b*][1,3]thiazol-6-yl, 2-methylimidazo[2,1-*b*][1,3,4]thiadiazol-6-yl, 6-cyanoimidazo[1,2-*a*]pyridin-2-yl (also referred to as 2-imidazo[1,2-*a*]pyridine-6-carbonitrile),

6-fluoroimidazo[1,2-*a*]pyridin-2-yl, 8-fluoroimidazo[1,2-*a*]pyridin-2-yl,
 6,8-difluoroimidazo[1,2-*a*]pyridin-2-yl, 7-(trifluoromethyl)imidazo[1,2-*a*]pyridin-2-yl,
 8-(trifluoromethyl)imidazo[1,2-*a*]pyridin-2-yl, 6-chloroimidazo[1,2-*a*]pyridin-2-yl,
 7-chloroimidazo[1,2-*a*]pyridin-2-yl, 8-chloroimidazo[1,2-*a*]pyridin-2-yl,
 8-bromoimidazo[1,2-*a*]pyridin-2-yl, 2-methylimidazo[1,2-*a*]pyridin-2-yl,
 5-methylimidazo[1,2-*a*]pyridin-2-yl, 6-methylimidazo[1,2-*a*]pyridin-2-yl,
 7-methylimidazo[1,2-*a*]pyridin-2-yl, 8-methylimidazo[1,2-*a*]pyridin-2-yl,
 7-ethylimidazo[1,2-*a*]pyridin-2-yl, 8-ethylimidazo[1,2-*a*]pyridin-2-yl,
 6,8-dimethylimidazo[1,2-*a*]pyridin-2-yl, 8-ethyl-6-methylimidazo[1,2-*a*]pyridin-2-yl,
 7-methoxyimidazo[1,2-*a*]pyridin-2-yl, 8-methoxyimidazo[1,2-*a*]pyridin-2-yl,
 6-fluoro-8-methylimidazo[1,2-*a*]pyridin-2-yl, 8-fluoro-6-methylimidazo[1,2-*a*]pyridin-2-yl,
 8-chloro-6-methylimidazo[1,2-*a*]pyridin-2-yl, 6-methyl-8-nitroimidazo[1,2-*a*]pyridin-2-yl,
 8-cyclopropylimidazo[1,2-*a*]pyridin-2-yl, 2-methylimidazo[1,2-*a*]pyridin-6-yl,
 2-ethylimidazo[1,2-*a*]pyridin-6-yl, 2,3-dimethylimidazo[1,2-*a*]pyridin-6-yl,
 2,8-dimethylimidazo[1,2-*a*]pyridin-6-yl, 2-(trifluoromethyl)imidazo[1,2-*a*]pyridin-6-yl,
 8-chloro-2-methylimidazo[1,2-*a*]pyridin-6-yl, 8-fluoro-2-methylimidazo[1,2-*a*]pyridin-6-yl,
 6-fluoroimidazo[1,2-*a*]pyrimidin-2-yl, 6-chloroimidazo[1,2-*a*]pyrimidin-2-yl,
 6-methylimidazo[1,2-*a*]pyrimidin-2-yl, 7-methylimidazo[1,2-*a*]pyrimidin-2-yl,
 2-methylimidazo[1,2-*a*]pyrimidin-6-yl, 6-methylimidazo[1,2-*b*]pyridazin-2-yl,
 2-methyl-3-(1,2,3,6-tetrahydropyridin-4-yl)imidazo[1,2-*b*]pyridazin-6-yl,
 6-methylimidazo[1,2-*a*]pyrazin-2-yl, 8-methylimidazo[1,2-*a*]pyrazin-2-yl,
 6,8-dimethylimidazo[1,2-*a*]pyrazin-2-yl, 6-chloro-8-methylimidazo[1,2-*a*]pyrazin-2-yl,
 6-methyl-8-(trifluoromethyl)imidazo[1,2-*a*]pyrazin-2-yl,
 8-(methylsulfanyl)imidazo[1,2-*a*]pyrazin-2-yl, 2-methylimidazo[2,1-*b*][1,3]thiazol-6-yl,
 3-methylimidazo[2,1-*b*][1,3]thiazol-6-yl or 2-methylimidazo[2,1-*b*][1,3,4]thiadiazol-6-yl.

[00329] In another embodiment of the use of a compound of Formula (I),

[00330] R₂ is heteroaryl selected from thienyl, 1*H*-pyrazolyl, 1*H*-imidazolyl, 1,3-thiazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, pyridinyl, pyrimidinyl, 1*H*-indolyl, 2*H*-indolyl, 1*H*-indazolyl, 2*H*-indazolyl, indoliziny, benzofuranyl, benzothienyl, 1*H*-benzimidazolyl, 1,3-benzothiazolyl, 1,3-benzoxazolyl, 9*H*-purinyl; wherein, each instance of heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00331] In another embodiment of the use of a compound of Formula (I),

[00332] R₂ is heteroaryl selected from furo[3,2-*b*]pyridinyl, furo[3,2-*c*]pyridinyl, furo[2,3-*c*]pyridinyl, thieno[3,2-*c*]pyridinyl, thieno[2,3-*d*]pyrimidinyl, 1*H*-pyrrolo[2,3-*b*]pyridinyl, 1*H*-pyrrolo[2,3-*c*]pyridinyl, pyrrolo[1,2-*a*]pyrimidinyl, pyrrolo[1,2-*a*]pyrazinyl, pyrrolo[1,2-*b*]pyridazinyl, pyrazolo[1,5-*a*]pyridinyl, pyrazolo[1,5-*a*]pyrazinyl, imidazo[1,2-*a*]pyridinyl, imidazo[1,2-*a*]pyrimidinyl, imidazo[1,2-*c*]pyrimidinyl, imidazo[1,2-*b*]pyridazinyl, imidazo[1,2-*a*]pyrazinyl, imidazo[2,1-*b*][1,3]thiazolyl, imidazo[2,1-*b*][1,3,4]thiadiazolyl, [1,3]oxazolo[4,5-*b*]pyridinyl or quinoxalinyl; wherein, each instance of heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00333] In one embodiment of the use of a compound of Formula (I), R₂ is heteroaryl-amino, wherein heteroaryl is selected from pyridinyl or pyrimidinyl; and, wherein, each instance of heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00334] In another embodiment of the use of a compound of Formula (I), R₂ is heteroaryl-amino selected from pyridin-2-yl-amino, pyridin-3-yl-amino or pyrimidin-2-yl-amino; wherein, each instance of heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00335] In one embodiment of the use of a compound of Formula (I), R₆ is selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; wherein, halogen and halo is selected from fluoro, chloro, bromo or iodo.

[00336] In one embodiment of the use of a compound of Formula (I), R₆ is C₁₋₈alkyl selected from methyl, ethyl, propyl, isopropyl or tert-butyl.

[00337] In another embodiment of the use of a compound of Formula (I), R₆ is C₁₋₈alkyl selected from ethyl, propyl, isopropyl or tert-butyl.

[00338] In one embodiment of the use of a compound of Formula (I), R₆ is C₂₋₈alkenyl selected from ethenyl, allyl or buta-1,3-dienyl.

[00339] In another embodiment of the use of a compound of Formula (I), R₆ is C₂₋₈alkenyl selected from ethenyl or allyl.

[00340] In one embodiment of the use of a compound of Formula (I), R₆ is halo-C₁₋₈alkyl selected from trihalo-methyl, dihalo-methyl, halo-methyl, trihalo-ethyl, dihalo-ethyl, halo-ethyl,

trihalo-propyl, dihalo-propyl or halo-propyl; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00341] In one embodiment of the use of a compound of Formula (I), R₆ is hydroxy-C₁₋₈alkyl selected from hydroxy-methyl, hydroxy-ethyl, hydroxy-propyl, dihydroxy-propyl, hydroxy-butyl or dihydroxy-butyl.

[00342] In another embodiment of the use of a compound of Formula (I), R₆ is hydroxy-C₁₋₈alkyl selected from hydroxy-methyl, dihydroxy-propyl, hydroxy-butyl or dihydroxy-butyl.

[00343] In one embodiment of the use of a compound of Formula (I), R₆ is C₁₋₈alkoxy selected from methoxy, ethoxy, propoxy or isopropoxy.

[00344] In one embodiment of the use of a compound of Formula (I), R₆ is halo-C₁₋₈alkoxy selected from trihalo-methoxy, dihalo-methoxy, halo-methoxy, trihalo-ethoxy, dihalo-ethoxy, halo-ethoxy, trihalo-propoxy, dihalo-propoxy or halo-propoxy; wherein, halo is selected from fluoro, chloro, bromo or iodo.

[00345] In one embodiment of the use of a compound of Formula (I), R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl; wherein C₃₋₁₄cycloalkyl is selected from cyclopropyl or cyclobutoxy; wherein aryl is selected from phenyl; wherein heterocyclyl is selected from oxetanyl, pyrrolidinyl or 1,2,3,6-tetrahydropyridinyl; and, wherein heteroaryl is selected from thienyl or pyridinyl.

[00346] In another embodiment of the use of a compound of Formula (I), R₇ is C₃₋₁₄cycloalkyl or C₃₋₁₄cycloalkyl-oxy, wherein each instance of C₃₋₁₄cycloalkyl is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl.

[00347] In another embodiment of the use of a compound of Formula (I), R₇ is C₃₋₈cycloalkyl or C₃₋₈cycloalkyl-oxy, wherein each instance of C₃₋₈cycloalkyl is selected from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or cycloheptyl.

[00348] In one embodiment of the use of a compound of Formula (I), R₇ is aryl selected from phenyl.

[00349] In one embodiment of the use of a compound of Formula (I), R₇ is heterocyclyl selected from oxetanyl, pyrrolidinyl or 1,2,3,6-tetrahydropyridinyl.

[00350] In another embodiment of the use of a compound of Formula (I), R₇ is heterocyclyl selected from oxetan-3-yl, pyrrolidin-1-yl or 1,2,3,6-tetrahydropyridin-4-yl.

[00351] In one embodiment of the use of a compound of Formula (I), R₇ is heteroaryl selected from thienyl or pyridinyl.

[00352] In another embodiment of the use of a compound of Formula (I), R₇ is heteroaryl selected from pyridinyl.

[00353] In one embodiment of the use of a compound of Formula (I), R₇ is heteroaryl selected from thien-2-yl or pyridin-2-yl.

[00354] In another embodiment of the use of a compound of Formula (I), R₇ is heteroaryl selected from pyridin-2-yl.

[00355] In one embodiment of the use of a compound of Formula (I), R_c is hydrogen or C₁₋₈alkyl.

[00356] In another embodiment of the use of a compound of Formula (I),

[00357] R₁ is heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents; and,

[00358] wherein, heterocyclyl is selected from azetidiny, tetrahydrofuranyl, pyrrolidinyl, piperidinyl, piperazinyl, 1,4-diazepanyl, 1,2,5,6-tetrahydropyridinyl, 1,2,3,6-tetrahydropyridinyl, hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, (3*aR*,6*aR*)-hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, hexahydropyrrolo[3,4-*b*]pyrrol-(2*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-(2*H*)-yl, hexahydropyrrolo[3,4-*c*]pyrrol-(1*H*)-yl, (3*aR*,6*aS*)-hexahydropyrrolo[3,4-*c*]pyrrol-(1*H*)-yl, octahydro-5*H*-pyrrolo[3,2-*c*]pyridinyl,

octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, (4*aR*,7*aR*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, (4*aS*,7*aS*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, hexahydropyrrolo[1,2-*a*]pyrazin-(2*H*)-one, hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (7*R*,8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aR*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aS*)-octahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aR*)-octahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, octahydro-2*H*-pyrido[1,2-*a*]pyrazinyl, 3-azabicyclo[3.1.0]hexyl, (1*R*,5*S*)-3-azabicyclo[3.1.0]hexyl, 8-azabicyclo[3.2.1]octyl, (1*R*,5*S*)-8-azabicyclo[3.2.1]octyl, 8-azabicyclo[3.2.1]oct-2-enyl, (1*R*,5*S*)-8-azabicyclo[3.2.1]oct-2-enyl, 9-azabicyclo[3.3.1]nonyl, (1*R*,5*S*)-9-azabicyclo[3.3.1]nonyl, 2,5-diazabicyclo[2.2.1]heptyl, (1*S*,4*S*)-2,5-diazabicyclo[2.2.1]heptyl, 2,5-diazabicyclo[2.2.2]octyl, 3,8-diazabicyclo[3.2.1]octyl, (1*R*,5*S*)-3,8-diazabicyclo[3.2.1]octyl, 1,4-diazabicyclo[3.2.2]nonyl, azaspiro[3.3]heptyl, 2,6-diazaspiro[3.3]heptyl, 2,7-diazaspiro[3.5]nonyl, 5,8-diazaspiro[3.5]nonyl, 2,7-diazaspiro[4.4]nonyl or 6,9-diazaspiro[4.5]decyl.

[00359] In another embodiment of the use of a compound of Formula (I),

[00360] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

[00361] wherein, aryl is phenyl;

[00362] wherein, heterocyclyl is selected from 1,2,3,6-tetrahydropyridinyl, 1,3-benzodioxolyl or 2,3-dihydro-1,4-benzodioxinyl;

[00363] wherein, heteroaryl is selected from thienyl, 1*H*-pyrazolyl, 1*H*-imidazolyl, 1,3-thiazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, pyridinyl, pyrimidinyl, 1*H*-indolyl, 2*H*-indolyl, 1*H*-indazolyl, 2*H*-indazolyl, indolizinyl, benzofuranyl, benzothienyl, 1*H*-benzimidazolyl, 1,3-benzothiazolyl, 1,3-benzoxazolyl, 9*H*-purinyl, furo[3,2-*b*]pyridinyl, furo[3,2-*c*]pyridinyl, furo[2,3-*c*]pyridinyl, thieno[3,2-*c*]pyridinyl, thieno[2,3-*d*]pyrimidinyl, 1*H*-pyrrolo[2,3-*b*]pyridinyl, 1*H*-pyrrolo[2,3-*c*]pyridinyl, pyrrolo[1,2-*a*]pyrimidinyl, pyrrolo[1,2-*a*]pyrazinyl, pyrrolo[1,2-*b*]pyridazinyl, pyrazolo[1,5-*a*]pyridinyl, pyrazolo[1,5-*a*]pyrazinyl, imidazo[1,2-*a*]pyridinyl, imidazo[1,2-*a*]pyrimidinyl, imidazo[1,2-*c*]pyrimidinyl, imidazo[1,2-*b*]pyridazinyl, imidazo[1,2-*a*]pyrazinyl, imidazo[2,1-*b*][1,3]thiazolyl, imidazo[2,1-*b*][1,3,4]thiadiazolyl, [1,3]oxazolo[4,5-*b*]pyridinyl or quinoxalinyl; and, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00364] In another embodiment of the use of a compound of Formula (I),

[00365] R₁ is heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

[00366] wherein, heterocyclyl is selected from azetidiny, tetrahydrofuranyl, pyrrolidinyl, piperidinyl, piperazinyl, 1,4-diazepanyl, 1,2,5,6-tetrahydropyridinyl, 1,2,3,6-tetrahydropyridinyl, hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, (3*aR*,6*aR*)-hexahydropyrrolo[3,4-*b*]pyrrol-(1*H*)-yl, hexahydropyrrolo[3,4-*b*]pyrrol-(2*H*)-yl, (3*aS*,6*aS*)-hexahydropyrrolo[3,4-*b*]pyrrol-(2*H*)-yl, hexahydropyrrolo[3,4-*c*]pyrrol-(1*H*)-yl, (3*aR*,6*aS*)-hexahydropyrrolo[3,4-*c*]pyrrol-(1*H*)-yl, octahydro-5*H*-pyrrolo[3,2-*c*]pyridinyl, octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, (4*aR*,7*aR*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, (4*aS*,7*aS*)-octahydro-6*H*-pyrrolo[3,4-*b*]pyridinyl, hexahydropyrrolo[1,2-*a*]pyrazin-(2*H*)-one, hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (7*R*,8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aS*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aR*)-hexahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aS*)-octahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, (8*aR*)-octahydropyrrolo[1,2-*a*]pyrazin-(1*H*)-yl, octahydro-2*H*-pyrido[1,2-*a*]pyrazinyl, 3-azabicyclo[3.1.0]hexyl, (1*R*,5*S*)-3-azabicyclo[3.1.0]hexyl, 8-azabicyclo[3.2.1]octyl, (1*R*,5*S*)-8-azabicyclo[3.2.1]octyl, 8-azabicyclo[3.2.1]oct-2-enyl, (1*R*,5*S*)-8-azabicyclo[3.2.1]oct-2-enyl, 9-azabicyclo[3.3.1]nonyl, (1*R*,5*S*)-9-azabicyclo[3.3.1]nonyl, 2,5-diazabicyclo[2.2.1]heptyl, (1*S*,4*S*)-2,5-diazabicyclo[2.2.1]heptyl, 2,5-diazabicyclo[2.2.2]octyl, 3,8-diazabicyclo[3.2.1]octyl, (1*R*,5*S*)-3,8-diazabicyclo[3.2.1]octyl, 1,4-diazabicyclo[3.2.2]nonyl, azaspiro[3.3]heptyl,

2,6-diazaspiro[3.3]heptyl, 2,7-diazaspiro[3.5]nonyl, 5,8-diazaspiro[3.5]nonyl, 2,7-diazaspiro[4.4]nonyl or 6,9-diazaspiro[4.5]decyl; and, wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents; and

[00367] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

[00368] wherein, heterocyclyl is selected from 1,2,3,6-tetrahydropyridin-4-yl, 1,3-benzodioxol-5-yl or 2,3-dihydro-1,4-benzodioxin-6-yl;

[00369] wherein, heteroaryl is selected from thienyl, 1*H*-pyrazolyl, 1*H*-imidazolyl, 1,3-thiazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, pyridinyl, pyrimidinyl, 1*H*-indolyl, 2*H*-indolyl, 1*H*-indazolyl, 2*H*-indazolyl, indolizinyl, benzofuranyl, benzothienyl, 1*H*-benzimidazolyl, 1,3-benzothiazolyl, 1,3-benzoxazolyl, 9*H*-purinyl, furo[3,2-*b*]pyridinyl, furo[3,2-*c*]pyridinyl, furo[2,3-*c*]pyridinyl, thieno[3,2-*c*]pyridinyl, thieno[2,3-*d*]pyrimidinyl, 1*H*-pyrrolo[2,3-*b*]pyridinyl, 1*H*-pyrrolo[2,3-*c*]pyridinyl, pyrrolo[1,2-*a*]pyrimidinyl, pyrrolo[1,2-*a*]pyrazinyl, pyrrolo[1,2-*b*]pyridazinyl, pyrazolo[1,5-*a*]pyridinyl, pyrazolo[1,5-*a*]pyrazinyl, imidazo[1,2-*a*]pyridinyl, imidazo[1,2-*a*]pyrimidinyl, imidazo[1,2-*c*]pyrimidinyl, imidazo[1,2-*b*]pyridazinyl, imidazo[1,2-*a*]pyrazinyl, imidazo[2,1-*b*][1,3]thiazolyl, imidazo[2,1-*b*][1,3,4]thiadiazolyl, [1,3]oxazolo[4,5-*b*]pyridinyl or quinoxalinyl; and, wherein, each instance of heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00370] In another embodiment of the use of a compound of Formula (I),

[00371] R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy, C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl, C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl, C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino, (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino, [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino or [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino; and

[00372] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00373] In another embodiment of the use of a compound of Formula (I),

[00374] R₁ is heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or

(heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents; and

[00375] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00376] In another embodiment of the use of a compound of Formula (I),

[00377] R₁ is heterocyclyl, heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino, (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl or heterocyclyl-carbonyl-oxy; wherein, each instance of heterocyclyl is optionally substituted with R₃ and R₄ substituents; and

[00378] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00379] In another embodiment of the use of a compound of Formula (I),

[00380] R₁ is heterocyclyl optionally substituted with R₃ and R₄ substituents; and

[00381] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00382] In another embodiment of the use of a compound of Formula (I),

[00383] R₁ is C₃₋₁₄cycloalkyl optionally substituted with R₃ and R₄ substituents; and

[00384] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00385] In another embodiment of the use of a compound of Formula (I),

[00386] R₁ is aryl-C₁₋₈alkyl-amino, (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of aryl is optionally substituted with R₃ and R₄ substituents; and

[00387] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00388] In another embodiment of the use of a compound of Formula (I),

[00389] R₁ is aryl-C₁₋₈alkyl-amino optionally substituted with R₃ and R₄ substituents; and

[00390] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00391] In another embodiment of the use of a compound of Formula (I),

[00392] R₁ is heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl; wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with R₃ and R₄ substituents; and

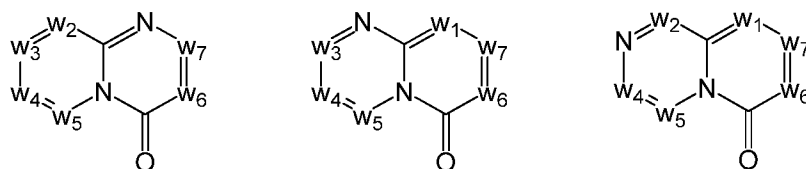
[00393] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

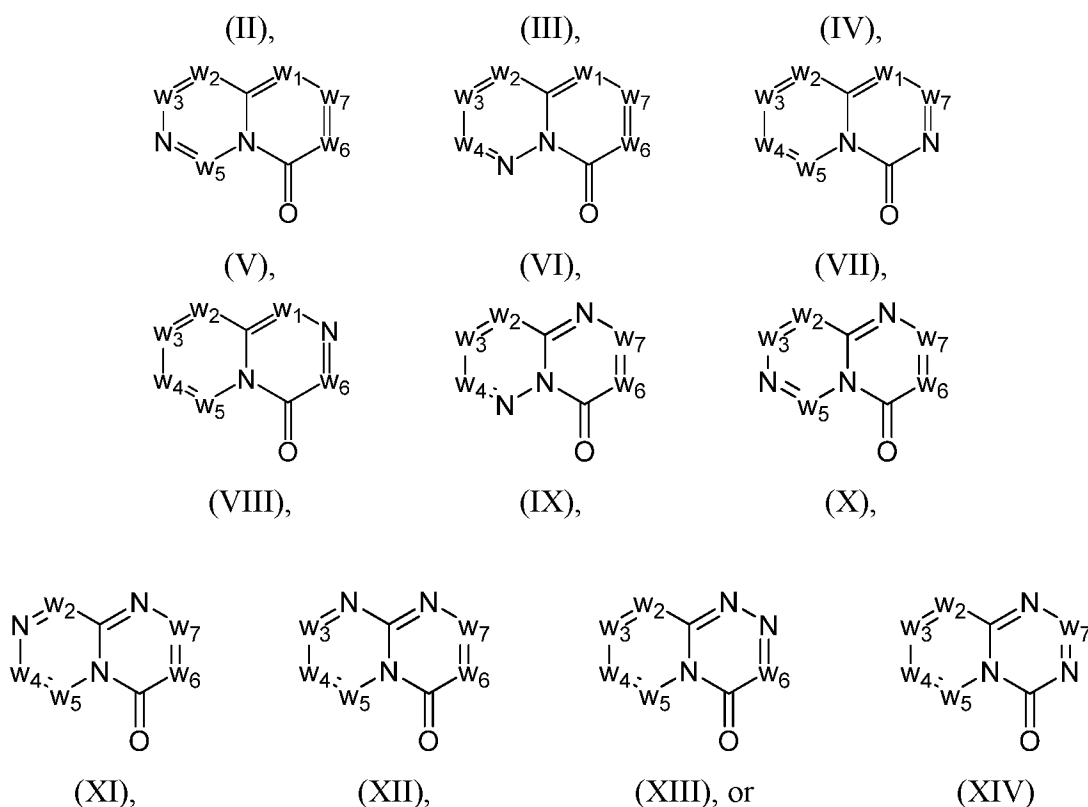
[00394] In another embodiment of the use of a compound of Formula (I),

[00395] R₁ is heteroaryl optionally substituted with R₃ and R₄ substituents; and

[00396] R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino, wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with R₆ and R₇ substituents.

[00397] In one embodiment, the compound of Formula (I), used in a method disclosed herein, is a compound selected from Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII) or Formula (XIV):





[00398] or a form thereof.

[00399] In an embodiment of the use of the compound of Formula (I), w_3 is C-R₁, w_6 is C-R₂, w_1 , w_4 , w_5 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00400] In another embodiment of the use of the compound of Formula (I), w_3 is C-R₂, w_6 is C-R₁, w_1 , w_4 , w_5 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00401] In another embodiment of the use of the compound of Formula (I), w_4 is C-R₁, w_7 is C-R₂, w_1 , w_3 and w_5 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00402] In another embodiment of the use of the compound of Formula (I), w_4 is C-R₂, w_7 is C-R₁, w_1 , w_3 and w_5 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00403] In an embodiment of the use of the compound of Formula (II), w_3 is C-R₁, w_6 is C-R₂, w_4 , w_5 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00404] In another embodiment of the use of the compound of Formula (II), w_3 is C-R₂, w_6 is C-R₁, w_4 , w_5 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00405] In another embodiment of the use of the compound of Formula (II), w_4 is C-R₁, w_7 is C-R₂, w_3 and w_5 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00406] In another embodiment of the use of the compound of Formula (II), w_4 is C-R₂, w_7 is C-R₁, w_3 and w_5 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00407] In an embodiment of the use of the compound of Formula (III), w_3 is C-R₁, w_6 is C-R₂ and w_1 , w_4 , w_5 and w_7 are independently C-R_a or N.

[00408] In another embodiment of the use of the compound of Formula (III), w_3 is C-R₂, w_6 is C-R₁ and w_1 , w_4 , w_5 and w_7 are independently C-R_a or N.

[00409] In another embodiment of the use of the compound of Formula (III), w_4 is C-R₁, w_7 is C-R₂, w_1 , w_3 and w_5 are independently C-R_a or N and w_6 is C-R_c or N.

[00410] In another embodiment of the use of the compound of Formula (III), w_4 is C-R₂, w_7 is C-R₁, w_1 , w_3 and w_5 are independently C-R_a or N and w_6 is C-R_c or N.

[00411] In an embodiment of the use of the compound of Formula (IV), w_4 is C-R₁, w_7 is C-R₂, w_1 and w_5 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00412] In another embodiment of the use of the compound of Formula (IV), w_4 is C-R₂, w_7 is C-R₁, w_1 and w_5 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00413] In an embodiment of the use of the compound of Formula (V), w_3 is C-R₁, w_6 is C-R₂, w_1 , w_5 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00414] In another embodiment of the use of the compound of Formula (V), w_3 is C-R₂, w_6 is C-R₁, w_1 , w_5 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00415] In an embodiment of the use of the compound of Formula (VI), w_3 is C-R₁, w_6 is C-R₂, w_1 , w_4 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00416] In another embodiment of the use of the compound of Formula (VI), w_3 is C-R₂, w_6 is C-R₁, w_1 , w_4 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00417] In another embodiment of the use of the compound of Formula (VI), w_4 is C-R₁, w_7 is C-R₂, w_1 and w_3 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00418] In another embodiment of the use of the compound of Formula (VI), w_4 is C-R₂, w_7 is C-R₁, w_1 and w_3 are independently C-R_a or N, w_2 is C-R_b or N and w_6 is C-R_c or N.

[00419] In another embodiment of the use of the compound of Formula (VII), w_4 is C-R₁, w_7 is C-R₂, w_1 , w_3 and w_5 are C-R_a or N and w_2 is C-R_b or N.

[00420] In another embodiment of the use of the compound of Formula (VII), w_4 is C-R₂, w_7 is C-R₁, w_1 , w_3 and w_5 are C-R_a or N and w_2 is C-R_b or N.

[00421] In another embodiment of the use of the compound of Formula (VIII), w_3 is C-R₁, w_6 is C-R₂, w_1 , w_4 and w_5 are C-R_a or N and w_2 is C-R_b or N.

[00422] In another embodiment of the use of the compound of Formula (VIII), w_3 is C-R₂, w_6 is C-R₁, w_1 , w_4 and w_5 are C-R_a or N and w_2 is C-R_b or N.

[00423] In an embodiment of the use of the compound of Formula (IX), w_3 is C-R₁, w_6 is C-R₂, w_4 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00424] In another embodiment of the use of the compound of Formula (IX), w_3 is C-R₂, w_6 is C-R₁, w_4 and w_7 are independently C-R_a or N and w_2 is C-R_b or N.

[00425] In another embodiment of the use of the compound of Formula (IX), w_4 is C-R₁, w_7 is C-R₂, w_2 is C-R_b or N, w_3 is C-R_a or N and w_6 is C-R_c or N.

[00426] In another embodiment of the use of the compound of Formula (IX), w_4 is C-R₂, w_7 is C-R₁, w_2 is C-R_b or N, w_3 is C-R_a or N and w_6 is C-R_c or N.

[00427] In an embodiment of the use of the compound of Formula (X), w_3 is C-R₁, w_6 is C-R₂, w_2 is C-R_b or N and w_5 and w_7 are independently C-R_a or N.

[00428] In another embodiment of the use of the compound of Formula (X), w_3 is C-R₂, w_6 is C-R₁, w_2 is C-R_b or N and w_5 and w_7 are independently C-R_a or N.

[00429] In an embodiment of the use of the compound of Formula (XI), w_4 is C-R₁, w_7 is C-R₂, w_2 is C-R_b or N, w_5 is C-R_a or N and w_6 is C-R_c or N.

[00430] In another embodiment of the use of the compound of Formula (XI), w_4 is C-R₂, w_7 is C-R₁, w_2 is C-R_b or N, w_5 is C-R_a or N and w_6 is C-R_c or N.

[00431] In an embodiment of the use of the compound of Formula (XII), w_3 is C-R₁, w_6 is C-R₂ and w_4 , w_5 and w_7 are independently C-R_a or N.

[00432] In another embodiment of the use of the compound of Formula (XII), w_3 is C-R₂, w_6 is C-R₁ and w_4 , w_5 and w_7 are independently C-R_a or N.

[00433] In another embodiment of the use of the compound of Formula (XII), w_4 is C-R₁, w_7 is C-R₂, w_3 and w_5 are independently C-R_a or N and w_6 is C-R_c or N.

[00434] In another embodiment of the use of the compound of Formula (XII), w_4 is C-R₂, w_7 is C-R₁, w_3 and w_5 are independently C-R_a or N and w_6 is C-R_c or N.

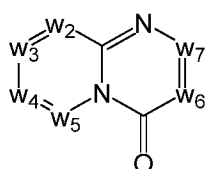
[00435] In an embodiment of the use of the compound of Formula (XIII), w_3 is C-R₁, w_6 is C-R₂, w_2 is C-R_b or N and w_4 and w_5 are independently C-R_a or N.

[00436] In another embodiment of the use of the compound of Formula (XIII), w_3 is C-R₂, w_6 is C-R₁, w_2 is C-R_b or N and w_4 and w_5 are independently C-R_a or N.

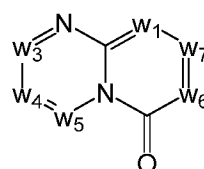
[00437] In an embodiment of the use of the compound of Formula (XIV), w_4 is C-R₁, w_7 is C-R₂, w_2 is C-R_b or N and w_3 and w_5 are independently C-R_a or N.

[00438] In another embodiment of the use of the compound of Formula (XIV), w_4 is C-R₂, w_7 is C-R₁, w_2 is C-R_b or N and w_3 and w_5 are independently C-R_a or N.

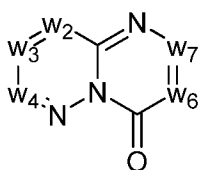
[00439] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound selected from Formula (II), Formula (III), Formula (IX), Formula (XI) or Formula (XII):



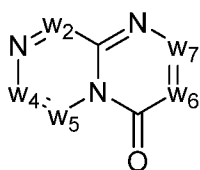
(II),



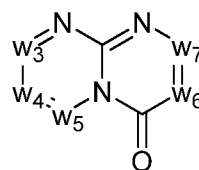
(III),



(IX),



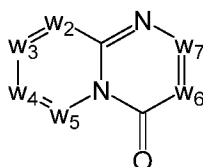
(XI), or



(XII)

[00440] or a form thereof.

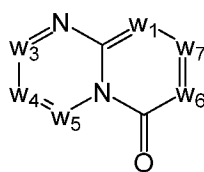
[00441] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (II):



(II)

[00442] or a form thereof.

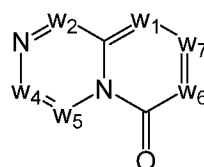
[00443] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (III):



(III)

[00444] or a form thereof.

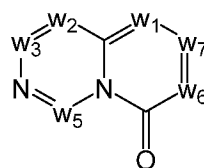
[00445] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (IV):



(IV)

[00446] or a form thereof.

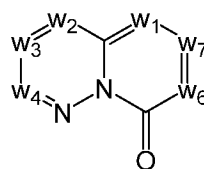
[00447] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (V):



(V)

[00448] or a form thereof.

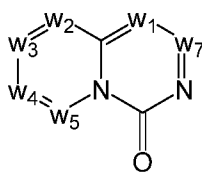
[00449] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (VI):



(VI)

[00450] or a form thereof.

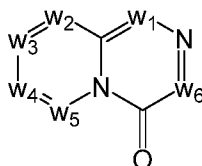
[00451] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (VII):



(VII)

[00452] or a form thereof.

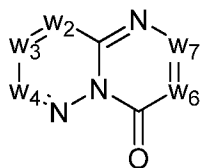
[00453] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (VIII):



(VIII)

[00454] or a form thereof.

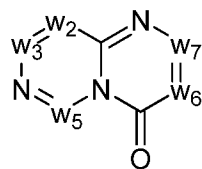
[00455] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (IX):



(IX)

[00456] or a form thereof.

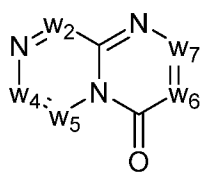
[00457] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (X):



(X)

[00458] or a form thereof.

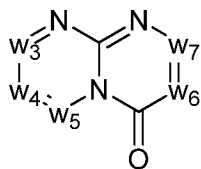
[00459] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (XI):



(XI)

[00460] or a form thereof.

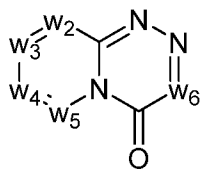
[00461] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (XII):



(XII)

[00462] or a form thereof.

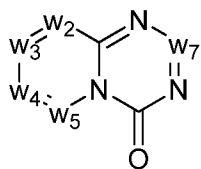
[00463] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (XIII):



(XIII)

[00464] or a form thereof.

[00465] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (XIV):

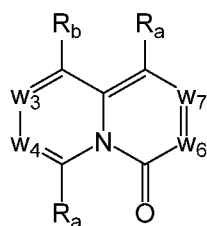


(XIV)

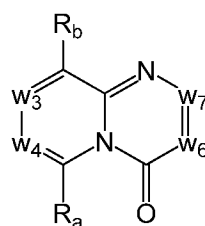
[00466] or a form thereof.

[00467] In one embodiment, the compound of Formula (I), Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII) or Formula (XIV) used in a method disclosed herein is a compound selected from Formula (Ia), Formula (IIa), Formula (IIIa),

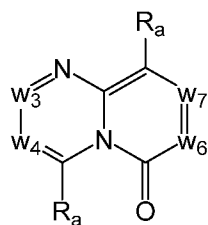
Formula (IVa), Formula (Va), Formula (VIa), Formula (VIIa), Formula (VIIIa), Formula (IXa), Formula (Xa), Formula (XIa), Formula (XIIa), Formula (XIIIa) or Formula (XIVa), respectively:



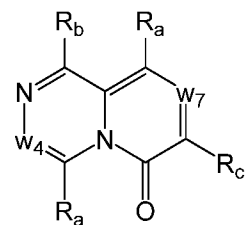
(Ia),



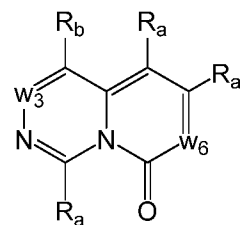
(IIa),



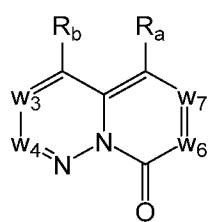
(IIIa),



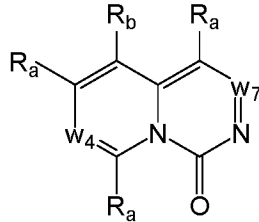
(IVa),



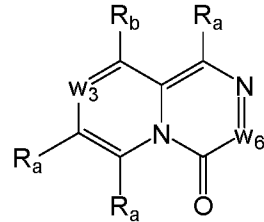
(Va),



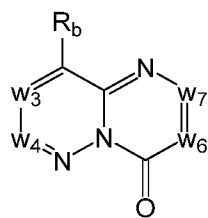
(VIa),



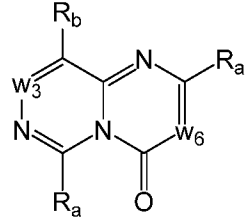
(VIIa),



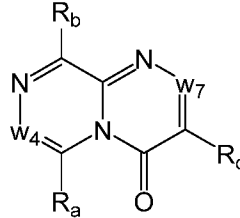
(VIIIa),



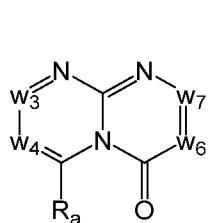
(IXa),



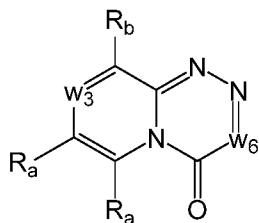
(Xa),



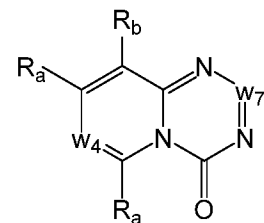
(XIa),



(XIIa),



(XIIIa), or



(XIVa)

[00468] or a form thereof.

[00469] In an embodiment of the use of the compound of Formula (Ia), one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

[00470] when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

[00471] when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

[00472] when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

[00473] when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N.

[00474] In an embodiment of the use of the compound of Formula (IIa), one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

[00475] when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

[00476] when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

[00477] when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

[00478] when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N.

[00479] In an embodiment of the use of the compound of Formula (IIIa), one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

[00480] when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

[00481] when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

[00482] when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

[00483] when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N.

[00484] In an embodiment of the use of the compound of Formula (IVa), one of w₄ and w₇ is C-R₁ and the other is C-R₂, provided that, when w₄ is C-R₁, then w₇ is C-R₂; or, when w₄ is C-R₂, then w₇ is C-R₁.

[00485] In an embodiment of the use of the compound of Formula (Va), one of w₃ and w₆ is C-R₁ and the other is C-R₂, provided that, when w₃ is C-R₁, then w₆ is C-R₂; or, when w₃ is C-R₂, then w₆ is C-R₁.

[00486] In an embodiment of the use of the compound of Formula (VIa), one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

[00487] when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

[00488] when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

[00489] when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

[00490] when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N.

[00491] In an embodiment of the use of the compound of Formula (VIIa), one of w₄ and w₇ is C-R₁ and the other is C-R₂, provided that, when w₄ is C-R₁, then w₇ is C-R₂; or, when w₄ is C-R₂, then w₇ is C-R₁.

[00492] In an embodiment of the use of the compound of Formula (VIIIa), one of w₃ and w₆ is C-R₁ and the other is C-R₂, provided that, when w₃ is C-R₁, then w₆ is C-R₂; or, when w₃ is C-R₂, then w₆ is C-R₁.

[00493] In an embodiment of the use of the compound of Formula (IXa), one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

[00494] when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

[00495] when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

[00496] when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

[00497] when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N.

[00498] In an embodiment of the use of the compound of Formula (Xa), one of w₃ and w₆ is C-R₁ and the other is C-R₂, provided that, when w₃ is C-R₁, then w₆ is C-R₂; or, when w₃ is C-R₂, then w₆ is C-R₁.

[00499] In an embodiment of the use of the compound of Formula (XIa), one of w₄ and w₇ is C-R₁ and the other is C-R₂, provided that, when w₄ is C-R₁, then w₇ is C-R₂; or, when w₄ is C-R₂, then w₇ is C-R₁.

[00500] In an embodiment of the use of the compound of Formula (XIIa), one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

[00501] when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

[00502] when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

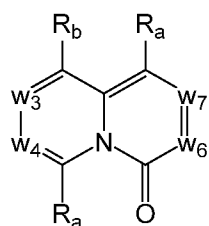
[00503] when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

[00504] when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N.

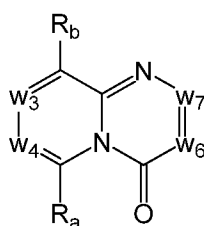
[00505] In an embodiment of the use of the compound of Formula (XIIIa), one of w₃ and w₆ is C-R₁ and the other is C-R₂, provided that, when w₃ is C-R₁, then w₆ is C-R₂; or, when w₃ is C-R₂, then w₆ is C-R₁.

[00506] In an embodiment of the use of the compound of Formula (XIVa), one of w₄ and w₇ is C-R₁ and the other is C-R₂, provided that, when w₄ is C-R₁, then w₇ is C-R₂; or, when w₄ is C-R₂, then w₇ is C-R₁.

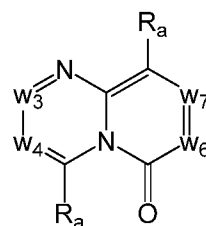
[00507] In another embodiment, the compound of Formula (I), Formula (II), Formula (III), Formula (IX), Formula (XI) or Formula (XII), used in a method disclosed herein, is a compound selected from Formula (Ia), Formula (IIa), Formula (IIIa), Formula (IXa), Formula (XIa) or Formula (XIIa), respectively:



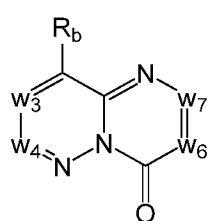
(Ia),



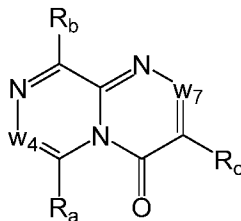
(IIa),



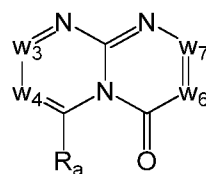
(IIIa),



(IXa),



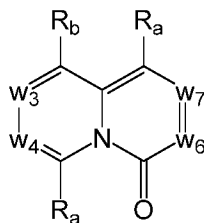
(XIa), or



(XIIa)

[00508] or a form thereof.

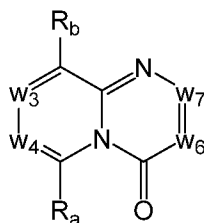
[00509] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound of Formula (Ia):



(Ia)

[00510] or a form thereof.

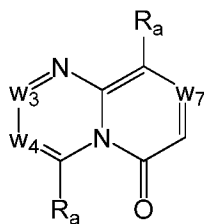
[00511] In another embodiment, the compound of Formula (II) used in a method disclosed herein is a compound of Formula (IIa):



(IIa)

[00512] or a form thereof.

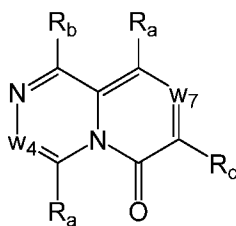
[00513] In another embodiment, the compound of Formula (III) used in a method disclosed herein is a compound of Formula (IIIa):



(IIIa)

[00514] or a form thereof.

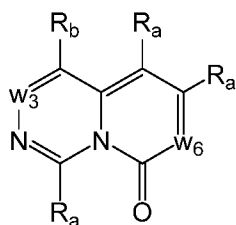
[00515] In another embodiment, the compound of Formula (IV) used in a method disclosed herein is a compound of Formula (IVa):



(IVa)

[00516] or a form thereof.

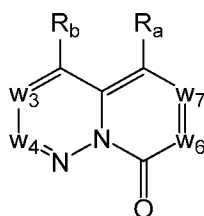
[00517] In another embodiment, the compound of Formula (V) used in a method disclosed herein is a compound of Formula (Va):



(Va)

[00518] or a form thereof.

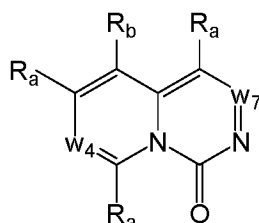
[00519] In another embodiment, the compound of Formula (VI) used in a method disclosed herein is a compound of Formula (VIa):



(VIa)

[00520] or a form thereof.

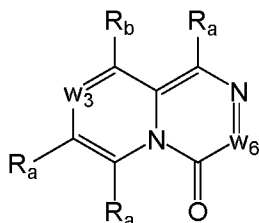
[00521] In another embodiment, the compound of Formula (VII) used in a method disclosed herein is a compound of Formula (VIIa):



(VIIa)

[00522] or a form thereof.

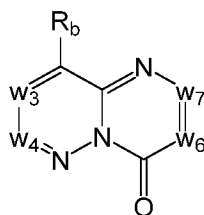
[00523] In another embodiment, the compound of Formula (VIII) used in a method disclosed herein is a compound of Formula (VIIIa):



(VIIIa)

[00524] or a form thereof.

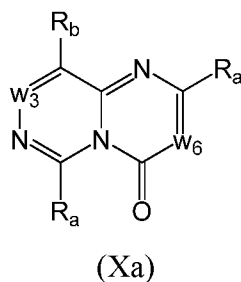
[00525] In another embodiment, the compound of Formula (IX) used in a method disclosed herein is a compound of Formula (IXa):



(IXa)

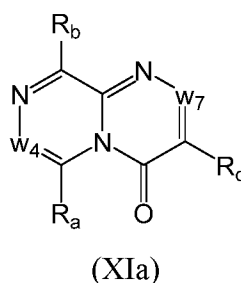
[00526] or a form thereof.

[00527] In another embodiment, the compound of Formula (X) used in a method disclosed herein is a compound of Formula (Xa):



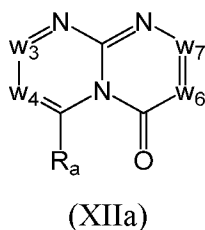
[00528] or a form thereof.

[00529] In another embodiment, the compound of Formula (XI) used in a method disclosed herein is a compound of Formula (XIa):



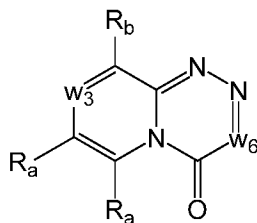
[00530] or a form thereof.

[00531] In another embodiment, the compound of Formula (XII) used in a method disclosed herein is a compound of Formula (XIIa):

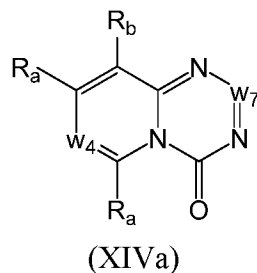


[00532] or a form thereof.

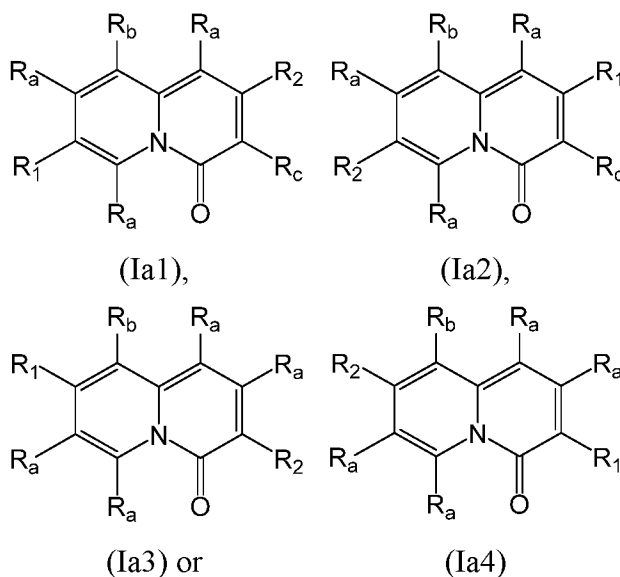
[00533] In another embodiment, the compound of Formula (XIII) used in a method disclosed herein is a compound of Formula (XIIIa):



(XIIIa)

[00534] or a form thereof.**[00535]** In another embodiment, the compound of Formula (XIV) used in a method disclosed herein is a compound of Formula (XIVa):

(XIVa)

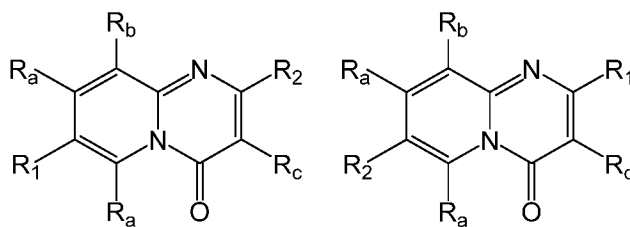
[00536] or a form thereof.**[00537]** In one embodiment, the compound of Formula (Ia) used in a method disclosed herein is a compound of Formula (Ia1), Formula (Ia2), Formula (Ia3) or Formula (Ia4):

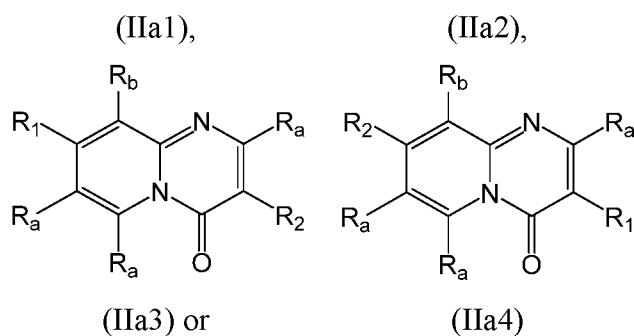
(Ia1),

(Ia2),

(Ia3) or

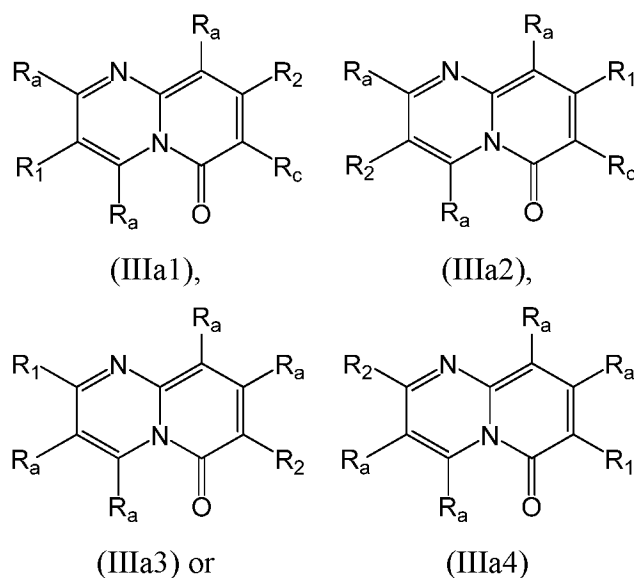
(Ia4)

[00538] or a form thereof.**[00539]** In one embodiment, the compound of Formula (IIa) used in a method disclosed herein is a compound of Formula (IIa1), Formula (IIa2), Formula (IIa3) or Formula (IIa4):



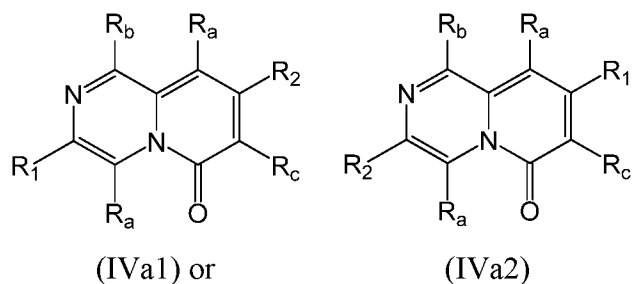
[00540] or a form thereof.

[00541] In one embodiment, the compound of Formula (IIIa) used in a method disclosed herein is a compound of Formula (IIIa1), Formula (IIIa2), Formula (IIIa3) or Formula (IIIa4):



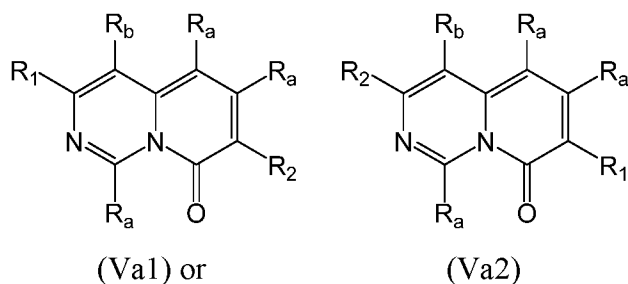
[00542] or a form thereof.

[00543] In one embodiment, the compound of Formula (IVa) used in a method disclosed herein is a compound of Formula (IVa1) or Formula (IVa2):



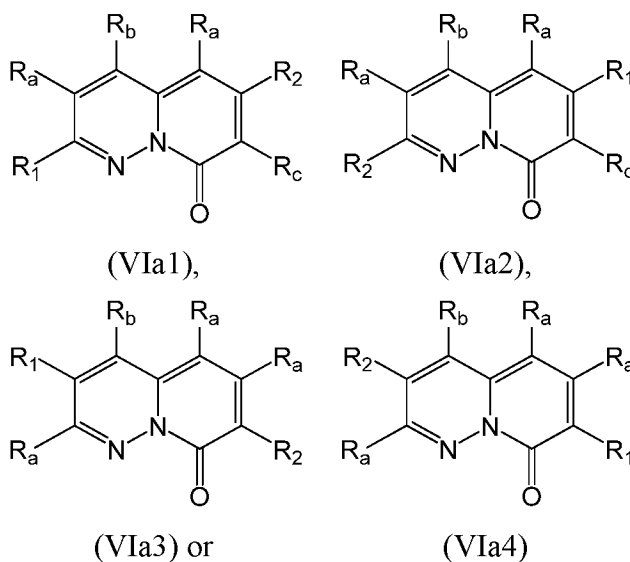
[00393] or a form thereof.

[00394] In one embodiment, the compound of Formula (Va) used in a method disclosed herein is a compound of Formula (Va1) or Formula (Va2):



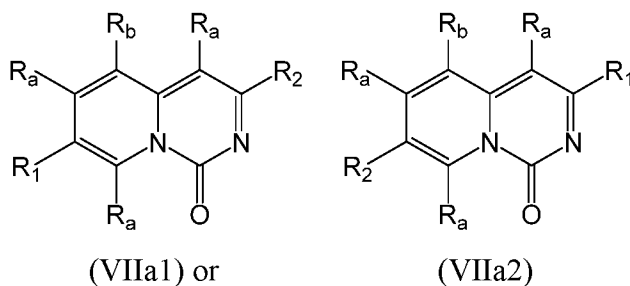
[00544] or a form thereof.

[00545] In one embodiment, the compound of Formula (VIa) used in a method disclosed herein is a compound of Formula (VIa1), Formula (VIa2), Formula (VIa3) or Formula (VIa4):



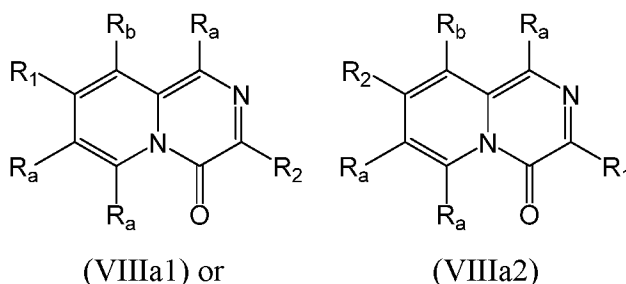
[00546] or a form thereof.

[00547] In one embodiment, the compound of Formula (VIIa) used in a method disclosed herein is a compound of Formula (VIIa1) or Formula (VIIa2):



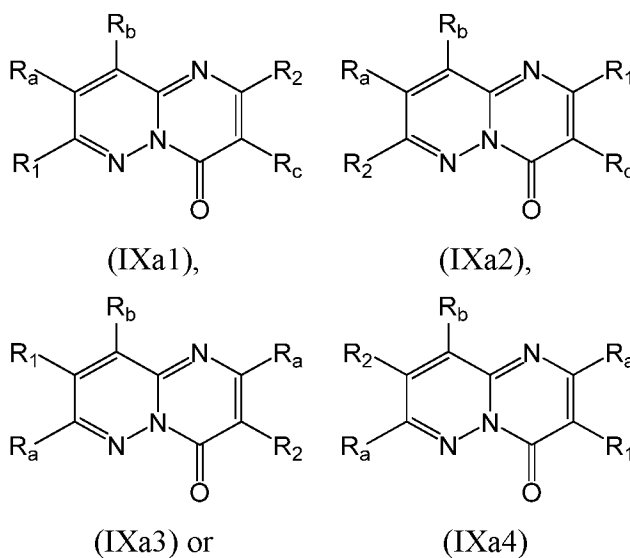
[00548] or a form thereof.

[00549] In one embodiment, the compound of Formula (VIIIa) used in a method disclosed herein is a compound of Formula (VIIIa1) or Formula (VIIIa2):



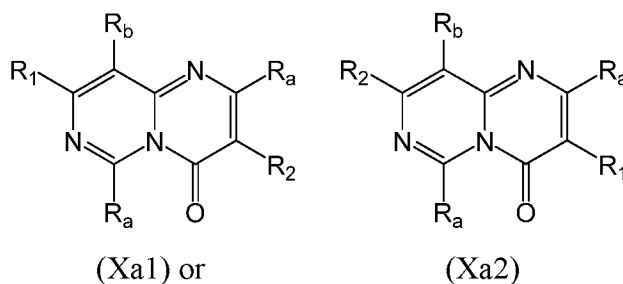
[00550] or a form thereof.

[00551] In one embodiment, the compound of Formula (IXa) used in a method disclosed herein is a compound of Formula (IXa1), Formula (IXa2), Formula (IXa3) or Formula (IXa4):



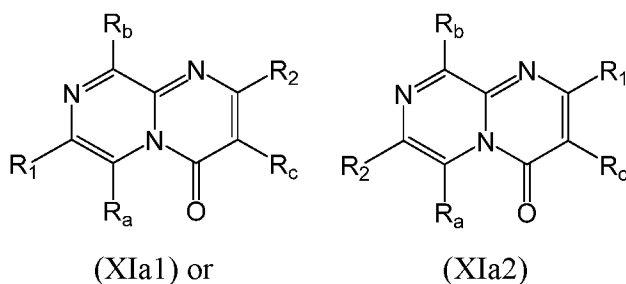
[00552] or a form thereof.

[00553] In one embodiment, the compound of Formula (Xa) used in a method disclosed herein is a compound of Formula (Xa1) or Formula (Xa2):



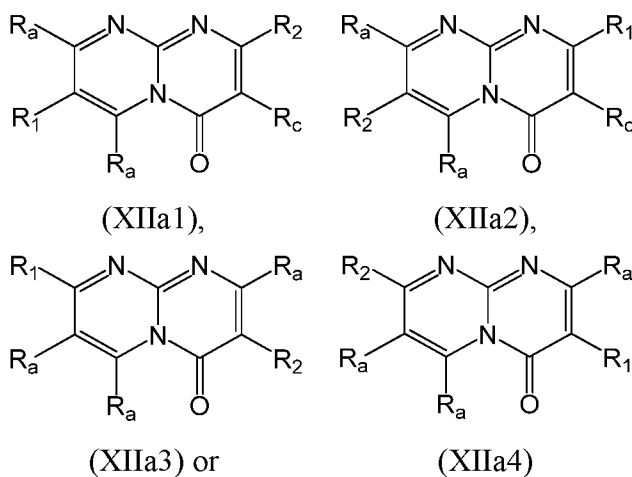
[00554] or a form thereof.

[00555] In one embodiment, the compound of Formula (XIa) used in a method disclosed herein is a compound of Formula (XIa1) or Formula (XIa2):



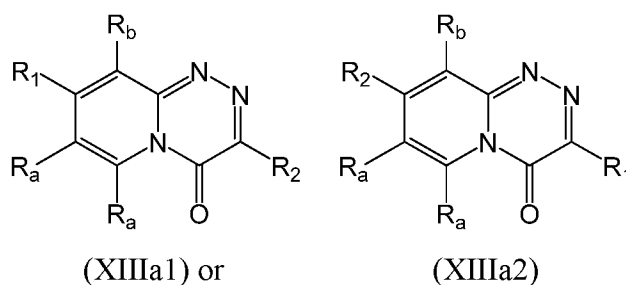
[00556] or a form thereof.

[00557] In one embodiment, the compound of Formula (XIIa) used in a method disclosed herein is a compound of Formula (XIIa1), Formula (XIIa2), Formula (XIIa3) or Formula (XIIa4):



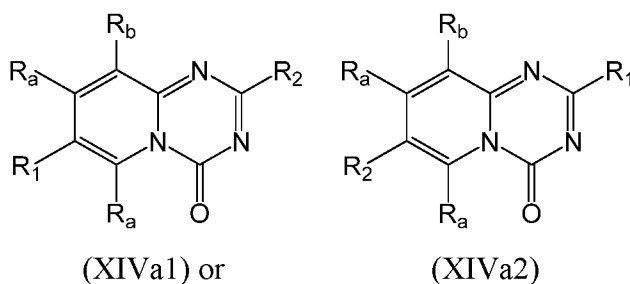
[00558] or a form thereof.

[00559] In one embodiment, the compound of Formula (XIIIa) used in a method disclosed herein is a compound of Formula (XIIIa1) or Formula (XIIIa2):



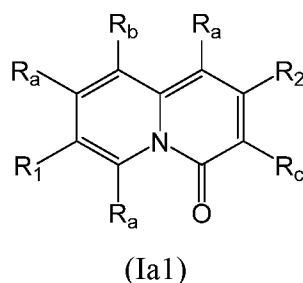
[00560] or a form thereof.

[00561] In one embodiment, the compound of Formula (XIVa) used in a method disclosed herein is a compound of Formula (XIVa1) or Formula (XIVa2):



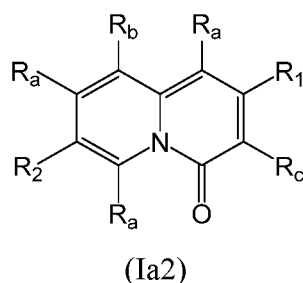
[00562] or a form thereof.

[00563] In one embodiment, the compound of Formula (Ia) used in a method disclosed herein is a compound of Formula (Ia1):



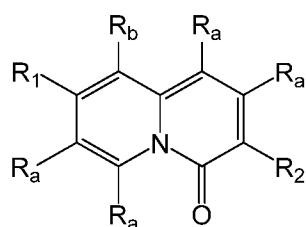
[00564] or a form thereof.

[00565] In one embodiment, the compound of Formula (Ia) used in a method disclosed herein is a compound of Formula (Ia2):



[00566] or a form thereof.

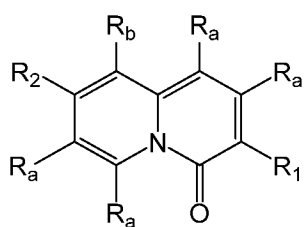
[00567] In one embodiment, the compound of Formula (Ia) used in a method disclosed herein is a compound of Formula (Ia3):



(Ia3)

[00568] or a form thereof.

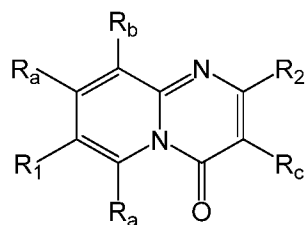
[00569] In one embodiment, the compound of Formula (Ia) used in a method disclosed herein is a compound of Formula (Ia4):



(Ia4)

[00570] or a form thereof.

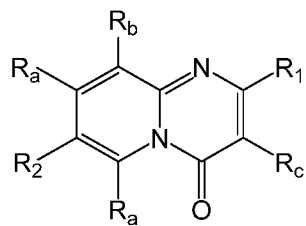
[00571] In one embodiment, the compound of Formula (IIa) used in a method disclosed herein is a compound of Formula (IIa1):



(IIa1)

[00572] or a form thereof.

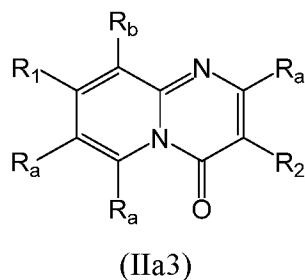
[00573] In one embodiment, the compound of Formula (IIa) used in a method disclosed herein is a compound of Formula (IIa2):



(IIa2)

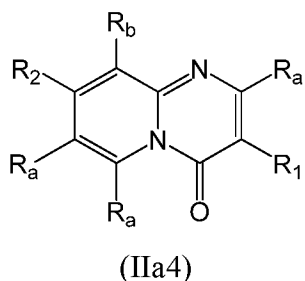
[00574] or a form thereof.

[00575] In one embodiment, the compound of Formula (IIa) used in a method disclosed herein is a compound of Formula (IIa3):



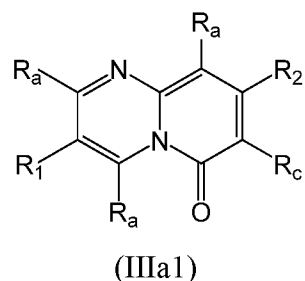
[00576] or a form thereof.

[00577] In one embodiment, the compound of Formula (IIa) used in a method disclosed herein is a compound of Formula (IIa4):



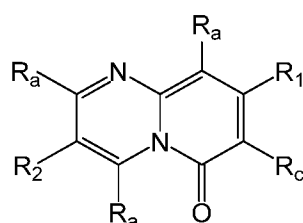
[00578] or a form thereof.

[00579] In one embodiment, the compound of Formula (IIIa) used in a method disclosed herein is a compound of Formula (IIIa1):



[00580] or a form thereof.

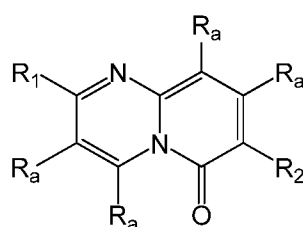
[00581] In one embodiment, the compound of Formula (IIIa) used in a method disclosed herein is a compound of Formula (IIIa2):



(IIIa2)

[00582] or a form thereof.

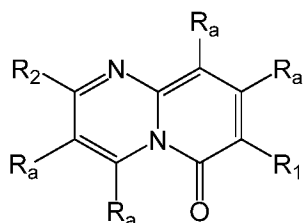
[00583] In one embodiment, the compound of Formula (IIIa) used in a method disclosed herein is a compound of Formula (IIIa3):



(IIIa3)

[00584] or a form thereof.

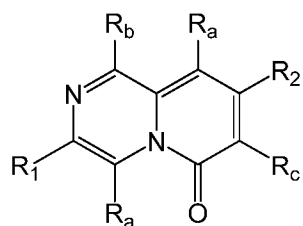
[00585] In one embodiment, the compound of Formula (IIIa) used in a method disclosed herein is a compound of Formula (IIIa4):



(IIIa4)

[00586] or a form thereof.

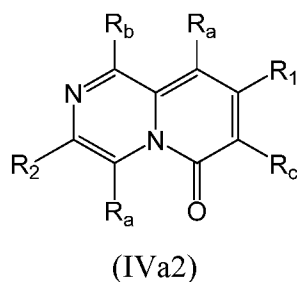
[00587] In one embodiment, the compound of Formula (IVa) used in a method disclosed herein is a compound of Formula (IVa1):



(IVa1)

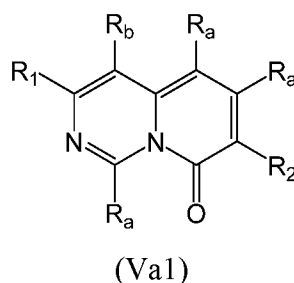
[00588] or a form thereof.

[00589] In one embodiment, the compound of Formula (IVa) used in a method disclosed herein is a compound of Formula (IVa2):



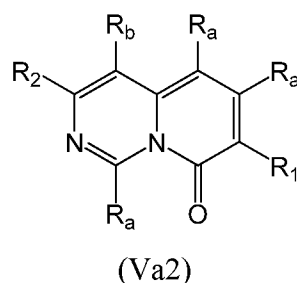
[00590] or a form thereof.

[00591] In one embodiment, the compound of Formula (Va) used in a method disclosed herein is a compound of Formula (Va1):



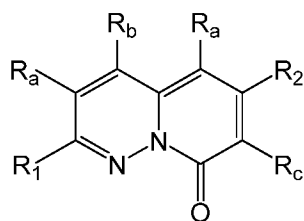
[00592] or a form thereof.

[00593] In one embodiment, the compound of Formula (Va) used in a method disclosed herein is a compound of Formula (Va2):



[00594] or a form thereof.

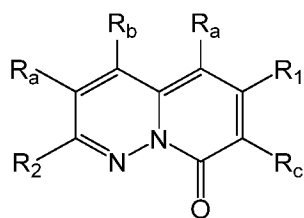
[00595] In one embodiment, the compound of Formula (VIa) used in a method disclosed herein is a compound of Formula (VIa1):



(VIa1)

[00596] or a form thereof.

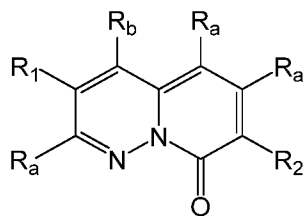
[00597] In one embodiment, the compound of Formula (VIa) used in a method disclosed herein is a compound of Formula (VIa2):



(VIa2)

[00598] or a form thereof.

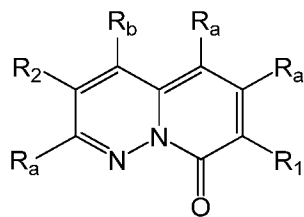
[00599] In one embodiment, the compound of Formula (VIa) used in a method disclosed herein is a compound of Formula (VIa3):



(VIa3)

[00600] or a form thereof.

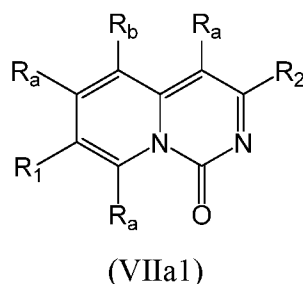
[00601] In one embodiment, the compound of Formula (VIa) used in a method disclosed herein is a compound of Formula (VIa4):



(VIa4)

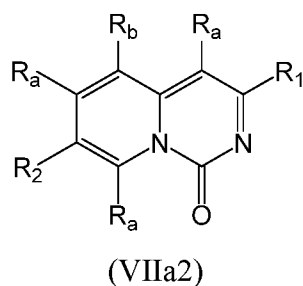
[00602] or a form thereof.

[00603] In one embodiment, the compound of Formula (VIIa) used in a method disclosed herein is a compound of Formula (VIIa1):



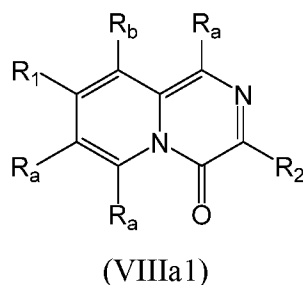
[00604] or a form thereof.

[00605] In one embodiment, the compound of Formula (VIIa) used in a method disclosed herein is a compound of Formula (VIIa2):



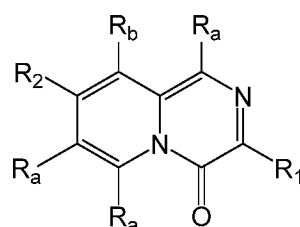
[00606] or a form thereof.

[00607] In one embodiment, the compound of Formula (VIIIa) used in a method disclosed herein is a compound of Formula (VIIIa1):



[00608] or a form thereof.

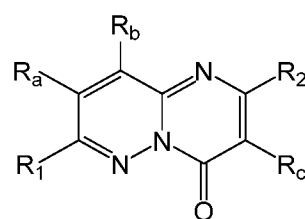
[00609] In one embodiment, the compound of Formula (VIIIa) used in a method disclosed herein is a compound of Formula (VIIIa2):



(VIIIa2)

[00610] or a form thereof.

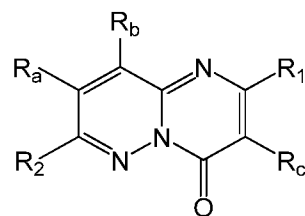
[00611] In one embodiment, the compound of Formula (IXa) used in a method disclosed herein is a compound of Formula (IXa1):



(IXa1)

[00612] or a form thereof.

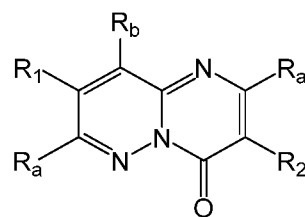
[00613] In one embodiment, the compound of Formula (IXa) used in a method disclosed herein is a compound of Formula (IXa2):



(IXa2)

[00614] or a form thereof.

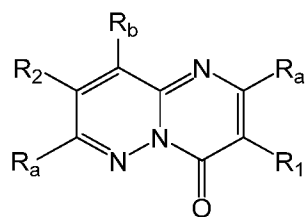
[00615] In one embodiment, the compound of Formula (IXa) used in a method disclosed herein is a compound of Formula (IXa3):



(IXa3)

[00616] or a form thereof.

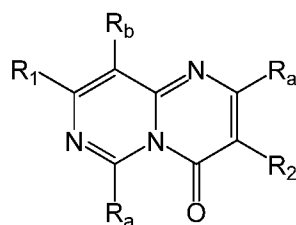
[00617] In one embodiment, the compound of Formula (IXa) used in a method disclosed herein is a compound of Formula (IXa4):



(IXa4)

[00618] or a form thereof.

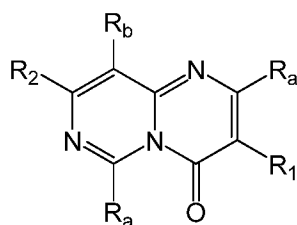
[00619] In one embodiment, the compound of Formula (Xa) used in a method disclosed herein is a compound of Formula (Xa1):



(Xa1)

[00471] or a form thereof.

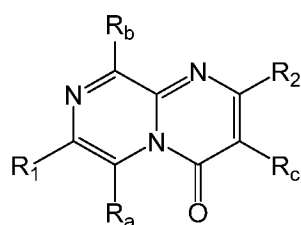
[00472] In one embodiment, the compound of Formula (Xa) used in a method disclosed herein is a compound of Formula (Xa2):



(Xa2)

[00620] or a form thereof.

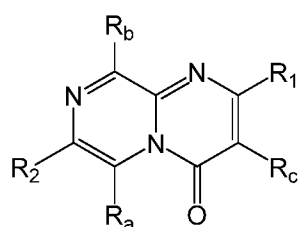
[00621] In one embodiment, the compound of Formula (XIa) used in a method disclosed herein is a compound of Formula (XIa1):



(XIa1)

[00622] or a form thereof.

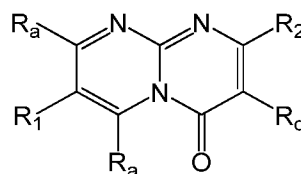
[00623] In one embodiment, the compound of Formula (XIa) used in a method disclosed herein is a compound of Formula (XIa2):



(XIa2)

[00624] or a form thereof.

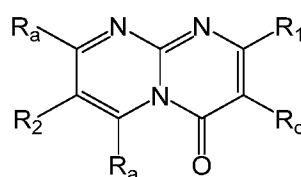
[00625] In one embodiment, the compound of Formula (XIIa) used in a method disclosed herein is a compound of Formula (XIIa1):



(XIIa1)

[00626] or a form thereof.

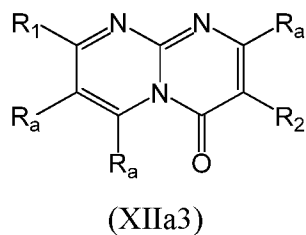
[00627] In one embodiment, the compound of Formula (XIIa) used in a method disclosed herein is a compound of Formula (XIIa2):



(XIIa2)

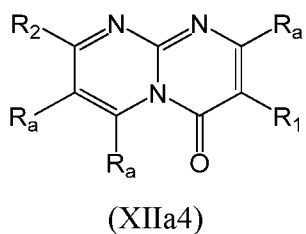
[00628] or a form thereof.

[00629] In one embodiment, the compound of Formula (XIIa) used in a method disclosed herein is a compound of Formula (XIIa3):



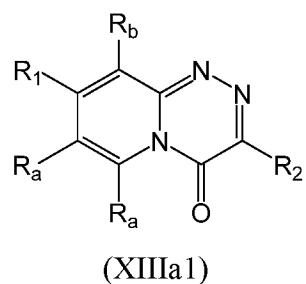
[00630] or a form thereof.

[00631] In one embodiment, the compound of Formula (XIIa) used in a method disclosed herein is a compound of Formula (XIIa4):



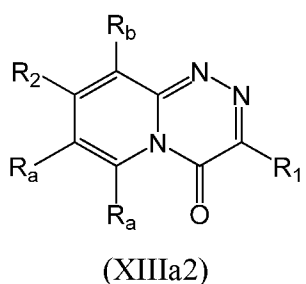
[00632] or a form thereof.

[00633] In one embodiment, the compound of Formula (XIIIa) used in a method disclosed herein is a compound of Formula (XIIIa1):



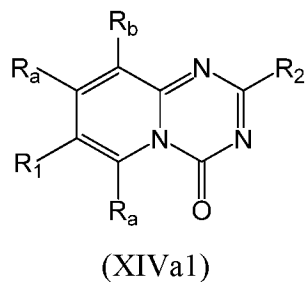
[00634] or a form thereof.

[00635] In one embodiment, the compound of Formula (XIIIa) used in a method disclosed herein is a compound of Formula (XIIIa2):



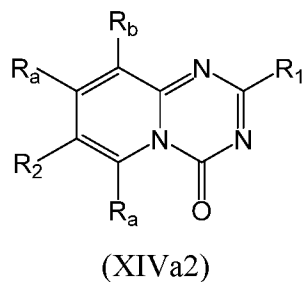
[00636] or a form thereof.

[00637] In one embodiment, the compound of Formula (XIVa) used in a method disclosed herein is a compound of Formula (XIVa1):



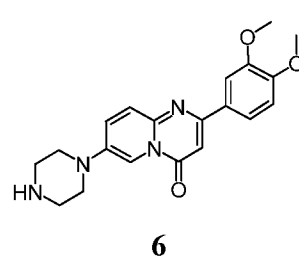
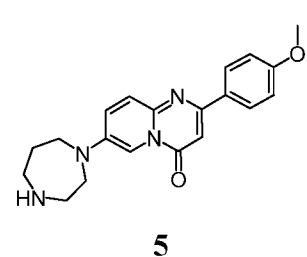
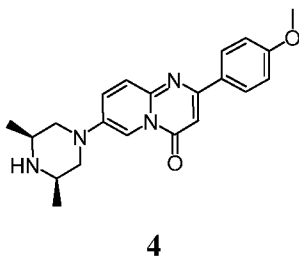
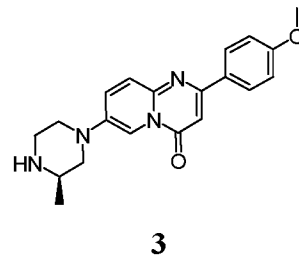
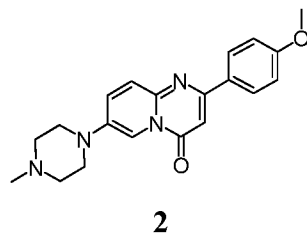
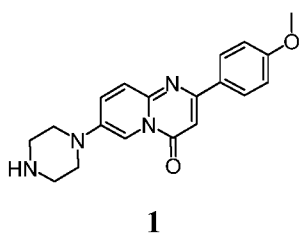
[00638] or a form thereof.

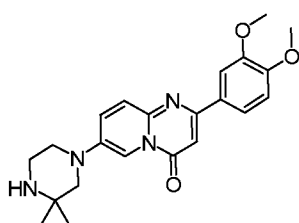
[00639] In one embodiment, the compound of Formula (XIVa) used in a method disclosed herein is a compound of Formula (XIVa2):



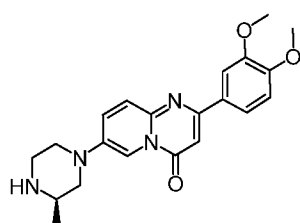
[00640] or a form thereof.

[00641] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound selected from the group consisting of:

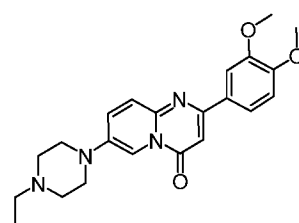




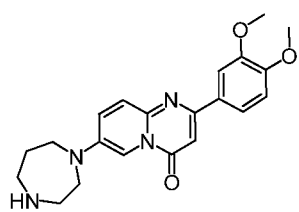
7



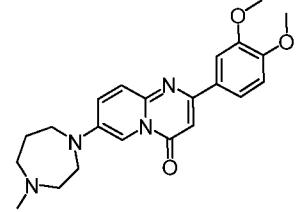
8



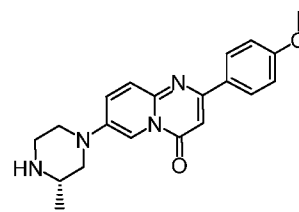
9



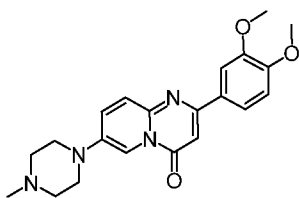
10



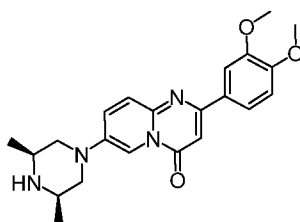
11



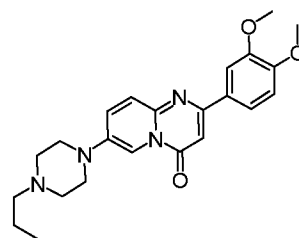
12



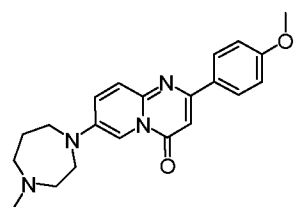
13



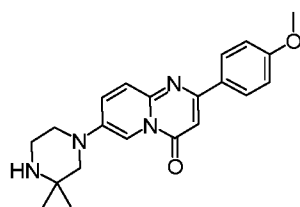
14



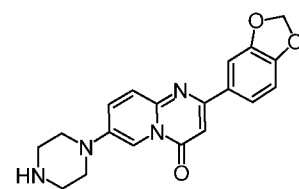
15



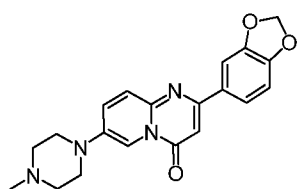
16



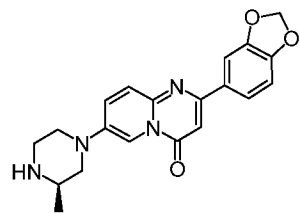
17



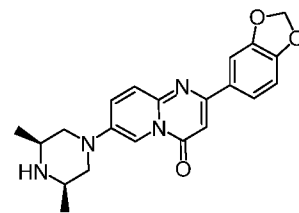
18



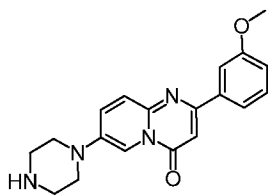
19



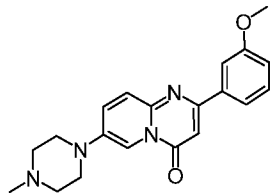
20



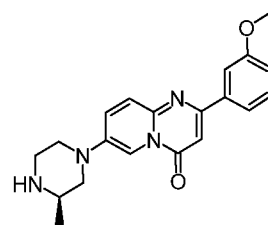
21



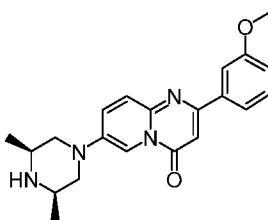
22



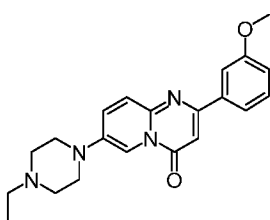
23



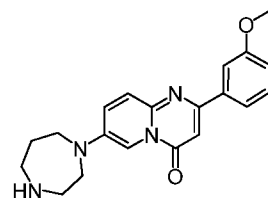
24



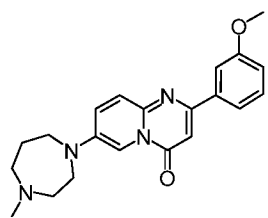
25



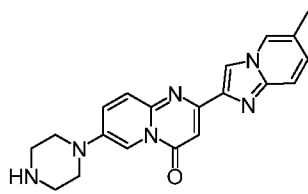
26



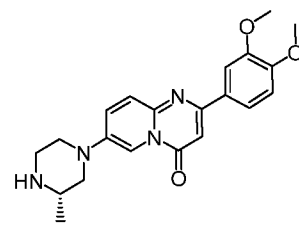
27



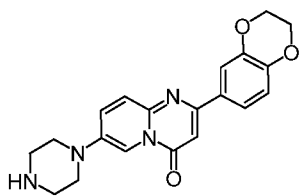
28



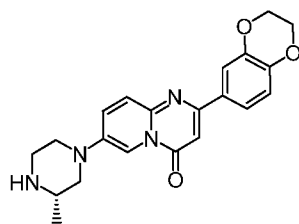
29



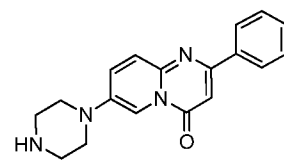
30



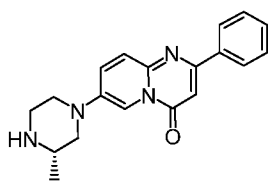
31



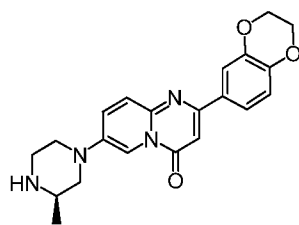
32



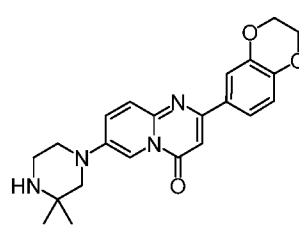
33



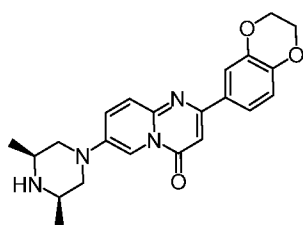
34



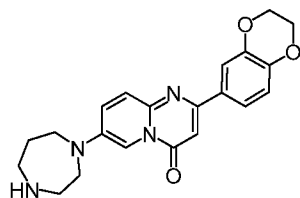
35



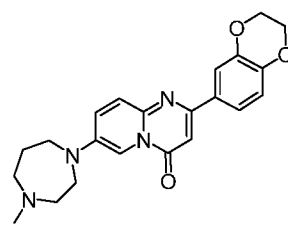
36



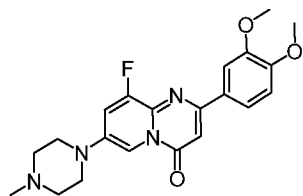
37



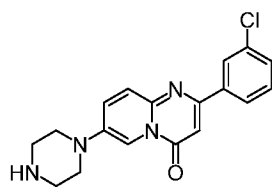
38



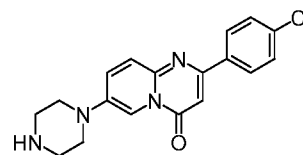
39



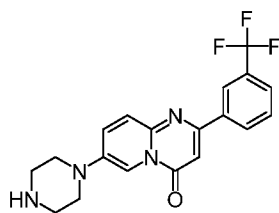
40



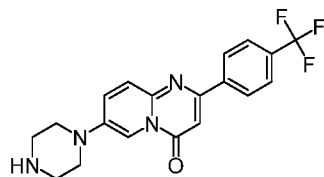
41



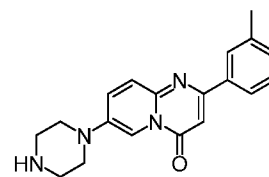
42



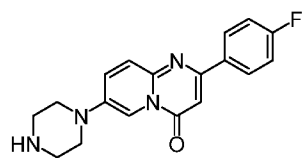
43



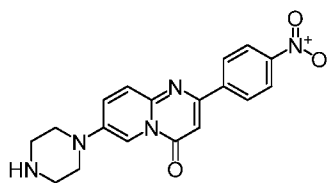
44



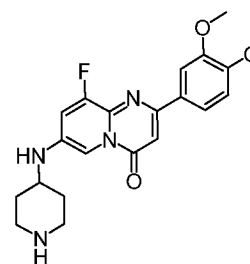
45



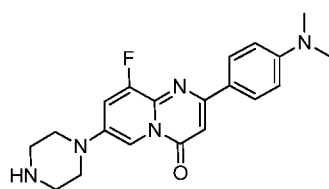
46



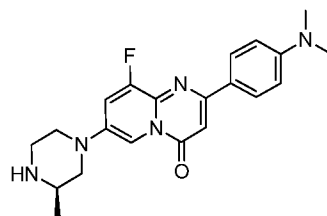
47



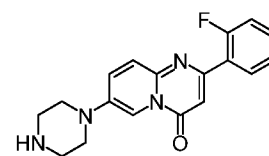
48



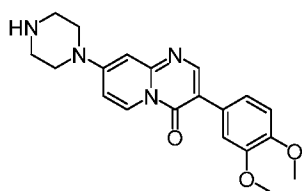
49



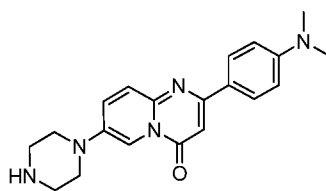
50



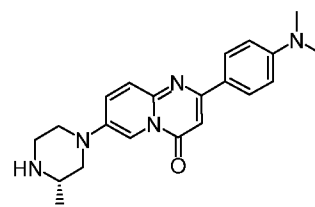
51



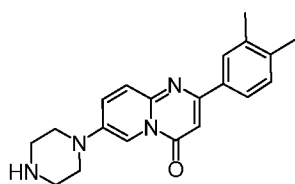
52



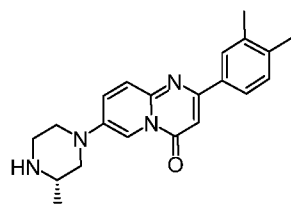
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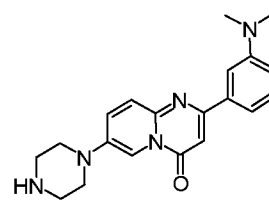
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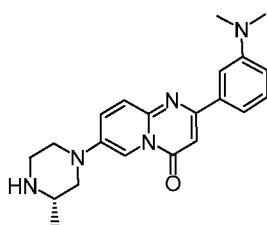
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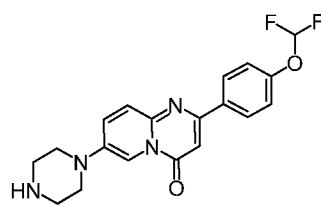
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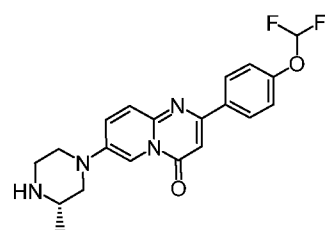
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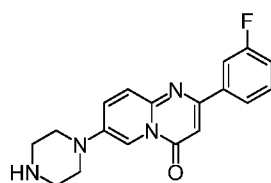
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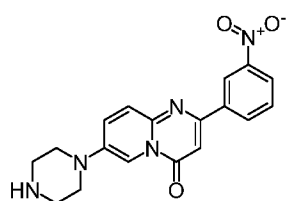
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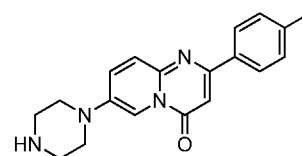
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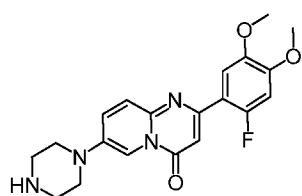
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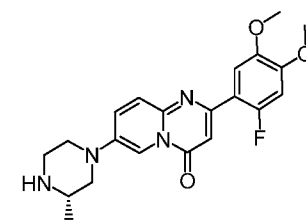
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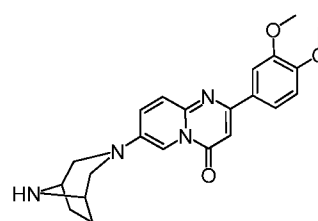
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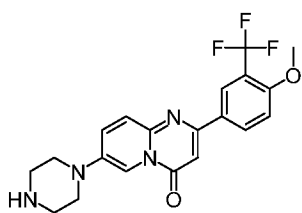
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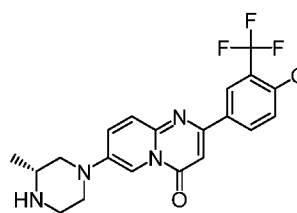
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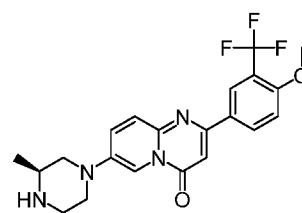
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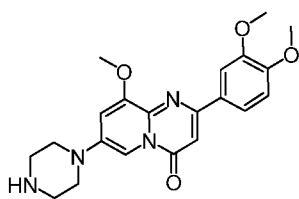
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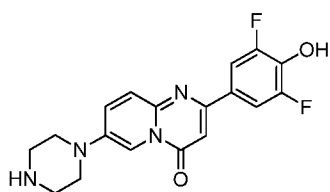
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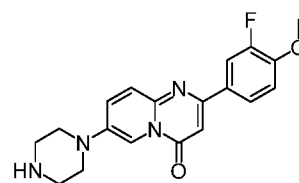
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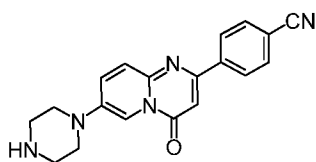
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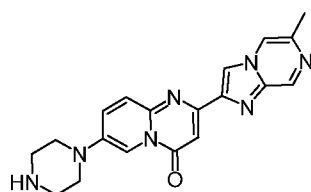
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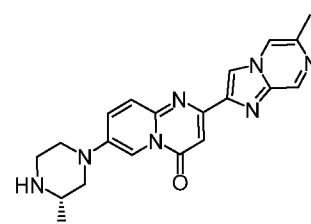
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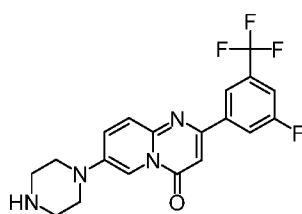
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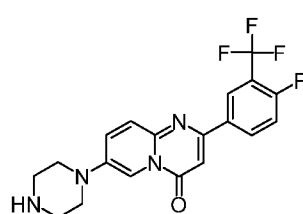
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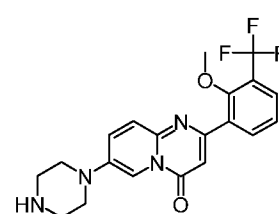
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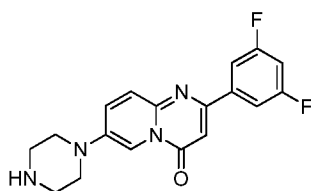
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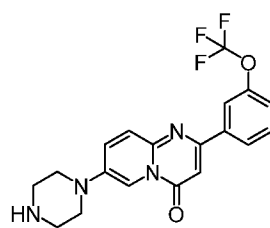
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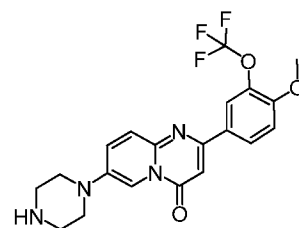
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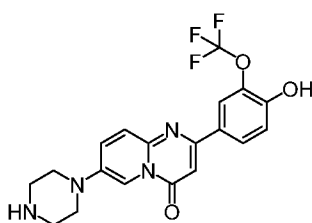
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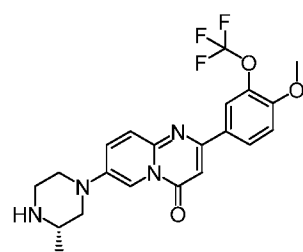
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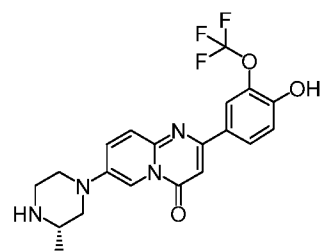
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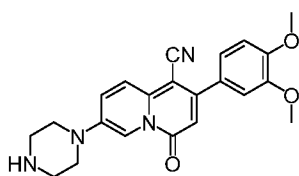
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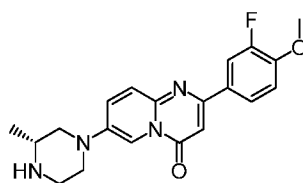
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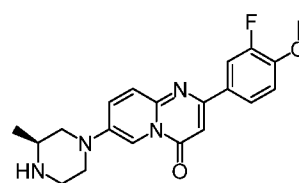
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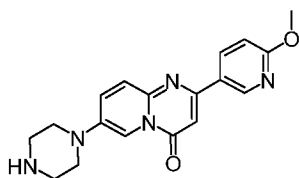
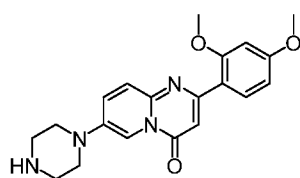
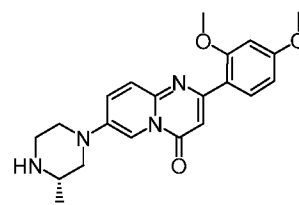
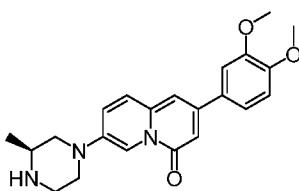
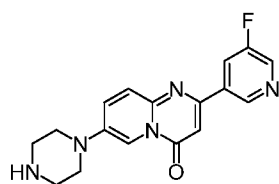
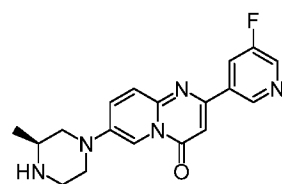
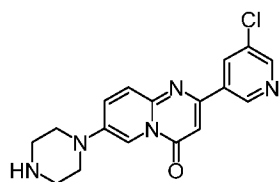
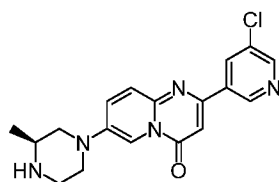
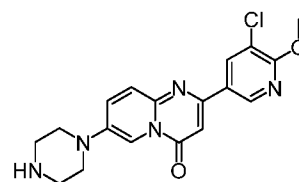
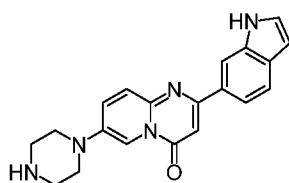
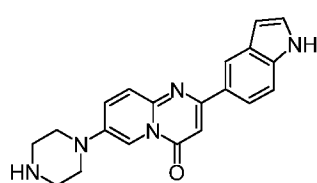
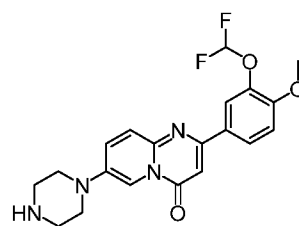
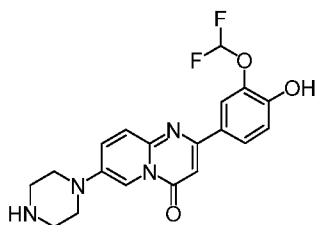
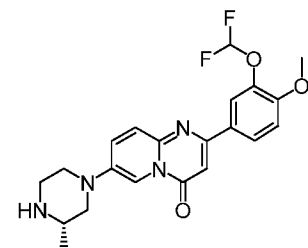
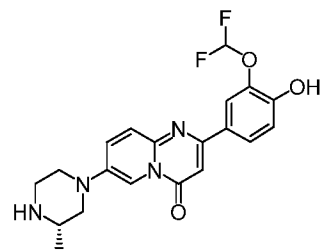
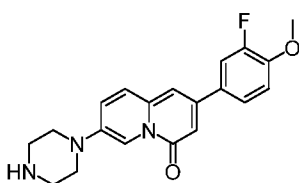
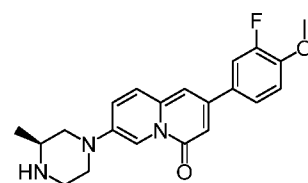
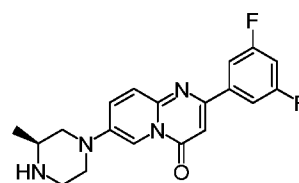
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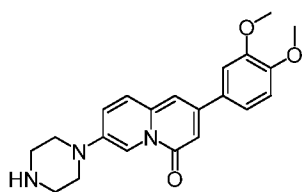
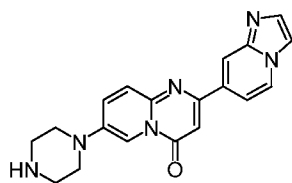
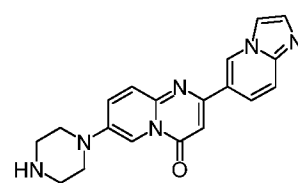
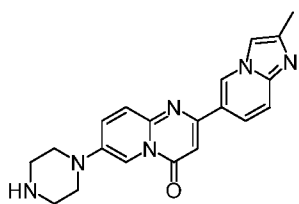
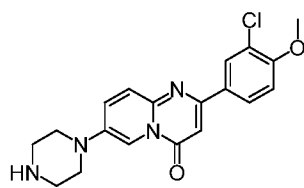
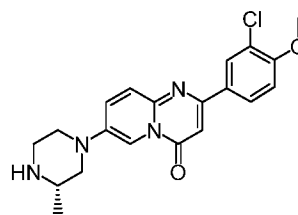
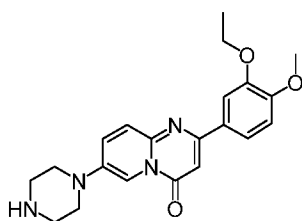
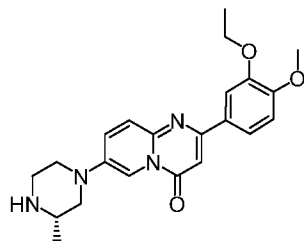
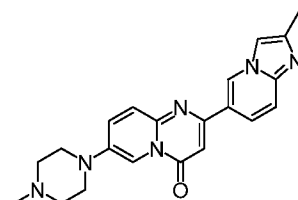
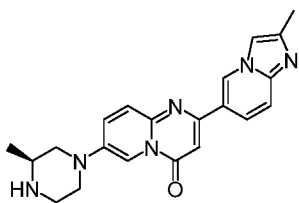
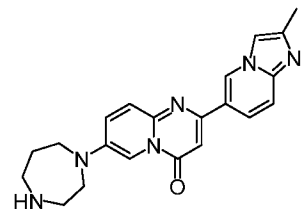
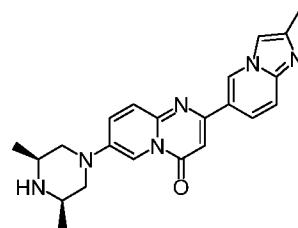
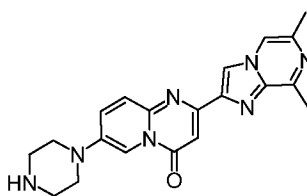
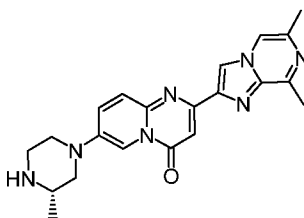
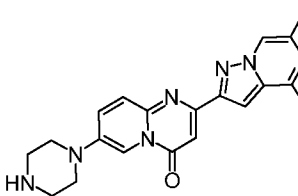


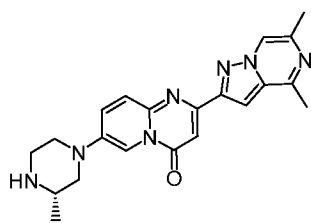
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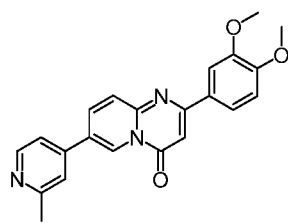
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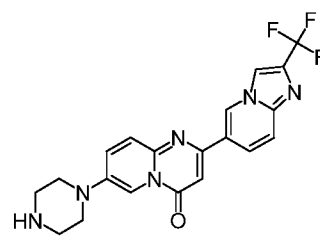
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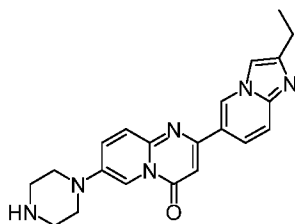
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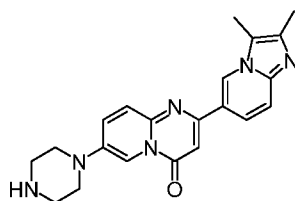
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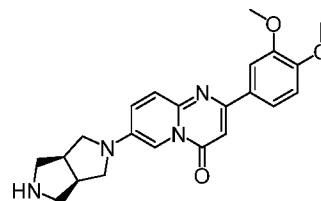
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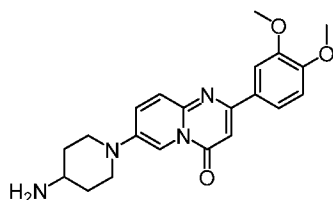
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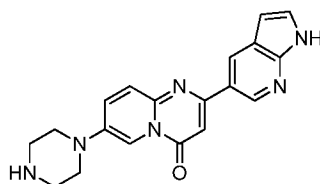
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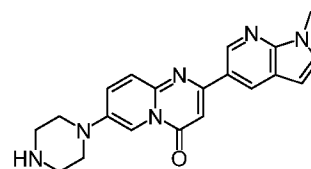
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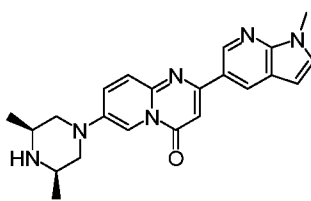
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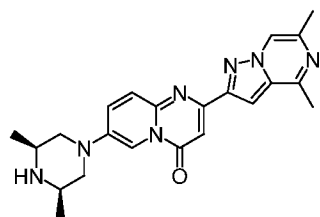
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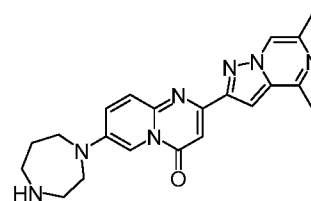
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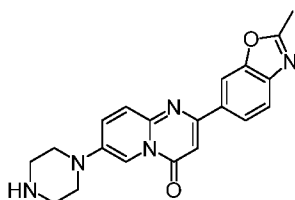
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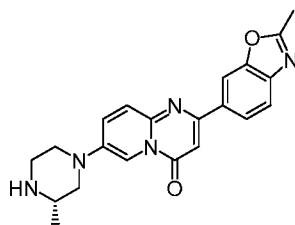
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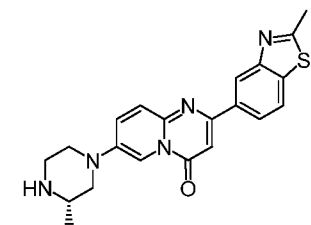
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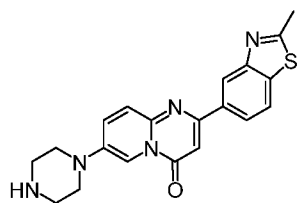
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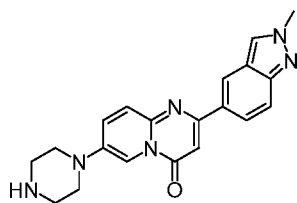
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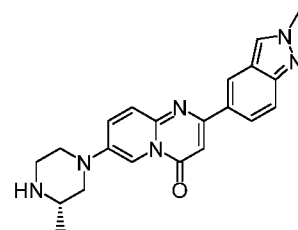
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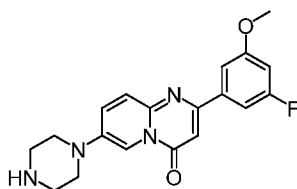
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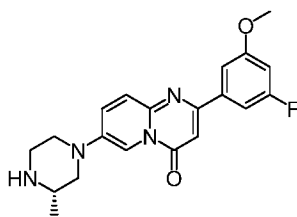
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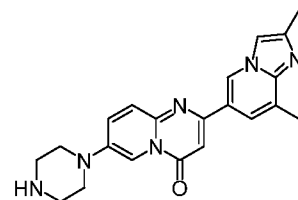
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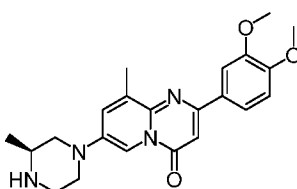
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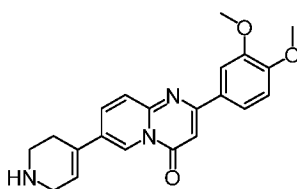
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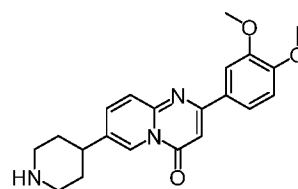
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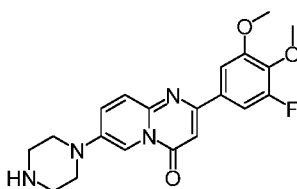
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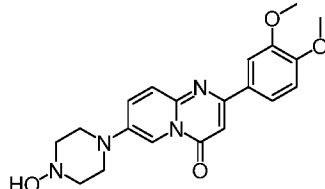
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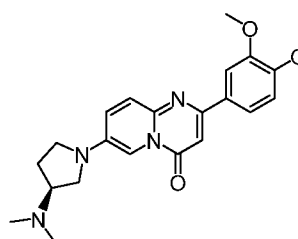
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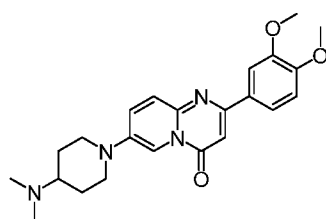
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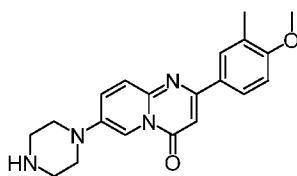
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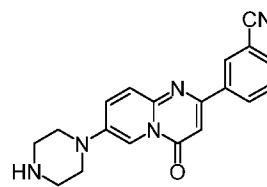
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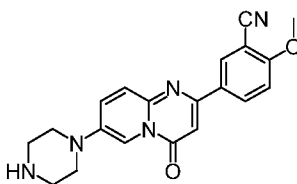
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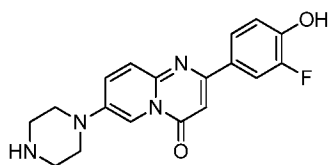
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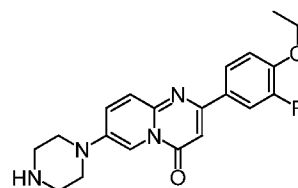
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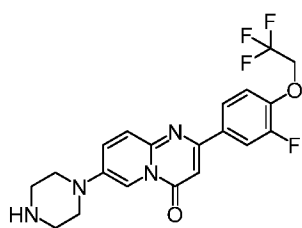
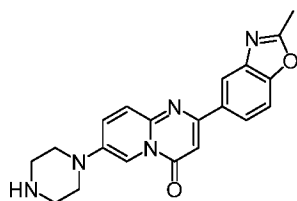
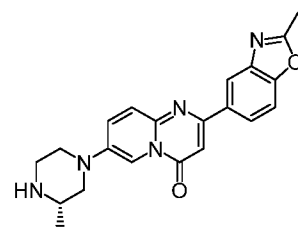
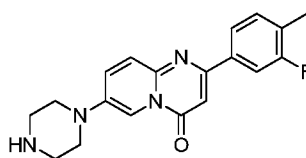
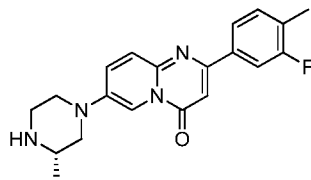
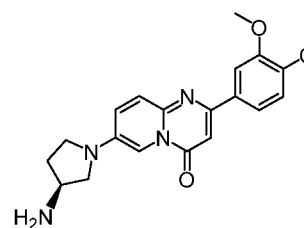
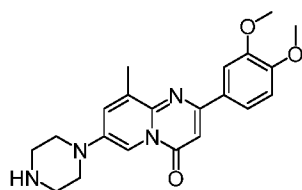
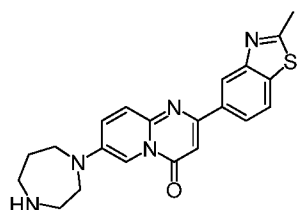
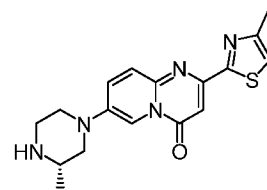
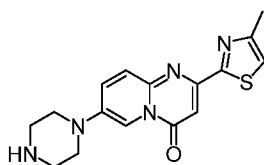
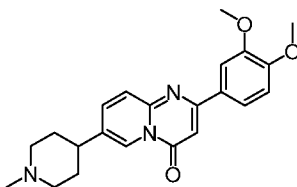
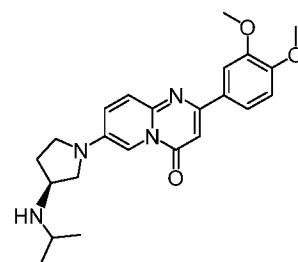
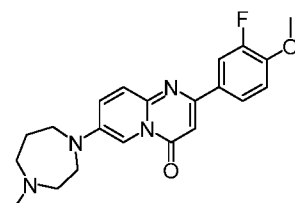
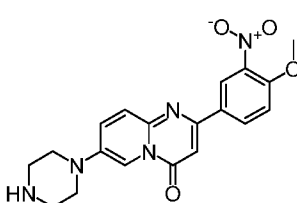
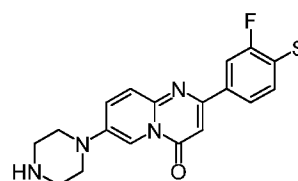
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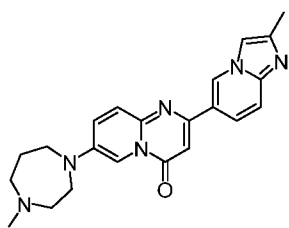


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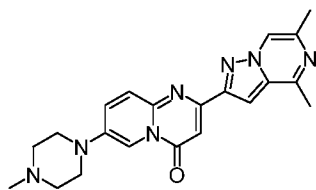


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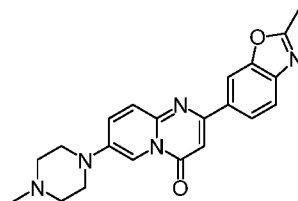
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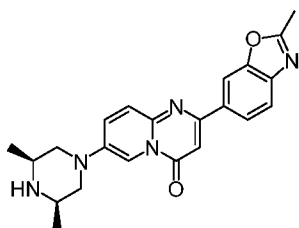
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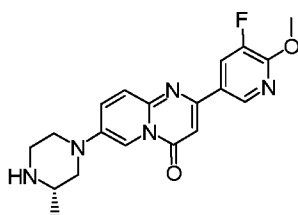
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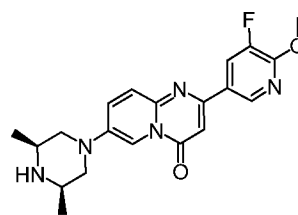
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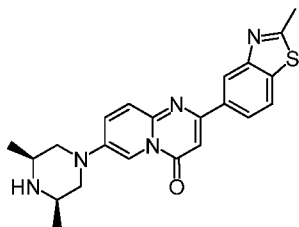
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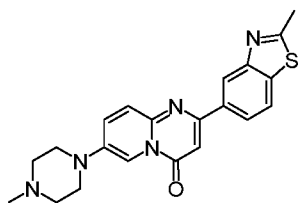
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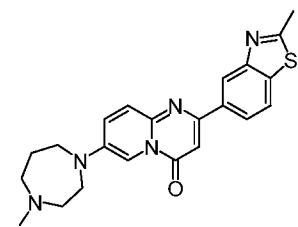
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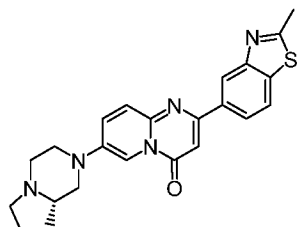
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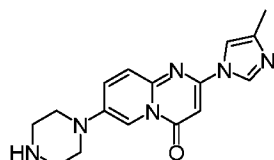
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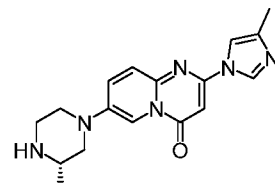
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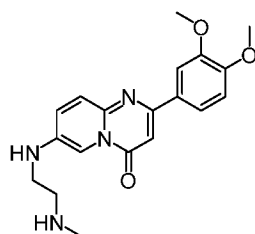
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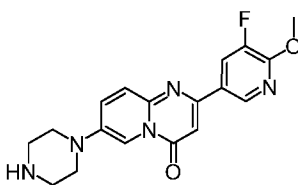
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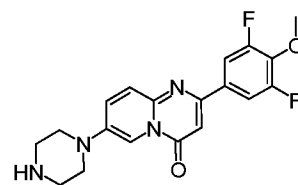
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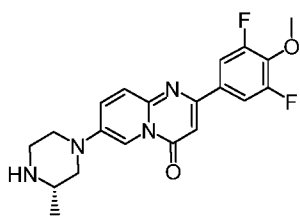
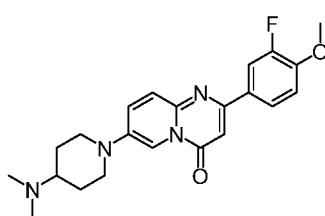
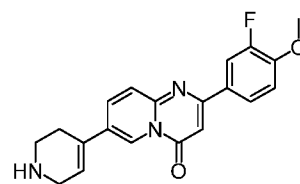
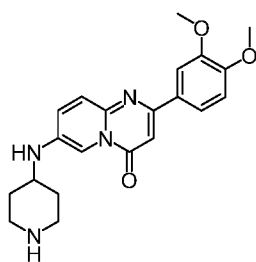
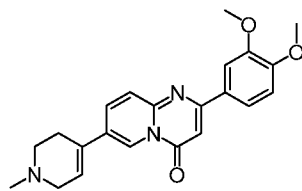
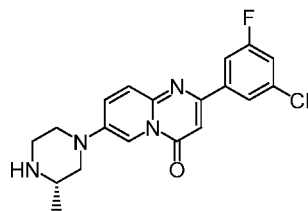
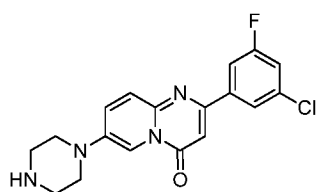
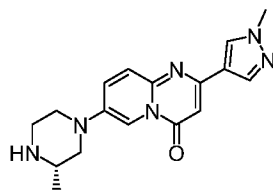
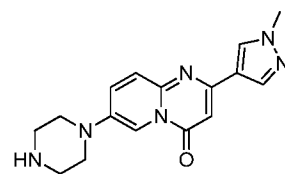
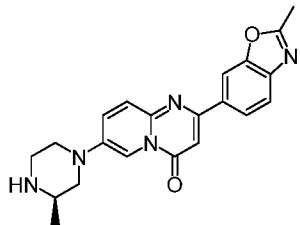
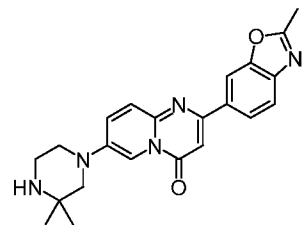
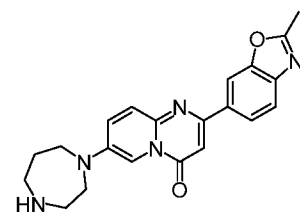
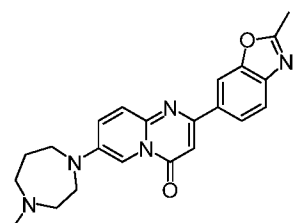
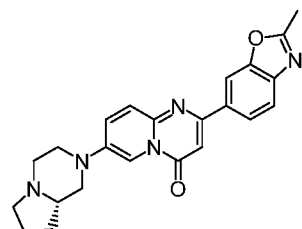
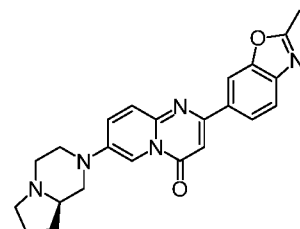
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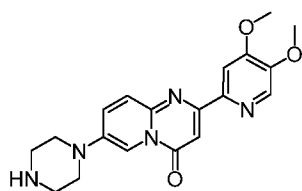
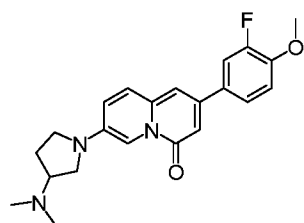
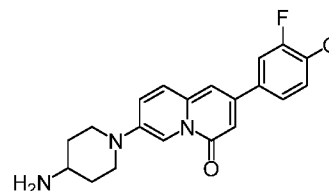
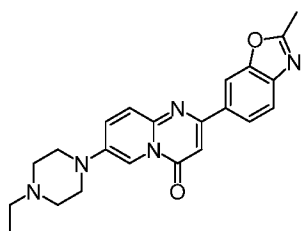
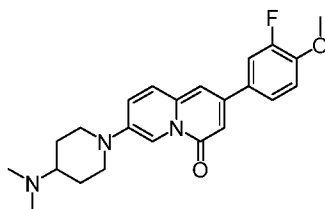
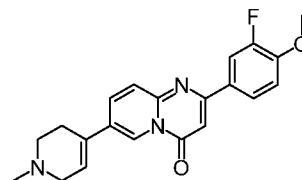
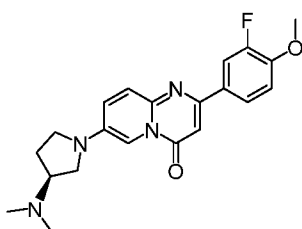
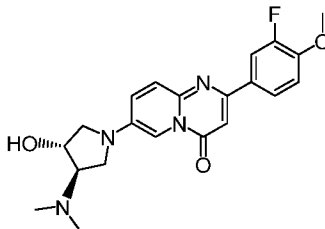
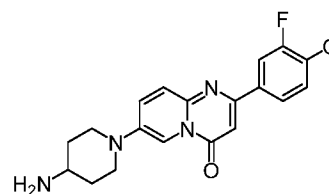
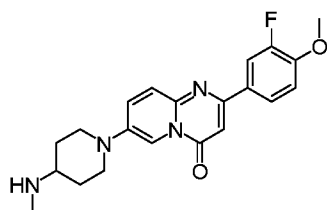
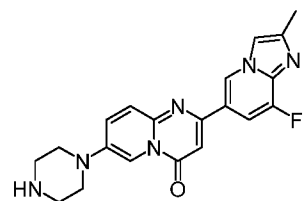
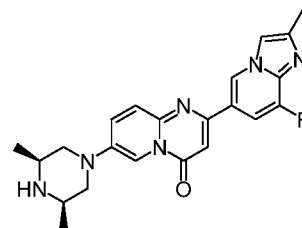
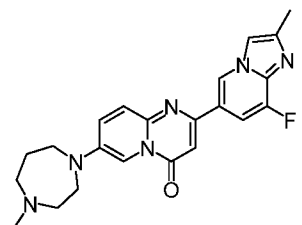
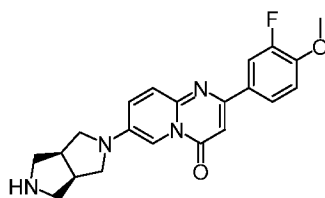
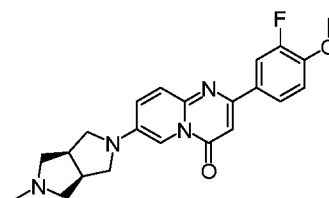


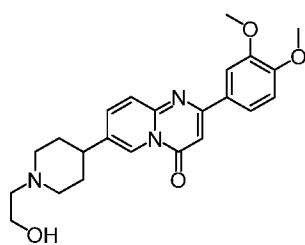
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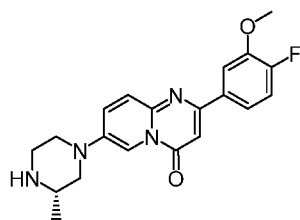
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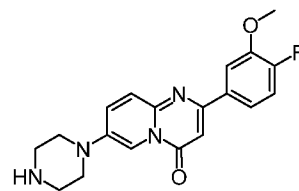
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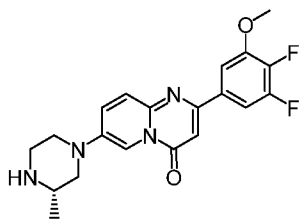
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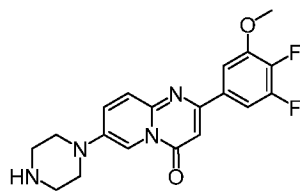
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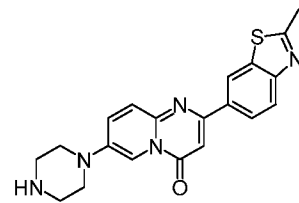
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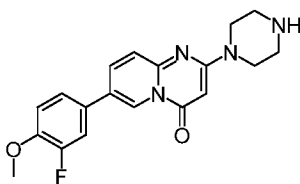
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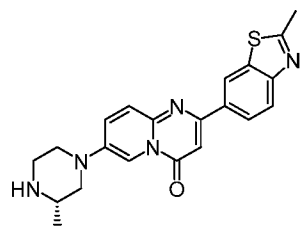
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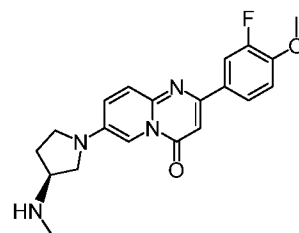
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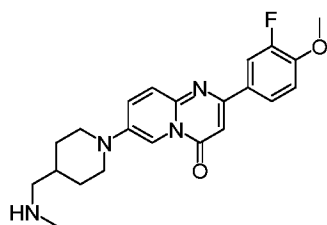
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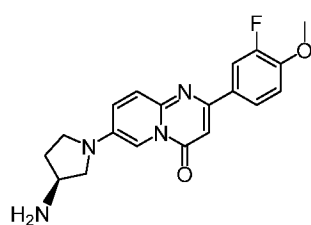
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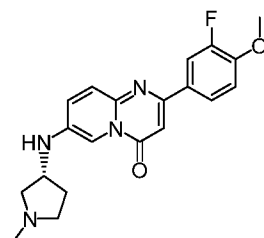
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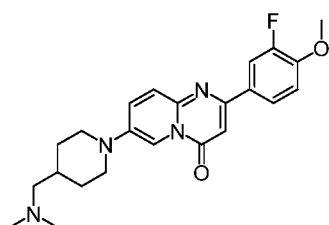
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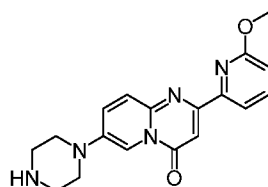
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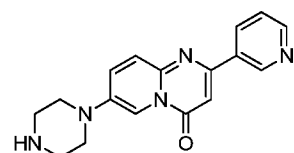
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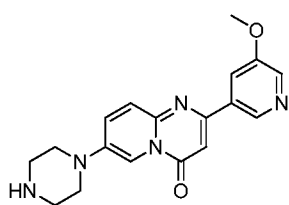
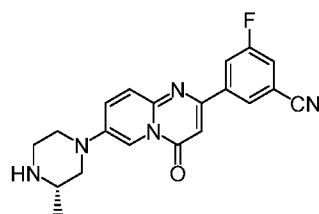
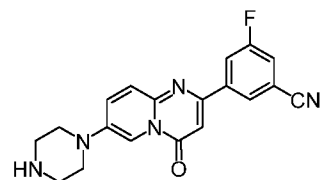
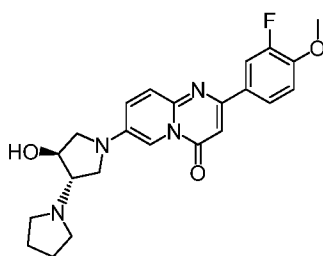
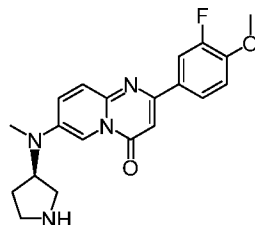
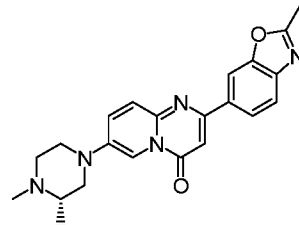
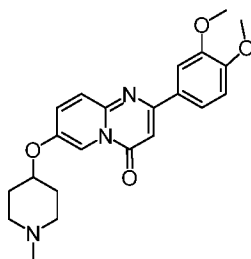
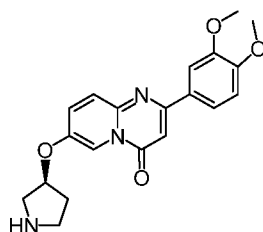
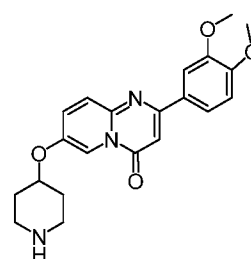
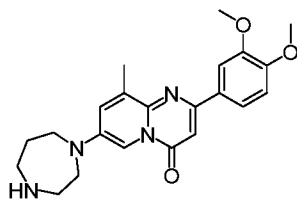
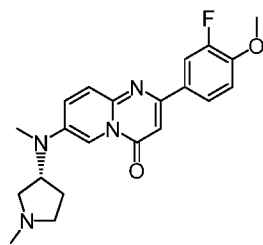
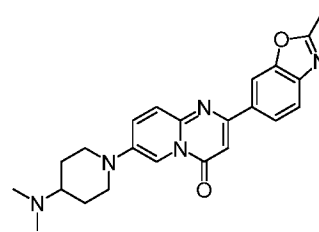
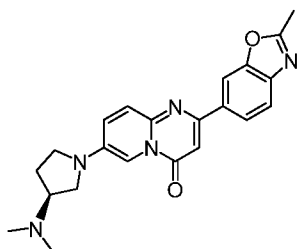
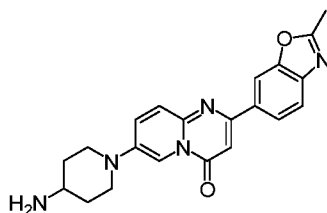
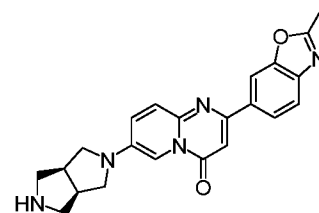
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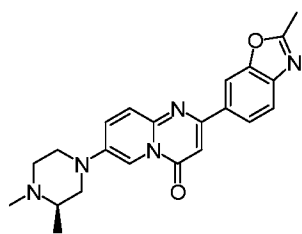


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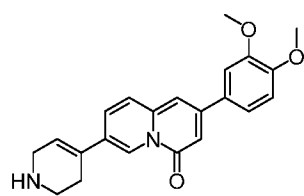


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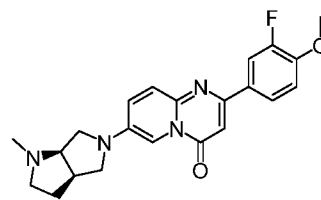
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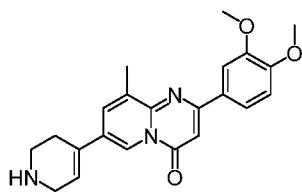
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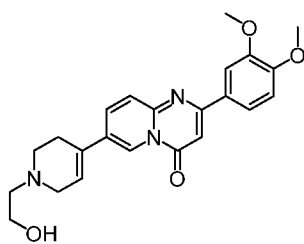
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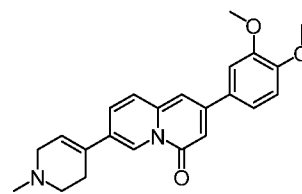
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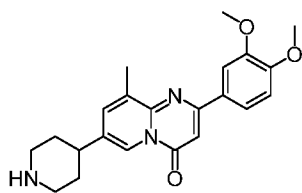
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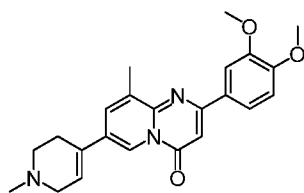
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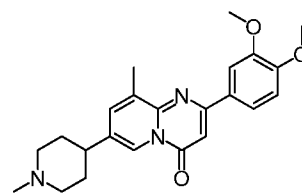
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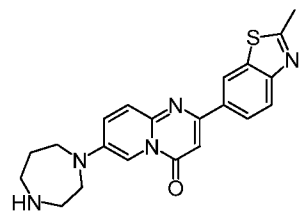
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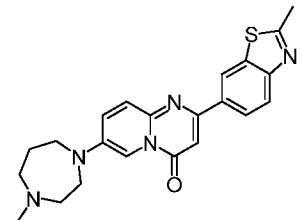
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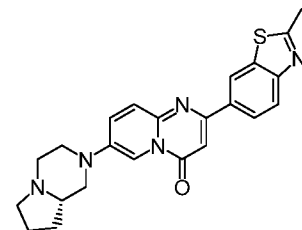
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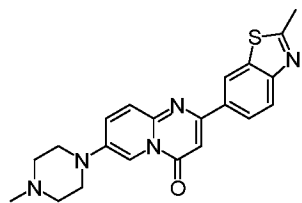
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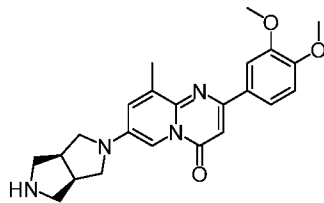
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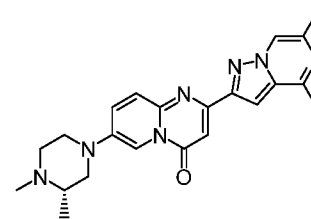
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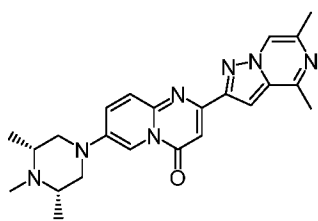
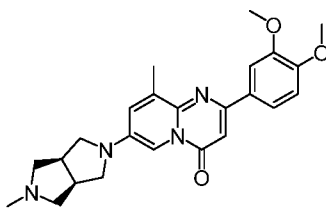
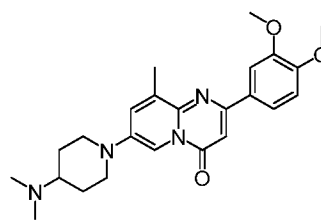
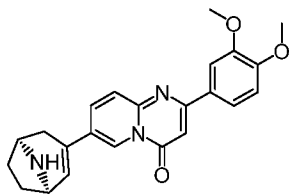
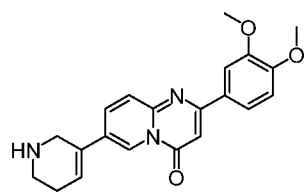
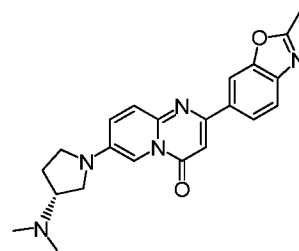
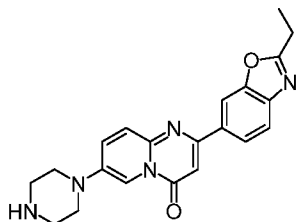
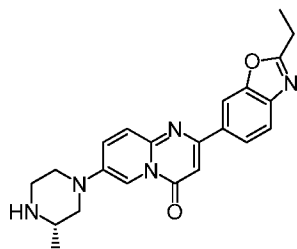
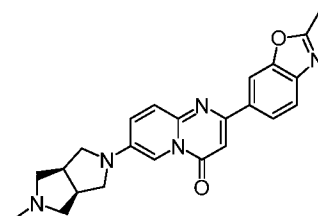
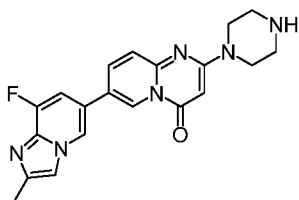
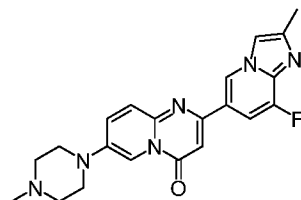
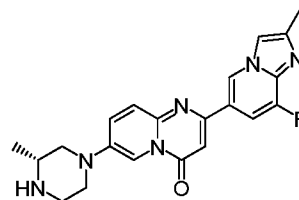
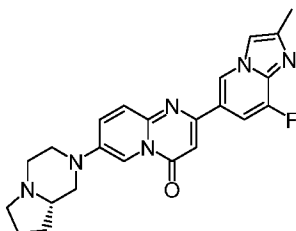
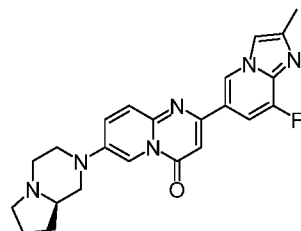
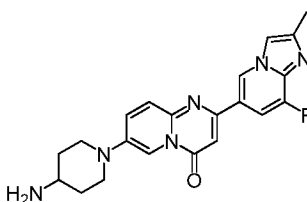
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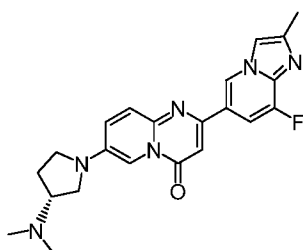


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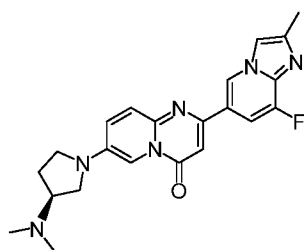


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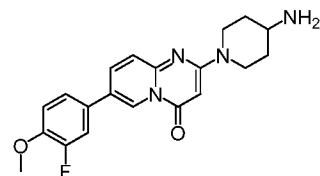
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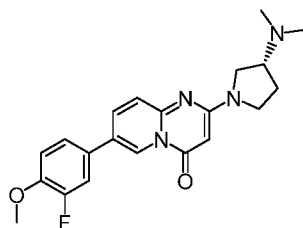
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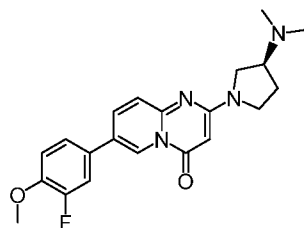
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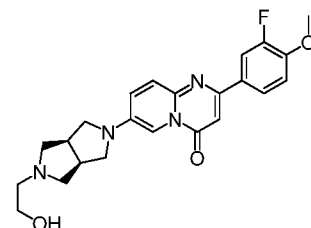
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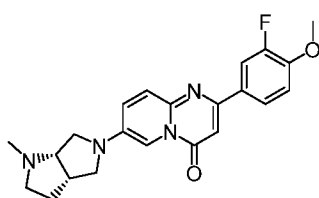
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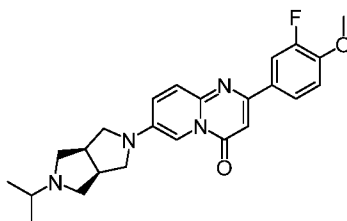
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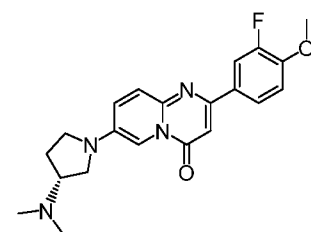
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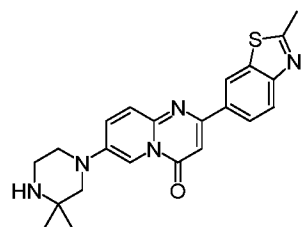
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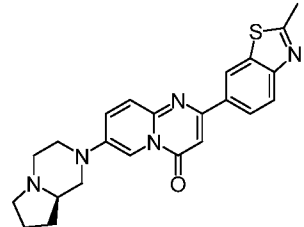
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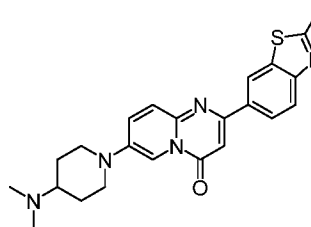
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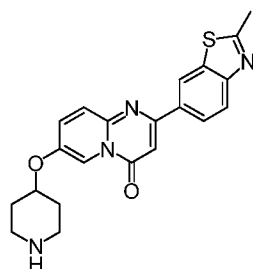
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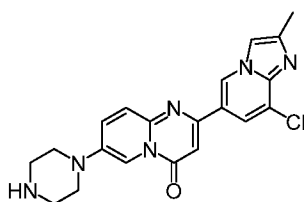
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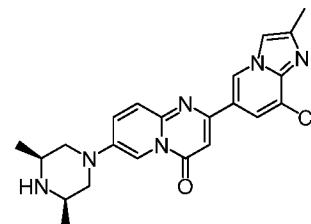
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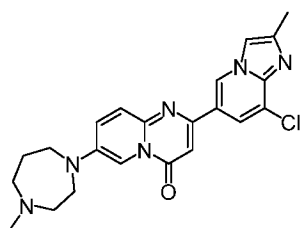
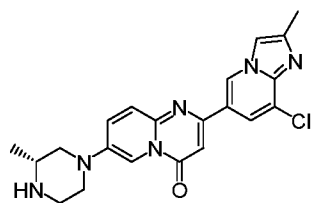
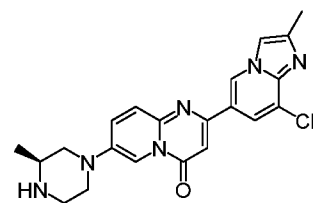
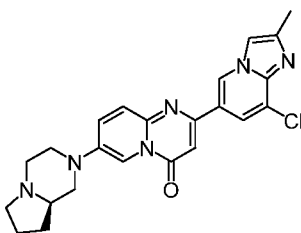
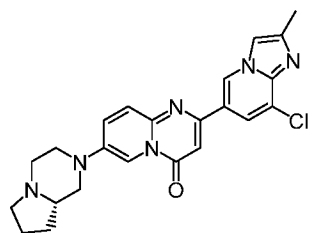
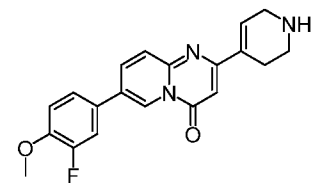
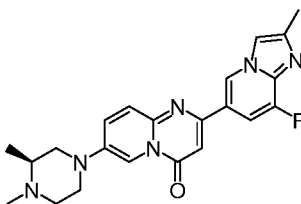
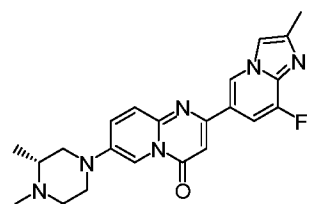
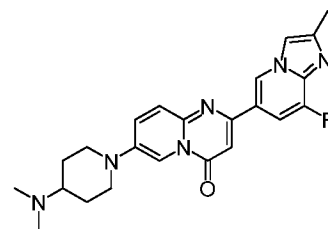
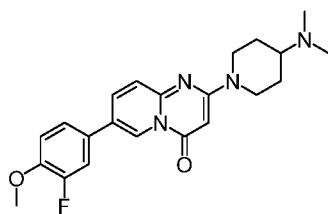
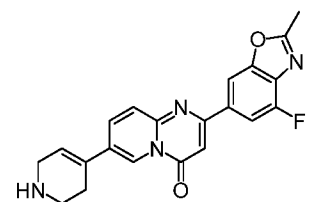
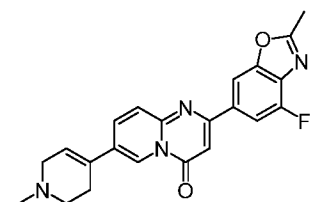
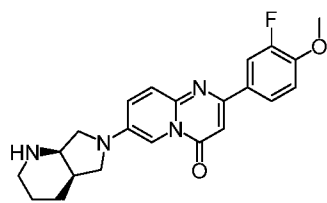
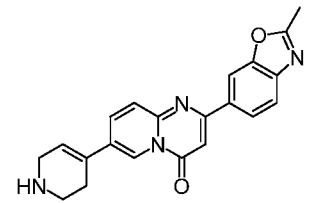
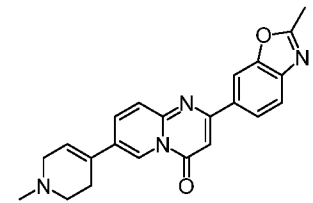
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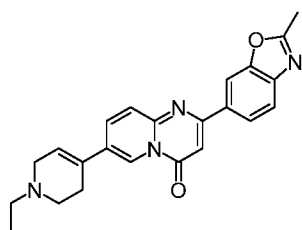


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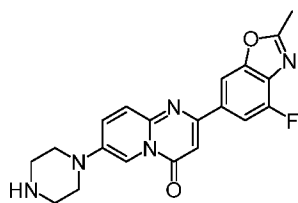


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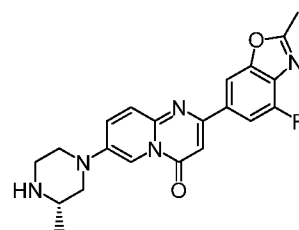
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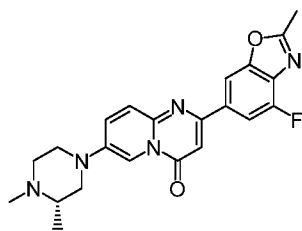
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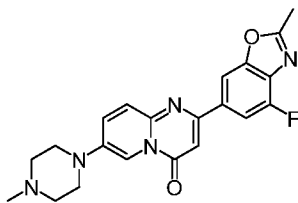
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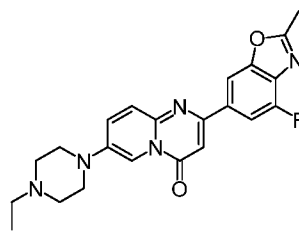
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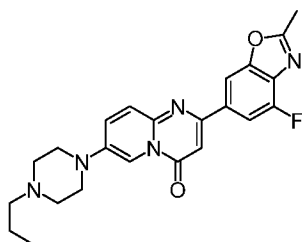
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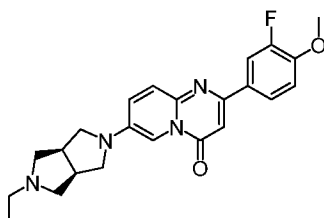
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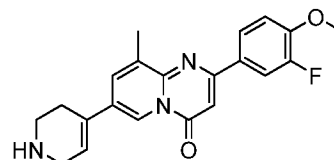
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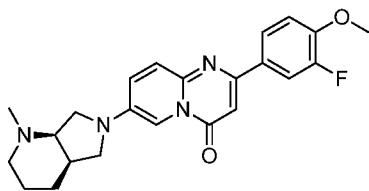
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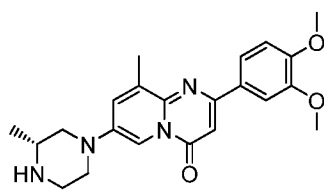
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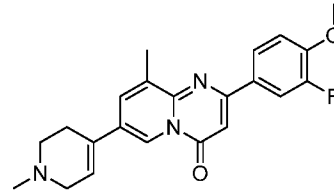
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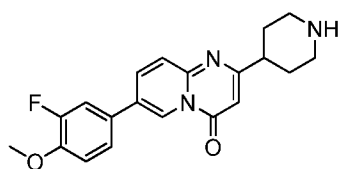
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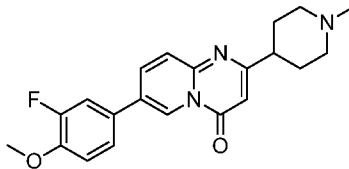
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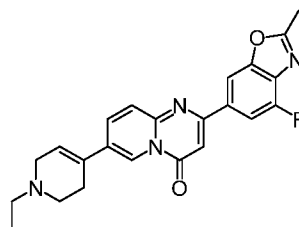
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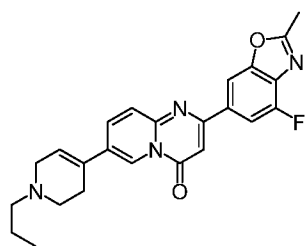
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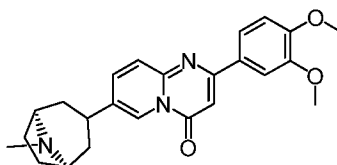
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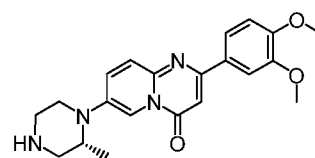
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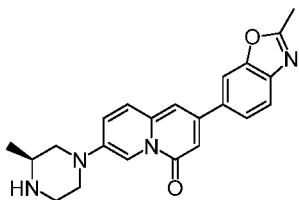
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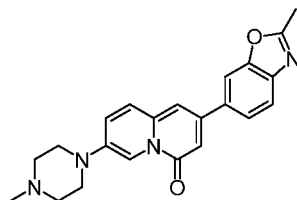
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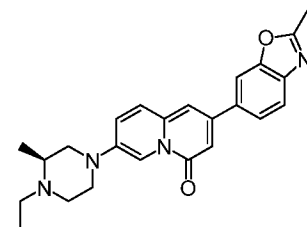
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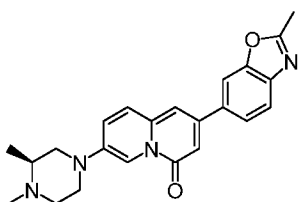
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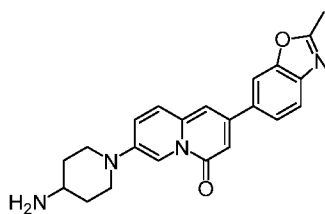
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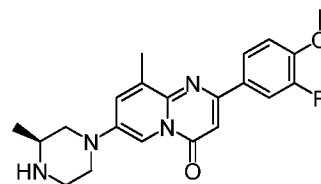
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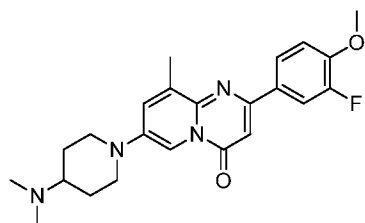
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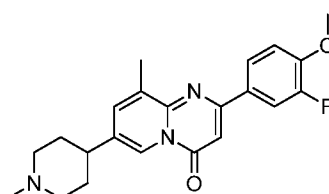
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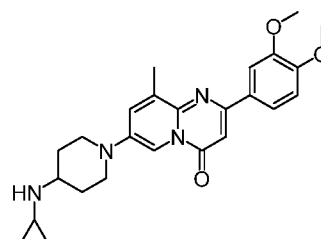
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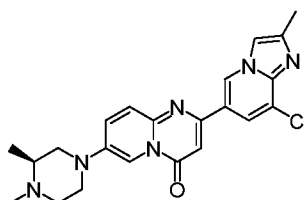
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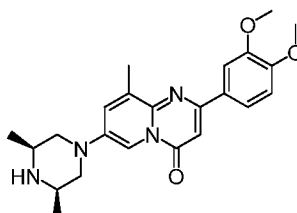
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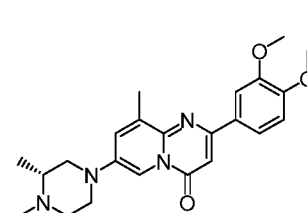
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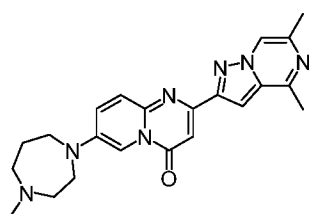
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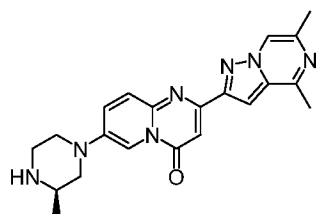
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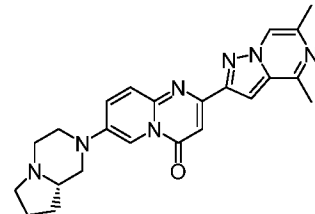
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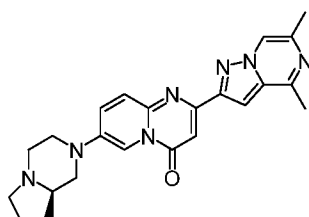
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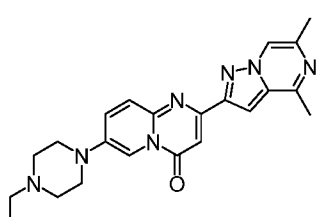
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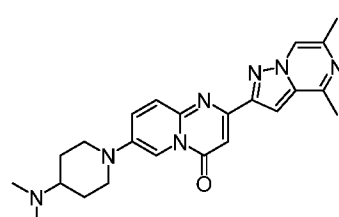
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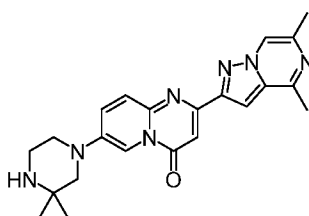
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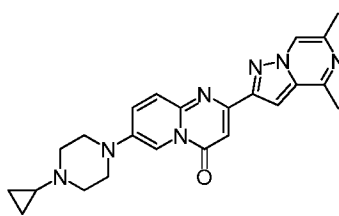
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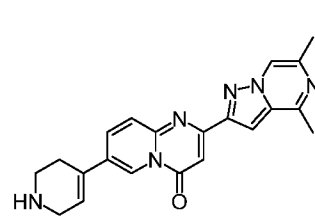
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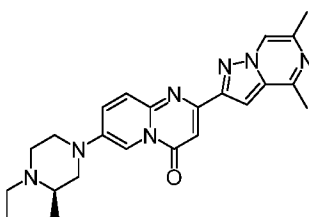
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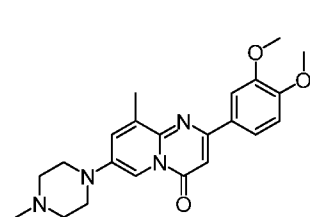
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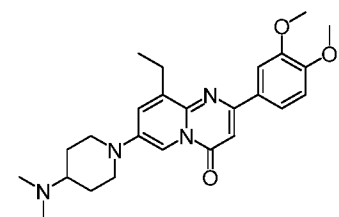
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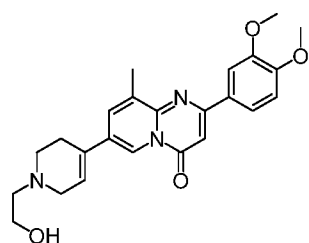
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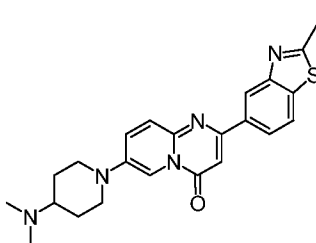
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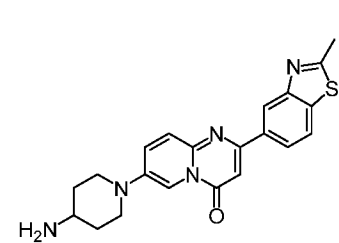
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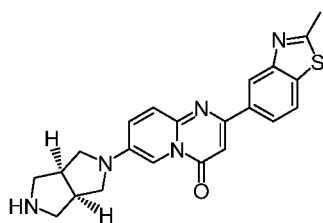
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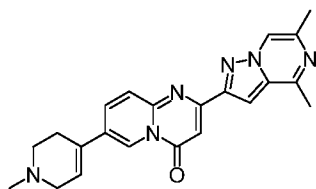
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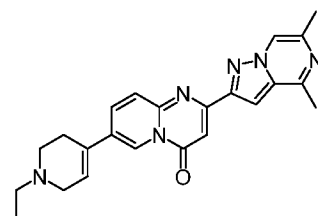
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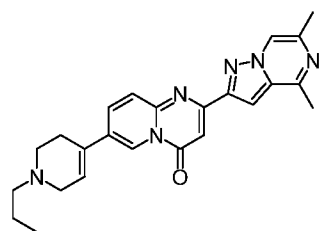
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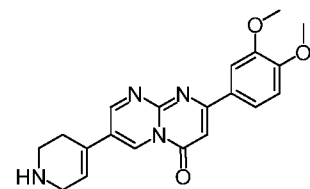
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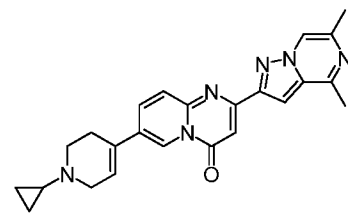
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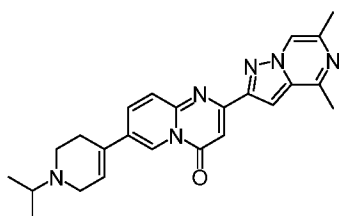
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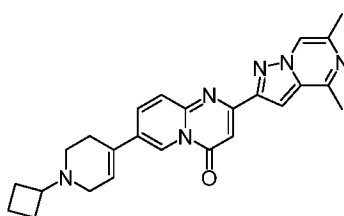
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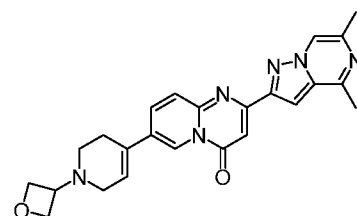
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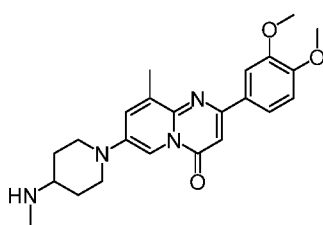
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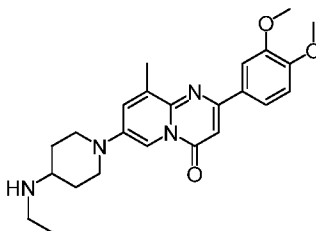
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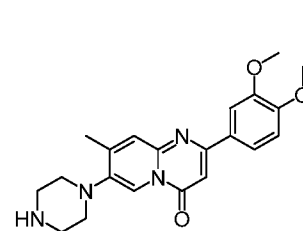
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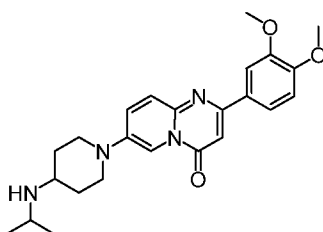
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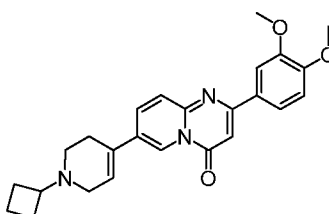
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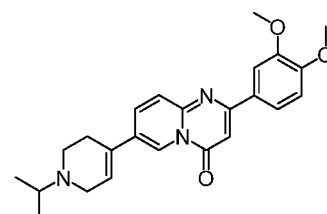
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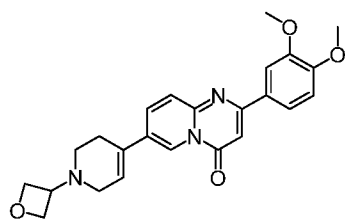
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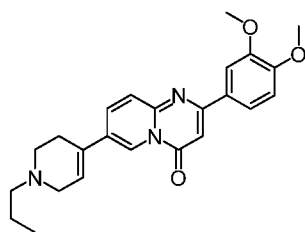
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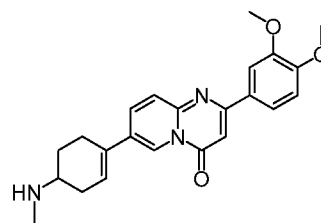
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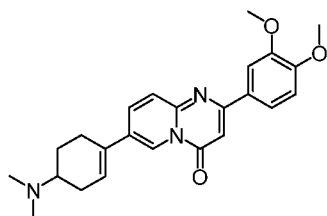
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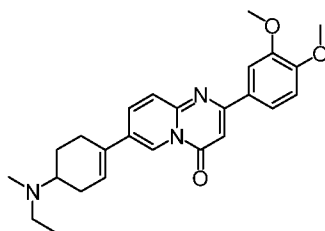
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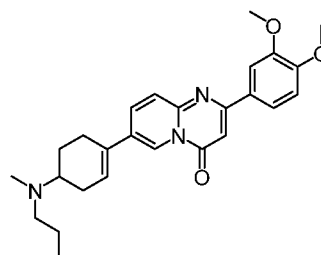
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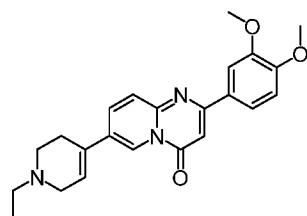
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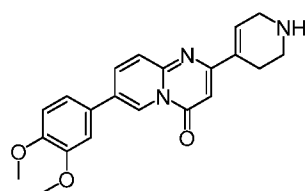
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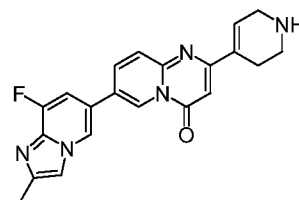
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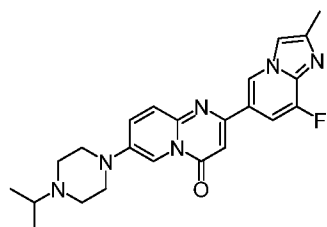
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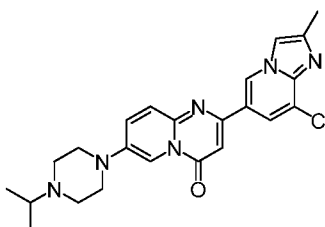
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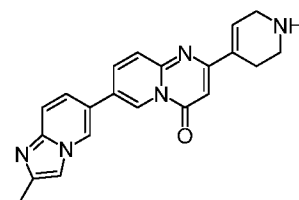
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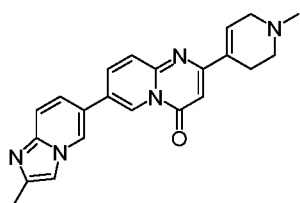
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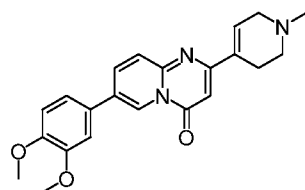
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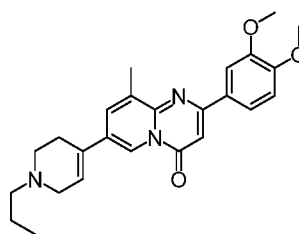
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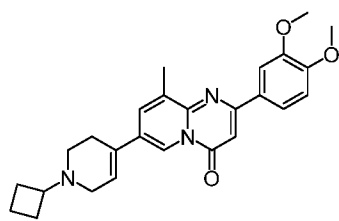
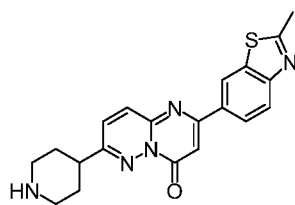
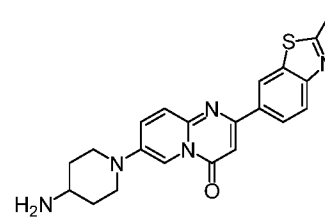
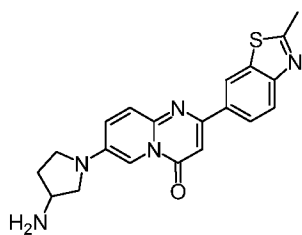
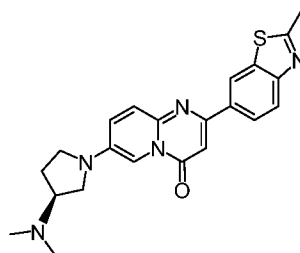
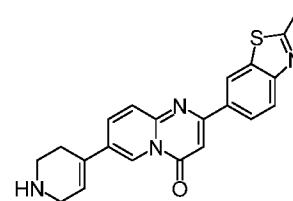
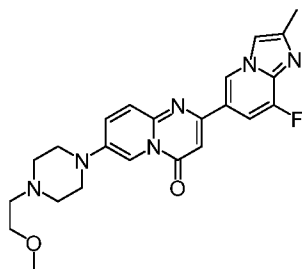
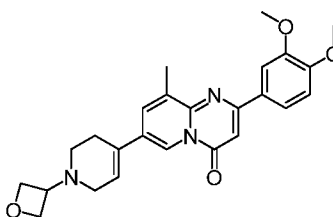
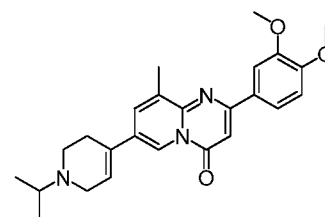
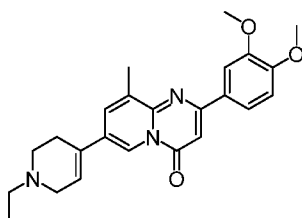
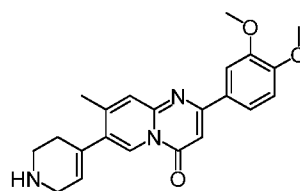
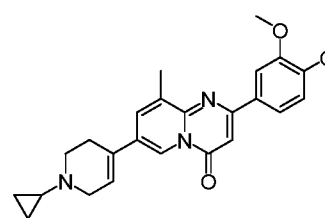
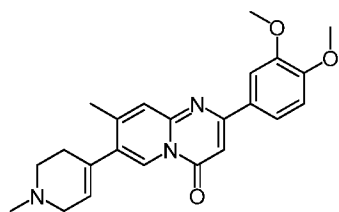
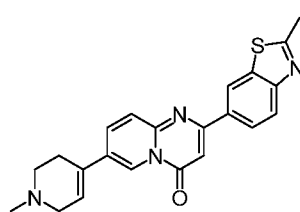
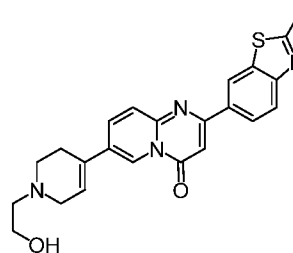
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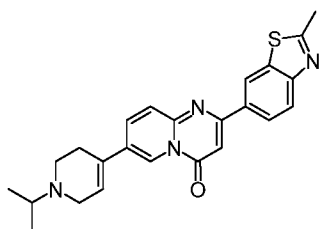


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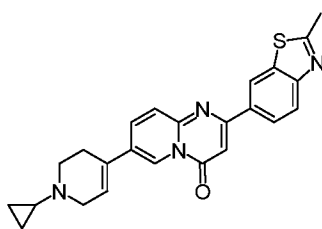


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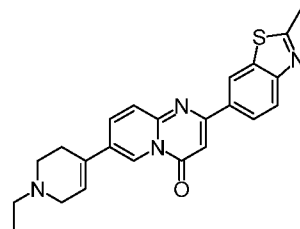
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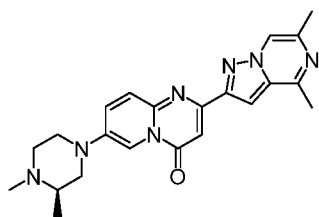
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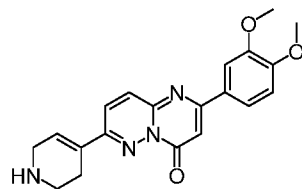
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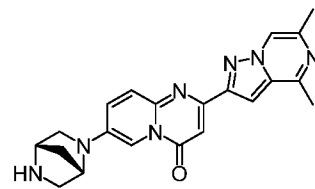
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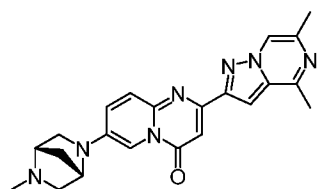
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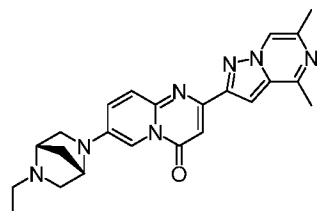
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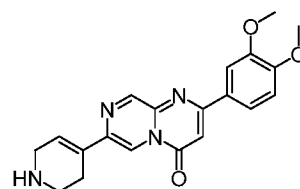
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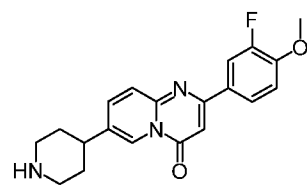
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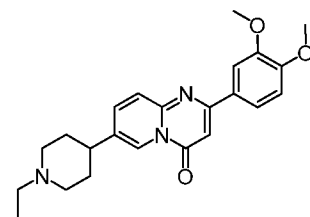
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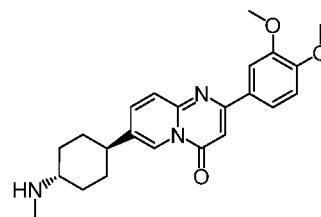
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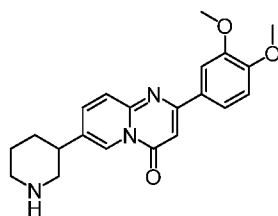
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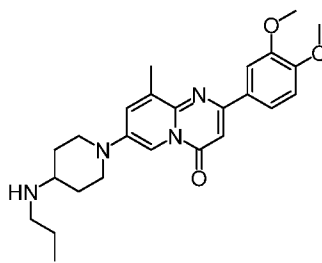
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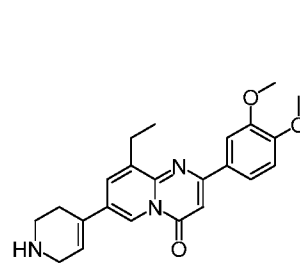
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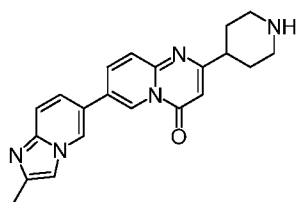
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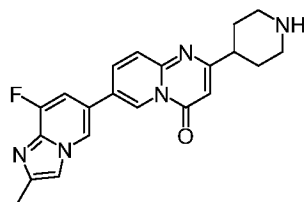
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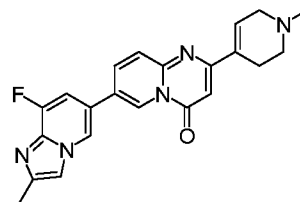
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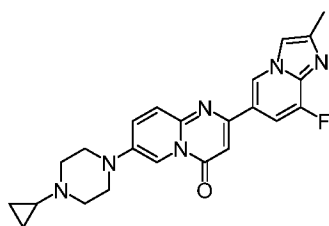
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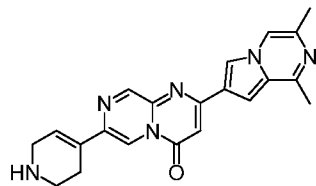
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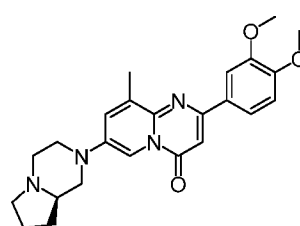
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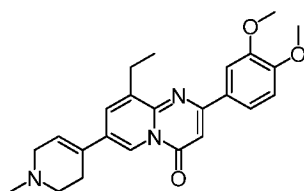
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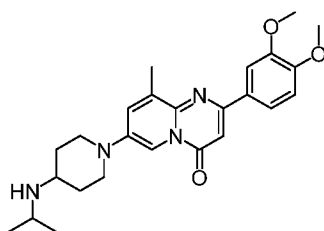
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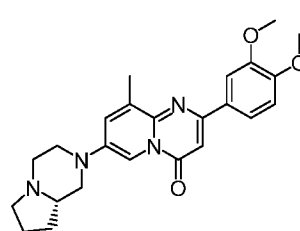
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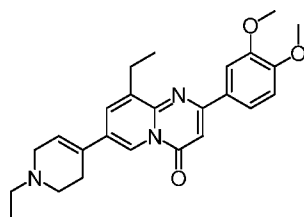
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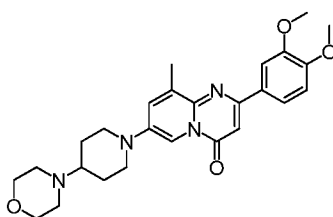
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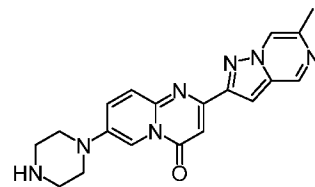
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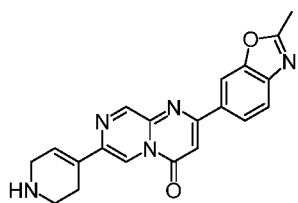
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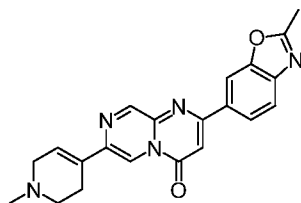
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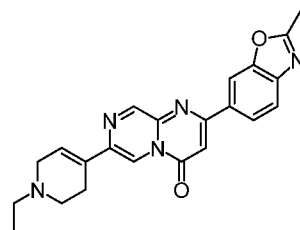
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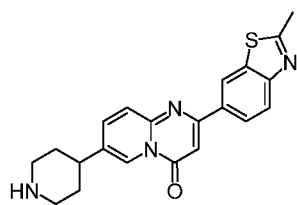
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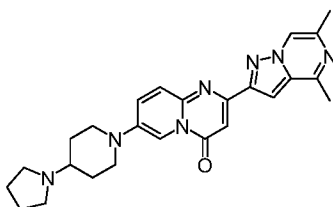
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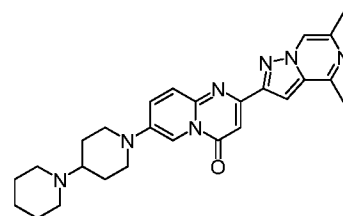
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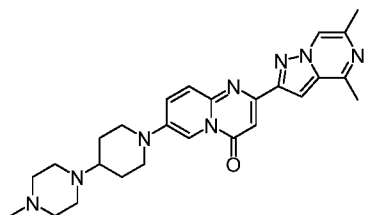
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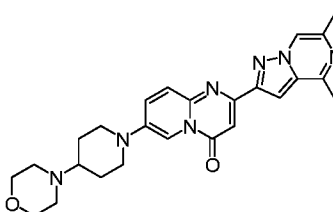
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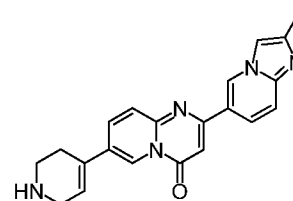
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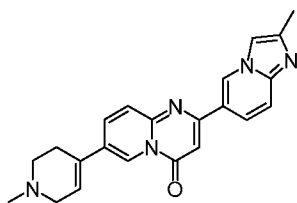
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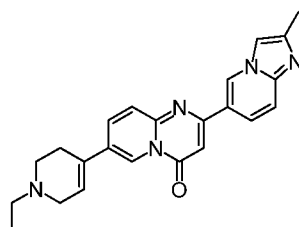
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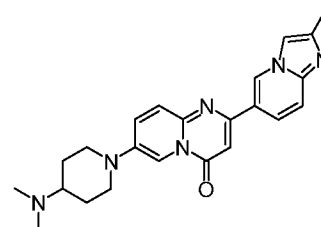
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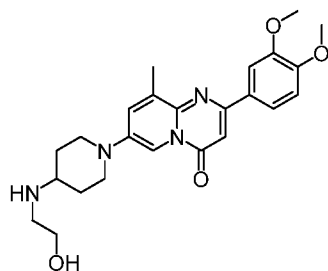
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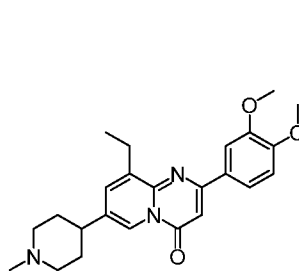
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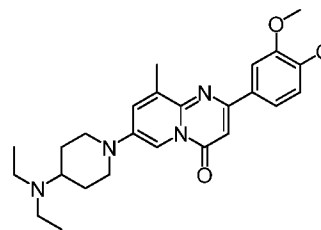
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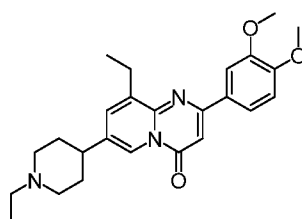
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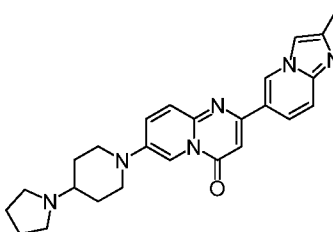
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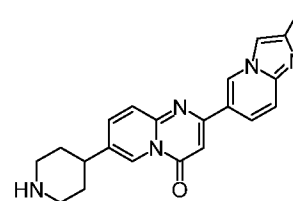
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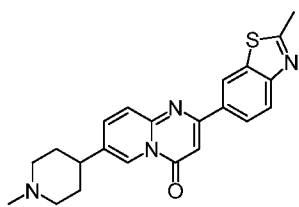
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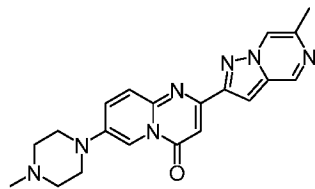
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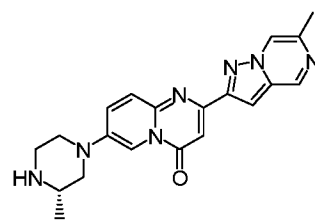
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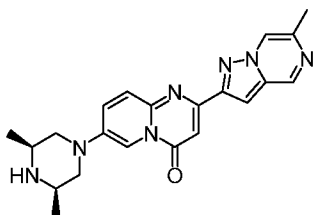
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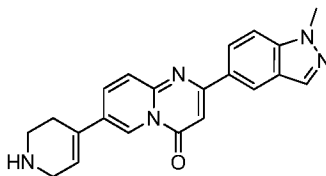
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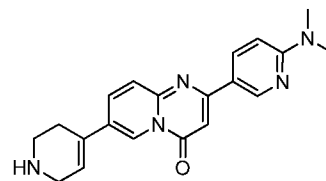
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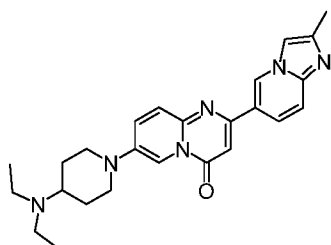
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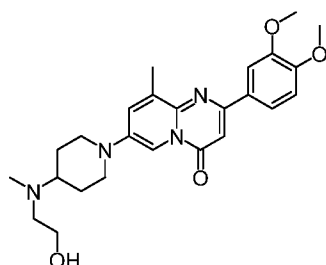
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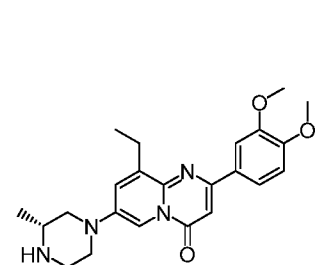
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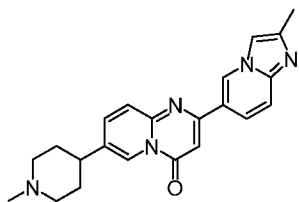
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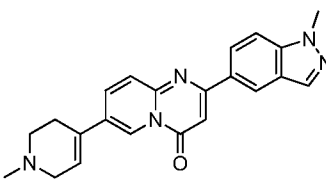
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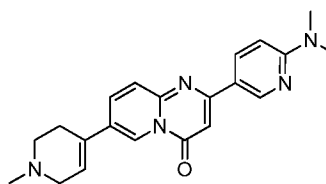
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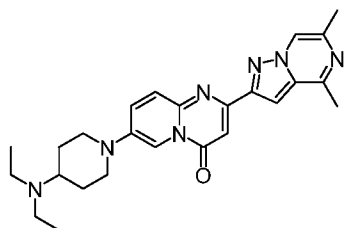
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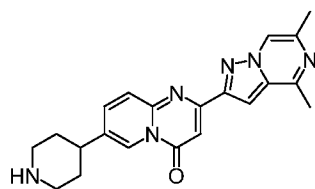
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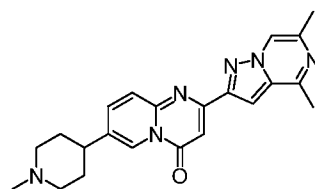
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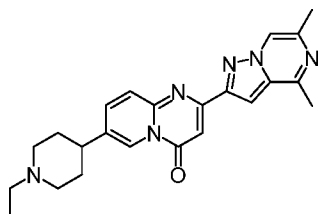
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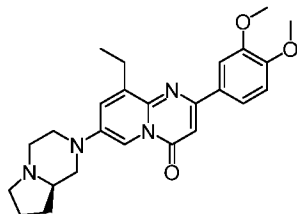
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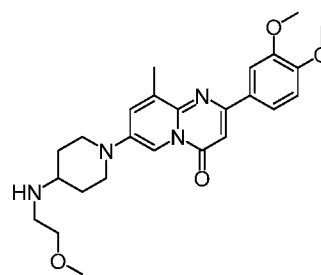
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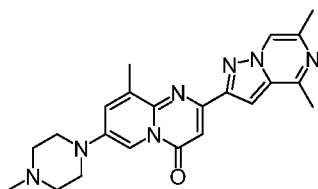
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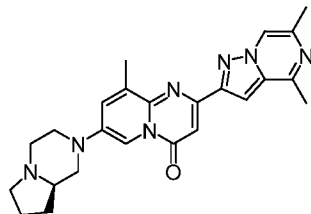
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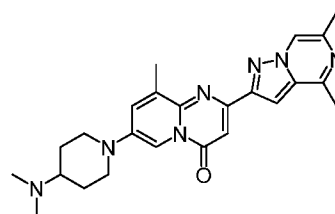
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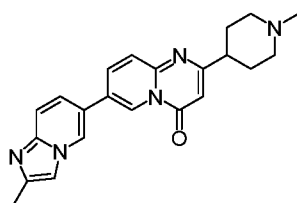
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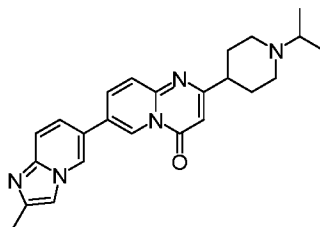
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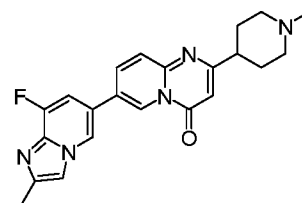
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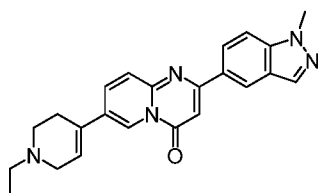
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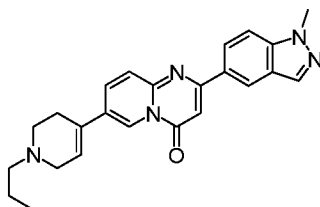
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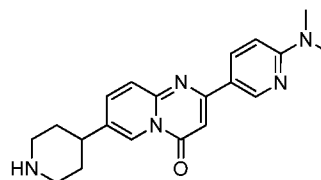
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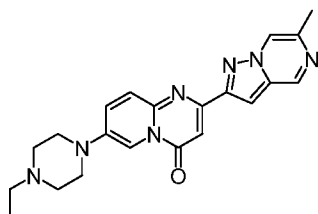
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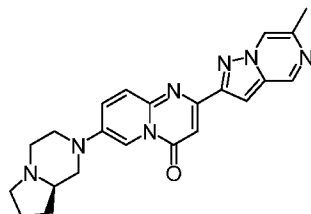
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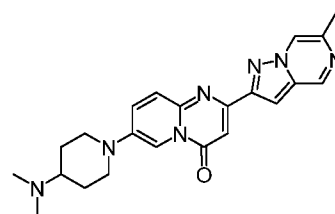
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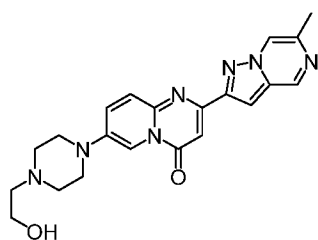
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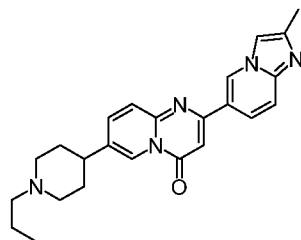
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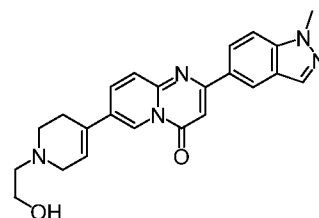
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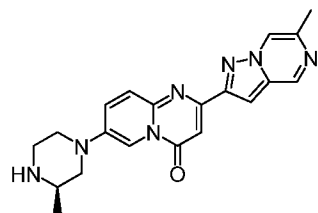
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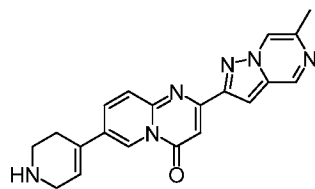
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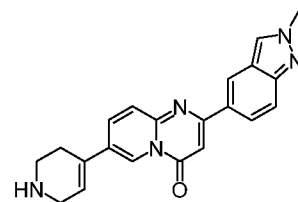
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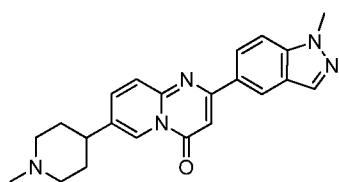
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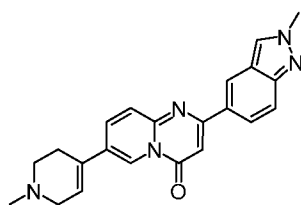
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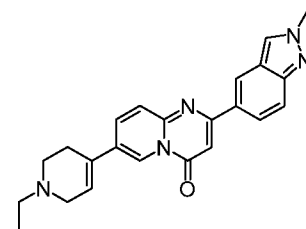
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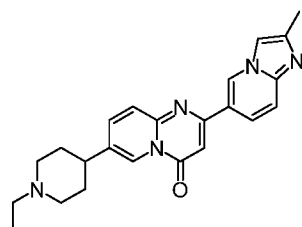
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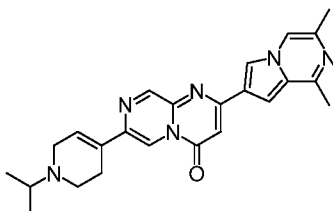
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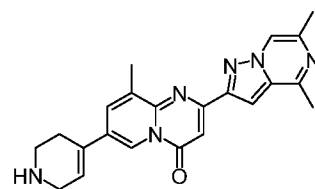
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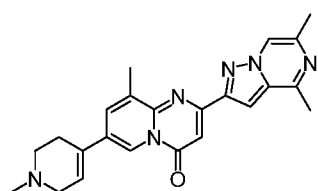
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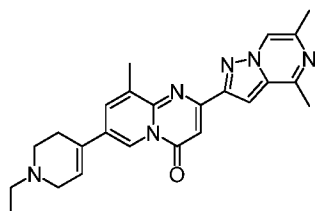
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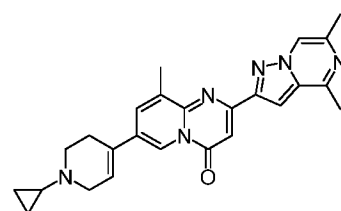
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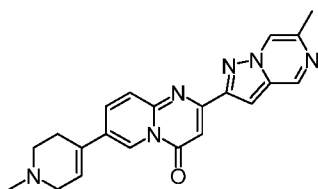
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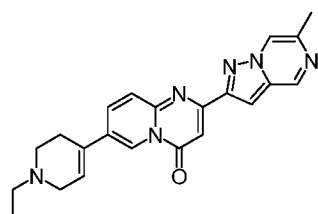
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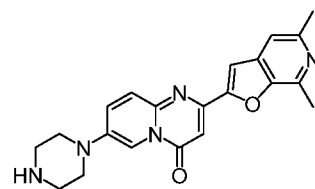
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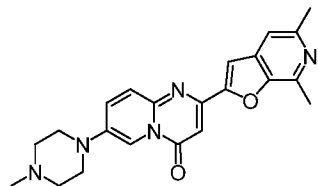
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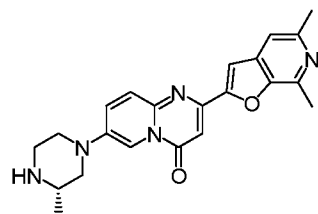
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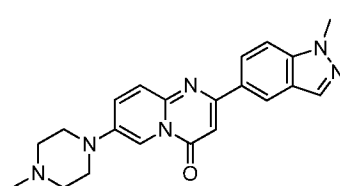
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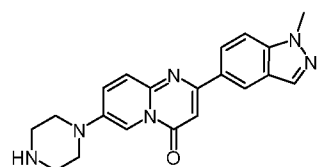
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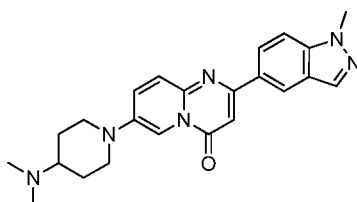
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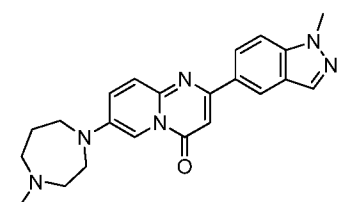
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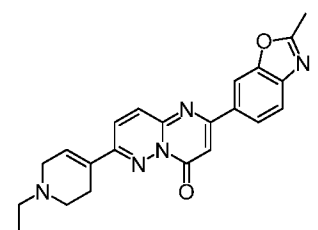
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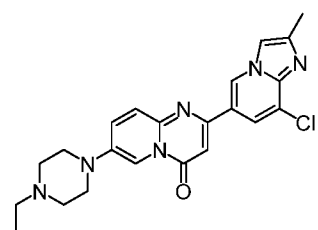
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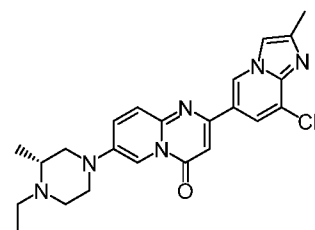
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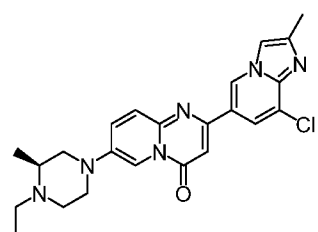
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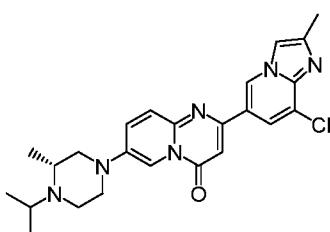
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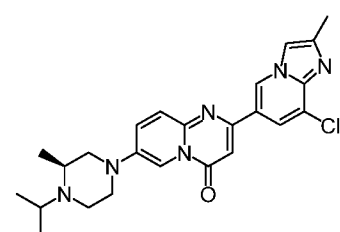
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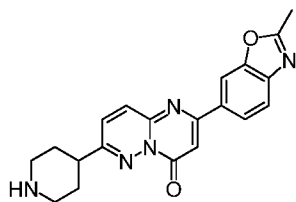
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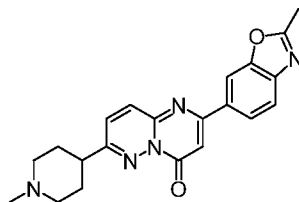
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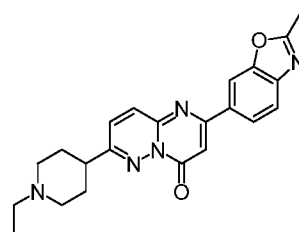
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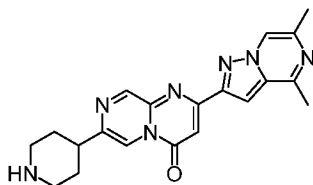
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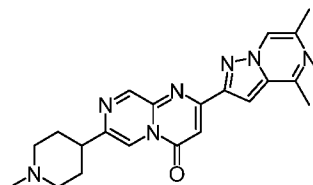
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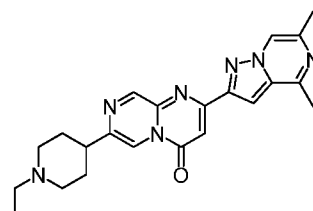
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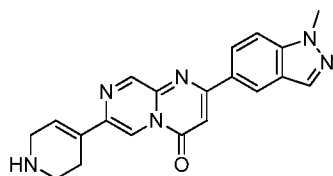
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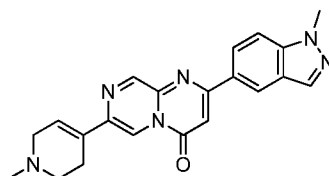
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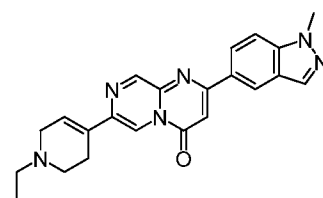
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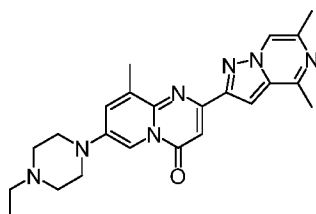
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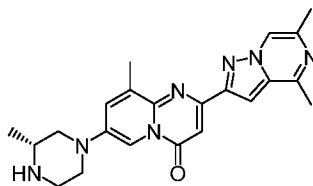
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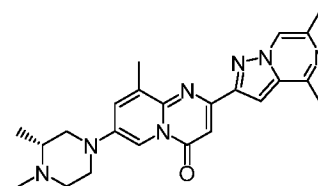
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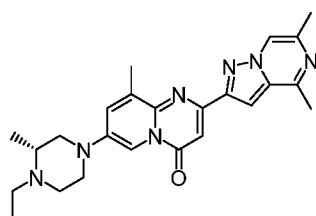
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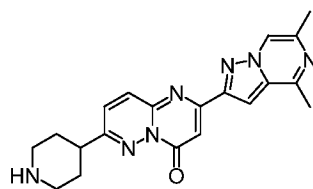
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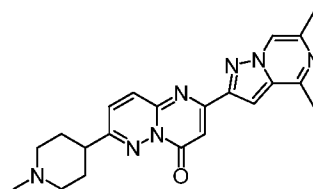
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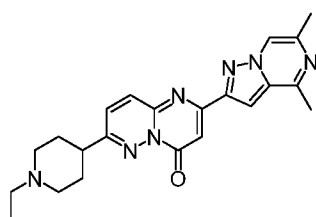
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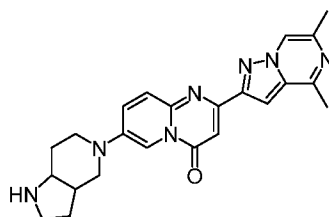
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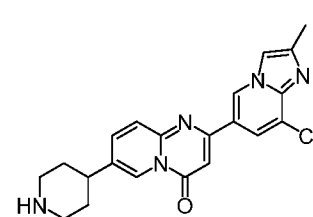
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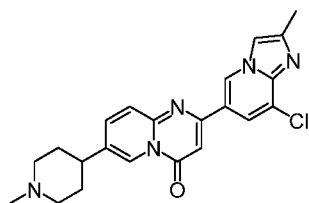
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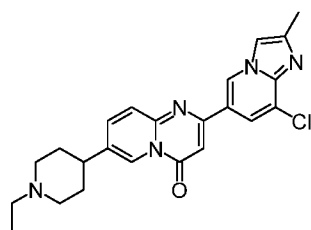
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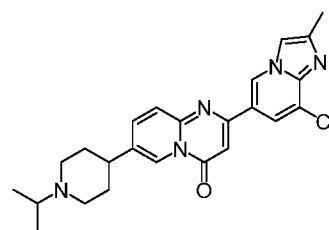
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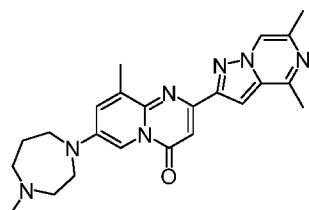
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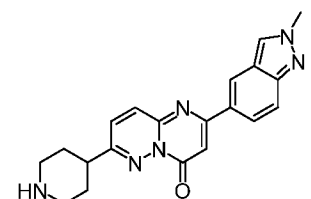
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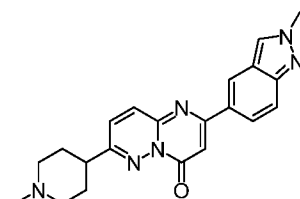
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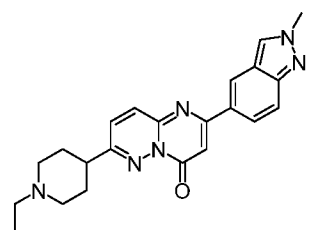
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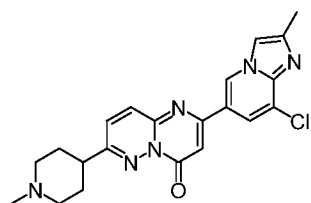
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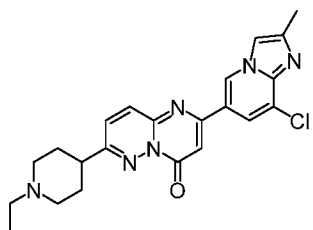
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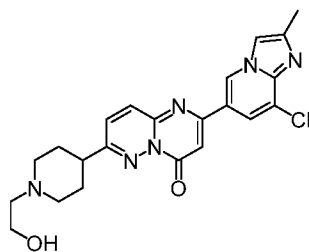
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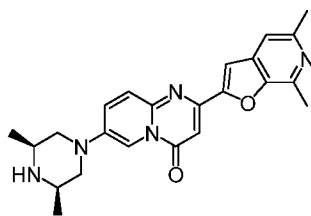
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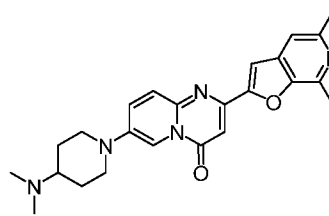
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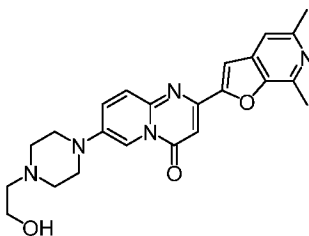
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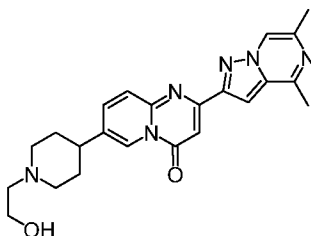
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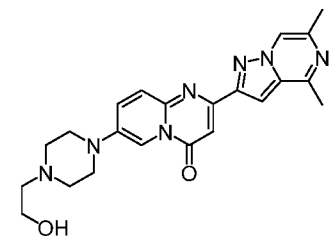
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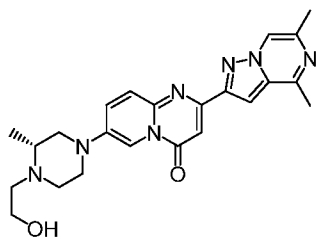
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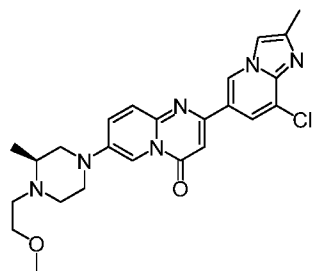
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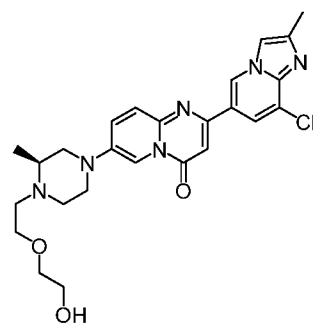
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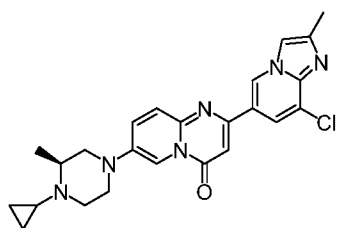
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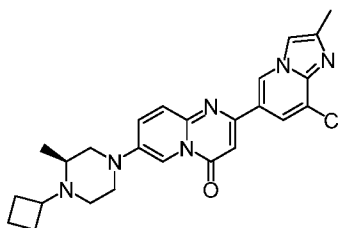
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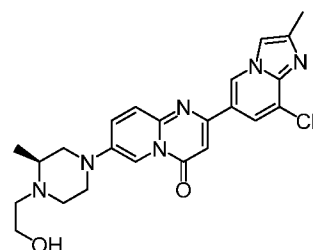
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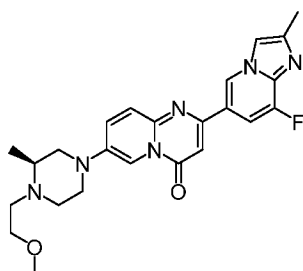
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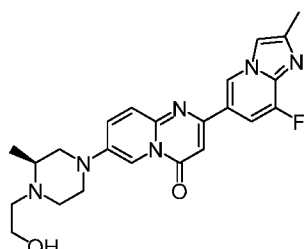
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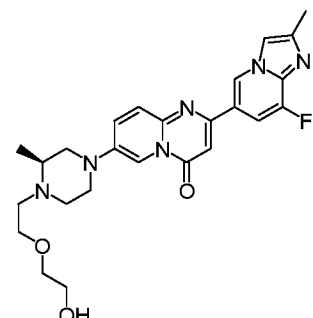
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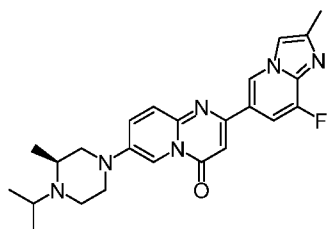
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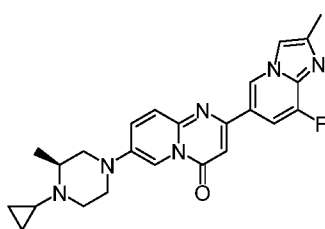
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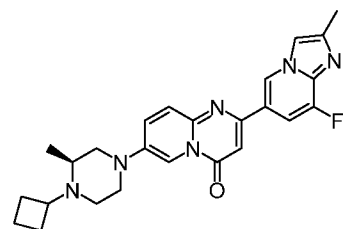
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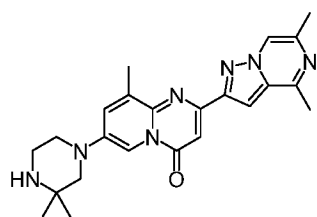
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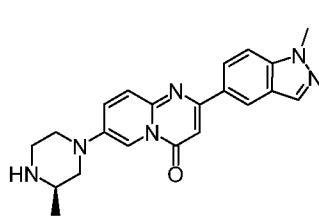
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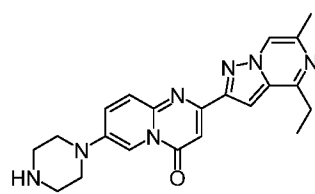
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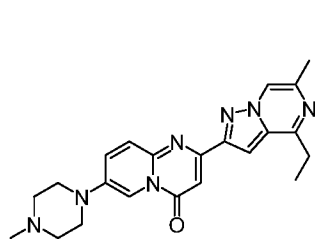
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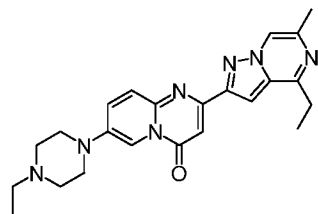
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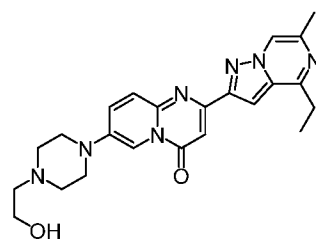
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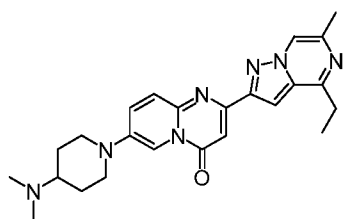
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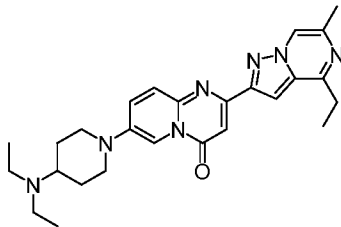
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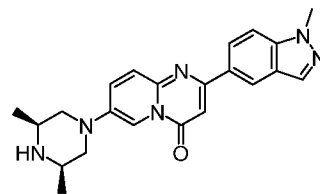
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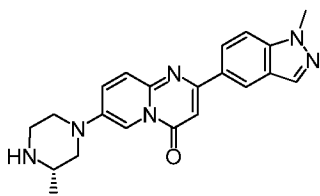
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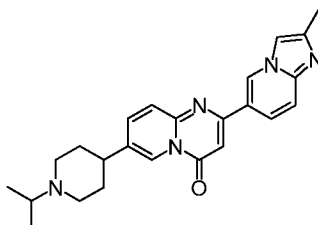
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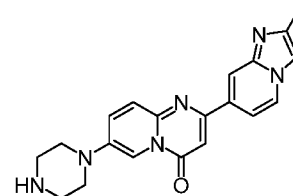
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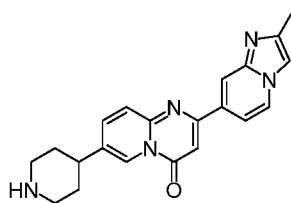
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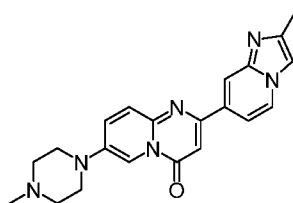
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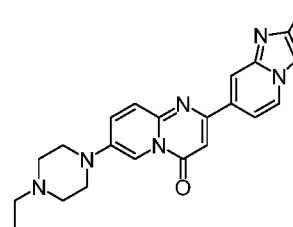
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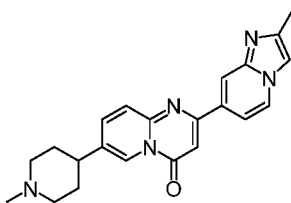
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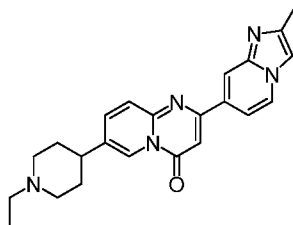
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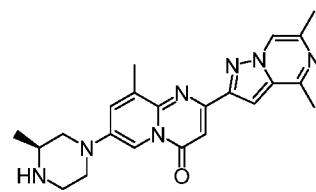
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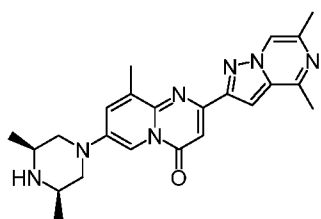
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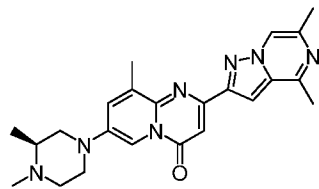
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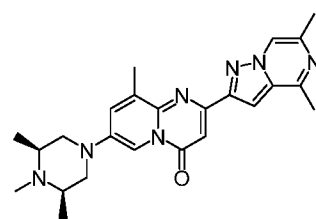
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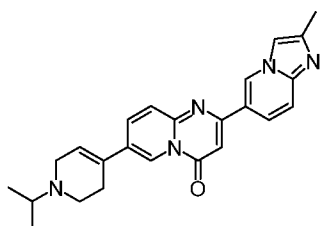
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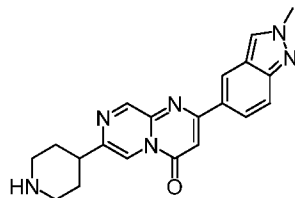
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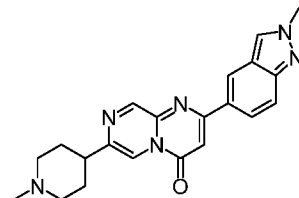
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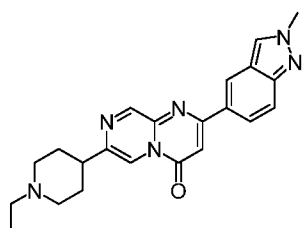
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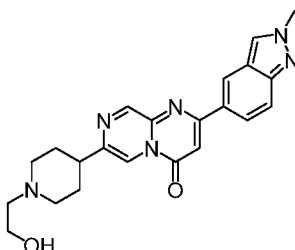
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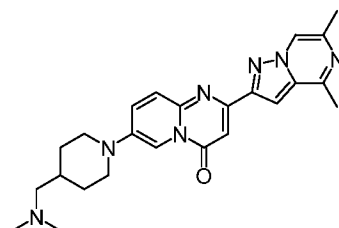
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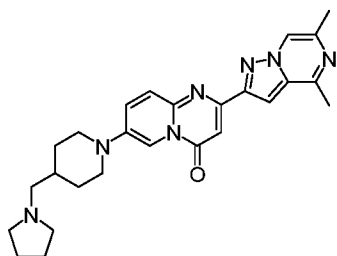
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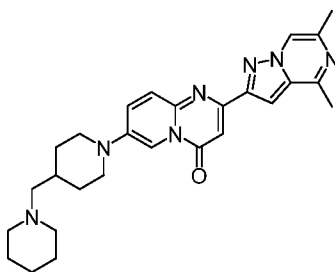
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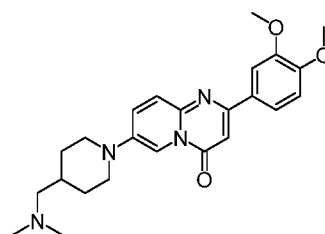
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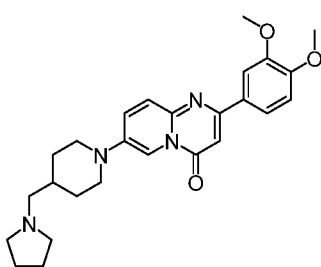
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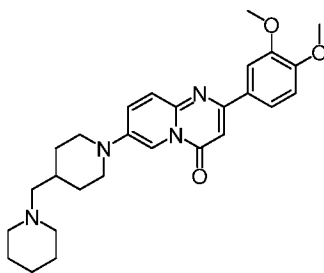
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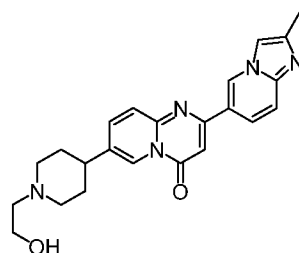
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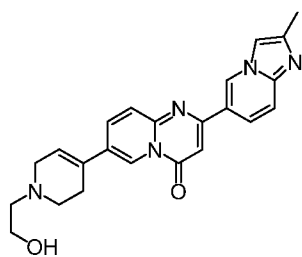
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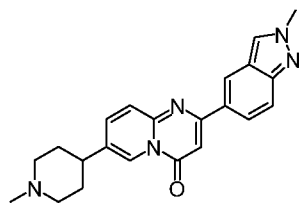
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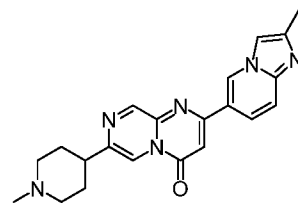
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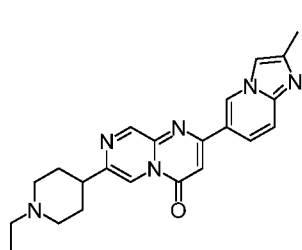
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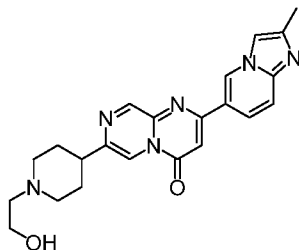
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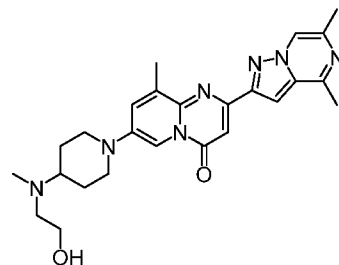
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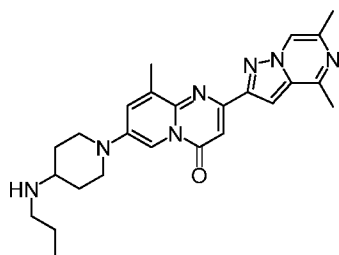
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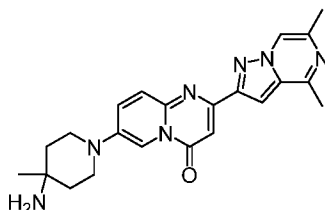
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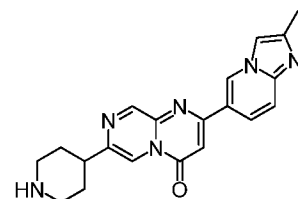
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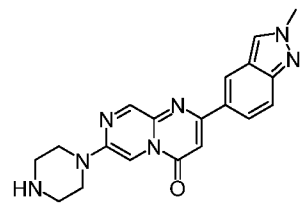
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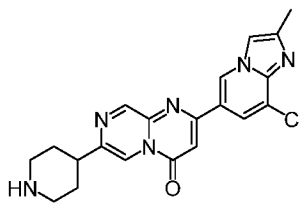
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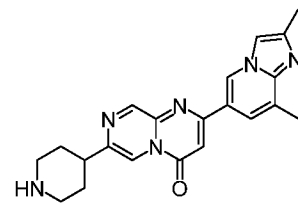
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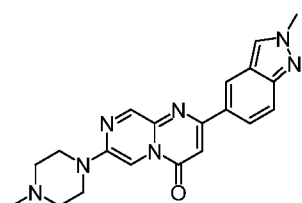
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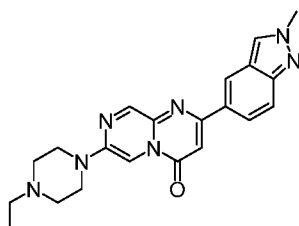
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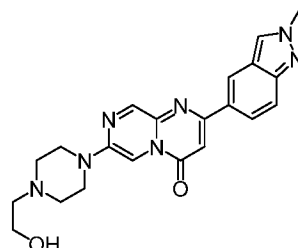
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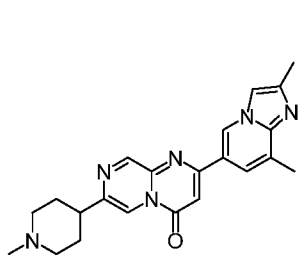
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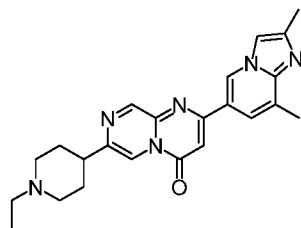
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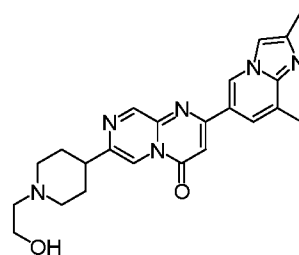
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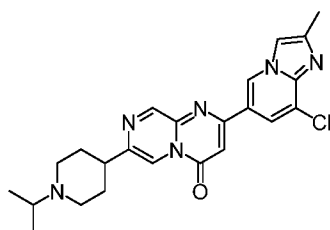
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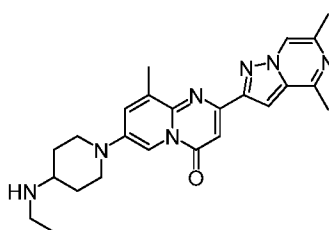
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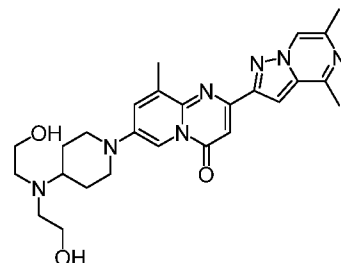
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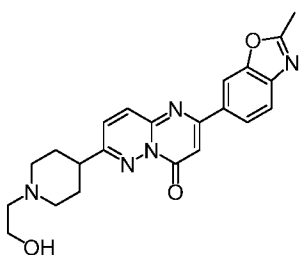
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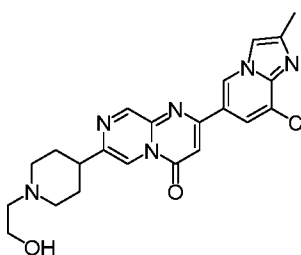
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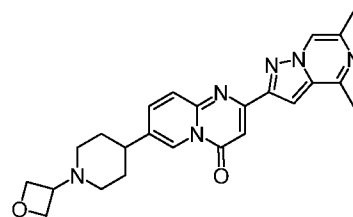
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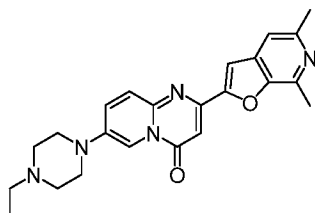
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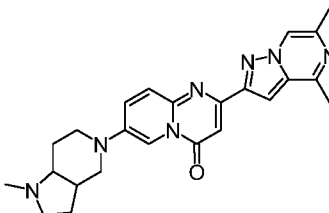
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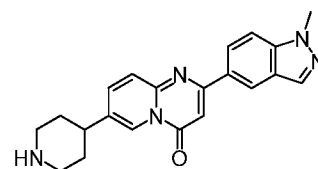
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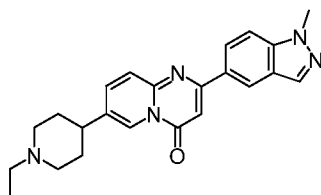
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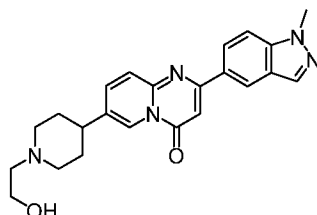
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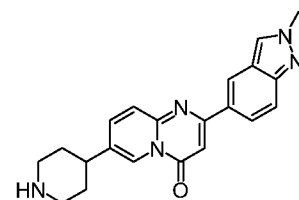
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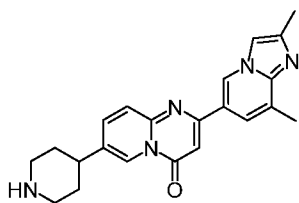
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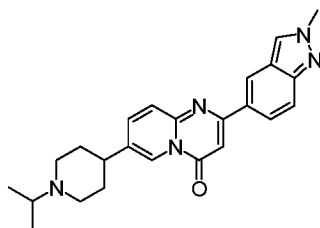
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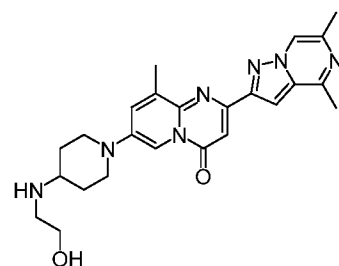
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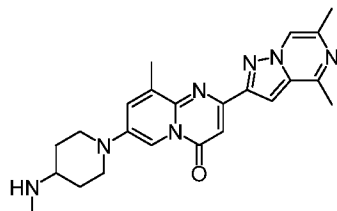
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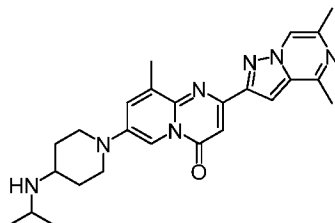
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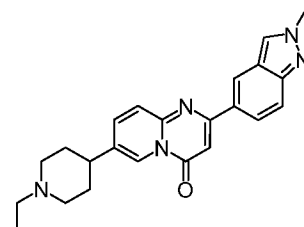
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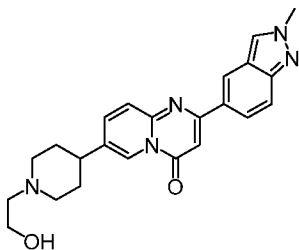
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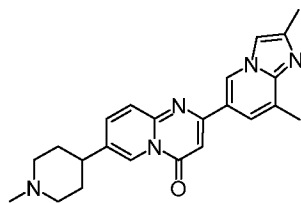
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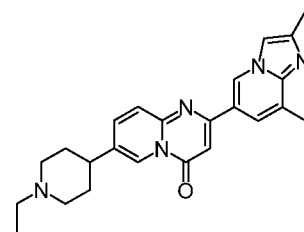
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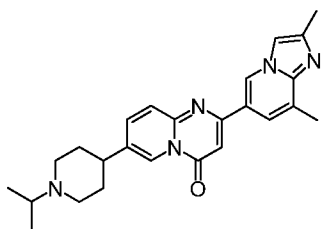
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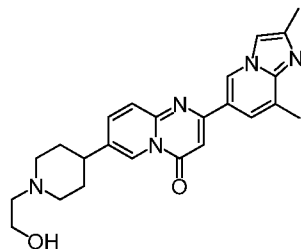
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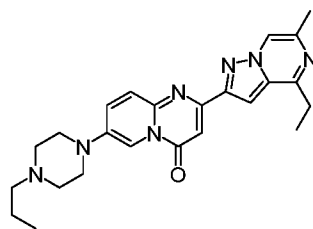
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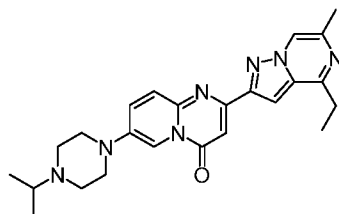
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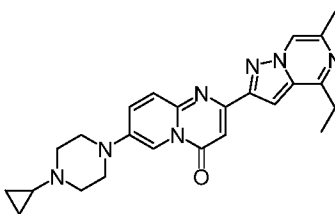
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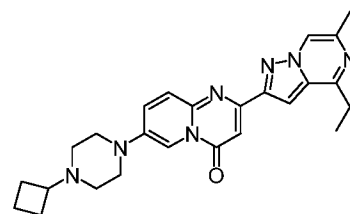
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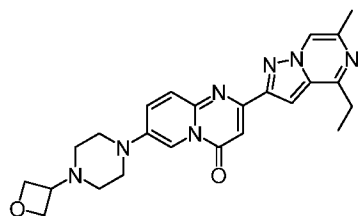
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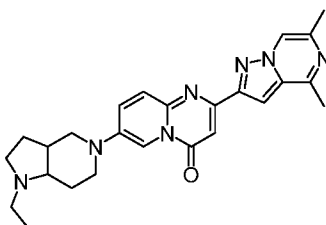
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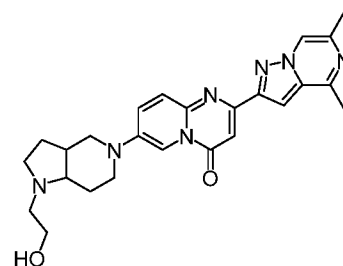
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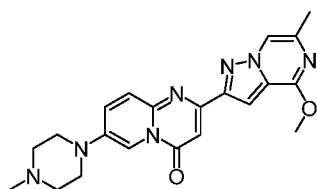
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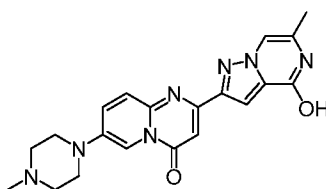
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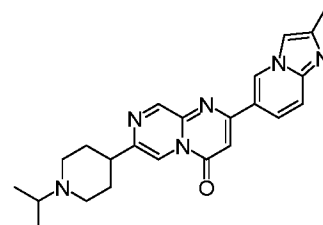
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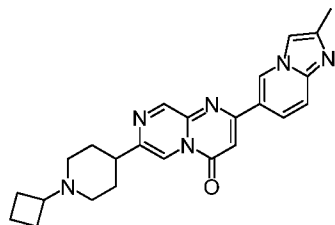
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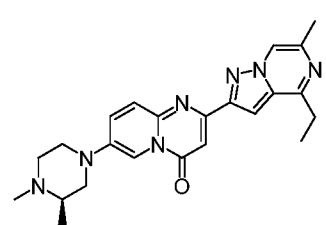
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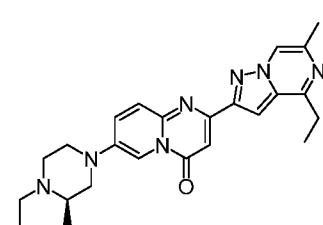
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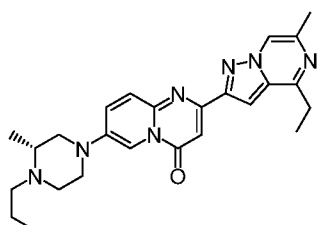
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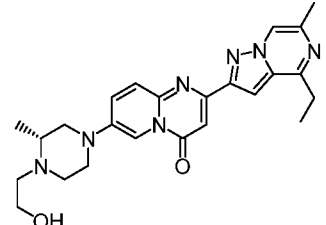
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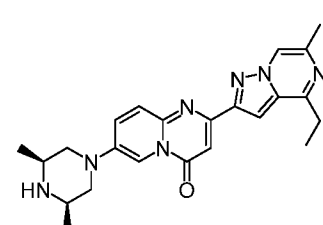
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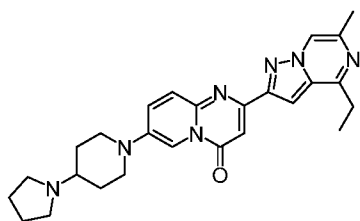
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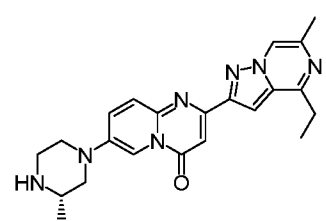
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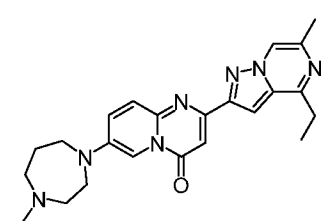
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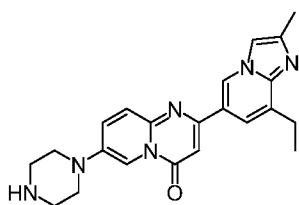
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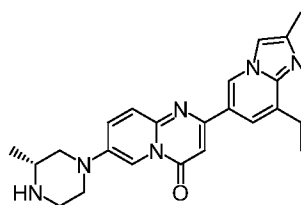
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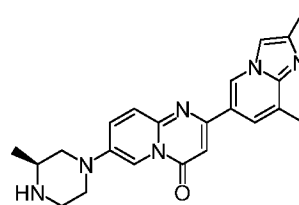
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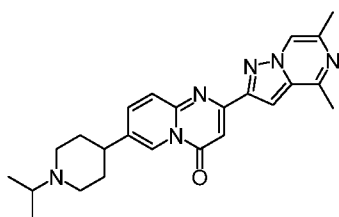
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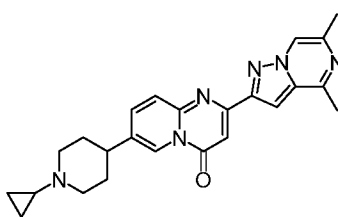
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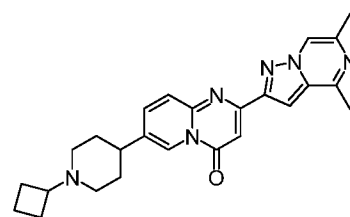
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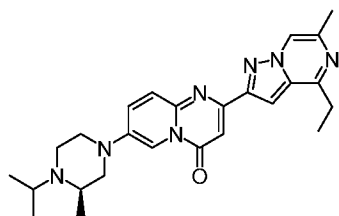
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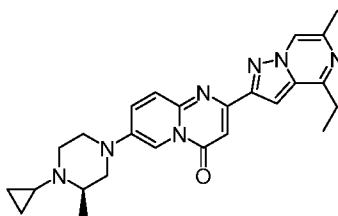
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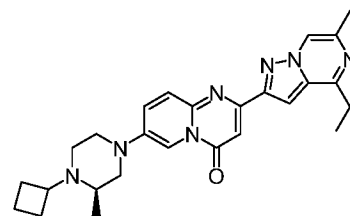
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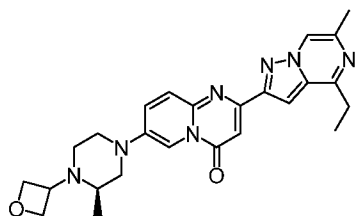
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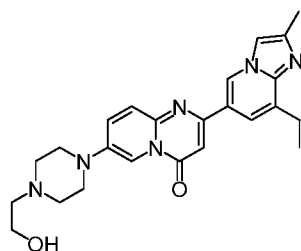
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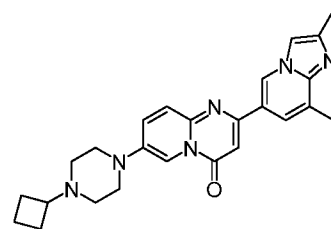
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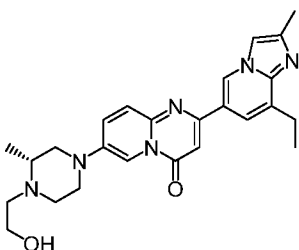
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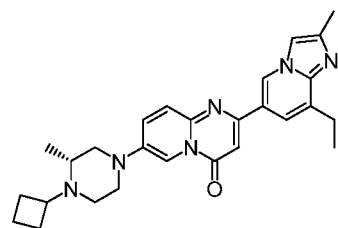
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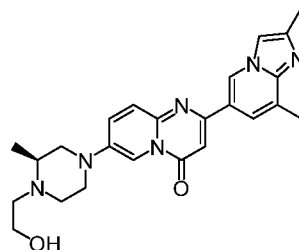
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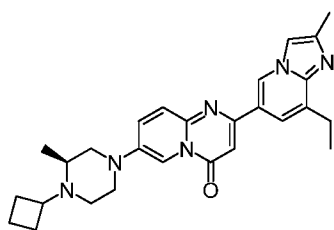
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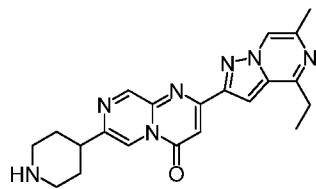
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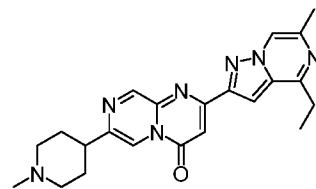
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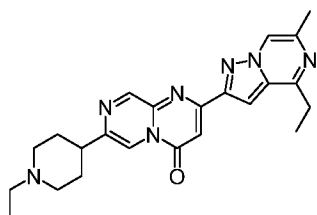
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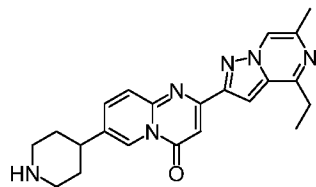
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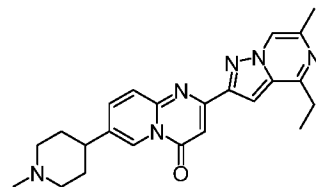
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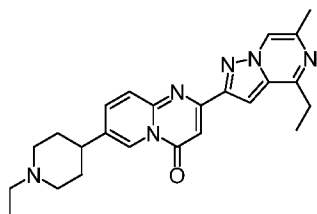
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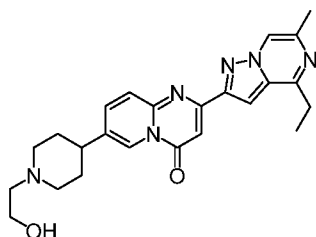
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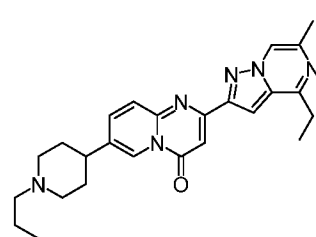
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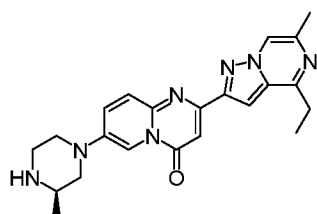
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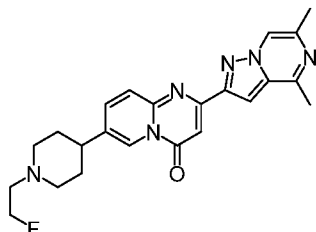
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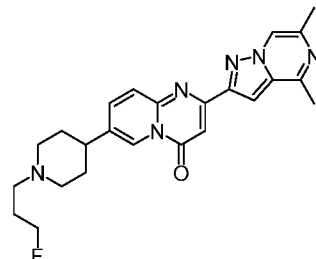
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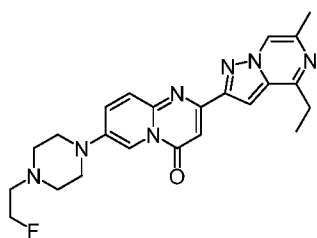
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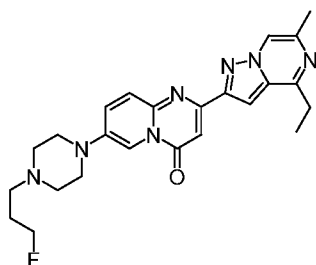
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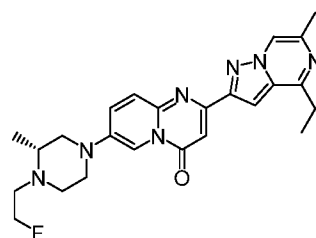
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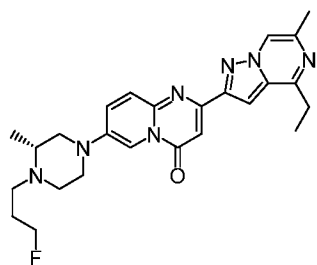
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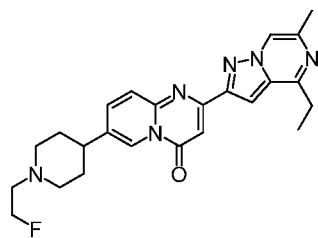
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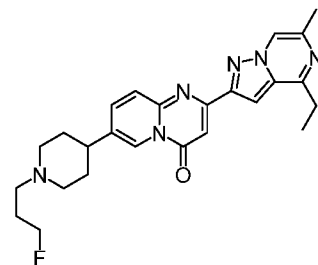
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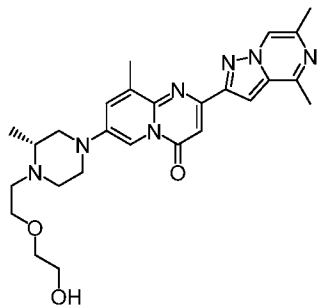
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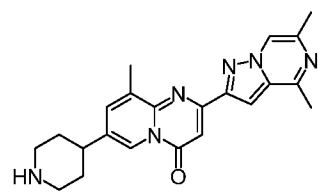
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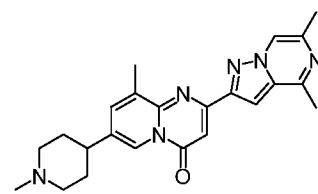
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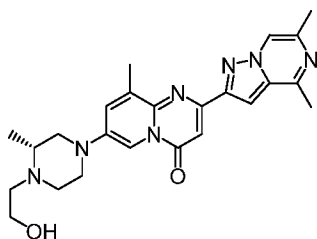
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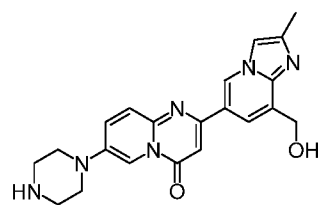
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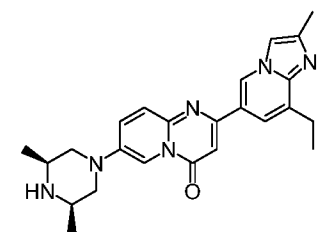
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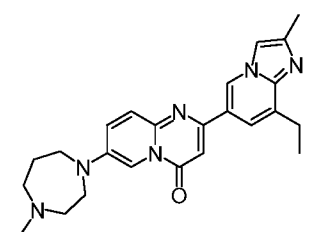
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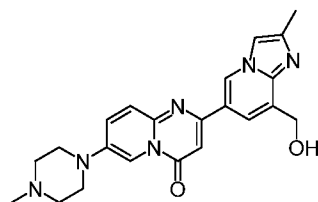
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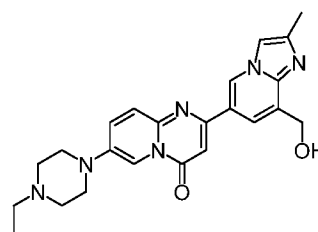
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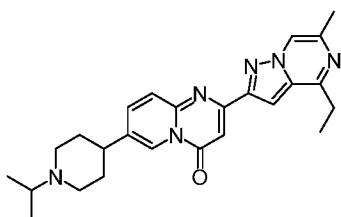
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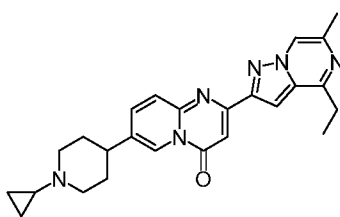
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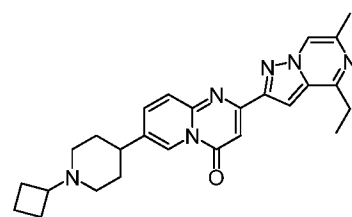
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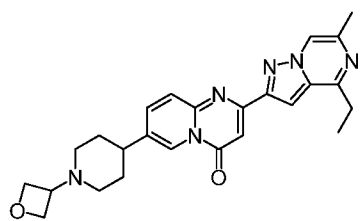
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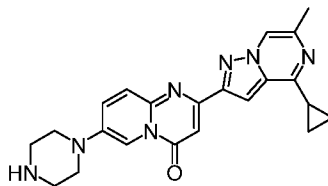
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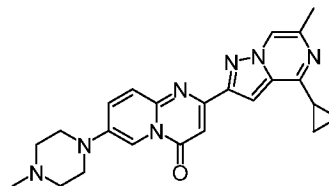
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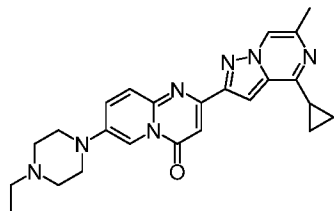
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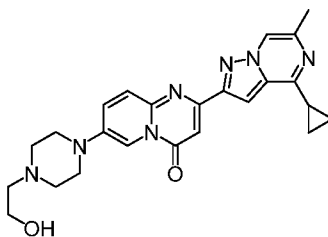
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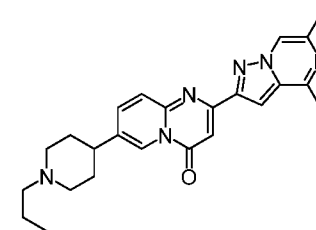
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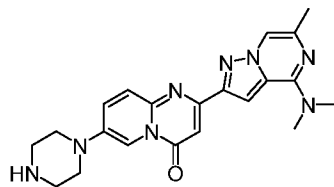
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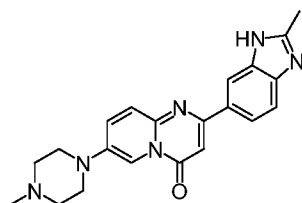
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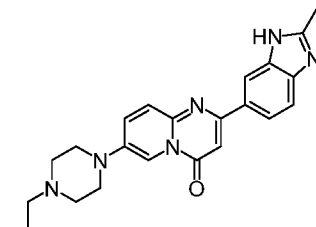
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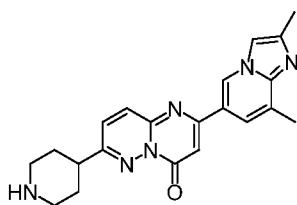
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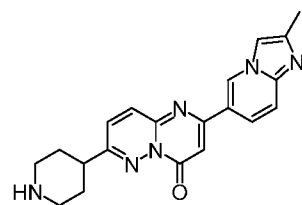
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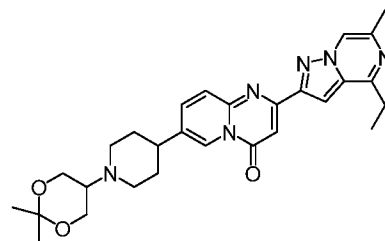
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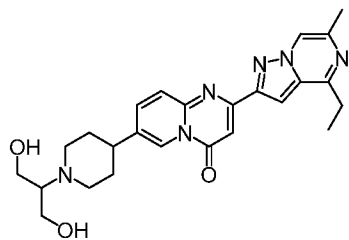
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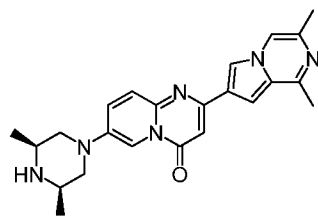
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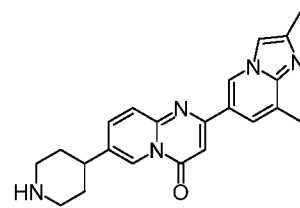
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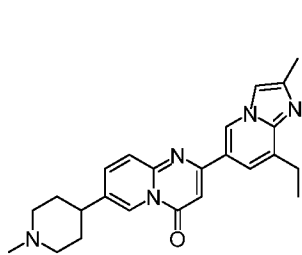
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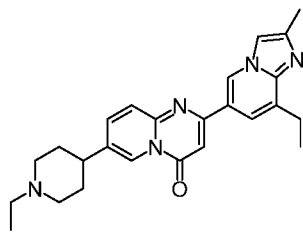
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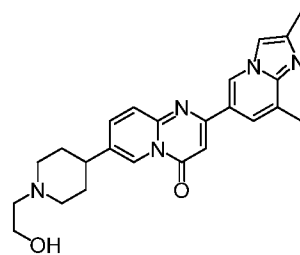
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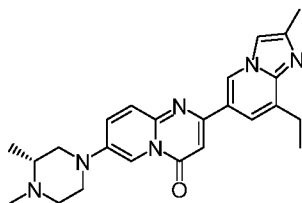
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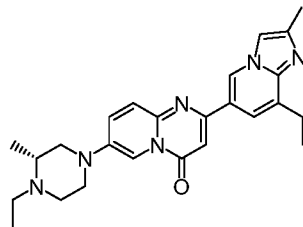
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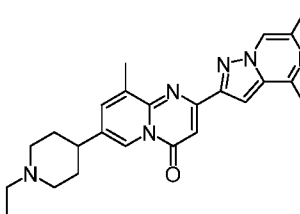
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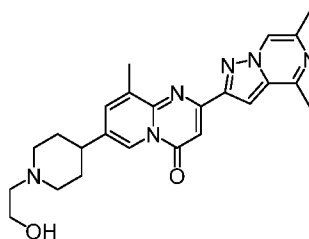
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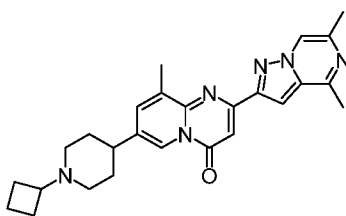
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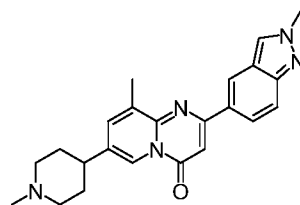
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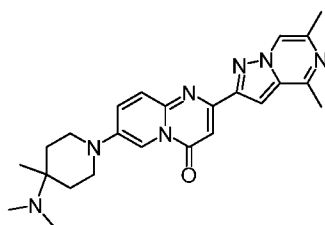
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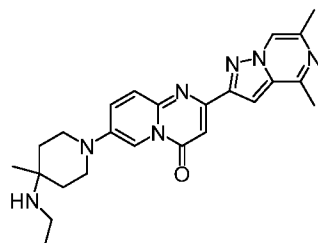
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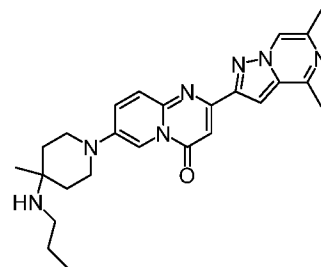
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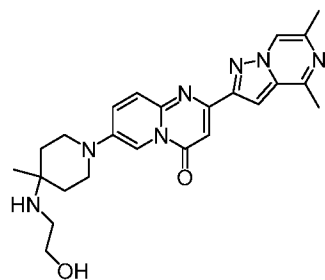
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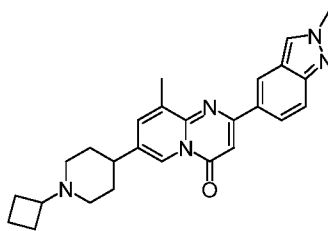
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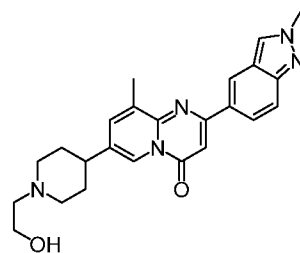
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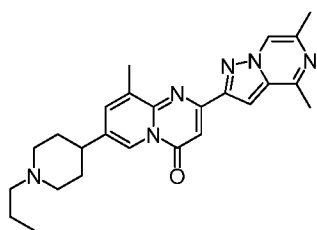
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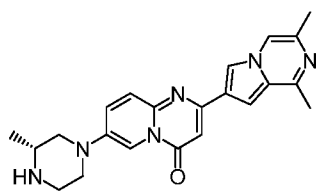
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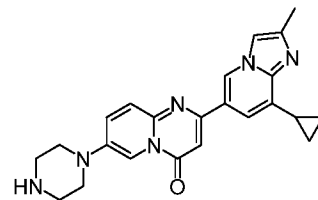
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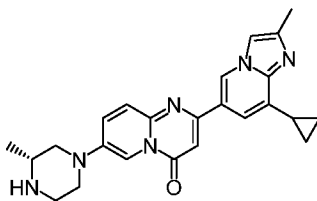
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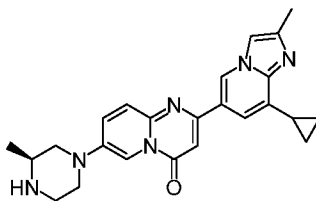
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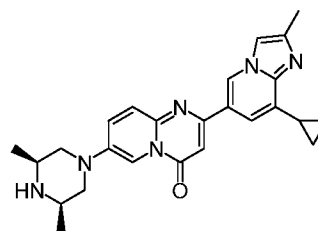
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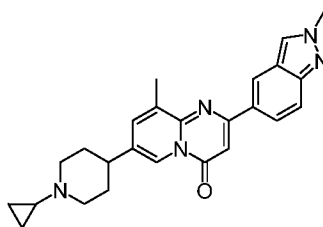
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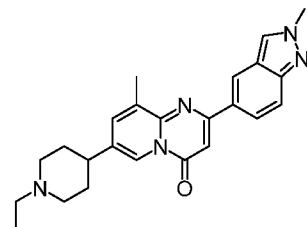
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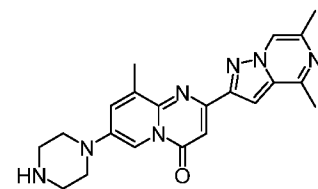
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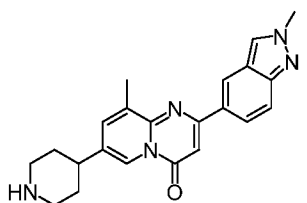
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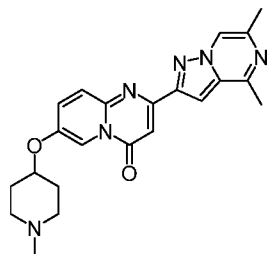
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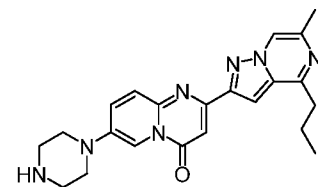
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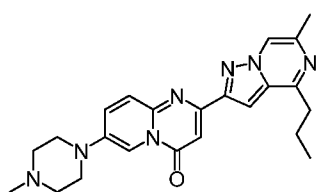
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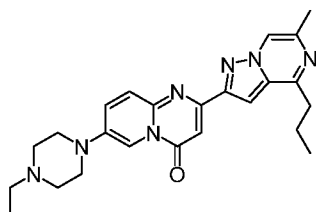
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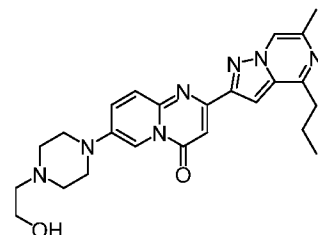
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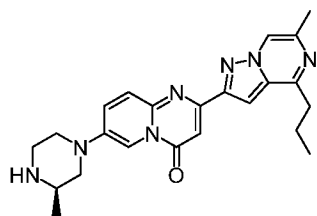
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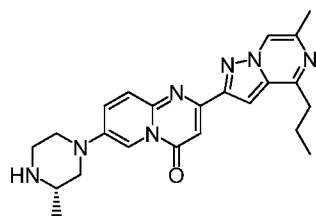
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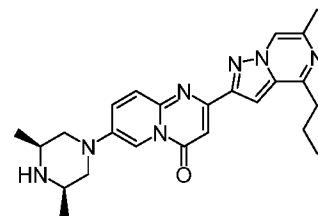
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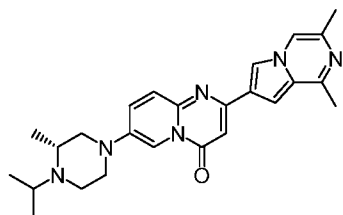
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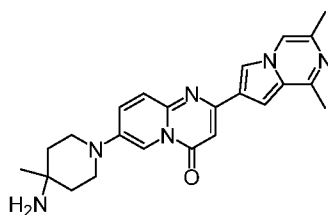
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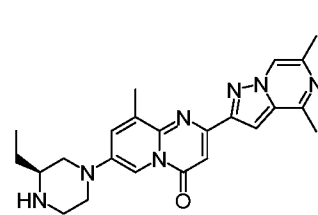
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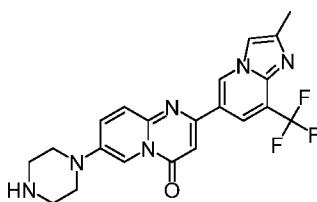
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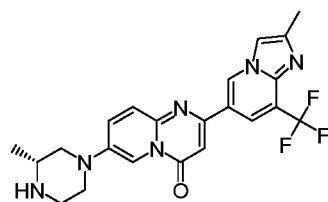
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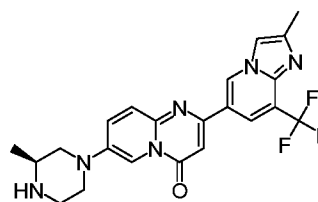
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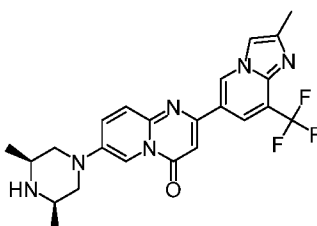
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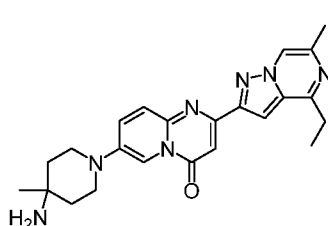
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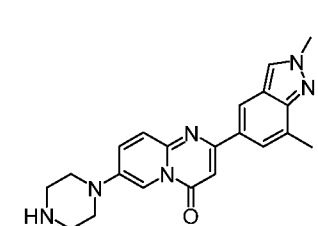
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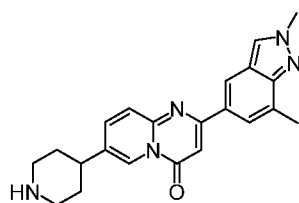
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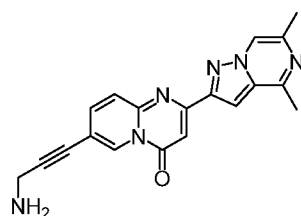
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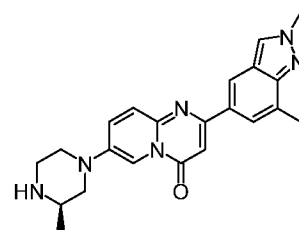
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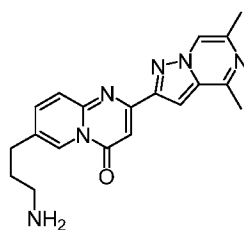
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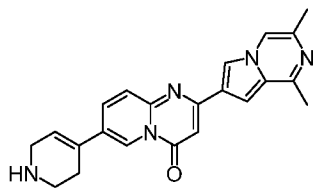
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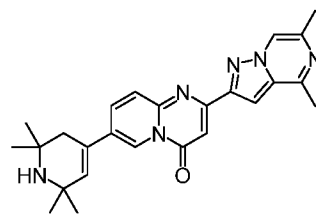
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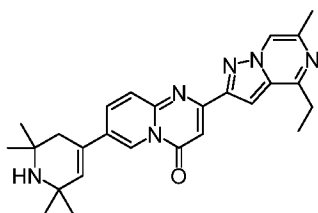
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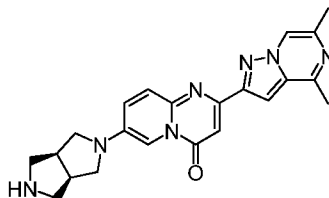
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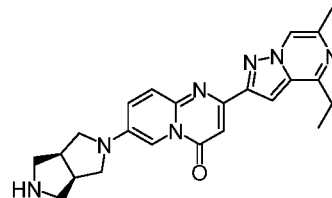
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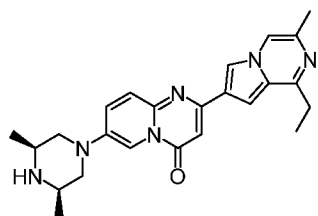
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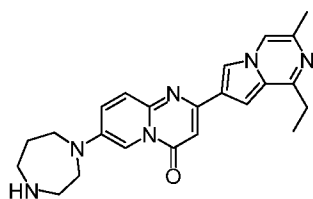
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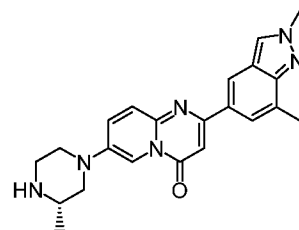
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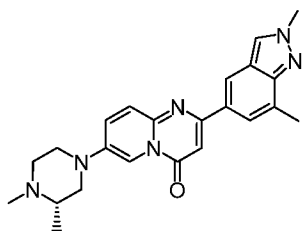
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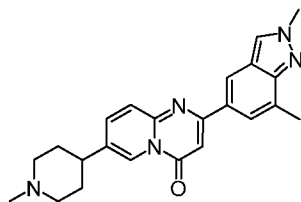
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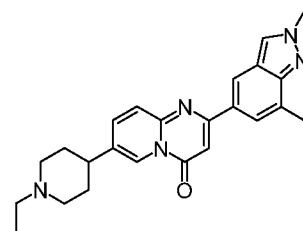
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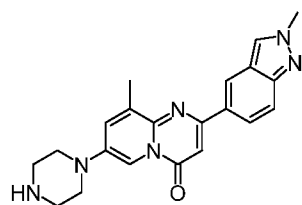
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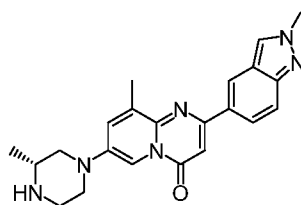
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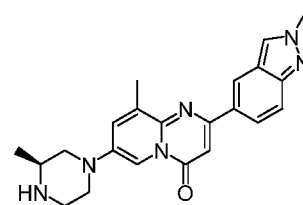
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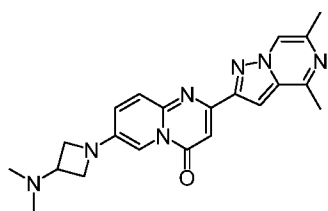
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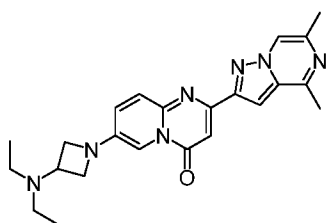
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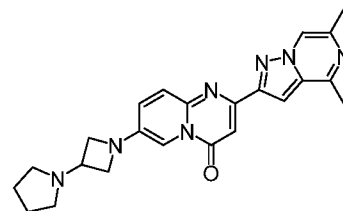
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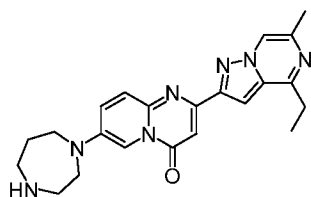
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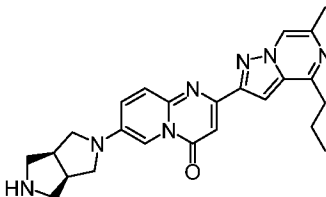
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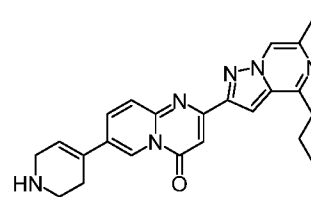
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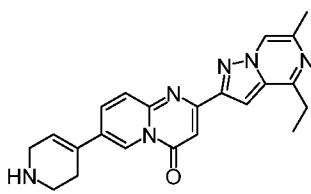
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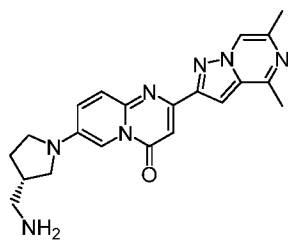
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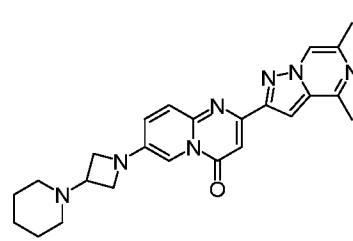
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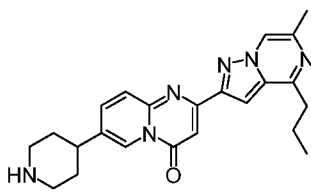
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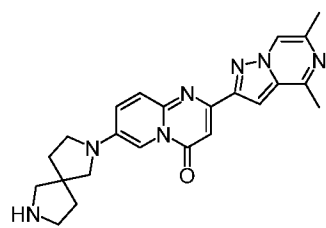
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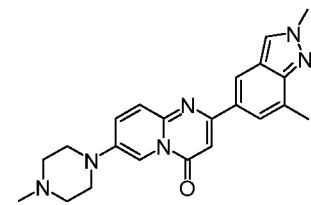
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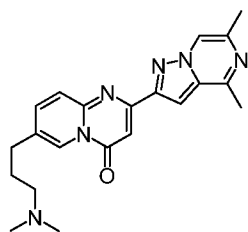
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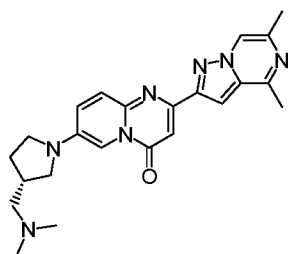
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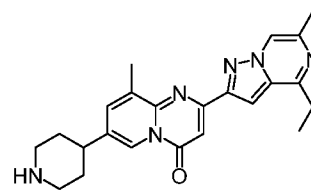
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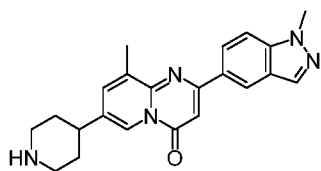
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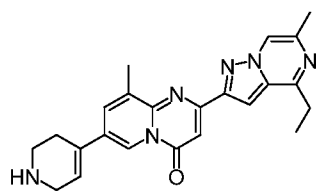
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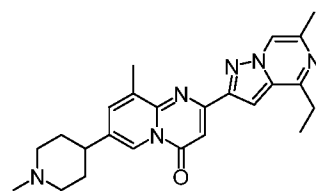
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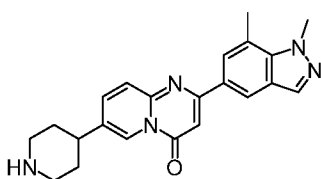
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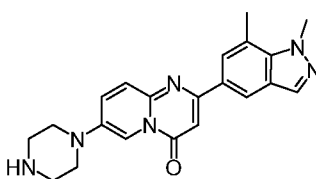
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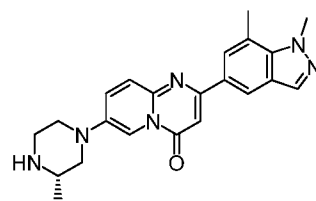
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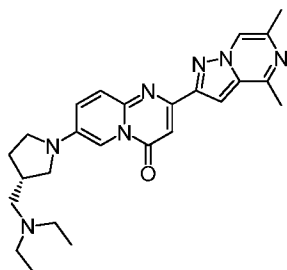
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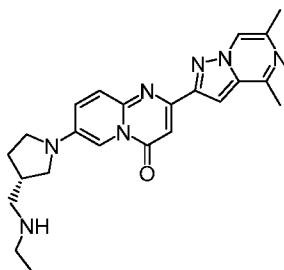
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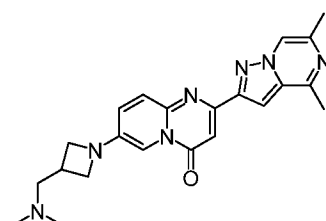
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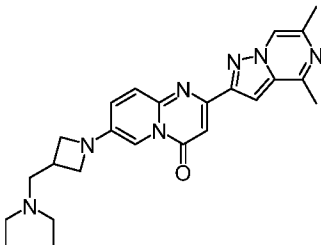
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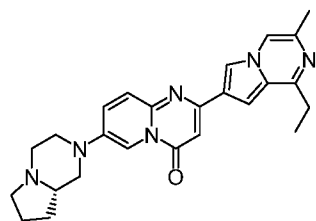
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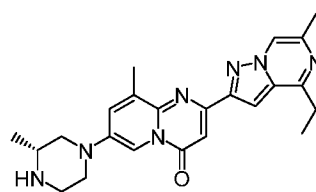
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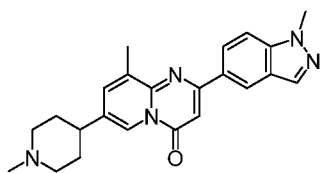
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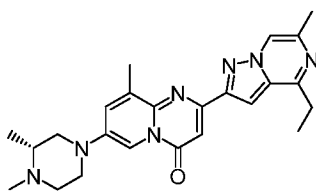
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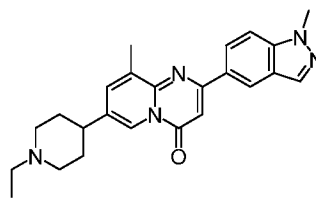
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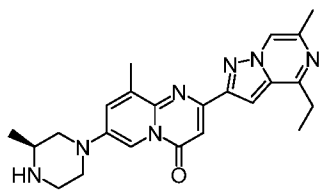
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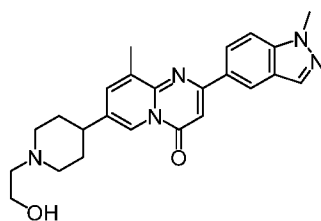
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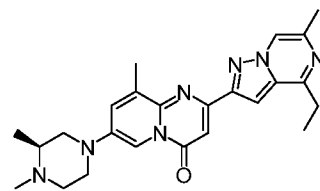
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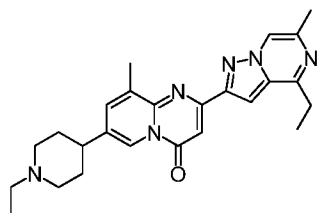
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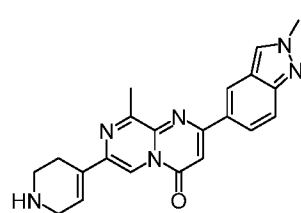
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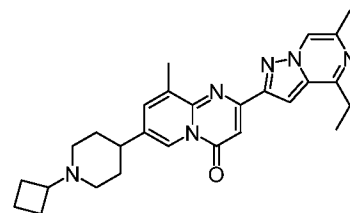
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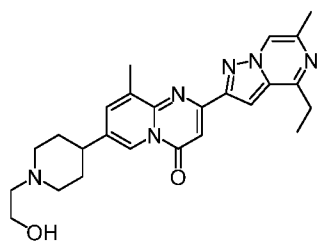
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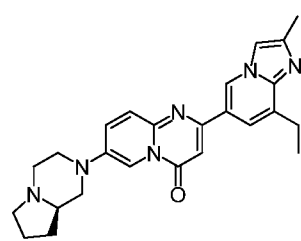
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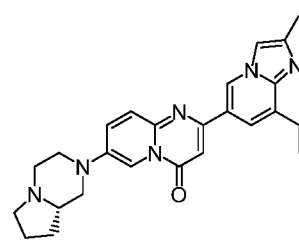
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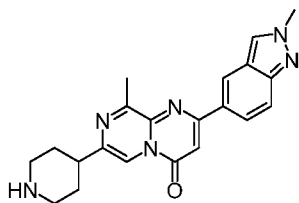
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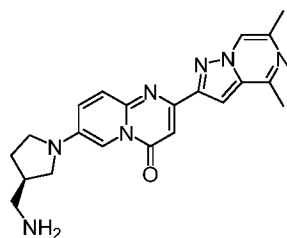
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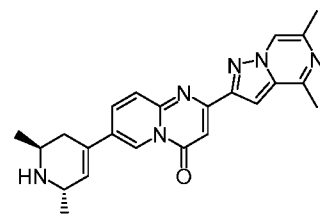
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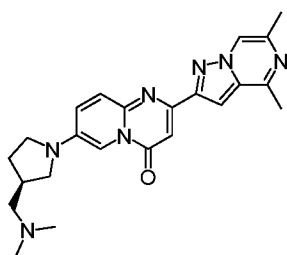
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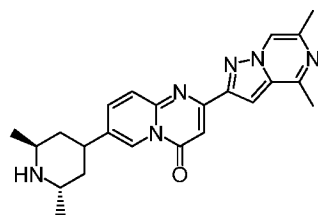
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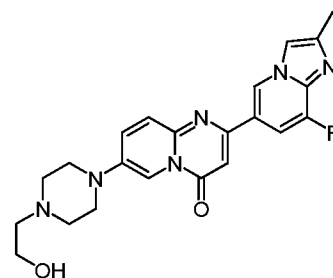
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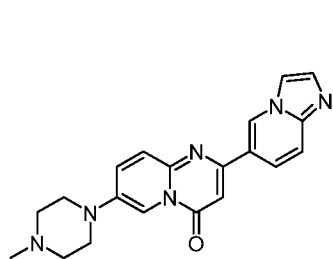
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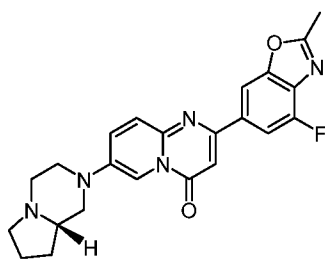
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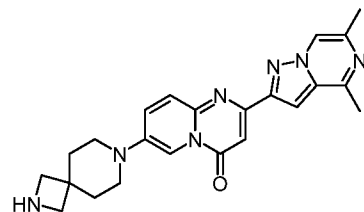
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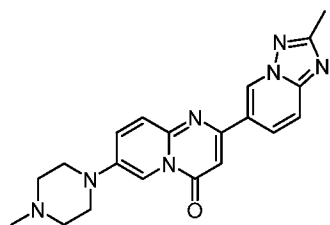
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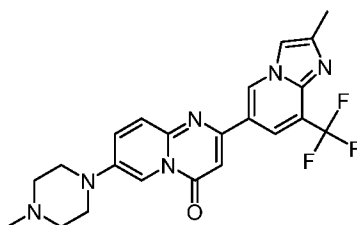
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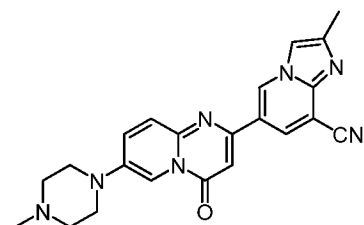
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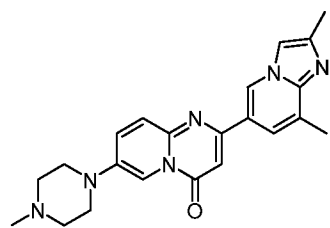
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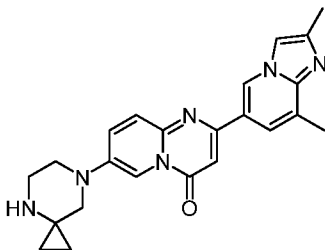
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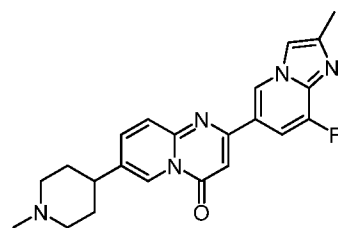
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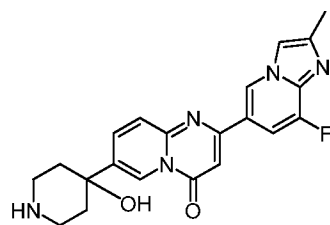
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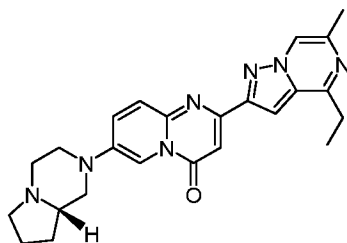
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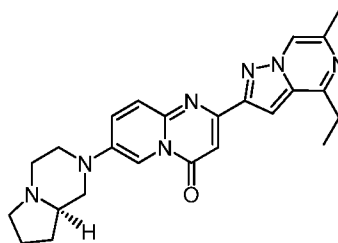
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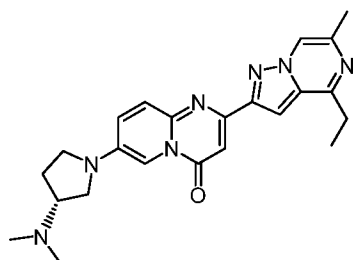
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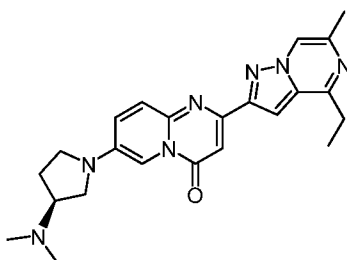
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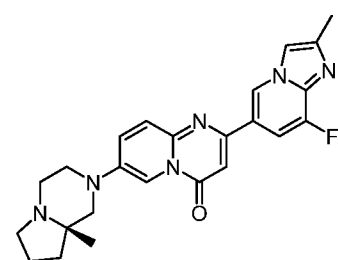
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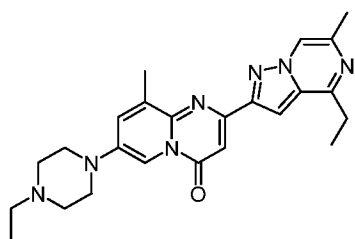
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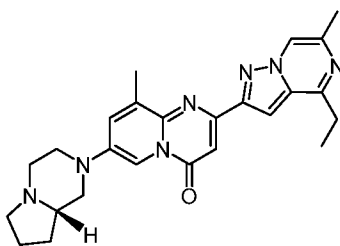
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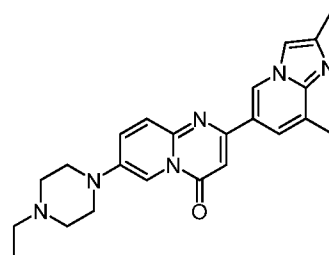
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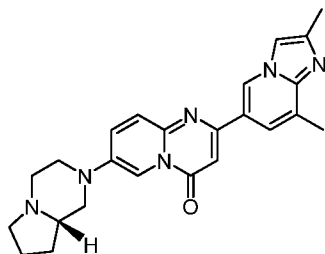
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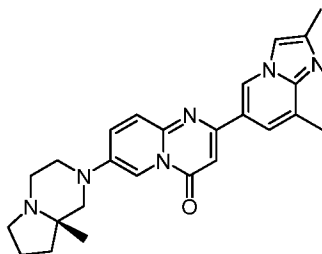
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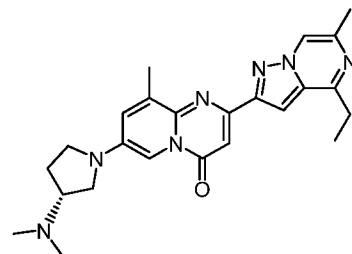
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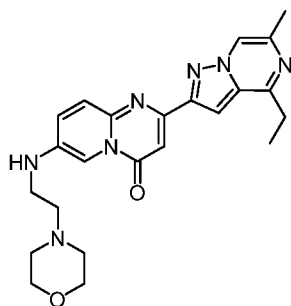
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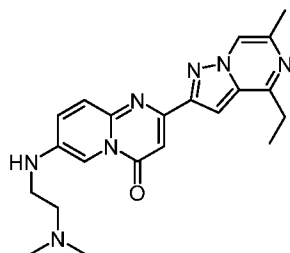
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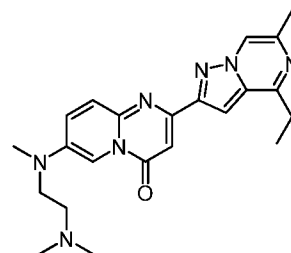
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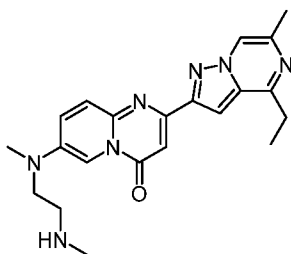
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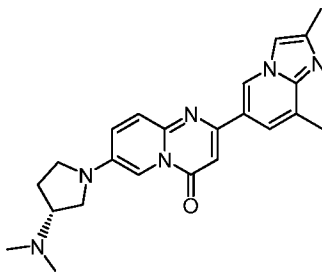
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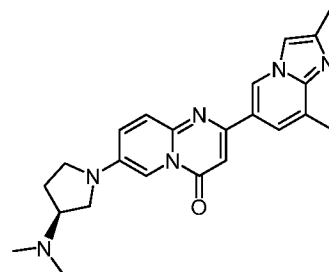
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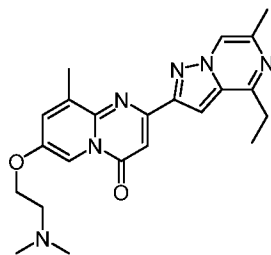
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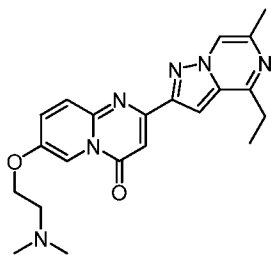
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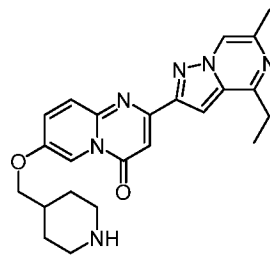
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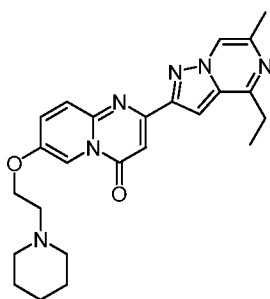
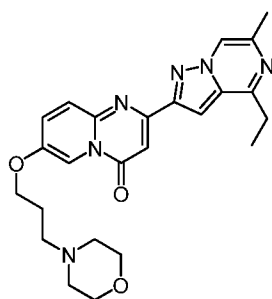
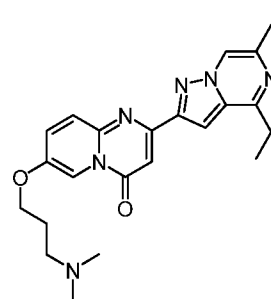
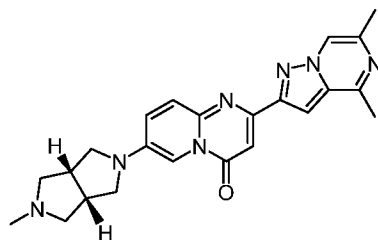
829



830



831

**832****833****834****835**

[00642] or a form thereof.

[00643] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound selected from the group consisting of:

2-(4-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methoxyphenyl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methoxyphenyl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(3,3-dimethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(3,4-dimethoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(4-propylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methoxyphenyl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(3,3-dimethylpiperazin-1-yl)-2-(4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1,3-benzodioxol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1,3-benzodioxol-5-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1,3-benzodioxol-5-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1,3-benzodioxol-5-yl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-methoxyphenyl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-methoxyphenyl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(3-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(4-ethylpiperazin-1-yl)-2-(3-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(1,4-diazepan-1-yl)-2-(3-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-methoxyphenyl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(6-methylimidazo[1,2-a]pyridin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dihydro-1,4-benzodioxin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dihydro-1,4-benzodioxin-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-phenyl-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3S)-3-methylpiperazin-1-yl]-2-phenyl-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dihydro-1,4-benzodioxin-6-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dihydro-1,4-benzodioxin-6-yl)-7-(3,3-dimethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dihydro-1,4-benzodioxin-6-yl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-(1,4-diazepan-1-yl)-2-(2,3-dihydro-1,4-benzodioxin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dihydro-1,4-benzodioxin-6-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-9-fluoro-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-chlorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-chlorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(piperazin-1-yl)-2-[3-(trifluoromethyl)phenyl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(piperazin-1-yl)-2-[4-(trifluoromethyl)phenyl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-methylphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-fluorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-nitrophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-9-fluoro-7-(piperidin-4-ylamino)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-(dimethylamino)phenyl]-9-fluoro-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-(dimethylamino)phenyl]-9-fluoro-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-fluorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
3-(3,4-dimethoxyphenyl)-8-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-(dimethylamino)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-(dimethylamino)phenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethylphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethylphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-(dimethylamino)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-(dimethylamino)phenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-(difluoromethoxy)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-(difluoromethoxy)phenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-nitrophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-methylphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-fluoro-4,5-dimethoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-fluoro-4,5-dimethoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-(3,8-diazabicyclo[3.2.1]oct-3-yl)-2-(3,4-dimethoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-methoxy-3-(trifluoromethyl)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-methoxy-3-(trifluoromethyl)phenyl]-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-methoxy-3-(trifluoromethyl)phenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-9-methoxy-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,5-difluoro-4-hydroxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
4-[4-oxo-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-2-yl]benzonitrile
2-(6-methylimidazo[1,2-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(6-methylimidazo[1,2-a]pyrazin-2-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-fluoro-5-(trifluoromethyl)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-fluoro-3-(trifluoromethyl)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[2-methoxy-3-(trifluoromethyl)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,5-difluorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(piperazin-1-yl)-2-[3-(trifluoromethoxy)phenyl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-methoxy-3-(trifluoromethoxy)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-hydroxy-3-(trifluoromethoxy)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-methoxy-3-(trifluoromethoxy)phenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[4-hydroxy-3-(trifluoromethoxy)phenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-4-oxo-7-(piperazin-1-yl)-4H-quinolizine-1-carbonitrile
2-(3-fluoro-4-methoxyphenyl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(6-methoxypyridin-3-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,4-dimethoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,4-dimethoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-quinolizin-4-one
2-(5-fluoropyridin-3-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(5-fluoropyridin-3-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(5-chloropyridin-3-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(5-chloropyridin-3-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(5-chloro-6-methoxypyridin-3-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1H-indol-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1H-indol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-(difluoromethoxy)-4-methoxyphenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[3-(difluoromethoxy)-4-hydroxyphenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-(difluoromethoxy)-4-methoxyphenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-(difluoromethoxy)-4-hydroxyphenyl]-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-(piperazin-1-yl)-4H-quinolizin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-quinolizin-4-one
2-(3,5-difluorophenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-(piperazin-1-yl)-4H-quinolizin-4-one
2-(imidazo[1,2-a]pyridin-7-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(imidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-chloro-4-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-chloro-4-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-ethoxy-4-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-ethoxy-4-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-(1,4-diazepan-1-yl)-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(6,8-dimethylimidazo[1,2-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(6,8-dimethylimidazo[1,2-a]pyrazin-2-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-(2-methylpyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(piperazin-1-yl)-2-[2-(trifluoromethyl)imidazo[1,2-a]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-ethylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,3-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-(4-aminopiperidin-1-yl)-2-(3,4-dimethoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(piperazin-1-yl)-2-(1H-pyrrolo[2,3-b]pyridin-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(1-methyl-1H-pyrrolo[2,3-b]pyridin-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(1-methyl-1H-pyrrolo[2,3-b]pyridin-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(1,4-diazepan-1-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzoxazol-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzoxazol-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzothiazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzothiazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-2H-indazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-2H-indazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-5-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-5-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-9-methyl-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4,5-dimethoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-(4-hydroxypiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[4-(dimethylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-methoxy-3-methylphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

3-[4-oxo-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-2-yl]benzonitrile
2-methoxy-5-[4-oxo-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-2-yl]benzonitrile
2-(3-fluoro-4-hydroxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-ethoxy-3-fluorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-fluoro-4-(2,2,2-trifluoroethoxy)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzoxazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzoxazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methylphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methylphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3S)-3-aminopyrrolidin-1-yl]-2-(3,4-dimethoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-9-methyl-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(1,4-diazepan-1-yl)-2-(2-methyl-1,3-benzothiazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3S)-3-methylpiperazin-1-yl]-2-(4-methyl-1,3-thiazol-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-methyl-1,3-thiazol-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[(3S)-3-(propan-2-ylamino)pyrrolidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-methoxy-3-nitrophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-[3-fluoro-4-(methylsulfanyl)phenyl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(4-methyl-1,4-diazepan-1-yl)-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzoxazol-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(5-fluoro-6-methoxypyridin-3-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(5-fluoro-6-methoxypyridin-3-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(2-methyl-1,3-benzothiazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-5-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-5-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-2-(2-methyl-1,3-benzothiazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methyl-1H-imidazol-1-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methyl-1H-imidazol-1-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{[2-(methylamino)ethyl]amino}-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5-fluoro-6-methoxypyridin-3-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,5-difluoro-4-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,5-difluoro-4-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(piperidin-4-ylamino)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-chloro-5-fluorophenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-chloro-5-fluorophenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-methylpiperazin-1-yl]-2-(1-methyl-1H-pyrazol-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-pyrazol-4-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3,3-dimethylpiperazin-1-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,5-dimethoxypyridin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[3-(dimethylamino)pyrrolidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-quinolizin-4-one
7-(4-aminopiperidin-1-yl)-2-(3-fluoro-4-methoxyphenyl)-4H-quinolizin-4-one
7-(4-ethylpiperazin-1-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[4-(dimethylamino)piperidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-quinolizin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,4R)-3-(dimethylamino)-4-hydroxypyrrolidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(4-aminopiperidin-1-yl)-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-[4-(methylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3-fluoro-4-methoxyphenyl)-7-[(3aR,6aS)-5-methylhexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-dimethoxyphenyl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-fluoro-3-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(4-fluoro-3-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-difluoro-5-methoxyphenyl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one
2-(3,4-difluoro-5-methoxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzothiazol-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
7-(3-fluoro-4-methoxyphenyl)-2-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one
2-(2-methyl-1,3-benzothiazol-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(3S)-3-(methylamino)pyrrolidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-{4-[(methylamino)methyl]piperidin-1-yl}-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-aminopyrrolidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-{[(3R)-1-methylpyrrolidin-3-yl]amino}-4H-pyrido[1,2-a]pyrimidin-4-one

7-{4-[(dimethylamino)methyl]piperidin-1-yl}-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methoxypyridin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(piperazin-1-yl)-2-(pyridin-3-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5-methoxypyridin-3-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

3-fluoro-5-{7-[(3S)-3-methylpiperazin-1-yl]-4-oxo-4H-pyrido[1,2-a]pyrimidin-2-yl}benzonitrile

3-fluoro-5-[4-oxo-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-2-yl]benzonitrile

2-(3-fluoro-4-methoxyphenyl)-7-[(3'S,4'S)-4'-hydroxy-1,3'-bipyrrolidin-1'-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-{methyl[(3R)-pyrrolidin-3-yl]amino}-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(1-methylpiperidin-4-yl)oxy]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(3S)-pyrrolidin-3-yloxy]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(piperidin-4-yloxy)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(3,4-dimethoxyphenyl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-{methyl[(3R)-1-methylpyrrolidin-3-yl]amino}-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-aminopiperidin-1-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-quinolizin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(3aR,6aR)-1-methylhexahydropyrrolo[3,4-b]pyrrol-5(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[1-(2-hydroxyethyl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-quinolizin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R,5S)-3,4,5-trimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[(3aR,6aS)-5-methylhexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(dimethylamino)piperidin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(1R,5S)-8-azabicyclo[3.2.1]oct-2-en-3-yl]-2-(3,4-dimethoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1,2,5,6-tetrahydropyridin-3-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-ethyl-1,3-benzoxazol-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-ethyl-1,3-benzoxazol-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-[(3aR,6aS)-5-methylhexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-2-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-aminopiperidin-1-yl)-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-aminopiperidin-1-yl)-7-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-7-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-7-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(3aR,6aS)-5-(2-hydroxyethyl)hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(3aS,6aS)-1-methylhexahydropyrrolo[3,4-b]pyrrol-5(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(3aR,6aS)-5-(propan-2-yl)hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3,3-dimethylpiperazin-1-yl)-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(piperidin-4-yloxy)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3-fluoro-4-methoxyphenyl)-2-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[4-(dimethylamino)piperidin-1-yl]-7-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(4aR,7aR)-octahydro-6H-pyrrolo[3,4-b]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-(4-propylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3aR,6aS)-5-ethylhexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-9-methyl-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-[(4aR,7aR)-1-methyloctahydro-6H-pyrrolo[3,4-b]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-9-methyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3-fluoro-4-methoxyphenyl)-2-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3-fluoro-4-methoxyphenyl)-2-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-(1-propyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(1R,5S)-8-methyl-8-azabicyclo[3.2.1]oct-3-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(2R)-2-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-quinolizin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(4-methylpiperazin-1-yl)-4H-quinolizin-4-one

7-[(3S)-4-ethyl-3-methylpiperazin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-quinolizin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-quinolizin-4-one

7-(4-aminopiperidin-1-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-quinolizin-4-one

2-(3-fluoro-4-methoxyphenyl)-9-methyl-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-9-methyl-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(cyclopropylamino)piperidin-1-yl]-2-(3,4-dimethoxyphenyl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3,4-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(3R)-3,4-dimethylpiperazin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3,3-dimethylpiperazin-1-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-cyclopropylpiperazin-1-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-ethyl-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(dimethylamino)piperidin-1-yl]-9-ethyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[1-(2-hydroxyethyl)-1,2,3,6-tetrahydropyridin-4-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(2-methyl-1,3-benzothiazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-aminopiperidin-1-yl)-2-(2-methyl-1,3-benzothiazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-2-(2-methyl-1,3-benzothiazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-propyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrimido[1,2-a]pyrimidin-4-one

7-(1-cyclopropyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(propan-2-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(oxetan-3-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[4-(methylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(ethylamino)piperidin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-8-methyl-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(propan-2-ylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(3,4-dimethoxyphenyl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[1-(propan-2-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[1-(oxetan-3-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1-propyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(methylamino)cyclohex-1-en-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(dimethylamino)cyclohex-1-en-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{4-[ethyl(methyl)amino]cyclohex-1-en-1-yl}-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{4-[methyl(propyl)amino]cyclohex-1-en-1-yl}-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3,4-dimethoxyphenyl)-2-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-2-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2-methylimidazo[1,2-a]pyridin-6-yl)-2-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2-methylimidazo[1,2-a]pyridin-6-yl)-2-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3,4-dimethoxyphenyl)-2-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-(1-propyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(3,4-dimethoxyphenyl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

7-(4-aminopiperidin-1-yl)-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3-aminopyrrolidin-1-yl)-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[4-(2-methoxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[1-(oxetan-3-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[1-(propan-2-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-8-methyl-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclopropyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(3,4-dimethoxyphenyl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-8-methyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)-1,2,3,6-tetrahydropyridin-4-yl]-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-[1-(propan-2-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclopropyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methyl-1,3-benzothiazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

7-[(1S,4S)-2,5-diazabicyclo[2.2.1]hept-2-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(1S,4S)-5-methyl-2,5-diazabicyclo[2.2.1]hept-2-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(1S,4S)-5-ethyl-2,5-diazabicyclo[2.2.1]hept-2-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(3-fluoro-4-methoxyphenyl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[cis-4-(methylamino)cyclohexyl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-(piperidin-3-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[4-(propylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2-methylimidazo[1,2-a]pyridin-6-yl)-2-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-2-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-2-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-cyclopropylpiperazin-1-yl)-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[4-(propan-2-ylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-methyl-7-[4-(morpholin-4-yl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one hydrochloride (1:1)

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(pyrrolidin-1-yl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4'-bipiperidin-1'-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(4-methylpiperazin-1-yl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(morpholin-4-yl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{4-[(2-hydroxyethyl)amino]piperidin-1-yl}-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(diethylamino)piperidin-1-yl]-2-(3,4-dimethoxyphenyl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-[4-(pyrrolidin-1-yl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-methylpiperazin-1-yl)-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-methylpiperazin-1-yl]-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[6-(dimethylamino)pyridin-3-yl]-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(diethylamino)piperidin-1-yl]-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{4-[(2-hydroxyethyl)(methyl)amino]piperidin-1-yl}-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[6-(dimethylamino)pyridin-3-yl]-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(diethylamino)piperidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-9-ethyl-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{4-[(2-methoxyethyl)amino]piperidin-1-yl}-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2-methylimidazo[1,2-a]pyridin-6-yl)-2-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2-methylimidazo[1,2-a]pyridin-6-yl)-2-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-2-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(1-propyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[6-(dimethylamino)pyridin-3-yl]-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(2-hydroxyethyl)piperazin-1-yl]-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-propylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)-1,2,3,6-tetrahydropyridin-4-yl]-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-methylpiperazin-1-yl]-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-7-[1-(propan-2-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclopropyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-methyl-1,4-diazepan-1-yl)-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-4-ethyl-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-ethyl-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-3-methyl-4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3-methyl-4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(2-methyl-1,3-benzoxazol-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(1-methyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(1-ethyl-1,2,3,6-tetrahydropyridin-4-yl)-2-(1-methyl-1H-indazol-5-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-ethylpiperazin-1-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-ethyl-3-methylpiperazin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(octahydro-5H-pyrrolo[3,2-c]pyridin-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methyl-2H-indazol-5-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrimido[1,2-b]pyridazin-4-one

2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-7-[4-(2-hydroxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(2-hydroxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-(2-methoxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-[2-(2-hydroxyethoxy)ethyl]-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-cyclopropyl-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-cyclobutyl-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-(2-methoxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-[2-(2-hydroxyethoxy)ethyl]-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3-methyl-4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-4-cyclopropyl-3-methylpiperazin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-4-cyclobutyl-3-methylpiperazin-1-yl]-2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3,3-dimethylpiperazin-1-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(2-hydroxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)piperidin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(diethylamino)piperidin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-7-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-7-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-7-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-7-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-(2-methylimidazo[1,2-a]pyridin-7-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-7-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methylimidazo[1,2-a]pyridin-7-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[(3R,5S)-3,4,5-trimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(propan-2-yl)-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methyl-2H-indazol-5-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-2-(2-methyl-2H-indazol-5-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-{4-[(dimethylamino)methyl]piperidin-1-yl}-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(pyrrolidin-1-ylmethyl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(piperidin-1-ylmethyl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-{4-[(dimethylamino)methyl]piperidin-1-yl}-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(pyrrolidin-1-ylmethyl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(3,4-dimethoxyphenyl)-7-[4-(piperidin-1-ylmethyl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)-1,2,3,6-tetrahydropyridin-4-yl]-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-{4-[(2-hydroxyethyl)(methyl)amino]piperidin-1-yl}-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[4-(propylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-amino-4-methylpiperidin-1-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(piperazin-1-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-(2-methyl-2H-indazol-5-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-[4-(2-hydroxyethyl)piperazin-1-yl]-2-(2-methyl-2H-indazol-5-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(ethylamino)piperidin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-{4-[bis(2-hydroxyethyl)amino]piperidin-1-yl}-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-2-(2-methyl-1,3-benzoxazol-6-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(8-chloro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(oxetan-3-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(5,7-dimethylfuro[2,3-c]pyridin-2-yl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methyloctahydro-5H-pyrrolo[3,2-c]pyridin-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-methyl-1H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-2H-indazol-5-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-{4-[(2-hydroxyethyl)amino]piperidin-1-yl}-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[4-(methylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[4-(propan-2-ylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-propylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-cyclopropylpiperazin-1-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-cyclobutylpiperazin-1-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(oxetan-3-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethyloctahydro-5H-pyrrolo[3,2-c]pyridin-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-hydroxyethyl)octahydro-5H-pyrrolo[3,2-c]pyridin-5-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-methoxy-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-hydroxy-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(1-cyclobutylpiperidin-4-yl)-2-(2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-4-ethyl-3-methylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-3-methyl-4-propylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(pyrrolidin-1-yl)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclopropylpiperidin-4-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutylpiperidin-4-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-3-methyl-4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-4-cyclopropyl-3-methylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-4-cyclobutyl-3-methylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-3-methyl-4-(oxetan-3-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[4-(2-hydroxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-cyclobutylpiperazin-1-yl)-2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-4-cyclobutyl-3-methylpiperazin-1-yl]-2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-4-cyclobutyl-3-methylpiperazin-1-yl]-2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-propylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-fluoroethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(3-fluoropropyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(2-fluoroethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(3-fluoropropyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-(2-fluoroethyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-(3-fluoropropyl)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-fluoroethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(3-fluoropropyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-{(3R)-4-[2-(2-hydroxyethoxy)ethyl]-3-methylpiperazin-1-yl}-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3R)-4-(2-hydroxyethyl)-3-methylpiperazin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-[8-(hydroxymethyl)-2-methylimidazo[1,2-a]pyridin-6-yl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-methyl-1,4-diazepan-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[8-(hydroxymethyl)-2-methylimidazo[1,2-a]pyridin-6-yl]-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-[8-(hydroxymethyl)-2-methylimidazo[1,2-a]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(propan-2-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclopropylpiperidin-4-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutylpiperidin-4-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(oxetan-3-yl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-cyclopropyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-cyclopropyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-cyclopropyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-cyclopropyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(2-hydroxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-propylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-[4-(dimethylamino)-6-methylpyrazolo[1,5-a]pyrazin-2-yl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2-methyl-1H-benzimidazol-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-(2-methyl-1H-benzimidazol-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

2-(2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one

7-[1-(2,2-dimethyl-1,3-dioxan-5-yl)piperidin-4-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(1,3-dihydroxypropan-2-yl)piperidin-4-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-4-ethyl-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutylpiperidin-4-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(dimethylamino)-4-methylpiperidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-(ethylamino)-4-methylpiperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[4-methyl-4-(propylamino)piperidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-{4-[(2-hydroxyethyl)amino]-4-methylpiperidin-1-yl}-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclobutylpiperidin-4-yl)-9-methyl-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-9-methyl-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(1-propylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-cyclopropyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-cyclopropyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-cyclopropyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-cyclopropyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-cyclopropylpiperidin-4-yl)-9-methyl-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-9-methyl-2-(2-methyl-2H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(1-methylpiperidin-4-yl)oxy]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-methylpiperazin-1-yl)-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-ethylpiperazin-1-yl)-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[4-(2-hydroxyethyl)piperazin-1-yl]-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-methylpiperazin-1-yl]-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-methylpiperazin-1-yl]-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-7-[(3R)-3-methyl-4-(propan-2-yl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-amino-4-methylpiperidin-1-yl)-2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3S)-3-ethylpiperazin-1-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-[2-methyl-8-(trifluoromethyl)imidazo[1,2-a]pyridin-6-yl]-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-methylpiperazin-1-yl]-2-[2-methyl-8-(trifluoromethyl)imidazo[1,2-a]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-methylpiperazin-1-yl]-2-[2-methyl-8-(trifluoromethyl)imidazo[1,2-a]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-[2-methyl-8-(trifluoromethyl)imidazo[1,2-a]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-amino-4-methylpiperidin-1-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3-aminoprop-1-yn-1-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(3-aminopropyl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-(2,2,6,6-tetramethyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(2,2,6,6-tetramethyl-1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R,5S)-3,5-dimethylpiperazin-1-yl]-2-(1-ethyl-3-methylpyrrolo[1,2-a]pyrazin-7-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(1-ethyl-3-methylpyrrolo[1,2-a]pyrazin-7-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-[(3S)-3,4-dimethylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-(1-ethylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[3-(dimethylamino)azetidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[3-(diethylamino)azetidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[3-(pyrrolidin-1-yl)azetidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1,4-diazepan-1-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-(aminomethyl)pyrrolidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[3-(piperidin-1-yl)azetidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(6-methyl-4-propylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2,7-diazaspiro[4.4]non-2-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,7-dimethyl-2H-indazol-5-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[3-(dimethylamino)propyl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-[(dimethylamino)methyl]pyrrolidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(1-methyl-1H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,7-dimethyl-1H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,7-dimethyl-1H-indazol-5-yl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1,7-dimethyl-1H-indazol-5-yl)-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-[(diethylamino)methyl]pyrrolidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3S)-3-[(ethylamino)methyl]pyrrolidin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-{3-[(dimethylamino)methyl]azetidin-1-yl}-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-{3-[(diethylamino)methyl]azetidin-1-yl}-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(1-ethyl-3-methylpyrrolo[1,2-a]pyrazin-7-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[(3R)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(1-methyl-1H-indazol-5-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3,4-dimethylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-(1-ethylpiperidin-4-yl)-9-methyl-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-7-[(3S)-3-methylpiperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[1-(2-hydroxyethyl)piperidin-4-yl]-9-methyl-2-(1-methyl-1H-indazol-5-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3,4-dimethylpiperazin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(1-ethylpiperidin-4-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-(1-cyclobutylpiperidin-4-yl)-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[1-(2-hydroxyethyl)piperidin-4-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-ethyl-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

9-methyl-2-(2-methyl-2H-indazol-5-yl)-7-(piperidin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one

7-[(3R)-3-(aminomethyl)pyrrolidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(2S,6S)-2,6-dimethyl-1,2,3,6-tetrahydropyridin-4-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-[(dimethylamino)methyl]pyrrolidin-1-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(2S,6S)-2,6-dimethylpiperidin-4-yl]-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[4-(2-hydroxyethyl)piperazin-1-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(imidazo[1,2-a]pyridin-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-fluoro-2-methyl-1,3-benzoxazol-6-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-(2,7-diazaspiro[3.5]non-7-yl)-2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-methylpiperazin-1-yl)-2-(2-methyl[1,2,4]triazolo[1,5-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4-methylpiperazin-1-yl)-2-[2-methyl-8-(trifluoromethyl)imidazo[1,2-a]pyridin-6-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-methyl-6-[7-(4-methylpiperazin-1-yl)-4-oxo-4H-pyrido[1,2-a]pyrimidin-2-yl]imidazo[1,2-a]pyridine-8-carbonitrile

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(4-methylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-(4,7-diazaspiro[2.5]oct-7-yl)-2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(1-methylpiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-(4-hydroxypiperidin-4-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(8aR)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(8-fluoro-2-methylimidazo[1,2-a]pyridin-6-yl)-7-[(8aS)-8a-methylhexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(4-ethylpiperazin-1-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(4-ethylpiperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-[(8aS)-hexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-7-(8a-methylhexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-{[2-(morpholin-4-yl)ethyl]amino}-4H-pyrido[1,2-a]pyrimidin-4-one

7-{[2-(dimethylamino)ethyl]amino}-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-{[2-(dimethylamino)ethyl](methyl)amino}-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-{methyl[2-(methylamino)ethyl]amino}-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3R)-3-(dimethylamino)pyrrolidin-1-yl]-2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[(3S)-3-(dimethylamino)pyrrolidin-1-yl]-2-(2,8-dimethylimidazo[1,2-a]pyridin-6-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

7-[2-(dimethylamino)ethoxy]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-9-methyl-4H-pyrido[1,2-a]pyrimidin-4-one

7-[2-(dimethylamino)ethoxy]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-(piperidin-4-ylmethoxy)-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[2-(piperidin-1-yl)ethoxy]-4H-pyrido[1,2-a]pyrimidin-4-one

2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-7-[3-(morpholin-4-yl)propoxy]-4H-pyrido[1,2-a]pyrimidin-4-one

7-[3-(dimethylamino)propoxy]-2-(4-ethyl-6-methylpyrazolo[1,5-a]pyrazin-2-yl)-4H-pyrido[1,2-a]pyrimidin-4-one, or

2-(4,6-dimethylpyrazolo[1,5-a]pyrazin-2-yl)-7-[(3aR,6aS)-5-methylhexahydropyrrolo[3,4-c]pyrrol-2(1H)-yl]-4H-pyrido[1,2-a]pyrimidin-4-one

or a salt, isotopologue, stereoisomer, racemate, enantiomer, diastereomer or tautomer thereof.

[00644] In another embodiment, the compound of Formula (I) used in a method disclosed herein is a compound selected from the group consisting of:

2-(3,5-difluoro-4-hydroxyphenyl)-7-(piperazin-1-yl)-4H-pyrido[1,2-a]pyrimidin-4-one hydrochloride

7-[4-(dimethylamino)piperidin-1-yl]-2-(3-fluoro-4-methoxyphenyl)-4H-quinolizin-4-one acetate

2-(2-methyl-1,3-benzothiazol-6-yl)-7-(piperidin-4-yl)-4H-pyrimido[1,2-b]pyridazin-4-one trifluoroacetate (1:1), or

2-(1,3-dimethylpyrrolo[1,2-a]pyrazin-7-yl)-7-(1,2,3,6-tetrahydropyridin-4-yl)-4H-pyrazino[1,2-a]pyrimidin-4-one hydrochloride (1:2)

or a free base, isotopologue, stereoisomer, racemate, enantiomer, diastereomer or tautomer thereof.

[00645] Compounds of Formula (I) can be prepared using reagents and methods known in the art, including the methods provided in International Application No. PCT/US2013/025292, filed on February 8, 2013, and published as International Publication No. WO 2013/119916 on August 15, 2013, the entire contents which are incorporated herein by reference (see in particular, General Synthetic Methods, Schemes A-J, at paragraphs [001126] to [001159]; and Specific Synthetic Examples, at paragraphs [001160] to [001573] and Table 1, therein).

TERMINOLOGY

[00646] The chemical terms used above and throughout the description herein, unless specifically defined otherwise, shall be understood by one of ordinary skill in the art to have the following indicated meanings.

[00647] As used herein, the term “C₁₋₈alkyl” generally refers to saturated hydrocarbon radicals having from one to eight carbon atoms in a straight or branched chain configuration, including, but not limited to, methyl, ethyl, n-propyl (also referred to as propyl or propanyl), isopropyl, n-butyl (also referred to as butyl or butanyl), isobutyl, sec-butyl, tert-butyl, n-pentyl (also referred to as pentyl or pentanyl), n-hexyl (also referred to as hexyl or hexanyl), n-heptyl (also referred to as heptyl or heptanyl), n-octyl and the like. In some embodiments, C₁₋₈alkyl includes, but is not limited to, C₁₋₆alkyl, C₁₋₄alkyl and the like. A C₁₋₈alkyl radical is optionally substituted with substituent species as described herein where allowed by available valences.

[00648] As used herein, the term “C₂₋₈alkenyl” generally refers to partially unsaturated hydrocarbon radicals having from two to eight carbon atoms in a straight or branched chain configuration and one or more carbon-carbon double bonds therein, including, but not limited to, ethenyl (also referred to as vinyl), allyl, propenyl and the like. In some embodiments, C₂₋₈alkenyl includes, but is not limited to, C₂₋₆alkenyl, C₂₋₄alkenyl and the like. A C₂₋₈alkenyl radical is optionally substituted with substituent species as described herein where allowed by available valences.

[00649] As used herein, the term “C₂₋₈alkynyl” generally refers to partially unsaturated hydrocarbon radicals having from two to eight carbon atoms in a straight or branched chain configuration and one or more carbon-carbon triple bonds therein, including, but not limited to, ethynyl, propynyl, butynyl and the like. In some embodiments, C₂₋₈alkynyl includes, but is not limited to, C₂₋₆alkynyl, C₂₋₄alkynyl and the like. A C₂₋₈alkynyl radical is optionally substituted with substituent species as described herein where allowed by available valences.

[00650] As used herein, the term “C₁₋₈alkoxy” generally refers to saturated hydrocarbon radicals having from one to eight carbon atoms in a straight or branched chain configuration of the formula: -O-C₁₋₈alkyl, including, but not limited to, methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy, tert-butoxy, n-pentoxy, n-hexoxy and the like. In some embodiments, C₁₋₈alkoxy includes, but is not limited to, C₁₋₆alkoxy, C₁₋₄alkoxy and the like. A C₁₋₈alkoxy radical is optionally substituted with substituent species as described herein where allowed by available valences.

[00651] As used herein, the term “C₃₋₁₄cycloalkyl” generally refers to a saturated or partially unsaturated monocyclic, bicyclic or polycyclic hydrocarbon radical, including, but not limited to, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cyclohexenyl, cycloheptyl, cyclooctyl, 1H-indanyl, indenyl, tetrahydro-naphthalenyl and the like. In some embodiments, C₃₋₁₄cycloalkyl includes, but is not limited to, C₃₋₈cycloalkyl, C₅₋₈cycloalkyl, C₃₋₁₀cycloalkyl and the like. A C₃₋₁₄cycloalkyl radical is optionally substituted with substituent species as described herein where allowed by available valences.

[00652] As used herein, the term “aryl” generally refers to a monocyclic, bicyclic or polycyclic aromatic carbon atom ring structure radical, including, but not limited to, phenyl, naphthyl, anthracenyl, fluorenyl, azulenyl, phenanthrenyl and the like. An aryl radical is

optionally substituted with substituent species as described herein where allowed by available valences.

[00653] As used herein, the term “heteroaryl” generally refers to a monocyclic, bicyclic or polycyclic aromatic carbon atom ring structure radical in which one or more carbon atom ring members have been replaced, where allowed by structural stability, with one or more heteroatoms, such as an O, S or N atom, including, but not limited to, furanyl (also referred to as furyl), thienyl (also referred to as thiophenyl), pyrrolyl, 2H-pyrrolyl, 3H-pyrrolyl, pyrazolyl, 1H-pyrazolyl, imidazolyl, 1H-imidazolyl, isoxazolyl, isothiazolyl, oxazolyl, 1,3-thiazolyl, triazolyl (such as 1H-1,2,3-triazolyl and the like), oxadiazolyl (such as 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl and the like), thiadiazolyl, tetrazolyl (such as 1H-tetrazolyl, 2H-tetrazolyl and the like), pyridinyl (also referred to as pyridyl), pyrimidinyl, pyrazinyl, pyridazinyl, triazinyl, indolyl, 1H-indolyl, indazolyl, 1H-indazolyl, 2H-indazolyl, indoliziny, isoindolyl, benzofuranyl, benzothienyl (also referred to as benzothiophenyl), benzoimidazolyl, 1H-benzoimidazolyl, 1,3-benzothiazolyl, 1,3-benzoxazolyl (also referred to as 1,3-benzooxazolyl), purinyl, 9H-purinyl, quinoliny, isoquinoliny, quinazoliny, quinoxaliny, 1,3-diazinyl, 1,2-diazinyl, 1,2-diazolyl, 1,4-diazanaphthalenyl, acridinyl, furo[3,2-b]pyridinyl, furo[3,2-c]pyridinyl, furo[2,3-c]pyridinyl, 6H-thieno[2,3-b]pyrrolyl, thieno[3,2-c]pyridinyl, thieno[2,3-d]pyrimidinyl, 1H-pyrrolo[2,3-b]pyridinyl, 1H-pyrrolo[2,3-c]pyridinyl, 1H-pyrrolo[3,2-b]pyridinyl, pyrrolo[1,2-a]pyrazinyl, pyrrolo[1,2-b]pyridazinyl, pyrazolo[1,5-a]pyridinyl, pyrazolo[1,5-a]pyrazinyl, imidazo[1,2-a]pyridinyl, 3H-imidazo[4,5-b]pyridinyl, imidazo[1,2-a]pyrimidinyl, imidazo[1,2-c]pyrimidinyl, imidazo[1,2-b]pyridazinyl, imidazo[1,2-a]pyrazinyl, imidazo[2,1-b][1,3]thiazolyl, imidazo[2,1-b][1,3,4]thiadiazolyl, [1,2,4]triazolo[1,5-a]pyridinyl, [1,2,4]triazolo[4,3-a]pyridinyl and the like. A heteroaryl radical is optionally substituted on a carbon or nitrogen atom ring member with substituent species as described herein where allowed by available valences.

[00654] As used herein, the term “heterocyclyl” generally refers to a saturated or partially unsaturated monocyclic, bicyclic or polycyclic carbon atom ring structure radical in which one or more carbon atom ring members have been replaced, where allowed by structural stability, with a heteroatom, such as an O, S or N atom, including, but not limited to, oxiranyl, oxetanyl, azetidiny, tetrahydrofuranyl, pyrroliny, pyrrolidinyl, pyrazoliny, pyrazolidinyl, imidazoliny, imidazolidinyl, isoxazoliny, isoxazolidinyl, isothiazoliny, isothiazolidinyl, oxazoliny,

oxazolidinyl, thiazolinyl, thiazolidinyl, triazolinyl, triazolidinyl, oxadiazolinyl, oxadiazolidinyl, thiadiazolinyl, thiadiazolidinyl, tetrazolinyl, tetrazolidinyl, pyranyl, dihydro-2H-pyranyl, thiopyranyl, 1,3-dioxanyl, 1,2,5,6-tetrahydropyridinyl, 1,2,3,6-tetrahydropyridinyl, piperidinyl, piperazinyl, morpholinyl, thiomorpholinyl, 1,4-diazepanyl, 1,3-benzodioxolyl (also referred to as benzo[d][1,3]dioxolyl), 1,4-benzodioxanyl, 2,3-dihydro-1,4-benzodioxinyl (also referred to as 2,3-dihydrobenzo[b][1,4]dioxinyl), hexahydropyrrolo[3,4-b]pyrrol-(1H)-yl, (3aS,6aS)-hexahydropyrrolo[3,4-b]pyrrol-(1H)-yl, (3aR,6aR)-hexahydropyrrolo[3,4-b]pyrrol-(1H)-yl, hexahydropyrrolo[3,4-b]pyrrol-(2H)-yl, (3aS,6aS)-hexahydropyrrolo[3,4-b]pyrrol-(2H)-yl, (3aR,6aR)-hexahydropyrrolo[3,4-b]pyrrol-(2H)-yl, hexahydropyrrolo[3,4-c]pyrrol-(1H)-yl, (3aR,6aS)-hexahydropyrrolo[3,4-c]pyrrol-(1H)-yl, (3aR,6aR)-hexahydropyrrolo[3,4-c]pyrrol-(1H)-yl, octahydro-5H-pyrrolo[3,2-c]pyridinyl, octahydro-6H-pyrrolo[3,4-b]pyridinyl, (4aR,7aR)-octahydro-6H-pyrrolo[3,4-b]pyridinyl, (4aS,7aS)-octahydro-6H-pyrrolo[3,4-b]pyridinyl, hexahydropyrrolo[1,2-a]pyrazin-(1H)-yl, (7R,8aS)-hexahydropyrrolo[1,2-a]pyrazin-(1H)-yl, (8aS)-hexahydropyrrolo[1,2-a]pyrazin-(1H)-yl, (8aR)-hexahydropyrrolo[1,2-a]pyrazin-(1H)-yl, (8aS)-octahydropyrrolo[1,2-a]pyrazin-(1H)-yl, (8aR)-octahydropyrrolo[1,2-a]pyrazin-(1H)-yl, hexahydropyrrolo[1,2-a]pyrazin-(2H)-one, octahydro-2H-pyrido[1,2-a]pyrazinyl, 3-azabicyclo[3.1.0]hexyl, (1R,5S)-3-azabicyclo[3.1.0]hexyl, 8-azabicyclo[3.2.1]octyl, (1R,5S)-8-azabicyclo[3.2.1]octyl, 8-azabicyclo[3.2.1]oct-2-enyl, (1R,5S)-8-azabicyclo[3.2.1]oct-2-enyl, 9-azabicyclo[3.3.1]nonyl, (1R,5S)-9-azabicyclo[3.3.1]nonyl, 2,5-diazabicyclo[2.2.1]heptyl, (1S,4S)-2,5-diazabicyclo[2.2.1]heptyl, 2,5-diazabicyclo[2.2.2]octyl, 3,8-diazabicyclo[3.2.1]octyl, (1R,5S)-3,8-diazabicyclo[3.2.1]octyl, 1,4-diazabicyclo[3.2.2]nonyl, azaspiro[3.3]heptyl, 2,6-diazaspiro[3.3]heptyl, 2,7-diazaspiro[3.5]nonyl, 5,8-diazaspiro[3.5]nonyl, 2,7-diazaspiro[4.4]nonyl, 6,9-diazaspiro[4.5]decyl and the like. A heterocyclyl radical is optionally substituted on a carbon or nitrogen atom ring member with substituent species as described herein where allowed by available valences.

[00655] As used herein, the term “C₁₋₈alkoxy-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-O-C₁₋₈alkyl.

[00656] As used herein, the term “C₁₋₈alkoxy-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-O-C₁₋₈alkyl.

[00657] As used herein, the term “(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-O-C₁₋₈alkyl)₂.

[00658] As used herein, the term “C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-NH-C₁₋₈alkyl-O-C₁₋₈alkyl.

[00659] As used herein, the term “(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-N(C₁₋₈alkyl-O-C₁₋₈alkyl)₂.

[00660] As used herein, the term “(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-O-C₁₋₈alkyl).

[00661] As used herein, the term “C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-C₁₋₈alkyl-O-C₁₋₈alkyl.

[00662] As used herein, the term “(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl-O-C₁₋₈alkyl)₂.

[00663] As used herein, the term “(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-O-C₁₋₈alkyl).

[00664] As used herein, the term “C₁₋₈alkoxy-carbonyl” refers to a radical of the formula: -C(O)-O-C₁₋₈alkyl.

[00665] As used herein, the term “C₁₋₈alkoxy-carbonyl-C₂₋₈alkenyl” refers to a radical of the formula: -C₂₋₈alkenyl-C(O)-O-C₁₋₈alkyl.

[00666] As used herein, the term “C₁₋₈alkoxy-carbonyl-amino” refers to a radical of the formula: -NH-C(O)-O-C₁₋₈alkyl.

[00667] As used herein, the term “C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl.

[00668] As used herein, the term “(C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl)₂.

[00669] As used herein, the term “C₁₋₈alkyl-amino-C₂₋₈alkenyl” refers to a radical of the formula: -C₂₋₈alkenyl-NH-C₁₋₈alkyl.

[00670] As used herein, the term “(C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl” refers to a radical of the formula: -C₂₋₈alkenyl-N(C₁₋₈alkyl)₂.

[00671] As used herein, the term “C₁₋₈alkyl-amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-NH-C₁₋₈alkyl.

[00672] As used herein, the term “(C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-N(C₁₋₈alkyl)₂.

[00673] As used herein, the term “C₁₋₈alkyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-C₁₋₈alkyl.

[00674] As used herein, the term “(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl)₂.

[00675] As used herein, the term “C₁₋₈alkyl-amino-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-NH-C₁₋₈alkyl.

[00676] As used herein, the term “(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-N(C₁₋₈alkyl)₂.

[00677] As used herein, the term “(C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-NH-C₁₋₈alkyl)₂.

[00678] As used herein, the term “[C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino” refers to a radical of the formula: -N[C₁₋₈alkyl-N(C₁₋₈alkyl)₂]₂.

[00679] As used herein, the term “(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-NH-C₁₋₈alkyl).

[00680] As used herein, the term “[C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)[C₁₋₈alkyl-N(C₁₋₈alkyl)₂].

[00681] As used herein, the term “C₁₋₈alkyl-amino-C₂₋₈alkynyl” refers to a radical of the formula: -C₂₋₈alkynyl-NH-C₁₋₈alkyl.

[00682] As used herein, the term “(C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl” refers to a radical of the formula: -C₂₋₈alkynyl-N(C₁₋₈alkyl)₂.

[00683] As used herein, the term “C₁₋₈alkyl-carbonyl” refers to a radical of the formula: -C(O)-C₁₋₈alkyl.

[00684] As used herein, the term “C₁₋₈alkyl-carbonyl-amino” refers to a radical of the formula: -NH-C(O)-C₁₋₈alkyl.

[00685] As used herein, the term “C₁₋₈alkyl-thio” refers to a radical of the formula: -S-C₁₋₈alkyl.

[00686] As used herein, the term “amino-C₂₋₈alkenyl” refers to a radical of the formula: -C₂₋₈alkenyl-NH₂.

[00687] As used herein, the term “amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-NH₂.

[00688] As used herein, the term “amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH₂.

[00689] As used herein, the term “amino-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-NH₂.

[00690] As used herein, the term “(amino-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-NH₂)₂.

[00691] As used herein, the term “(amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-NH₂).

[00692] As used herein, the term “amino-C₂₋₈alkynyl” refers to a radical of the formula: -C₂₋₈alkynyl-NH₂.

[00693] As used herein, the term “aryl-C₁₋₈alkoxy-carbonyl” refers to a radical of the formula: -C(O)-O-C₁₋₈alkyl-aryl.

[00694] As used herein, the term “aryl-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-aryl.

[00695] As used herein, the term “aryl-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-aryl.

[00696] As used herein, the term “(aryl-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-aryl)₂.

[00697] As used herein, the term “(aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-aryl).

[00698] As used herein, the term “aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-C₁₋₈alkyl-aryl.

[00699] As used herein, the term “(aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl-aryl)₂.

[00700] As used herein, the term “(aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-aryl).

[00701] As used herein, the term “aryl-amino” refers to a radical of the formula: -NH-aryl.

- [00702] As used herein, the term “aryl-amino-carbonyl” refers to a radical of the formula: -C(O)-NH-aryl .
- [00703] As used herein, the term “aryl-sulfonyloxy- C_{1-8} alkyl” refers to a radical of the formula: $\text{-C}_{1-8}\text{alkyl-O-SO}_2\text{-aryl}$.
- [00704] As used herein, the term “benzoxy-carbonyl” refers to a radical of the formula: $\text{-C(O)O-CH}_2\text{-phenyl}$.
- [00705] As used herein, the term “ C_{3-14} cycloalkyl- C_{1-8} alkyl” refers to a radical of the formula: $\text{-C}_{1-8}\text{alkyl-C}_{3-14}\text{cycloalkyl}$.
- [00706] As used herein, the term “ C_{3-14} cycloalkyl-amino” refers to a radical of the formula: $\text{-NH-C}_{3-14}\text{cycloalkyl}$.
- [00707] As used herein, the term “ C_{3-14} cycloalkyl-oxy” refers to a radical of the formula: $\text{-O-C}_{3-14}\text{cycloalkyl}$.
- [00708] As used herein, the term “halo” or “halogen” generally refers to a halogen atom radical, including fluoro, chloro, bromo and iodo.
- [00709] As used herein, the term “halo- C_{1-8} alkoxy” refers to a radical of the formula: $\text{-O-C}_{1-8}\text{alkyl-halo}$, wherein C_{1-8} alkyl is partially or completely substituted with one or more halogen atoms where allowed by available valences.
- [00710] As used herein, the term “halo- C_{1-8} alkyl” refers to a radical of the formula: $\text{-C}_{1-8}\text{alkyl-halo}$, wherein C_{1-8} alkyl is partially or completely substituted with one or more halogen atoms where allowed by available valences.
- [00711] As used herein, the term “halo- C_{1-8} alkyl-amino” refers to a radical of the formula: $\text{-NH-C}_{1-8}\text{alkyl-halo}$.
- [00712] As used herein, the term “(halo- C_{1-8} alkyl)(C_{1-8} alkyl)amino” refers to a radical of the formula: $\text{-N(C}_{1-8}\text{alkyl)(C}_{1-8}\text{alkyl-halo)}$.
- [00713] As used herein, the term “(halo- C_{1-8} alkyl) $_2$ -amino” refers to a radical of the formula: $\text{-N(C}_{1-8}\text{alkyl-halo)}_2$.
- [00714] As used herein, the term “heteroaryl- C_{1-8} alkoxy” refers to a radical of the formula: $\text{-O-C}_{1-8}\text{alkyl-heteroaryl}$.
- [00715] As used herein, the term “heteroaryl- C_{1-8} alkyl” refers to a radical of the formula: $\text{-C}_{1-8}\text{alkyl-heteroaryl}$.

[00716] As used herein, the term “heteroaryl-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-heteroaryl.

[00717] As used herein, the term “(heteroaryl-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-heteroaryl)₂.

[00718] As used herein, the term “(heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-heteroaryl).

[00719] As used herein, the term “heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-C₁₋₈alkyl-heteroaryl.

[00720] As used herein, the term “(heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl-heteroaryl)₂.

[00721] As used herein, the term “(heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-heteroaryl).

[00722] As used herein, the term “heteroaryl-amino” refers to a radical of the formula: -NH-heteroaryl.

[00723] As used herein, the term “heterocyclyl-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-heterocyclyl.

[00724] As used herein, the term “heterocyclyl-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-heterocyclyl.

[00725] As used herein, the term “heterocyclyl-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-heterocyclyl.

[00726] As used herein, the term “(heterocyclyl-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-heterocyclyl)₂.

[00727] As used herein, the term “(heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-heterocyclyl).

[00728] As used herein, the term “heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-C₁₋₈alkyl-heterocyclyl.

[00729] As used herein, the term “(heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl-heterocyclyl)₂.

[00730] As used herein, the term “(heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-heterocyclyl).

[00731] As used herein, the term “heterocyclyl-amino” refers to a radical of the formula: -NH-heterocyclyl.

[00732] As used herein, the term “(heterocyclyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(heterocyclyl).

[00733] As used herein, the term “heterocyclyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-heterocyclyl.

[00734] As used herein, the term “heterocyclyl-carbonyl” refers to a radical of the formula: -C(O)-heterocyclyl.

[00735] As used herein, the term “heterocyclyl-carbonyl-oxy” refers to a radical of the formula: -O-C(O)-heterocyclyl.

[00736] As used herein, the term “heterocyclyl-oxy” refers to a radical of the formula: -O-heterocyclyl.

[00737] As used herein, the term “hydroxy” refers to a radical of the formula: -OH.

[00738] As used herein, the term “hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-O-C₁₋₈alkyl-OH.

[00739] As used herein, the term “hydroxy-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-OH, wherein C₁₋₈alkyl is partially or completely substituted with one or more hydroxy radicals where allowed by available valences.

[00740] As used herein, the term “hydroxy-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-OH.

[00741] As used herein, the term “(hydroxy-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-OH)₂.

[00742] As used herein, the term “(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-OH).

[00743] As used herein, the term “hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-NH-C₁₋₈alkyl-OH.

[00744] As used herein, the term “(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl-OH)₂.

[00745] As used herein, the term “(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl” refers to a radical of the formula: -C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-OH).

[00746] As used herein, the term “hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-NH-C₁₋₈alkyl-OH.

[00747] As used herein, the term “(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-N(C₁₋₈alkyl-OH)₂.

[00748] As used herein, the term “(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy” refers to a radical of the formula: -O-C₁₋₈alkyl-N(C₁₋₈alkyl)(C₁₋₈alkyl-OH).

[00749] As used herein, the term “hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-NH-C₁₋₈alkyl-OH.

[00750] As used herein, the term “(hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino” refers to a radical of the formula: -N(C₁₋₈alkyl-NH-C₁₋₈alkyl-OH)₂.

[00751] As used herein, the term “(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-N(C₁₋₈alkyl-OH)₂.

[00752] As used herein, the term “(hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)(C₁₋₈alkyl-NH-C₁₋₈alkyl-OH).

[00753] As used herein, the term “[hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)[C₁₋₈alkyl-N(C₁₋₈alkyl-OH)₂].

[00754] As used herein, the term “(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino” refers to a radical of the formula: -NH-C₁₋₈alkyl-N(C₁₋₈alkyl,C₁₋₈alkyl-OH).

[00755] As used herein, the term “[hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino” refers to a radical of the formula: -N(C₁₋₈alkyl)[C₁₋₈alkyl -N(C₁₋₈alkyl)(C₁₋₈alkyl -OH)].

[00756] As used herein, the term “substituent” means positional variables on the atoms of a core molecule that are attached at a designated atom position, replacing one or more hydrogen atoms on the designated atom, provided that the atom of attachment does not exceed the available valence or shared valences, such that the substitution results in a stable compound. Accordingly, combinations of substituents and/or variables are permissible only if such combinations result in stable compounds. It should also be noted that any carbon as well as heteroatom with a valence level that appears to be unsatisfied as described or shown herein is assumed to have a sufficient number of hydrogen atom(s) to satisfy the valences described or shown.

[00757] For the purposes of this description, where one or more substituent variables for a compound of Formula (I) encompass functionalities incorporated into a compound of Formula (I), each functionality appearing at any location within the disclosed compound may be independently selected, and as appropriate, independently and/or optionally substituted.

[00758] As used herein, the terms “independently selected,” or “each selected” refer to functional variables in a substituent list that may be attached more than once on the structure of a core molecule, where the pattern of substitution at each occurrence is independent of the pattern at any other occurrence. Further, the use of a generic substituent on a core structure for a compound provided herein is understood to include the replacement of the generic substituent with specie substituents that are included within the particular genus, e.g., aryl may be independently replaced with phenyl or naphthalenyl (also referred to as naphthyl) and the like, such that the resulting compound is intended to be included within the scope of the compounds described herein.

[00759] As used herein, the term “each instance of” when used in a phrase such as “...aryl, aryl-C₁₋₈alkyl, heterocyclyl and heterocyclyl-C₁₋₈alkyl, wherein each instance of aryl and heterocyclyl is optionally substituted with one or two substituents...” is intended to include optional, independent substitution on each of the aryl and heterocyclyl rings and on the aryl and heterocyclyl portions of aryl-C₁₋₈alkyl and heterocyclyl-C₁₋₈alkyl.

[00760] As used herein, the term “optionally substituted” means that the specified substituent variables, groups, radicals or moieties represent the scope of the genus and may be independently chosen as needed to replace one or more hydrogen atoms on the designated atom of attachment of a core molecule.

[00761] As used herein, the terms “stable compound” or “stable structure” mean a compound that is sufficiently robust to be isolated to a useful degree of purity from a reaction mixture and formulations thereof into an efficacious therapeutic agent.

[00762] Compound names provided herein were obtained using ACD Labs Index Name software provided by ACD Labs and/or ChemDraw Ultra software provided by CambridgeSoft®. When the compound name disclosed herein conflicts with the structure depicted, the structure shown will supercede the use of the name to define the compound intended. Nomenclature for substituent radicals defined herein may differ slightly from the chemical name from which they

are derived; one skilled in the art will recognize that the definition of the substituent radical is intended to include the radical as found in the chemical name.

[00763] As used herein the term “aberrant” refers to a deviation from the norm of, *e.g.*, the average healthy subject or a cell(s) or tissue sample from a healthy subject. The term “aberrant expression,” as used herein, refers to abnormal expression (up-regulated or down-regulated resulting in an excessive or deficient amount thereof) of a gene product (*e.g.*, RNA transcript or protein) by a cell, tissue sample, or subject relative to a corresponding normal, healthy cell, tissue sample or subject. In a specific embodiment, the “aberrant expression” refers to an altered level of a gene product (*e.g.*, RNA transcript or protein) in a cell, tissue sample, or subject relative to a corresponding normal, healthy cell, tissue sample or subject. The term “aberrant amount” as used herein refers to an altered level of a gene product (*e.g.*, RNA, protein, polypeptide, or peptide) in a cell, tissue sample, or subject relative to a corresponding normal, healthy cell, tissue sample or subject. In specific embodiments, the amount of a gene product (*e.g.*, RNA, protein, polypeptide, or peptide) in a cell, tissue sample, or subject relative to a corresponding cell or tissue sample from a healthy subject or a healthy subject, is considered aberrant if it is 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6-fold or more above or below the amount of the gene product in the corresponding cell or tissue sample from a healthy subject or healthy subject.

[00764] The term “intronic REMS” refers to a REMS sequence present in an intron that functions as a 5' splice site in the presence of a compound described herein. The intronic REMS, when downstream of a first branch point (BP) sequence and a first 3' splice site (3' ss) sequence and upstream of a second branch point (BP) sequence and a second 3' splice site (3' ss) sequence) (as shown in Figure 1A) and in the presence of a compound described herein, can function as a 5' splice site. The intronic REMS may also function as a 5' splice site when upstream of a first branch point and a first 3' splice site in the presence of a compound described herein (see Figure 1B or 1C). Any one, two, three, or more or all of the following may be present endogenously or non-endogenously in the affected intron: the intronic REMS, the first BP, the second BP, the first 3' ss, and the second 3' ss.

[00765] As used herein, a “non-endogenous” nucleotide sequence (such as a non-endogenous 5' splice site, a non-endogenous branch point or a non-endogenous 3' splice site) is a nucleotide sequence not naturally found to be part of a pre-RNA or a DNA sequence encoding a pre-RNA

sequence. In other words, the hand of man is required to synthesize or manipulate the RNA or DNA sequence to introduce the nucleotide sequence.

[00766] As used herein, the term “non-endogenous intronic REMS” refers to a REMS sequence not naturally found to be part of an RNA sequence or naturally encoded by a DNA sequence. In other words, the hand of man is required to manipulate the RNA or DNA sequence to introduce the intronic REMS or the nucleotide sequence encoding the REMS into an intron.

[00767] As used herein, the terms “intron-derived exon,” “intronic exon,” “iExon” and “intronic exon” (collectively iExon) refers to the formation of an exon from an RNA sequence present in an intron following splicing of an RNA transcript in the presence of a compound described herein or another agent which results in an iREMS functioning as an intronic 5' splice site. In particular, an iExon comprises the following RNA sequence as an exon when RNA splicing of an RNA transcript comprising two exons and an intron occurs in the presence of a compound described herein, wherein a first exon is upstream of the intron and a second exon is downstream of the intron, and wherein the intron comprises a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point, and a second 3' splice site: the RNA sequence between the first 3' splice site and the iREMS, as shown in Figure 1A. One or more of the iREMS sequence, branch point and 3' splice site may be naturally present in an intron or may be introduced into the intron. When all such elements are present or introduced, in the presence of a compound described herein the elements define an exonic boundary that enables the splicing machinery to generate an iExon in RNA, a result that would not naturally occur without the addition of a splicing modulator compound.

[00768] As used herein, the term “pseudoexon” refers to a potential exon in intronic regions of pre-mRNA that is not normally spliced into mature mRNA. A subset of pseudoexons are spliced in the presence of a compound described herein or another agent resulting from an iREMS functioning as a 5' splice site within the pseudoexon, to form an iExon. An intronic REMS-containing pseudoexon is not known to be endogenously recognized by the splicing machinery for producing an iExon, but in the presence of a splicing modulator compound as described herein, the splicing machinery produces an iExon. Accordingly, production of an iExon from a pseudoexon is intended to be included within the scope of various aspects of the collective term “iExon.”

[00769] As used herein, the term “unannotated exon” refers to endogenous sequences that are naturally present as exons in mature mRNA product according to experimental evidence but are not annotated in NCBI’s RefSeq database (<https://www.ncbi.nlm.nih.gov/refseq/>). Some unannotated exons contain an intronic REMS at the 5’ splice site. A REMS-containing unannotated exon is not known to be endogenously recognized by the splicing machinery for producing an iExon, but in the presence of a splicing modulator compound as described herein, the splicing machinery produces an iExon. Accordingly, production of an iExon from an unannotated exon is intended to be included within the scope of various aspects of the collective term “iExon.”

[00770] As used herein, the term “substantial change” in the context of the amount of one or more RNA transcripts (*e.g.*, rRNA, tRNA, miRNA, siRNA, piRNA, lncRNA, pre-mRNA or mRNA transcripts), an alternative splice variant thereof or an isoform thereof, or one or more proteins thereof, each expressed as the product of one or more of genes, means that the amount of such products changes by a statistically significant amount such as, in a nonlimiting example, a p value less than a value selected from 0.1, 0.01, 0.001, or 0.0001.

[00771] As used herein, the terms “subject” and “patient” are used interchangeably to refer to an animal or any living organism having sensation and the power of voluntary movement, and which requires for its existence oxygen and organic food. Non-limiting examples include members of the human, equine, porcine, bovine, rattus, murine, canine and feline species. In some embodiments, the subject is a mammal or a warm-blooded vertebrate animal. In certain embodiments, the subject is a non-human animal. In specific embodiments, the subject is a human.

[00772] As used herein, the term “functional protein” refers to a form of a protein that retains a certain biological function or the functions of a full length protein or protein isoform encoded by a gene. Accordingly, inclusion of an iExon that is located in the protein coding region of an mRNA that expresses a functional protein is intended to be included within the scope of the description herein.

[00773] As used herein, the term “non-functional protein” refers to a form of a protein that does not retain any biological function compared to full length protein or a protein isoform encoded by a gene in the absence of a splicing modifier compound as described herein. Accordingly, inclusion of an iExon that is located in the protein coding region of an mRNA that

expresses a non-functional protein is intended to be included within the scope of the description herein.

[00774] As used herein, in the context of a functional protein produced from an artificial construct, the term “produce substantially less” means that the amount of functional protein produced in the presence of a compound described herein is at least substantially 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 100% less than the amount of functional protein produced in the absence of the compound.

COMPOUND FORMS

[00775] As used herein, the terms “a compound of Formula (Ia),” “a compound of Formula (Ia1),” “a compound of Formula (Ia2),” “a compound of Formula (Ia3),” “a compound of Formula (Ia4),” “a compound of Formula (II),” “a compound of Formula (IIa),” “a compound of Formula (IIa1),” “a compound of Formula (IIa2),” “a compound of Formula (IIa3),” “a compound of Formula (IIa4),” “a compound of Formula (III),” “a compound of Formula (IIIa),” “a compound of Formula (IIIa1),” “a compound of Formula (IIIa2),” “a compound of Formula (IIIa3),” “a compound of Formula (IIIa4),” “a compound of Formula (IV),” “a compound of Formula (IVa),” “a compound of Formula (IVa1),” “a compound of Formula (IVa2),” “a compound of Formula (V),” “a compound of Formula (Va),” “a compound of Formula (Va1),” “a compound of Formula (Va2),” “a compound of Formula (VI),” “a compound of Formula (VIa),” “a compound of Formula (VIa1),” “a compound of Formula (VIa2),” “a compound of Formula (VIa3),” “a compound of Formula (VIa4),” “a compound of Formula (VII),” “a compound of Formula (VIIa),” “a compound of Formula (VIIa1),” “a compound of Formula (VIIa2),” “a compound of Formula (VIII),” “a compound of Formula (VIIIa),” “a compound of Formula (VIIIa1),” “a compound of Formula (VIIIa2),” “a compound of Formula (IX),” “a compound of Formula (IXa),” “a compound of Formula (IXa1),” “a compound of Formula (IXa2),” “a compound of Formula (IXa3),” “a compound of Formula (IXa4),” “a compound of Formula (X),” “a compound of Formula (Xa),” “a compound of Formula (Xa1),” “a compound of Formula (Xa2),” “a compound of Formula (XI),” “a compound of Formula (XIa),” “a compound of Formula (XIa1),” “a compound of Formula (XIa2),” “a compound of Formula (XII),” “a compound of Formula (XIIa),” “a compound of Formula (XIIa1),” “a compound of Formula (XIIa2),” “a compound of Formula (XIIa3),” “a compound of Formula (XIIa4),” “a

compound of Formula (XIII),” “a compound of Formula (XIIIa),” “a compound of Formula (XIIIa1),” “a compound of Formula (XIIIa2),” “a compound of Formula (XIV),” “a compound of Formula (XIVa),” “a compound of Formula (XIVa1),” and “a compound of Formula (XIVa2),” each refer to subgenera of the compound of Formula (I) or a form thereof.

[00776] Rather than repeat embodiments for the various subgenera of the compound of Formula (I), in certain embodiments, the term “a compound of Formula (I) or a form thereof” is used to inclusively refer to a compound of Formula (Ia) or a form thereof, a compound of Formula (Ia1) or a form thereof, a compound of Formula (Ia2) or a form thereof, a compound of Formula (Ia3) or a form thereof, a compound of Formula (Ia4) or a form thereof, a compound of Formula (II) or a form thereof, a compound of Formula (IIa) or a form thereof, a compound of Formula (IIa1) or a form thereof, a compound of Formula (IIa2) or a form thereof, a compound of Formula (IIa3) or a form thereof, a compound of Formula (IIa4) or a form thereof, a compound of Formula (III) or a form thereof, a compound of Formula (IIIa) or a form thereof, a compound of Formula (IIIa1) or a form thereof, a compound of Formula (IIIa2) or a form thereof, a compound of Formula (IIIa3) or a form thereof, a compound of Formula (IIIa4) or a form thereof, a compound of Formula (IV) or a form thereof, a compound of Formula (IVa) or a form thereof, a compound of Formula (IVa1) or a form thereof, a compound of Formula (IVa2) or a form thereof, a compound of Formula (V) or a form thereof, a compound of Formula (Va) or a form thereof, a compound of Formula (Va1) or a form thereof, a compound of Formula (Va2) or a form thereof, a compound of Formula (VI) or a form thereof, a compound of Formula (VIa) or a form thereof, a compound of Formula (VIa1) or a form thereof, a compound of Formula (VIa2) or a form thereof, a compound of Formula (VIa3) or a form thereof, a compound of Formula (VIa4) or a form thereof, a compound of Formula (VII) or a form thereof, a compound of Formula (VIIa) or a form thereof, a compound of Formula (VIIa1) or a form thereof, a compound of Formula (VIIa2) or a form thereof, a compound of Formula (VIII) or a form thereof, a compound of Formula (VIIIa) or a form thereof, a compound of Formula (VIIIa1) or a form thereof, a compound of Formula (VIIIa2) or a form thereof, a compound of Formula (IX) or a form thereof, a compound of Formula (IXa) or a form thereof, a compound of Formula (IXa1) or a form thereof, a compound of Formula (IXa2) or a form thereof, a compound of Formula (IXa3) or a form thereof, a compound of Formula (IXa4) or a form thereof, a compound of Formula (X) or a form thereof, a compound of Formula (Xa) or a form thereof, a compound of

Formula (Xa1) or a form thereof, a compound of Formula (Xa2) or a form thereof, a compound of Formula (XI) or a form thereof, a compound of Formula (XIa) or a form thereof, a compound of Formula (XIa1) or a form thereof, a compound of Formula (XIa2) or a form thereof, a compound of Formula (XII) or a form thereof, a compound of Formula (XIIa) or a form thereof, a compound of Formula (XIIa1) or a form thereof, a compound of Formula (XIIa2) or a form thereof, a compound of Formula (XIIa3) or a form thereof, a compound of Formula (XIIa4) or a form thereof, a compound of Formula (XIII) or a form thereof, a compound of Formula (XIIIa) or a form thereof, a compound of Formula (XIIIa1) or a form thereof, a compound of Formula (XIIIa2) or a form thereof, a compound of Formula (XIV) or a form thereof, a compound of Formula (XIVa) or a form thereof, a compound of Formula (XIVa1) or a form thereof or a compound of Formula (XIVa2) or a form thereof, either separately or together.

[00777] Thus, embodiments and references to “a compound of Formula (I)” are intended to be inclusive of compounds of Formula (Ia), Formula (Ia1), Formula (Ia2), Formula (Ia3), Formula (Ia4), Formula (II), Formula (IIa), Formula (IIa1), Formula (IIa2), Formula (IIa3), Formula (IIa4), Formula (III), Formula (IIIa), Formula (IIIa1), Formula (IIIa2), Formula (IIIa3), Formula (IIIa4), Formula (IV), Formula (IVa), Formula (IVa1), Formula (IVa2), Formula (V), Formula (Va), Formula (Va1), Formula (Va2), Formula (VI), Formula (VIa), Formula (VIa1), Formula (VIa2), Formula (VIa3), Formula (VIa4), Formula (VII), Formula (VIIa), Formula (VIIa1), Formula (VIIa2), Formula (VIII), Formula (VIIIa), Formula (VIIIa1), Formula (VIIIa2), Formula (IX), Formula (IXa), Formula (IXa1), Formula (IXa2), Formula (IXa3), Formula (IXa4), Formula (X), Formula (Xa), Formula (Xa1), Formula (Xa2), Formula (XI), Formula (XIa), Formula (XIa1), Formula (XIa2), Formula (XII), Formula (XIIa), Formula (XIIa1), Formula (XIIa2), Formula (XIIa3), Formula (XIIa4), Formula (XIII), Formula (XIIIa), Formula (XIIIa1), Formula (XIIIa2), Formula (XIV), Formula (XIVa), Formula (XIVa1) and Formula (XIVa2).

[00778] As used herein, the term “form” means a compound of Formula (I) selected from a free acid, free base, salt, isotopologue, stereoisomer, racemate, enantiomer, diastereomer, or tautomer thereof.

[00779] In certain embodiments described herein, the form of the compound of Formula (I) is selected from a salt, isotopologue, stereoisomer, racemate, enantiomer, diastereomer or tautomer thereof.

[00780] In certain embodiments described herein, the form of the compound of Formula (I) is a selected from a free acid, isotopologue, stereoisomer, racemate, enantiomer, diastereomer or tautomer thereof.

[00781] In certain embodiments described herein, the form of the compound of Formula (I) is a selected from a free base, isotopologue, stereoisomer, racemate, enantiomer, diastereomer or tautomer thereof.

[00782] In certain embodiments described herein, the form of the compound of Formula (I) is a free acid, free base or salt thereof.

[00783] In certain embodiments described herein, the form of the compound of Formula (I) is an isotopologue thereof.

[00784] In certain embodiments described herein, the form of the compound of Formula (I) is a stereoisomer, racemate, enantiomer or diastereomer thereof.

[00785] In certain embodiments described herein, the form of the compound of Formula (I) is a tautomer thereof.

[00786] In certain embodiments described herein, the form of the compound of Formula (I) is a pharmaceutically acceptable form.

[00787] In certain embodiments described herein, the compound of Formula (I) or a form thereof is isolated for use.

[00788] As used herein, the term “isolated” means the physical state of a compound of Formula (I) or a form thereof after being isolated and/or purified from a synthetic process (*e.g.*, from a reaction mixture) or natural source or combination thereof according to an isolation or purification process or processes described herein or which are well known to the skilled artisan (*e.g.*, chromatography, recrystallization and the like) in sufficient purity to be characterizable by standard analytical techniques described herein or well known to the skilled artisan.

[00789] As used herein, the term “protected” means that a functional group on a compound of Formula (I) is in a form modified to preclude undesired side reactions at the protected site when the compound is subjected to a reaction. Suitable protecting groups will be recognized by those with ordinary skill in the art as well as by reference to standard textbooks such as, for example, T. W. Greene et al, *Protective Groups in Organic Synthesis* (1991), Wiley, New York.

[00790] Prodrugs of a compound of Formula (I) or a form thereof are also contemplated herein.

[00791] As used herein, the term “prodrug” means that a functional group on a compound of Formula (I) is in a form (*e.g.*, acting as an active or inactive drug precursor) that is transformed in vivo to yield an active or more active compound of Formula (I) or a form thereof. The transformation may occur by various mechanisms (*e.g.*, by metabolic and/or non-metabolic chemical processes), such as, for example, by hydrolysis and/or metabolism in blood, liver and/or other organs and tissues. A discussion of the use of prodrugs is provided by V.J.. Stella, et. al., “Biotechnology: Pharmaceutical Aspects, Prodrugs: Challenges and Rewards,” American Association of Pharmaceutical Scientists and Springer Press, 2007.

[00792] In one example, when a compound of Formula (I) or a form thereof contains a carboxylic acid functional group, a prodrug can comprise an ester formed by the replacement of the hydrogen atom of the acid group with a functional group such as alkyl and the like. In another example, when a compound of Formula (I) or a form thereof contains an alcohol functional group, a prodrug can be formed by the replacement of the hydrogen atom of the alcohol group with a functional group such as alkyl or substituted carbonyl and the like. In another example, when a compound of Formula (I) or a form thereof contains an amine functional group, a prodrug can be formed by the replacement of one or more amine hydrogen atoms with a functional group such as alkyl or substituted carbonyl. In another example, when a compound of Formula (I) or a form thereof contains a hydrogen substituent, a prodrug can be formed by the replacement of one or more hydrogen atoms with an alkyl substituent.

[00793] Pharmaceutically acceptable prodrugs of compounds of Formula (I) or a form thereof include those compounds substituted with one or more of the following groups: carboxylic acid esters, sulfonate esters, amino acid esters phosphonate esters, mono-, di- or triphosphate esters or alkyl substituents where appropriate. As described herein, it is understood by a person of ordinary skill in the art that one or more of such substituents may be used to provide a compound of Formula (I) or a form thereof for use as a prodrug.

[00794] The compounds of Formula (I) can form salts which are intended to be included within the scope of this description. Reference to a compound of Formula (I) herein is understood to include reference to salts thereof, unless otherwise indicated. The term “salt(s)”, as employed herein, denotes acidic salts formed with inorganic and/or organic acids, as well as basic salts formed with inorganic and/or organic bases. In addition, when a compound of Formula (I) contains both a basic moiety, such as, but not limited to a pyridine or imidazole, and

an acidic moiety, such as, but not limited to a carboxylic acid, zwitterions (“inner salts”) may be formed and are included within the term “salt(s)” as used herein.

[00795] The term “pharmaceutically acceptable salt(s)”, as used herein, means those salts of compounds described herein that are safe and effective (i.e., non-toxic, physiologically acceptable) for use in mammals and that possess biological activity, although other salts are also useful. Salts of the compounds of Formula (I) may be formed, for example, by reacting a compound of Formula (I) with an amount of acid or base, such as an equivalent or stoichiometric amount, in a medium such as one in which the salt precipitates or in an aqueous medium followed by lyophilization.

[00796] Pharmaceutically acceptable salts include one or more salts of acidic or basic groups present in compounds described herein. Embodiments of acid addition salts include, and are not limited to, acetate, acid phosphate, ascorbate, benzoate, benzenesulfonate, bisulfate, bitartrate, borate, butyrate, chloride, citrate, camphorate, camphorsulfonate, ethanesulfonate, formate, fumarate, gentisinate, gluconate, glucaronate, glutamate, hydrobromide, hydrochloride, dihydrochloride, hydroiodide, isonicotinate, lactate, maleate, methanesulfonate, naphthalenesulfonate, nitrate, oxalate, pamoate, pantothenate, phosphate, propionate, saccharate, salicylate, succinate, sulfate, tartrate, thiocyanate, toluenesulfonate (also known as tosylate), trifluoroacetate salts and the like. One or more embodiments of acid addition salts include a chloride, hydrochloride, dihydrochloride, trihydrochloride, hydrobromide, acetate, diacetate or trifluoroacetate salt. More particular embodiments include a chloride, hydrochloride, dihydrochloride, hydrobromide or trifluoroacetate salt.

[00797] Additionally, acids which are generally considered suitable for the formation of pharmaceutically useful salts from basic pharmaceutical compounds are discussed, for example, by P. Stahl et al, Camille G. (eds.) Handbook of Pharmaceutical Salts. Properties, Selection and Use. (2002) Zurich: Wiley-VCH; S. Berge et al, Journal of Pharmaceutical Sciences (1977) 66(1) 1-19; P. Gould, International J. of Pharmaceutics (1986) 33, 201-217; Anderson et al, The Practice of Medicinal Chemistry (1996), Academic Press, New York; and in The Orange Book (see, website for Food & Drug Administration, Washington, D.C.). These disclosures are incorporated herein by reference thereto.

[00798] Suitable basic salts include, but are not limited to, aluminum, ammonium, calcium, lithium, magnesium, potassium, sodium, zinc, and diethanolamine salts. Certain compounds

described herein can also form pharmaceutically acceptable salts with organic bases (for example, organic amines) such as, but not limited to, dicyclohexylamines, tert-butyl amines and the like, and with various amino acids such as, but not limited to, arginine, lysine and the like. Basic nitrogen-containing groups may be quarternized with agents such as lower alkyl halides (*e.g.*, methyl, ethyl, and butyl chlorides, bromides and iodides), dialkyl sulfates (*e.g.*, dimethyl, diethyl, and dibutyl sulfates), long chain halides (*e.g.*, decyl, lauryl, and stearyl chlorides, bromides and iodides), aralkyl halides (*e.g.*, benzyl and phenethyl bromides), and others.

[00799] All such acid salts and base salts are intended to be pharmaceutically acceptable salts within the scope of the description herein and all such acid and base salts are considered equivalent to the free forms of the corresponding compounds for the purposes described herein.

[00800] Compounds of Formula I and forms thereof may further exist in a tautomeric form. All such tautomeric forms are contemplated herein as part of the present description.

[00801] The compounds of Formula (I) may contain asymmetric or chiral centers, and, therefore, may exist in different stereoisomeric forms. The present description is intended to include all stereoisomeric forms of the compounds of Formula (I) as well as mixtures thereof, including racemic mixtures.

[00802] The compounds of Formula (I) described herein may include one or more chiral centers, and as such may exist as racemic mixtures (R/S) or as substantially pure enantiomers and diastereomers. The compounds may also exist as substantially pure (R) or (S) enantiomers (when one chiral center is present). In one embodiment, the compounds of Formula (I) described herein are (S) isomers and may exist as enantiomerically pure compositions substantially comprising only the (S) isomer. In another embodiment, the compounds of Formula (I) described herein are (R) isomers and may exist as enantiomerically pure compositions substantially comprising only the (R) isomer. As one of skill in the art will recognize, when more than one chiral center is present, the compounds of Formula (I) described herein may also include portions described as an (R,R), (R,S), (S,R) or (S,S) isomer, as defined by IUPAC Nomenclature Recommendations.

[00803] As used herein, the term “substantially pure” refers to compounds consisting substantially of a single isomer in an amount greater than or equal to 90%, in an amount greater than or equal to 92%, in an amount greater than or equal to 95%, in an amount greater than or

equal to 98%, in an amount greater than or equal to 99%, or in an amount equal to 100% of the single isomer.

[00804] In one aspect, a compound of Formula (I) is a substantially pure (S) enantiomer present in an amount greater than or equal to 90%, in an amount greater than or equal to 92%, in an amount greater than or equal to 95%, in an amount greater than or equal to 98%, in an amount greater than or equal to 99%, or in an amount equal to 100%.

[00805] In one aspect, a compound of Formula (I) is a substantially pure (R) enantiomer present in an amount greater than or equal to 90%, in an amount greater than or equal to 92%, in an amount greater than or equal to 95%, in an amount greater than or equal to 98%, in an amount greater than or equal to 99%, or in an amount equal to 100%.

[00806] As used herein, a “racemate” is any mixture of isometric forms that are not “enantiomerically pure”, including mixtures such as, without limitation, in a ratio of about 50/50, about 60/40, about 70/30, about 80/20, about 85/15 or about 90/10.

[00807] In addition, the present description embraces all geometric and positional isomers. For example, if a compound of Formula (I) incorporates a double bond or a fused ring, both the cis- and trans-forms, as well as mixtures, are embraced within the scope of the description herein.

[00808] Diastereomeric mixtures can be separated into their individual diastereomers on the basis of their physical chemical differences by methods well known to those skilled in the art, such as, for example, by chromatography and/or fractional crystallization. Enantiomers can be separated by use of chiral HPLC column or other chromatographic methods known to those skilled in the art.

[00809] Enantiomers can also be separated by converting the enantiomeric mixture into a diastereomeric mixture by reaction with an appropriate optically active compound (e.g., chiral auxiliary such as a chiral alcohol or Mosher's acid chloride), separating the diastereomers and converting (e.g., hydrolyzing) the individual diastereomers to the corresponding pure enantiomers. Also, some of the compounds of Formula (I) may be atropisomers (e.g., substituted biaryls) and are considered part of this description.

[00810] All stereoisomer forms (for example, geometric isomers, optical isomers, positional isomers and the like) of the present compounds (including salts, solvates, esters and prodrugs and transformed prodrugs thereof) which may exist due to asymmetric carbons on various

substituents, including enantiomeric forms (which may exist even in the absence of asymmetric carbons), rotameric forms, atropisomers, diastereomeric forms and regioisomeric forms are contemplated within the scope of the description herein. For example, if a compound of Formula (I) incorporates a double bond or a fused ring, both the cis- and trans-forms, as well as mixtures thereof, are embraced within the scope of the description herein. Also, for example, all keto-enol and imine-enamine tautomeric forms of the compounds are included in the description herein. Individual stereoisomers of the compounds of Formula (I) described herein may, for example, be substantially free of other isomers, or may be present in a racemic mixture, as described supra.

[00811] The use of the terms “salt,” “prodrug” and “transformed prodrug” are intended to equally apply to the salts, prodrugs and transformed prodrugs of all contemplated isotopologues, stereoisomers, racemates or tautomers of the instant compounds.

[00812] The term “isotopologue” refers to isotopically-enriched compounds which are identical to those recited herein, but for the fact that one or more atoms are replaced by an atom having an atomic mass or mass number different from the atomic mass or mass number usually found in nature. Examples of isotopes that can be incorporated into compounds described herein include isotopes of hydrogen, carbon, nitrogen, oxygen, phosphorus, fluorine and chlorine, such as H^2 , H^3 , C^{13} , C^{14} , N^{15} , O^{18} , O^{17} , P^{31} , P^{32} , S^{35} , F^{18} , Cl^{35} and Cl^{36} , respectively, each of which is also within the scope of this description.

[00813] Certain isotopically-enriched compounds described herein (*e.g.*, those labeled with H^3 and C^{14}) are useful in compound and/or substrate tissue distribution assays. Tritiated (*i.e.*, H^3) and carbon-14 (*i.e.*, C^{14}) isotopes are particularly preferred for their ease of preparation and detectability. Further, substitution with heavier isotopes such as deuterium (*i.e.*, “deuterium enriched”) may afford certain therapeutic advantages resulting from greater metabolic stability (*e.g.*, increased *in vivo* half-life or reduced dosage requirements) and hence may be preferred in some circumstances. Isotopically-enriched compounds of Formula (I) can generally be prepared using procedures known to persons of ordinary skill in the art by substituting an appropriate isotopically-enriched reagent for a non-isotopically-enriched reagent.

[00814] When the compounds are enriched with deuterium, the deuterium-to-hydrogen ratio on the deuterated atoms of the molecule substantially exceeds the naturally occurring deuterium-to-hydrogen ratio.

[00815] An embodiment described herein may include an isotopologue form of the compound of Formula (I), wherein the isotopologue is substituted on one or more atom members of the compound of Formula (I) with one or more deuterium atoms in place of one or more hydrogen atoms.

[00816] An embodiment described herein may include a compound of Formula (I) and forms thereof, wherein a carbon atom may have from 1 to 3 hydrogen atoms optionally replaced with deuterium.

[00817] One or more compounds described herein may exist in unsolvated as well as solvated forms with pharmaceutically acceptable solvents such as water, ethanol, and the like, and the description herein is intended to embrace both solvated and unsolvated forms.

[00818] As used herein, the term “solvate” means a physical association of a compound described herein with one or more solvent molecules. This physical association involves varying degrees of ionic and covalent bonding, including hydrogen bonding. In certain instances the solvate will be capable of isolation, for example when one or more solvent molecules are incorporated in the crystal lattice of the crystalline solid. As used herein, “solvate” encompasses both solution-phase and isolatable solvates. Non-limiting examples of suitable solvates include ethanolates, methanolates, and the like.

[00819] One or more compounds described herein may optionally be converted to a solvate. Preparation of solvates is generally known. A typical, non-limiting process involves dissolving a compound in a desired amount of the desired solvent (organic or water or mixtures thereof) at a higher than ambient temperature, and cooling the solution at a rate sufficient to form crystals which are then isolated by standard methods. Analytical techniques such as, for example infrared spectroscopy, show the presence of the solvent (or water) in the crystals as a solvate (or hydrate).

[00820] As used herein, the term “hydrate” means a solvate wherein the solvent molecule is water.

[00821] Polymorphic crystalline and amorphous forms of the compounds of Formula (I), and of the salts, solvates, esters and prodrugs of the compounds of Formula (I), are further intended to be included in the scope of the compounds described herein

METHODS FOR DETERMINING WHICH GENES MAY BE MODULATED BY THE COMPOUNDS

[00822] In another aspect, provided herein are methods for determining whether the splicing of the precursor RNA of a gene is likely to be modulated by a compound of Formula (I) or a form thereof, comprising searching for the presence of an intronic REMS (i.e., a sequence functioning as a 5' splice site) in a gene intronic sequence, wherein the presence of the intronic REMS 3' splice site and an intronic branch point in the gene sequence indicates that the splicing of the precursor RNA of the gene is likely to be modulated by the compound of Formula (I) or a form thereof, and the absence of the intronic REMS and an intronic 3' splice site and an intronic branch point in the gene sequence indicates that the splicing of the precursor RNA of the gene is unlikely to be modulated by the compound of Formula (I) or a form thereof. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described herein. In specific embodiments, the methods further comprise searching for the presence of the combination of an intronic REMS, an intronic 3' splice site and an intronic branch point in the gene sequence.

[00823] In another aspect, provided herein are methods for determining whether the amount of a product (e.g., an mRNA transcript or protein) of a gene is likely to be modulated by a compound of Formula (I) or a form thereof, comprising searching for the presence of an intronic REMS in the gene sequence, wherein the presence of the combination of an intronic REMS, an intronic 3' splice site and an intronic branch point in the gene sequence indicates that the amount of a product (e.g., an mRNA transcript or protein) of the gene is likely to be modulated by the compound of Formula (I) or a form thereof, and the absence of the combination of an intronic REMS, an intronic 3' splice site and an intronic branch point in the gene sequence indicates that the amount of a product (e.g., an mRNA transcript or protein) of the gene is unlikely to be modulated by the compound of Formula (I) or a form thereof. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described herein. In specific embodiments, the methods further comprise searching for the presence of any of an intronic REMS, an intronic 3' splice site, and an intronic branch point in the gene sequence.

[00824] The step of searching for the presence of an intronic REMS, an intronic 3' splice site, and an intronic branch point in the gene sequence described herein can be performed by a computer system comprising a memory storing instructions for searching for the presence of the intronic REMS, the intronic 3' splice site, and the intronic branch point in the gene sequence, or such a search can be performed manually.

[00825] In another aspect, provided herein are methods for determining whether the splicing of the precursor RNA of a gene is likely to be modulated via iExon inclusion by a compound of Formula (I) or a form thereof. In one particular aspect, the method comprises searching for the presence of an intronic REMS (i.e., a sequence functioning as a 5' splice site) in combination with, in order, an upstream branch point and an upstream 3' splice site in a gene intronic sequence. The presence of these elements with the intronic REMS and the endogenous presence of a downstream 3' splice site and a downstream branch point in the gene sequence indicates that the splicing of the precursor RNA of the gene is likely to be modulated by the compound of Formula (I) or a form thereof. In this aspect, the presence of an upstream branch point and upstream 3' splice site and the REMS in the intron enable the presence of the compound of Formula (I) or a form thereof to modulate iExon inclusion, i.e., splicing the iExon with the downstream endogenous exon (as shown in Figure 1A). Otherwise, in the absence of these elements, the iREMS will be either ignored by the spliceosome or, in a limited set of circumstances, will become an extended/cryptic 5' splice site for the upstream endogenous exon (as shown in Figure 1B and 1C). The absence of the intronic REMS in the gene sequence indicates that the splicing of the precursor RNA of the gene is unlikely to be modulated via iExon inclusion by the compound of Formula (I) or a form thereof. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described herein. In other specific embodiments, the methods further comprise searching for the presence of the combination of, in 5' to 3' order: an upstream branch point, an upstream 3' splice site, an intronic REMS, a downstream branch point and a downstream 3' splice site in the gene sequence.

[00826] In another aspect, provided herein are methods for determining whether the amount of a product (*e.g.*, an mRNA transcript or protein) of a gene is likely to be modulated via iExon inclusion by a compound of Formula (I) or a form thereof, comprising searching for the presence

of an intronic REMS in the gene sequence, wherein the presence of the combination of at least an upstream branch point, an upstream 3' splice site and an intronic REMS in the gene sequence indicates that the amount of a product (*e.g.*, an mRNA transcript or protein) of the gene is likely to be modulated via iExon inclusion by the compound of Formula (I) or a form thereof, and the absence of the combination of an upstream branch point, an upstream 3' splice site and an intronic REMS in the gene sequence indicates that the amount of a product (*e.g.*, an mRNA transcript or protein) of the gene is unlikely to be modulated via iExon inclusion by the compound of Formula (I) or a form thereof. In certain embodiments, a compound of Formula (I) is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV) described herein. In specific embodiments, the methods further comprise searching for the presence of any of, in 5' to 3' order: an upstream branch point, an upstream 3' splice site, an intronic REMS, a downstream 3' splice site, and a downstream branch point in the gene sequence.

[00827] The step of searching for the presence of an upstream branch point, an upstream 3' splice site and an intronic REMS in any of the gene sequences in any of the genes described herein can be performed by a computer system comprising a memory storing instructions for searching for the presence of the intronic REMS, the upstream 3' splice site, and the upstream branch point in the gene sequence, or such a search can be performed manually.

[00828] In certain embodiments, the splicing of a precursor RNA containing an intronic REMS is assessed by contacting a compound described herein with the precursor RNA in cell culture. In some embodiments, the splicing of a precursor RNA containing an intronic REMS is assessed by contacting a compound described herein with the precursor RNA in a cell-free extract. In a specific embodiment, the compound is one known to modulate the splicing of a precursor RNA containing an exonic REMS. *See, e.g.*, the section below relating to methods for determining whether a compound modulates the expression of certain genes, and the example below for techniques that could be used in these assessments.

METHODS FOR DETERMINING WHICH COMPOUNDS OF FORMULA (I) MODULATE THE EXPRESSION OF CERTAIN GENES

[00829] Provided herein are methods for determining whether a compound of Formula (I) or a form thereof modulates the amount of one, two, three or more RNA transcripts (e.g., pre-mRNA or mRNA transcripts or isoforms thereof) of one, two, three or more genes. In some embodiments, the gene is any one of the genes disclosed in Tables 2-7 or any one of the genes disclosed in Table 1. In certain embodiments, the gene is a gene disclosed in Tables 2-6. In some embodiments, the gene is a gene disclosed in Table 7. In other embodiments, the gene is a gene disclosed in Table 1. In certain embodiments, the gene is a gene not disclosed in either International Publication No. WO 2015/105657, International Publication No. WO 2016/196386, or both.

[00830] In one embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript, comprising: (a) contacting a cell(s) with a compound of Formula (I) or a form thereof, and (b) determining the amount of the RNA transcript produced by the cell(s), wherein an alteration in the amount of the RNA transcript in the presence of the compound relative to the amount of the RNA transcript in the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (e.g., an mRNA transcript), comprising: (a) contacting a first cell(s) with a compound of Formula (I) or a form thereof, (b) contacting a second cell(s) with a negative control (e.g., a vehicle control, such as PBS or DMSO); and (c) determining the amount of the RNA transcript produced by the first cell(s) and the second cell(s); and (d) comparing the amount of the RNA transcript produced by the first cell(s) to the amount of the RNA transcript expressed by the second cell(s), wherein an alteration in the amount of the RNA transcript produced by the first cell(s) relative to the amount of the RNA transcript produced by the second cell(s) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In certain embodiments, the contacting of the cell(s) with the compound occurs in cell culture. In other embodiments, the contacting of the cell(s) with the compound occurs in a subject, such as a non-human animal subject.

[00831] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (*e.g.*, an mRNA transcript), comprising: (a) culturing a cell(s) in the presence of a compound of Formula (I) or a form thereof; and (b) determining the amount of the two or more RNA transcript splice variants produced by the cell(s), wherein an alteration in the amount of the two or more RNA transcript in the presence of the compound relative to the amount of the two or more RNA transcript splice variants in the absence of the compound or the presence of a negative control (*e.g.*, a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript.

[00832] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (*e.g.*, an mRNA transcript), comprising: (a) culturing a cell(s) in the presence of a compound of Formula (I) or a form thereof; (b) isolating two or more RNA transcript splice variants from the cell(s) after a certain period of time; and (c) determining the amount of the two or more RNA transcript splice variants produced by the cell(s), wherein an alteration in the amount of the two or more RNA transcript in the presence of the compound relative to the amount of the two or more RNA transcript splice variants in the absence of the compound or the presence of a negative control (*e.g.*, a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (*e.g.*, an mRNA transcript), comprising (a) culturing a first cell(s) in the presence of a compound of Formula (I) or a form thereof; (b) culturing a second cell(s) in the presence of a negative control (*e.g.*, a vehicle control, such as PBS or DMSO); (c) isolating two or more RNA transcript splice variants produced by the first cell(s) and isolating two or more RNA transcript splice variants produced by the second cell(s); (d) determining the amount of the two or more RNA transcript splice variants produced by the first cell(s) and the second cell(s); and (e) comparing the amount of the two or more RNA transcript splice variants produced by the first cell(s) to the amount of the two or more RNA transcript splice variants produced by the second cell(s), wherein an alteration in the amount of the two or more RNA transcript splice variants produced by the first cell(s) relative to the amount of the

two or more RNA transcript splice variants produced by the second cell(s) indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript.

[00833] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (e.g., an mRNA transcript), comprising: (a) contacting a cell-free system with a compound of Formula (I) or a form thereof, and (b) determining the amount of the RNA transcript produced by the cell-free system, wherein an alteration in the amount of the RNA transcript in the presence of the compound relative to the amount of the RNA transcript in the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (e.g., an mRNA transcript), comprising: (a) contacting a first cell-free system with a compound of Formula (I) or a form thereof, (b) contacting a second cell-free system with a negative control (e.g., a vehicle control, such as PBS or DMSO); and (c) determining the amount of the RNA transcript produced by the first cell-free system and the second cell-free system; and (d) comparing the amount of the RNA transcript produced by the first cell-free system to the amount of the RNA transcript expressed by the second cell-free system, wherein an alteration in the amount of the RNA transcript produced by the first cell-free system relative to the amount of the RNA transcript produced by the second cell-free system indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In certain embodiments, the cell-free system comprises purely synthetic RNA, synthetic or recombinant (purified) enzymes, and protein factors. In other embodiments, the cell-free system comprises RNA transcribed from a synthetic DNA template, synthetic or recombinant (purified) enzymes, and protein factors. In other embodiments, the cell-free system comprises purely synthetic RNA and nuclear extract. In other embodiments, the cell-free system comprises RNA transcribed from a synthetic DNA template and nuclear extract. In other embodiments, the cell-free system comprises purely synthetic RNA and whole cell extract. In other embodiments, the cell-free system comprises RNA transcribed from a synthetic DNA template and whole cell extract. In certain embodiments, the cell-free system additionally comprises regulatory RNAs (e.g., microRNAs).

[00834] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (e.g., an mRNA transcript), comprising: (a) contacting a cell-free system with a compound of Formula (I) or a form thereof; and (b) determining the amount of two or more RNA transcript splice variants produced by the cell-free system, wherein an alteration in the amount of the two or more RNA transcript splice variants in the presence of the compound relative to the amount of the two or more RNA transcript splice variants in the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (e.g., an mRNA transcript), comprising: (a) contacting a first cell-free system with a compound of Formula (I) or a form thereof; (b) contacting a second cell-free system with a negative control (e.g., a vehicle control, such as PBS or DMSO); and (c) determining the amount of two or more RNA transcript splice variants produced by the first cell-free system and the second cell-free system; and (d) comparing the amount of the two or more RNA transcript splice variants produced by the first cell-free system to the amount of the RNA transcript expressed by the second cell-free system, wherein an alteration in the amount of the two or more RNA transcript splice variants produced by the first cell-free system relative to the amount of the two or more RNA transcript splice variants produced by the second cell-free system indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript. In certain embodiments, the cell-free system comprises purely synthetic RNA, synthetic or recombinant (purified) enzymes, and protein factors. In other embodiments, the cell-free system comprises RNA transcribed from a synthetic DNA template, synthetic or recombinant (purified) enzymes, and protein factors. In other embodiments, the cell-free system comprises purely synthetic RNA and nuclear extract. In other embodiments, the cell-free system comprises RNA transcribed from a synthetic DNA template and nuclear extract. In other embodiments, the cell-free system comprises purely synthetic RNA and whole cell extract. In other embodiments, the cell-free system comprises RNA transcribed from a synthetic DNA template and whole cell extract. In certain embodiments, the cell-free system additionally comprises regulatory RNAs (e.g., microRNAs).

[00835] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (*e.g.*, an mRNA transcript), comprising: (a) culturing a cell(s) in the presence of a compound of Formula (I) or a form thereof, (b) isolating the RNA transcript from the cell(s) after a certain period of time; and (c) determining the amount of the RNA transcript produced by the cell(s), wherein an alteration in the amount of the RNA transcript in the presence of the compound relative to the amount of the RNA transcript in the absence of the compound or the presence of a negative control (*e.g.*, a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (*e.g.*, an mRNA transcript), comprising (a) culturing a first cell(s) in the presence of a compound of Formula (I) or a form thereof, (b) culturing a second cell(s) in the presence of a negative control (*e.g.*, a vehicle control, such as PBS or DMSO); (c) isolating the RNA transcript produced by the first cell(s) and isolating the RNA transcript produced by the second cell(s); (d) determining the amount of the RNA transcript produced by the first cell(s) and the second cell(s); and (e) comparing the amount of the RNA transcript produced by the first cell(s) to the amount of the RNA transcript produced by the second cell(s), wherein an alteration in the amount of the RNA transcript produced by the first cell(s) relative to the amount of the RNA transcript produced by the second cell(s) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript.

[00836] In certain embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a primary cell(s) from a subject. In some embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a primary cell(s) from a subject with a disease. In specific embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a primary cell(s) from a subject with a disease associated with an aberrant amount of an RNA transcript(s) for a particular gene(s). In some specific embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a primary cell(s) from a subject with a disease associated with an aberrant amount of an isoform(s) of a particular gene(s). In some embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a fibroblast (*e.g.*, GM03813 or PNN 1-46 fibroblasts), an immune cell (*e.g.*, a T cell, B cell, natural killer cell, macrophage), or

a muscle cell. In certain embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a cancer cell.

[00837] In certain embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is from a cell line. In some embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a cell line derived from a subject with a disease. In certain embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is from a cell line known to have aberrant RNA transcript levels for a particular gene(s). In specific embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is from a cell line derived from a subject with a disease known to have aberrant RNA transcript levels for a particular gene(s). In certain embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a cancer cell line. In some specific embodiments, the cell(s) contacted or cultured with the compound of Formula (I) or a form thereof is from a cell line derived from a subject with a disease known to have an aberrant amount of an RNA isoform(s) and/or protein isoform(s) of a particular gene(s). Non-limiting examples of cell lines include 3T3, 4T1, 721, 9L, A2780, A172, A20, A253, A431, A-549, ALC, B16, B35, BCP-1, BEAS-2B, bEnd.3, BHK, BR 293, BT2O, BT483, BxPC3, C2C12, C3H-10T1/2, C6/36, C6, Cal-27, CHO, COR-L23, COS, COV-434, CML T1, CMT, CRL703O, CT26, D17, DH82, DU145, DuCaP, EL4, EM2, EM3, EMT6, FM3, H1299, H69, HB54, HB55, HCA2, HDF (human dermal fibroblasts), HEK-293, HeLa, Hepa1c1c7, HL-60, HMEC, Hs578T, HsS78Bst, HT-29, HTB2, HUVEC, Jurkat, J558L, JY, K562, Ku812, KCL22, KG1, KYO1, LNCap, Ma-Mel, MC-38, MCF-7, MCF-10A, MDA-MB-231, MDA-MB-468, MDA-MB-435, MDCK, MG63, MOR/0.2R, MONO-MAC 6, MRC5, MTD-1A, NCI-H69, NIH-3T3, NALM-1, NS0, NW-145, OPCN, OPCT, PNT-1A, PNT-2, Raji, RBL, RenCa, RIN-5F, RMA, Saos-2, Sf21, Sf9, SH-SY5Y, SiHa, SKBR3, SKOV-3, T2, T-47D, T84, THP1, U373, U87, U937, VCaP, Vero, VERY, W138, WM39, WT-49, X63, YAC-1, and YAR cells. In one embodiment, the cells are from a patient. In another embodiment, the patient cells are GM03813 cells.

[00838] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (*e.g.*, an mRNA transcript), comprising: (a) contacting a tissue sample with a compound of Formula (I) or a form thereof; and (b) determining the amount of the RNA transcript produced by the tissue

sample, wherein an alteration in the amount of the RNA transcript in the presence of the compound relative to the amount of the RNA transcript in the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (e.g., an mRNA transcript), comprising: (a) contacting a first tissue sample with a compound of Formula (I) or a form thereof, (b) contacting a second tissue sample with a negative control (e.g., a vehicle control, such as PBS or DMSO); and (c) determining the amount of the RNA transcript produced by the first tissue sample and the second tissue sample; and (d) comparing the amount of the RNA transcript produced by the first tissue sample to the amount of the RNA transcript produced by the second tissue sample, wherein an alteration in the amount of the RNA transcript produced by the first tissue sample relative to the amount of the RNA transcript produced by the second tissue sample indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. Any tissue sample containing cells may be used in the accordance with these methods. In certain embodiments, the tissue sample is a blood sample, a skin sample, a muscle sample, or a tumor sample. Techniques known to one skilled in the art may be used to obtain a tissue sample from a subject.

[00839] In some embodiments, a dose-response assay is performed. In one embodiment, the dose response assay comprises: (a) contacting a cell(s) with a concentration of a compound of Formula (I) or a form thereof; (b) determining the amount of the RNA transcript produced by the cell(s), wherein an alteration in the amount of the RNA transcript in the presence of the compound relative to the amount of the RNA transcript in the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript; (c) repeating steps (a) and (b), wherein the only experimental variable changed is the concentration of the compound or a form thereof; and (d) comparing the amount of the RNA transcript produced at the different concentrations of the compound or a form thereof. In another embodiment, the dose response assay comprises: (a) culturing a cell(s) in the presence of a compound of Formula (I) or a form thereof, (b) isolating the RNA transcript from the cell(s) after a certain period of time; (c) determining the amount of the RNA transcript produced by the

cell(s), wherein an alteration in the amount of the RNA transcript in the presence of the compound relative to the amount of the RNA transcript in the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO) indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript; (d) repeating steps (a), (b), and (c), wherein the only experimental variable changed is the concentration of the compound or a form thereof; and (e) comparing the amount of the RNA transcript produced at the different concentrations of the compound or a form thereof. In another embodiment, the dose-response assay comprises: (a) contacting each well of a microtiter plate containing cells with a different concentration of a compound of Formula (I) or a form thereof; (b) determining the amount of an RNA transcript produced by cells in each well; and (c) assessing the change of the amount of the RNA transcript at the different concentrations of the compound or form thereof.

[00840] In one embodiment, the dose response assay comprises: (a) contacting a cell(s) with a concentration of a compound of Formula (I) or a form thereof, wherein the cells are within the wells of a tissue culture container (e.g., a 96-well plate) at about the same density within each well, and wherein the cells are contacted with different concentrations of compound in different wells; (b) isolating the RNA from said cells in each well; (c) determining the amount of the RNA transcript produced by the cell(s) in each well; and (d) assessing change in the amount of the RNA transcript in the presence of one or more concentrations of compound relative to the amount of the RNA transcript in the presence of a different concentration of the compound or the absence of the compound or the presence of a negative control (e.g., a vehicle control such as PBS or DMSO).

[00841] In certain embodiments, the contacting of the cell(s) with the compound occurs in cell culture. In other embodiments, the contacting of the cell(s) with the compound occurs in a subject, such as a non-human animal subject.

[00842] In certain embodiments described herein, the cell(s) is contacted or cultured with a compound of Formula (I) or a form thereof, or a tissue sample is contacted with a compound of Formula (I) or a form thereof, or a negative control for a period of 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours, 8 hours, 12 hours, 18 hours, 24 hours, 48 hours, 72 hours or more. In other embodiments described herein, the cell(s) is contacted or cultured with a compound of Formula (I) or a form thereof, or a tissue sample is

contacted with a compound of Formula (I) or a form thereof, or a negative control for a period of 15 minutes to 1 hour, 1 to 2 hours, 2 to 4 hours, 6 to 12 hours, 12 to 18 hours, 12 to 24 hours, 28 to 24 hours, 24 to 48 hours, 48 to 72 hours.

[00843] In certain embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, or a tissue sample is contacted with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 0.0001 μ M, 0.0003 μ M, 0.001 μ M, 0.003 μ M, 0.01 μ M, 0.05 μ M, 1 μ M, 2 μ M, 5 μ M, 10 μ M, 15 μ M, 20 μ M, 25 μ M, 50 μ M, 75 μ M, 100 μ M, or 150 μ M. In other embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, or a tissue sample is contacted with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 0.0001 μ M, 0.0003 μ M, 0.0005 μ M, 0.001 μ M, 0.003 μ M, 0.005 μ M, 0.01 μ M, 0.03 μ M, 0.05 μ M, 0.1 μ M, 0.3 μ M, 0.5 μ M or 1 μ M. In other embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, or a tissue sample is contacted with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 175 μ M, 200 μ M, 250 μ M, 275 μ M, 300 μ M, 350 μ M, 400 μ M, 450 μ M, 500 μ M, 550 μ M, 600 μ M, 650 μ M, 700 μ M, 750 μ M, 800 μ M, 850 μ M, 900 μ M, 950 μ M or 1 mM. In some embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, or a tissue sample is contacted with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 5 nM, 10 nM, 20 nM, 30 nM, 40 nM, 50 nM, 60 nM, 70 nM, 80 nM, 90 nM, 100 nM, 150 nM, 200 nM, 250 nM, 300 nM, 350 nM, 400 nM, 450 nM, 500 nM, 550 nM, 600 nM, 650 nM, 700 nM, 750 nM, 800 nM, 850 nM, 900 nM, or 950 nM. In certain embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, or a tissue sample is contacted with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is between 0.0001 μ M to 0.001 μ M, 0.0001 μ M to 0.01 μ M, 0.0003 μ M to 0.001 μ M, 0.0003 μ M to 0.01 μ M, 0.001 μ M to 0.01 μ M, 0.003 μ M to 0.01 μ M, 0.01 μ M to 0.1 μ M, 0.1 μ M to 1 μ M, 1 μ M to 50 μ M, 50 μ M to 100 μ M, 100 μ M to 500 μ M, 500 μ M to 1 nM, 1 nM to 10 nM, 10 nM to 50 nM, 50 nM to 100 nM, 100 nM to 500 nM, 500 nM to 1000 nM.

[00844] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (e.g., an mRNA transcript), comprising: (a) administering a compound of Formula (I) or a form thereof to a subject (in certain embodiments, a non-human animal); and (b) determining the amount of the RNA transcript in a sample obtained from the subject, wherein an alteration in the amount of the RNA transcript measured in the sample from the subject administered the compound or form thereof relative to the amount of the RNA transcript in a sample from the subject prior to administration of the compound or form thereof or a sample from a different subject from the same species not administered the compound or form thereof indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the amount of an RNA transcript (e.g., an mRNA transcript), comprising: (a) administering a compound of Formula (I) or a form thereof to a first subject (in certain embodiments, a non-human animal); (b) administering a negative control (e.g., a pharmaceutical carrier) to a second subject (in certain embodiments, a non-human animal) of the same species as the first subject; and (c) determining the amount of the RNA transcript in a first tissue sample from the first subject and the amount of the RNA transcript in the second tissue sample from the second subject; and (d) comparing the amount of the RNA transcript in the first tissue sample to the amount of the RNA transcript in the second tissue sample, wherein an alteration in the amount of the RNA transcript in the first tissue sample relative to the amount of the RNA transcript in the second tissue sample indicates that the compound of Formula (I) or a form thereof modulates the amount of the RNA transcript. In certain embodiments, a compound of Formula (I) or form thereof is administered to a subject at a dose of about 0.001 mg/kg/day to about 500 mg/kg/day. In some embodiments, a single dose of a compound of Formula (I) or a form thereof is administered to a subject in accordance with the methods described herein. In other embodiments, 2, 3, 4, 5 or more doses of a compound of Formula (I) is administered to a subject in accordance with the methods described herein. In specific embodiments, the compound of Formula (I) or a form thereof is administered in a subject in a pharmaceutically acceptable carrier, excipient or diluent.

[00845] In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (e.g., an

mRNA transcript), comprising: (a) administering a compound of Formula (I) or a form thereof to a subject (in certain embodiments, a non-human animal); and (b) determining the amount of two or more RNA transcript splice variants in a sample obtained from the subject, wherein an alteration in the amount of the two or more RNA transcript splice variants measured in the sample from the subject administered the compound or form thereof relative to the amount of the two or more RNA transcript splice variants in a sample from the subject prior to administration of the compound or form thereof or a sample from a different subject from the same species not administered the compound or form thereof indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript. In another embodiment, provided herein is a method for determining whether a compound of Formula (I) or a form thereof modulates the splicing of an RNA transcript (e.g., an mRNA transcript), comprising: (a) administering a compound of Formula (I) or a form thereof to a first subject (in certain embodiments, a non-human animal); (b) administering a negative control (e.g., a pharmaceutical carrier) to a second subject (in certain embodiments, a non-human animal) of the same species as the first subject; and (c) determining the amount of two or more RNA transcript splice variants in a first tissue sample from the first subject and the amount of two or more RNA transcript splice variants in the second tissue sample from the second subject; and (d) comparing the amount of the two or more RNA transcript splice variants in the first tissue sample to the amount of the two or more RNA transcript splice variants in the second tissue sample, wherein an alteration in the amount of the two or more RNA transcript splice variants in the first tissue sample relative to the amount of the two or more RNA transcript splice variants in the second tissue sample indicates that the compound of Formula (I) or a form thereof modulates the splicing of the RNA transcript. In certain embodiments, a compound of Formula (I) or form thereof is administered to a subject at a dose of about 0.001 mg/kg/day to about 500 mg/kg/day. In some embodiments, a single dose of a compound of Formula (I) or a form thereof is administered to a subject in accordance with the methods described herein. In other embodiments, 2, 3, 4, 5 or more doses of a compound of Formula (I) is administered to a subject in accordance with the methods described herein. In specific embodiments, the compound of Formula (I) or a form thereof is administered in a subject in a pharmaceutically acceptable carrier, excipient or diluent.

[00846] In some embodiments, the compound of Formula (I) or a form thereof that is contacted or cultured with a cell(s) or a tissue sample, or administered to a subject is a compound

of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV). In some embodiments, the compound of Formula (I) or a form thereof that is contacted or cultured with a cell(s) or a tissue sample, or administered to a subject is a compound described herein.

[00847] Techniques known to one skilled in the art may be used to determine the amount of an RNA transcript(s). In some embodiments, the amount of one, two, three or more RNA transcripts is measured using deep sequencing, such as ILLUMINA[®] RNASeq, ILLUMINA[®] next generation sequencing (NGS), ION TORRENT[™] RNA next generation sequencing, 454[™] pyrosequencing, or Sequencing by Oligo Ligation Detection (SOLID[™]). In other embodiments, the amount of multiple RNA transcripts is measured using an exon array, such as the GENECHIP[®] human exon array. In certain embodiments, the amount of one, two, three or more RNA transcripts is determined by RT-PCR. In other embodiments, the amount of one, two, three or more RNA transcripts is measured by RT-qPCR or digital color-coded barcode technology. Techniques for conducting these assays are known to one skilled in the art.

[00848] In some embodiments, analysis is performed on data derived from the assay to measure the magnitude of splicing to determine the amount of exons spliced into an mRNA transcript that is produced in the presence of the compound relative to the amount in the absence of the compound or presence of a negative control. In a preferred embodiment, the method utilized is calculation of change in Percent Spliced In (Δ PSI). The method utilizes read data from RNAseq (or any other method that can distinguish mRNA splice isoforms) to calculate the ratio (percentage) between reads that either demonstrate inclusion (junctions between the upstream exon and the exon of interest) or exclusion (junction between the upstream and downstream exons, excluding the exon of interest), to demonstrate whether the presence of the compound affects the amount of exon inclusion relative to the amount of inclusion in the absence of the compound or the presence of a negative control.

[00849] The Δ PSI value is derived from the formula:

$$\text{[00850]} \quad \Delta\text{PSI (\%)} = \{(a+b)/2/[(a+b)/2 + c]\}^C - \{(a+b)/2/[(a+b)/2 + c]\}^U \times 100$$

[00851] Where “U” represents the value for probability of iExon inclusion $(a+b)/2/[(a+b)/2+c]^U$ in the absence of the compound; and, where “C” represents the value for probability of iExon inclusion $(a+b)/2/[(a+b)/2 + c]^C$ in the presence of the compound. The

values for “a” and “b” represent the number of reads supporting inclusion of an iExon in an RNA transcript. In other words, the “a” value is derived from the amount of reads for a first intronic nucleotide sequence comprising, in 5’ to 3’ order: a first exon having a 5’ splice site operably linked and upstream from a first intronic nucleotide sequence comprising a first branch point further operably linked and upstream from a first intronic 3’ splice site (upstream of the nascent iExon). The “b” value is derived from the amount of reads for a second intronic nucleotide sequence comprising, in 5’ to 3’ order: an iREMS sequence operably linked downstream from the first intronic 3’ splice site and upstream from a second intronic nucleotide sequence comprising a second branch point further operably linked and upstream from a second intronic 3’ splice site of a second exon. The value for “c” represents the number of reads supporting exclusion of an iExon. Accordingly, when a compound enables the splicing machinery to recognize a nascent iExon, the value for $(a+b)/2/[(a+b)/2+c]^C$ in the presence of the splicing modifier compound will differ from the value for $(a+b)/2/[(a+b)/2+c]^U$ in the absence of the compound. The statistically significant value for the likelihood of iExon inclusion may be obtained according to statistical analysis methods or other probability analysis methods known to those of ordinary skill in the art.

[00852] In some embodiments, a statistical analysis or other probability analysis is performed on data from the assay utilized to measure an RNA transcript. In certain embodiments, for example, a Fisher’s Exact Test statistical analysis is performed by comparing the total number of reads for the inclusion and exclusion of an iExon (or region) based on data from one or more assays used to measure whether the amount of an RNA transcript is altered in the presence of the compound relative to the amount in the absence of the compound or presence of a negative control. In specific embodiments, the statistical analysis results in a confidence value for those RNA transcripts with the alternation of 10%, 5%, 4%, 3%, 2%, 1%, 0.5%, 0.1%, 0.01%, 0.001% or 0.0001%. In some specific embodiments, the confidence value is a p value of those altered RNA transcripts of is 10%, 5%, 4%, 3%, 2%, 1%, 0.5%, 0.1%, 0.01%, 0.001% or 0.0001%. In certain specific embodiments, an exact test, student t-test or p value of those RNA transcripts with the alteration is 10%, 5%, 4%, 3%, 2%, 1%, 0.5% or 0.1% and 10%, 5%, 4%, 3%, 2%, 1%, 0.5%, 0.1%, 0.01%, 0.001% or 0.0001%, respectively.

[00853] In certain embodiments, a further analysis is performed to determine how the compound of Formula (I) or a form thereof is changing the amount of an RNA transcript(s). In

specific embodiments, a further analysis is performed to determine if an alternation in the amount of an RNA transcript(s) in the presence of a compound of Formula (I) or a form thereof relative the amount of the RNA transcript(s) in the absence of the compound or a form thereof, or the presence of a negative control is due to changes in transcription, splicing, and/or stability of the RNA transcript(s). Techniques known to one skilled in the art may be used to determine whether a compound of Formula (I) or a form thereof changes, *e.g.*, the transcription, splicing and/or stability of an RNA transcript(s).

[00854] In certain embodiments, the stability of one or more RNA transcripts is determined by serial analysis of gene expression (SAGE), differential display analysis (DD), RNA arbitrary primer (RAP)-PCR, restriction endonuclease-lytic analysis of differentially expressed sequences (READS), amplified restriction fragment-length polymorphism (ALFP), total gene expression analysis (TOGA), RT-PCR, RT-qPCR, RNA-Seq, digital color-coded barcode technology, high-density cDNA filter hybridization analysis (HDFCA), suppression subtractive hybridization (SSH), differential screening (DS), cDNA arrays, oligonucleotide chips, or tissue microarrays. In other embodiments, the stability of one or more RNA transcripts is determined by Northern blot, RNase protection, or slot blot.

[00855] In some embodiments, the transcription in a cell(s) or tissue sample is inhibited before (*e.g.*, 5 minutes, 10 minutes, 30 minutes, 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 12 hours, 18 hours, 24 hours, 36 hours, 48 hours, or 72 hours before) or after (*e.g.*, 5 minutes, 10 minutes, 30 minutes, 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 12 hours, 18 hours, 24 hours, 36 hours, 48 hours, or 72 hours after) the cell or the tissue sample is contacted or cultured with an inhibitor of transcription, such as α -amanitin, DRB, flavopiridol, triptolide, or actinomycin-D. In other embodiments, the transcription in a cell(s) or tissue sample is inhibited with an inhibitor of transcription, such as α -amanitin, DRB, flavopiridol, triptolide, or actinomycin-D, while the cell(s) or tissue sample is contacted or cultured with a compound of Formula (I) or a form thereof.

[00856] In certain embodiments, the level of transcription of one or more RNA transcripts is determined by nuclear run-on assay or an *in vitro* transcription initiation and elongation assay. In some embodiments, the detection of transcription is based on measuring radioactivity or fluorescence. In some embodiments, a PCR-based amplification step is used.

[00857] In specific embodiments, the amount of alternatively spliced forms of the RNA transcripts of a particular gene are measured to see if there is an alteration in the amount of one, two or more alternatively spliced forms of the RNA transcripts of the gene. In some embodiments, the amount of an isoform(s) encoded by a particular gene is measured to see if there is an alteration in the amount of the isoform(s). In certain embodiments, the levels of spliced forms of RNA are quantified by RT-PCR, RT-qPCR, RNA-Seq, digital color-coded barcode technology, or Northern blot. In other embodiments, sequence-specific techniques may be used to detect the levels of an individual spliceoform. In certain embodiments, splicing is measured *in vitro* using nuclear extracts. In some embodiments, detection is based on measuring radioactivity or fluorescence. Techniques known to one skilled in the art may be used to measure alterations in the amount of alternatively spliced forms of an RNA transcript of a gene and alterations in the amount of an isoform encoded by a gene. In a specific embodiment, modulation of RNA transcripts is assessed as described in the Examples described herein.

[00858] Also provided herein are methods of screening for new compounds that can be used to modulate the amount of a product (*e.g.*, a precursor RNA, an mRNA, or protein) of a gene comprising an intronic REMS in its DNA or RNA sequence. The methods described above in this section with respect to determining whether the amount of a product (*e.g.*, a precursor RNA, an mRNA, or protein) of a gene is likely to be modulated by a compound of Formula (I) or a form thereof can be also used in the methods of screening for new compounds. In a specific embodiment, the method comprises contacting a candidate compound with an RNA transcript, wherein the RNA transcript comprises exons and one or more introns, wherein at least one intron comprises, in 5' to 3' order, a branch point, a 3' splice site, and an intronic REMS. In another specific embodiment, the method comprises contacting a candidate compound with an RNA transcript, wherein the RNA transcript comprises exons and one or more introns, wherein at least one intron comprises an intronic REMS downstream of a branch point and a 3' splice site. The RNA transcript may be present in a cell or cell lysate. The methods described above regarding the techniques of contacting a compound with an RNA transcript, the dosage, *etc.*, may be used in the methods of screening. The candidate compounds to be screened can be provided by any source. For example, the candidate compounds to be screened can be from a compound library, such as a commercial compound library.

PHARMACEUTICAL COMPOSITIONS AND MODES OF ADMINISTRATION

[00859] When administered to a patient, a compound of Formula (I) or a form thereof is preferably administered as a component of a composition that optionally comprises a pharmaceutically acceptable carrier, excipient or diluent. The composition can be administered orally, or by any other convenient route, for example, by infusion or bolus injection, by absorption through epithelial or mucocutaneous linings (*e.g.*, oral mucosa, rectal, and intestinal mucosa) and may be administered together with another biologically active agent. Administration can be systemic or local. Various delivery systems are known, *e.g.*, encapsulation in liposomes, microparticles, microcapsules, capsules, and can be used to administer the compound.

[00860] Methods of administration include, but are not limited to, parenteral, intradermal, intramuscular, intraperitoneal, intravenous, subcutaneous, intranasal, epidural, oral, sublingual, intranasal, intraocular, intratumoral, intracerebral, intravaginal, transdermal, ocularly, rectally, by inhalation, or topically, particularly to the ears, nose, eyes, or skin. The mode of administration is left to the discretion of the practitioner. In most instances, administration will result in the release of a compound into the bloodstream, tissue or cell(s). In a specific embodiment, a compound is administered orally.

[00861] The amount of a compound of Formula (I) or a form thereof that will be effective in the treatment of a disease resulting from an aberrant amount of mRNA transcripts depends, *e.g.*, on the route of administration, the disease being treated, the general health of the subject, ethnicity, age, weight, and gender of the subject, diet, time, and the severity of disease progress, and should be decided according to the judgment of the practitioner and each patient's or subject's circumstances.

[00862] In specific embodiments, an "effective amount" in the context of the administration of a compound of Formula (I) or a form thereof, or composition or medicament thereof refers to an amount of a compound of Formula (I) or a form thereof to a patient which has a therapeutic effect and/or beneficial effect. In certain specific embodiments, an "effective amount" in the context of the administration of a compound of Formula (I) or a form thereof, or composition or medicament thereof to a patient results in one, two or more of the following effects: (i) reduces or ameliorates the severity of a disease; (ii) delays onset of a disease; (iii) inhibits the progression of a disease; (iv) reduces hospitalization of a subject; (v) reduces hospitalization length for a

subject; (vi) increases the survival of a subject; (vii) improves the quality of life of a subject; (viii) reduces the number of symptoms associated with a disease; (ix) reduces or ameliorates the severity of a symptom(s) associated with a disease; (x) reduces the duration of a symptom associated with a disease associated; (xi) prevents the recurrence of a symptom associated with a disease; (xii) inhibits the development or onset of a symptom of a disease; and/or (xiii) inhibits of the progression of a symptom associated with a disease. In certain embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to restore the amount of a RNA transcript of a gene to the amount of the RNA transcript detectable in healthy patients or cells from healthy patients. In other embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to restore the amount an RNA isoform and/or protein isoform of gene to the amount of the RNA isoform and/or protein isoform detectable in healthy patients or cells from healthy patients.

[00863] In certain embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to decrease the aberrant amount of an RNA transcript of a gene which associated with a disease. In certain embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to decrease the amount of the aberrant expression of an isoform of a gene. In some embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to result in a substantial change in the amount of an RNA transcript (*e.g.*, mRNA transcript), alternative splice variant or isoform.

[00864] In certain embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to increase or decrease the amount of an RNA transcript (*e.g.*, an mRNA transcript) of gene which is beneficial for the prevention and/or treatment of a disease. In certain embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to increase or decrease the amount of an alternative splice variant of an RNA transcript of gene which is beneficial for the prevention and/or treatment of a disease. In certain embodiments, an effective amount of a compound of Formula (I) or a form thereof is an amount effective to increase or decrease the amount of an isoform of gene which is beneficial for the prevention and/or treatment of a disease. Non-limiting examples of effective amounts of a compound of Formula (I) or a form thereof are described herein.

[00865] For example, the effective amount may be the amount required to prevent and/or treat a disease associated with the aberrant amount of an mRNA transcript of gene in a human subject.

[00866] In general, the effective amount will be in a range of from about 0.001 mg/kg/day to about 500 mg/kg/day for a patient having a weight in a range of between about 1 kg to about 200 kg. The typical adult subject is expected to have a median weight in a range of between about 70 and about 100 kg.

[00867] Within the scope of the present description, the “effective amount” of a compound of Formula (I) or a form thereof for use in the manufacture of a medicament, the preparation of a pharmaceutical kit or in a method for preventing and/or treating a disease in a human subject in need thereof, is intended to include an amount in a range of from about 0.001 mg to about 35,000 mg.

[00868] The compositions described herein are formulated for administration to the subject via any drug delivery route known in the art. Non-limiting examples include oral, ocular, rectal, buccal, topical, nasal, ophthalmic, subcutaneous, intramuscular, intravenous (bolus and infusion), intracerebral, transdermal, and pulmonary routes of administration.

[00869] Embodiments described herein include the use of a compound of Formula (I) or a form thereof in a pharmaceutical composition. In a specific embodiment, described herein is the use of a compound of Formula (I) or a form thereof in a pharmaceutical composition for preventing and/or treating a disease in a human subject in need thereof comprising administering an effective amount of a compound of Formula (I) or a form thereof in admixture with a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the human subject is a patient with a disease associated with the aberrant amount of an mRNA transcript(s).

[00870] A compound of Formula (I) or a form thereof may optionally be in the form of a composition comprising the compound or a form thereof and an optional carrier, excipient or diluent. Other embodiments provided herein include pharmaceutical compositions comprising an effective amount of a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient, or diluent. In a specific embodiment, the pharmaceutical compositions are suitable for veterinary and/or human administration. The pharmaceutical compositions provided herein can be in any form that allows for the composition to be administered to a subject.

[00871] In a specific embodiment and in this context, the term “pharmaceutically acceptable carrier, excipient or diluent” means a carrier, excipient or diluent approved by a regulatory agency of the Federal or a state government or listed in the U.S. Pharmacopeia or other generally

recognized pharmacopeia for use in animals, and more particularly in humans. The term “carrier” refers to a diluent, adjuvant (*e.g.*, Freund’s adjuvant (complete and incomplete)), excipient, or vehicle with which a therapeutic agent is administered. Such pharmaceutical carriers can be sterile liquids, such as water and oils, including those of petroleum, animal, vegetable or synthetic origin, such as peanut oil, soybean oil, mineral oil, sesame oil and the like. Water is a specific carrier for intravenously administered pharmaceutical compositions. Saline solutions and aqueous dextrose and glycerol solutions can also be employed as liquid carriers, particularly for injectable solutions.

[00872] Typical compositions and dosage forms comprise one or more excipients. Suitable excipients are well-known to those skilled in the art of pharmacy, and non limiting examples of suitable excipients include starch, glucose, lactose, sucrose, gelatin, malt, rice, flour, chalk, silica gel, sodium stearate, glycerol monostearate, talc, sodium chloride, dried skim milk, glycerol, propylene, glycol, water, ethanol and the like. Whether a particular excipient is suitable for incorporation into a pharmaceutical composition or dosage form depends on a variety of factors well known in the art including, but not limited to, the way in which the dosage form will be administered to a patient and the specific active ingredients in the dosage form. Further provided herein are anhydrous pharmaceutical compositions and dosage forms comprising one or more compounds of Formula (I) or a form thereof as described herein. The compositions and single unit dosage forms can take the form of solutions or syrups (optionally with a flavoring agent), suspensions (optionally with a flavoring agent), emulsions, tablets (*e.g.*, chewable tablets), pills, capsules, granules, powder (optionally for reconstitution), taste-masked or sustained-release formulations and the like.

[00873] Pharmaceutical compositions provided herein that are suitable for oral administration can be presented as discrete dosage forms, such as, but are not limited to, tablets, caplets, capsules, granules, powder, and liquids. Such dosage forms contain predetermined amounts of active ingredients, and may be prepared by methods of pharmacy well known to those skilled in the art.

[00874] Examples of excipients that can be used in oral dosage forms provided herein include, but are not limited to, binders, fillers, disintegrants, and lubricants.

METHODS OF MODULATING THE AMOUNT OF RNA TRANSCRIPTS ENCODED BY CERTAIN GENES

[00875] In one aspect, described herein are methods for modulating the amount of a product of a gene, wherein a precursor RNA transcript transcribed from the gene contains an intronic REMS, and the methods utilize a compound described herein. In certain embodiments, the gene contains a nucleotide sequence encoding an endogenous intronic REMS. In a specific embodiment, the precursor RNA transcript further contains a branch point and a 3' splice site upstream from the intronic REMS. In certain embodiments, the gene is any one of the genes disclosed in Tables 2-7 or 1. In certain embodiments, the gene contains a nucleotide sequence encoding a non-endogenous intronic REMS. In one embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, by way of nonlimiting example, disclosed in Tables 2-7 or 1, *infra*, the method comprising contacting a cell with a compound of Formula (I) or a form thereof.

[00876] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or a protein), wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAGtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting a cell with a compound described herein (for example, a compound of Formula (I) or a form thereof).

[00877] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein), wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a

nucleotide sequence encoding a first branch point and a nucleotide sequence encoding a first 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising contacting a cell with a compound described herein (for example, a compound of Formula (I) or a form thereof).

[00878] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein), wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1A, the method comprising contacting a cell with a compound described herein.

[00879] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein), wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1B, the method comprising contacting a cell with a compound described herein.

[00880] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein), wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1C, the method comprising contacting a cell with a compound described herein.

[00881] In a specific embodiment, the gene is a gene described in a table in this disclosure.

[00882] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Tables 2-7, *infra*, wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof.

[00883] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No.

PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In a specific embodiment, the precursor RNA transcript further contains a branch point and a 3' splice site upstream from the intronic REMS.

[00884] In certain embodiments, the gene is a gene not disclosed in either International Publication No. WO 2015/105657, International Publication No. WO 2016/196386, or both.

[00885] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Table 1, *infra*, wherein the precursor transcript transcribed from the gene comprises an intronic REMS, the method comprising contacting a cell with a compound of Formula (I) or a form thereof. In a specific embodiment, the precursor RNA transcript further contains a branch point and a 3' splice site upstream from the intronic REMS.

[00886] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Table 7, *infra*, comprising contacting a cell with a compound of Formula (I) or a form thereof. *See* the example section for additional information regarding the genes in Table 7. In certain embodiments, the cell is contacted with the compound of Formula (I) or a form thereof in a cell culture. In other embodiments, the cell is contacted with the compound of Formula (I) or a form thereof in a subject (*e.g.*, a non-human animal subject or a human subject). In a specific embodiment, the RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00887] In one aspect, provided herein is a method for producing a mature mRNA transcript comprising iExon from a pre-mRNA transcript, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In one embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a pre-mRNA transcript with a compound described herein (*e.g.*, a compound of Formula (I) or a

form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In another embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a cell or cell lysate containing a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In some embodiments, the pre-mRNA transcript is encoded by a gene disclosed herein (e.g., in a table herein).

[00888] In a particular embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2,

CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTF, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, P XK, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP. In another particular embodiment, provided herein is a method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a cell or cell lysate containing a pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1,

DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFF1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTf, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP.

[00889] In another aspect, provided herein is a method modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In one embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence

GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In another embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting a cell or cell lysate containing the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous or non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide. In some embodiments, the intron further comprises a first 5' splice site, a second branch point, and a second 3' splice site upstream of the iREMS. In some embodiments, the pre-mRNA transcript is encoded by a gene disclosed herein (e.g., in a table herein).

[00890] In a particular embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA,

CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNB59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1I1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRVI1, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11,

SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837. In a particular embodiment, provided herein is a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting a cell or cell lysate containing the pre-mRNA transcript with a compound described herein (e.g., a compound of Formula (I) or a form thereof), wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB,

CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFN59, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1H1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFF1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD, KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRVI1, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1,

SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837. In some embodiments, the intron further comprises a first 5' splice site, a second branch point, and a second 3' splice site upstream of the iREMS.

[00891] In certain embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is primary cell(s) or cell(s) from a cell line. In some embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a fibroblast(s), an immune cell(s), or a muscle cell(s). In some embodiments, the cell(s) contacted or cultured with a compound of Formula (I) or a form thereof is a cancer cell. Non-limiting examples of cell lines include 3T3, 4T1, 721, 9L, A2780, A172, A20, A253, A431, A-549, ALC, B16, B35, BCP-1, BEAS-2B, bEnd.3, BHK, BR 293, BT20, BT483, BxPC3, C2C12, C3H-10T1/2, C6/36, C6, Cal-27, CHO, COR-L23, COS, COV-434, CML T1, CMT, CRL7030, CT26, D17, DH82, DU145, DuCaP, EL4, EM2, EM3, EMT6, FM3, H1299, H69, HB54, HB55, HCA2, HDF, HEK-293, HeLa, Hepa1c1c7, HL-60, HMEC, Hs578T, HsS78Bst, HT-29, HTB2, HUVEC, Jurkat, J558L, JY, K562, Ku812, KCL22, KG1, KYO1, LNCap, Ma-Mel, MC-38, MCF-7, MCF-10A, MDA-MB-231, MDA-MB-468, MDA-MB-435, MDCK, MG63, MOR/0.2R, MONO-MAC 6, MRC5, MTD-1A, NCI-H69, NIH-3T3, NALM-1, NS0, NW-145, OPCN, OPCT, PNT-1A, PNT-2, Raji, RBL, RenCa, RIN-5F, RMA, Saos-2, Sf21, Sf9, SH-SY5Y, SiHa, SKBR3, SKOV-3, T2, T-47D, T84, THP1, U373, U87, U937, VCaP, Vero, VERY, W138, WM39, WT-49, X63, YAC-1, and YAR cells. In one embodiment, the cells are from a patient. In another embodiment, the patient cells are GM03813 cells.

[00892] In certain embodiments described herein, the cell(s) is contacted or cultured with a compound of Formula (I) or a form thereof with a compound of Formula (I) or a form thereof for a period of 15 minutes, 30 minutes, 45 minutes, 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours, 8 hours, 12 hours, 18 hours, 24 hours, 48 hours, 72 hours or more. In other embodiments

described herein, the cell(s) is contacted or cultured with a compound of Formula (I) or a form thereof with a compound of Formula (I) or a form thereof for a period of 15 minutes to 1 hour, 1 to 2 hours, 2 to 4 hours, 6 to 12 hours, 12 to 18 hours, 12 to 24 hours, 28 to 24 hours, 24 to 48 hours, 48 to 72 hours.

[00893] In certain embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 0.01 μ M, 0.05 μ M, 1 μ M, 2 μ M, 5 μ M, 10 μ M, 15 μ M, 20 μ M, 25 μ M, 50 μ M, 75 μ M, 100 μ M, or 150 μ M. In other embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 175 μ M, 200 μ M, 250 μ M, 275 μ M, 300 μ M, 350 μ M, 400 μ M, 450 μ M, 500 μ M, 550 μ M, 600 μ M, 650 μ M, 700 μ M, 750 μ M, 800 μ M, 850 μ M, 900 μ M, 950 μ M or 1 mM. In some embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is 5 nM, 10 nM, 20 nM, 30 nM, 40 nM, 50 nM, 60 nM, 70 nM, 80 nM, 90 nM, 100 nM, 150 nM, 200 nM, 250 nM, 300 nM, 350 nM, 400 nM, 450 nM, 500 nM, 550 nM, 600 nM, 650 nM, 700 nM, 750 nM, 800 nM, 850 nM, 900 nM, or 950 nM. In certain embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof, wherein the certain concentration is between 0.01 μ M to 0.1 μ M, 0.1 μ M to 1 μ M, 1 μ M to 50 μ M, 50 μ M to 100 μ M, 100 μ M to 500 μ M, 500 μ M to 1 nM, 1 nM to 10 nM, 10 nM to 50 nM, 50 nM to 100 nM, 100 nM to 500 nM, 500 nM to 1000 nM. In certain embodiments described herein, the cell(s) is contacted or cultured with a certain concentration of a compound of Formula (I) or a form thereof that results in a substantial change in the amount of an RNA transcript (*e.g.*, an mRNA transcript), an alternatively spliced variant, or an isoform of a gene (*e.g.*, a gene in Table 1, *infra*).

[00894] In another aspect, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript further contains a branch point and a 3' splice site upstream from the intronic REMS.

[00895] In one embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, by way of nonlimiting example, disclosed in Table 1, *infra*, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00896] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Tables 2-7, *infra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene in a subject, disclosed in International Patent Application No.

PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to the subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene in a subject, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to the subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00897] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the

precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00898] In a particular aspect, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene in a subject, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS (for example, an endogenous intronic REMS or a non-endogenous intronic REMS), the methods comprising administering to the subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript contains in 5' to 3' order a branch point, a 3' splice site and an intronic REMS. In specific embodiments of the foregoing aspects, as listed in Table 1, the gene is ABCA1, ABCA10, ABCB7, ABCB8, ABCC1, ABCC3, ABHD10, ABL2, ABLIM3, ACACA, ACADVL, ACAT2, ACTA2, ADAL, ADAM12, ADAM15, ADAM17, ADAM33, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF2, AFF3, AGK, AGPAT3, AGPAT4, AGPS, AHCYL2, AHDC1, AHRR, AJUBA, AK021888, AK310472, AKAP1, AKAP3, AKAP9, AKNA, ALCAM, ALDH4A1, AMPD2, ANK1, ANK2, ANK3, ANKFY1, ANKHD1-EIF4EBP3, ANKRA2, ANKRD17, ANKRD33B, ANKRD36, ANKS6, ANP32A, ANXA11, ANXA6, AP2B1, AP4B1-AS1, APAF1, APIP, APLP2, APP, APPL2, APTX, ARHGAP1, ARHGAP12, ARHGAP22, ARHGEF16, ARID1A, ARID2, ARID5B, ARL9, ARL15, ARM CX3, ARM CX6, ASAP1, ASIC1, ASL, ASNS, ASPH, ATAD2B, ATF7IP, ATG5, ATG9A, ATMIN, ATP2A3, ATP2C1, ATXN1, ATXN3, AURKA, AXIN1, B3GALT2, B3GNT6, B4GALT2, BACE1, BAG2,

BASP1, BC033281, BCAR3, BCL2L15, BCYRN1, BECN1, BEND6, BHMT2, BICD1, BIN1, BIN3-IT1, BIRC3, BIRC6, BNC1, BRD2, BRPF1, BSCL2, BTBD10, BTG2, BTN3A1, BZW1, C1orf86, C10orf54, C11orf30, C11orf70, C11orf73, C11orf94, C12orf4, C12orf56, C14orf132, C17orf76-AS1, C19orf47, C3, C4orf27, C5orf24, C6orf48, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, C9orf69, CA13, CA3, CAB39, CACNA2D2, CACNB1, CADM1, CALU, CAMKK1, CAND2, CAPNS1, CASC3, CASP7, CASP8AP2, CAV1, CCAR1, CCDC77, CCDC79, CCDC88A, CCDC92, CCDC122, CCER2, CCNF, CCT6A, CD276, CD46, CDC25B, CDC40, CDC42BPA, CDCA7, CDH11, CDH13, CDK11B, CDK16, CDKAL1, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CEP68, CFH, CFLAR, CHD8, CHEK1, CHITA, CIZ1, CLDN23, CLIC1, CLK4, CLTA, CMAHP, CNGA4, CNOT1, CNRIP1, CNTD1, COG1, COL1A1, COL11A1, COL12A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A1, COL6A6, COL8A1, COLEC12, COMP, COPS7B, CPA4, CPEB2, CPQ, CPSF4, CREB5, CRISPLD2, CRLF1, CRLS1, CRTAP, CRYBG3, CRYL1, CSDE1, CSNK1A1, CSNK1E, CSNK1G1, CTDSP2, CTNND1, CUL2, CUL4A, CUX1, CYB5B, CYB5R2, CYBRD1, CYGB, CYP1B1, CYP51A1, DAB2, DACT1, DAGLB, DARS, DAXX, DCAF10, DCAF11, DCAF17, DCBLD2, DCLK1, DCN, DCUN1D4, DDAH1, DDAH2, DDHD2, DDIT4L, DDR1, DDX39B, DDX42, DDX50, DEGS1, DENND1A, DENND1B, DENND5A, DEPTOR, DFNB59, DGCR2, DGKA, DHCR24, DHCR7, DHFR, DHX9, DIAPH1, DIAPH3, DIRAS3, DIS3L, DKFZp434M1735, DKK3, DLC1, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNM2, DNMBP, DOCK1, DOCK11, DPP8, DSEL, DST, DSTN, DYNC11I, DYRK1A, DZIP1L, EBF1, EEA1, EEF1A1, EFCAB14, EFEMP1, EGR1, EGR3, EHMT2, EIF2B3, EIF4G1, EIF4G2, EIF4G3, ELF2, ELN, ELP4, EMX2OS, ENAH, ENG, ENPP1, ENPP2, ENSA, EP300, EPN1, EPT1, ERC1, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFFI1, ESM1, ETV5, EVC, EVC2, EXO1, EXTL2, EYA3, F2R, FADS1, FADS2, FAF1, FAIM, FAM111A, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM198B, FAM20A, FAM219A, FAM219B, FAM3C, FAM46B, FAM65A, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FBXL6, FBXO10, FBXO18, FBXO31, FBXO34, FBXO9, FCHO1, FDFT1, FDPS, FER, FEZ1, FGD5-AS1, FGFR2, FGFR1, FGL2, FHOD3, FLII, FLNB, FLT1, FN1, FNBP1, FOCAD, FOS, FOSB, FOSL1, FOXP1, FOXP2, FRAS1, FSCN2, FUS, FYN, GABPB1, GAL3ST4, GALC, GALNT1, GALNT15, GAS7, GATA6, GBA2, GBGT1, GCFC2, GCNT1, GDF6, GGA2, GGCT, GHDC, GIGYF2, GJC1, GLCE, GMIP, GNA13, GNAQ, GNAS,

GNL3L, GOLGA2, GOLGA4, GOLGB1, GORASP1, GPR1, GPR183, GPR50, GPR89A, GPRC5A, GPRC5B, GPSM2, GREM1, GRK6, GRTP1, GSE1, GTF2H2B, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS2, HAS3, HAT1, HAUS3, HAUS6, HAVCR2, HDAC5, HDAC7, HDX, HECTD2-AS1, HEG1, HEPH, HEY1, HLA-A, HLA-E, HLTF, HMGA1, HMGA2, HMGB1, HMGCR, HMGN3-AS1, HMGCS1, HOOK3, HMOX1, HNMT, HNRNPR, HNRNPUL1, HP1BP3, HPS1, HRH1, HSD17B12, HSD17B4, HSPA1L, HTATIP2, HTT, IARS, IDH1, IDI1, IFT57, IGDCC4, IGF2BP2, IGF2R, IGFBP3, IL16, IL6ST, INA, INHBA, INPP5K, INSIG1, INTU, IQCE, IQCG, ITGA11, ITGA8, ITGAV, ITGB5, ITGB8, ITIH1, ITM2C, ITPKA, ITS1N1, IVD, KANSL3, KAT6B, KCNK2, KCNS1, KCNS2, KDM6A, KDSR, KIAA1033, KIAA1143, KIAA1199, KIAA1456, KIAA1462, KIAA1522, KIAA1524, KIAA1549, KIAA1715, KIAA1755, KIF14, KIF2A, KIF3A, KIT, KLC1, KLC2, KLF17, KLF6, KLHL7, KLRG1, KMT2D, KRT7, KRT18, KRT19, KRT34, KRTAP1-1, KRTAP1-5, KRTAP2-3, L3MBTL2, LAMA2, LAMB1, LAMB2P1, LARP4, LARP7, LATS2, LDLR, LEMD3, LETM2, LGALS8, LGI2, LGR4, LHX9, LIMS1, LINC00341, LINC00472, LINC00570, LINC00578, LINC00607, LINC00657, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMAN2L, LMO7, LMOD1, LOC400927, LONP1, LOX, LRBA, LRCH4, LRIG1, LRP4, LRP8, LRRC32, LRRC39, LRRC42, LRRC8A, LSAMP, LSS, LTBR, LUC7L2, LUM, LYPD1, LYRM1, LZTS2, MADD, MAFB, MAGED4, MAGED4B, MAMDC2, MAN1A2, MAN2A1, MAN2C1, MAP4K4, MAPK13, MASP1, MB, MB21D2, MBD1, MBOAT7, MC4R, MCM10, MDM2, MED1, MED13L, MEDAG, MEF2D, MEGF6, MEIS2, MEMO1, MEPCE, MFGE8, MFN2, MIAT, MICAL2, MINPP1, MIR612, MKL1, MKLN1, MKNK2, MLLT4, MLLT10, MLST8, MMAB, MMP10, MMP24, MMS19, MMS22L, MN1, MOXD1, MPPE1, MPZL1, MRPL3, MRPL45, MRPL55, MRPS28, MRVI1, MSANTD3, MSC, MSH2, MSH4, MSH6, MSL3, MSMO1, MSRB3, MTAP, MTERF3, MTERFD1, MTHFD1L, MTMR9, MTRR, MUM1, MVD, MVK, MXRA5, MYADM, MYCBP2, MYLK, MYO1D, MYO9B, MYOF, NA, NAA35, NAALADL2, NADK, NAE1, NAGS, NASP, NAV1, NAV2, NCOA1, NCOA3, NCOA4, NCSTN, NDNF, NELFA, NEO1, NEURL1B, NF2, NFE2L1, NFX1, NGF, NGFR, NHLH1, NID1, NID2, NIPA1, NKX3-1, NLN, NOL10, NOMO3, NOTCH3, NOTUM, NOVA2, NOX4, NPEPPS, NRD1, NREP, NRG1, NRROS, NSUN4, NT5C2, NT5E, NTNG1, NUDT4, NUP153, NUP35, NUP50, NUPL1, NUSAP1, OCLN, ODF2, OLR1, OS9, OSBPL6, OSBPL10, OSMR, OXCT1, OXCT2, P4HA1,

P4HB, PABPC1, PAIP2B, PAK4, PAPD4, PARD3, PARN, PARP14, PARP4, PARVB, PBLD, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PCNXL2, PCSK9, PDE1C, PDE4A, PDE5A, PDE7A, PDGFD, PDGFRB, PDLIM7, PDS5B, PDXDC1, PEAR1, PEPD, PEX5, PFKP, PHACTR3, PHF19, PHF8, PHRF1, PHTF2, PI4K2A, PIEZO1, PIGN, PIGU, PIK3C2B, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNA, PITPNB, PITPNM1, PITPNM3, PLAUI, PLEC, PLEK2, PLEKHA1, PLEKHA6, PLEKHB2, PLEKHH2, PLSCR1, PLSCR3, PLXNB2, PLXNC1, PMS1, PNISR, PODN, POLE3, POLN, POLR1A, POLR3D, POMT2, POSTN, POU2F1, PPAPDC1A, PPARA, PPARG, PPHLN1, PPIP5K1, PPIP5K2, PPM1E, PPP1R12A, PPP1R26, PPP3CA, PPP6R1, PPP6R2, PRKACB, PRKCA, PRKDC, PRKG1, PRMT1, PRNP, PRPF31, PRPH2, PRRG4, PRSS23, PRUNE2, PSMA4, PSMC1, PSMD6, PSMD6-AS2, PTGIS, PTK2B, PTPN14, PTX3, PUF60, PUS7, PVR, PXX, PXN, QKI, RAB23, RAB2B, RAB30, RAB34, RAB38, RAB44, RAD1, RAD9B, RAD23B, RAF1, RALB, RAP1A, RAP1GDS1, RAPGEF1, RARG, RARS, RARS2, RASSF8, RBBP8, RBCK1, RBFOX2, RBKS, RBM10, RCC1, RDX, RERE, RFTN1, RFWD2, RFX3-AS1, RGCC, RGS10, RGS3, RIF1, RNF14, RNF19A, RNF38, RNFT1, ROR1, ROR2, RPA1, RPL10, RPS10, RPS6KB2, RPS6KC1, RRBPI, RWDD4, SAMD4A, SAMD9, SAMD9L, SAR1A, SART3, SCAF4, SCAF8, SCARNA9, SCD, SCLT1, SCO1, SDCBP, SEC14L1, SEC22A, SEC24A, SEC24B, SEC61A1, SENP6, SEPT9, SERGEF, SERPINE2, SF1, SGK3, SGOL2, SH3RF1, SH3YL1, SHROOM3, SIGLEC10, SKA2, SKIL, SLC12A2, SLC24A3, SLC25A17, SLC35F3, SLC39A3, SLC39A10, SLC4A4, SLC4A11, SLC41A1, SLC44A2, SLC46A2, SLC6A15, SLC7A6, SLC7A8, SLC7A11, SLC9A3, SLIT3, SMARCA4, SMARCC2, SMC4, SMC6, SMCHD1, SMG1, SMG1P3, SMN2, SMPD4, SMTN, SMYD3, SMYD5, SNAP23, SNED1, SNHG16, SNX7, SNX14, SOCS2, SON, SORBS2, SORCS2, SOS2, SOX7, SPATA18, SPATA20, SPATA5, SPATS2, SPDYA, SPEF2, SPG20, SPIDR, SPRED2, SPRYD7, SQLE, SQRDL, SQSTM1, SRCAP, SREBF1, SREK1, SRGAP1, SRRM1, SRSF3, STAC2, STARD4, STAT1, STAT3, STAT4, STAU1, STC2, STEAP2, STK32B, STRIP1, STRN3, STRN4, STS, STX16, STXBP6, SULF1, SUPT20H, SVEP1, SYNE1, SYNE2, SYNGR2, SYNPO, SYNPO2, SYNPO2L, SYT15, SYTL2, TACC1, TAF2, TAGLN3, TANC2, TANGO6, TARBP1, TARS, TASP1, TBC1D15, TBL2, TCF12, TCF4, TCF7L2, TENC1, TENM2, TEP1, TET3, TEX21P, TFCP2, TGFA, TGFB2, TGFB3, TGFBI, TGFBR1, TGFBRAP1, TGM2, THADA, THAP4, THBS2, THRB, TIAM1, TIMP2, TJP2, TLE3, TLK1, TMC3, TMEM102, TMEM119,

TMEM134, TMEM154, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM47, TMEM50B, TMEM63A, TNC, TNFAIP3, TNFAIP8L3, TNFRSF12A, TNFRSF14, TNIP1, TNKS1BP1, TNPO3, TNRC18P1, TNRC6A, TNS1, TNS3, TNXB, TOE1, TOMM40, TOMM5, TOPORS, TP53AIP1, TP53INP1, TPRG1, TRAF3, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM26, TRIM28, TRIM65, TRIM66, TRMT1L, TRPC4, TRPS1, TSC2, TSHZ1, TSHZ2, TSPAN11, TSPAN18, TSPAN2, TSPAN7, TSSK3, TTC7A, TTC7B, TUBB2C, TUBB3, TUBE1, TXNIP, TXNL1, TXNRD1, TYW5, U2SURP, UBAP2L, UBE2G2, UBE2V1, UBQLN4, UCHL5, UHMK1, UHRF1BP1L, UNC5B, URGCP, USP19, USP7, USP27X, UVVAG, VANGL1, VARS2, VAV2, VCL, VIM-AS1, VIPAS39, VPS13A, VPS29, VPS41, VPS51, VSTM2L, VWA8, VWF, WDR19, WDR27, WDR37, WDR48, WDR91, WIPF1, WISP1, WNK1, WNT5B, WNT10B, WSB1, WWTR1, XIAP, XRN2, YAP1, YDJC, YES1,YPEL5, YTHDF3, Z24749, ZAK, ZBTB10, ZBTB24, ZBTB26, ZBTB7A, ZC3H12C, ZC3H14, ZC3H18, ZCCHC5, ZCCHC8, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZFP82, ZHX3, ZMIZ1, ZMIZ1-AS1, ZMYM2, ZNF12, ZNF138, ZNF148, ZNF212, ZNF219, ZNF227, ZNF232, ZNF24, ZNF268, ZNF28, ZNF281, ZNF335, ZNF350, ZNF37A, ZNF37BP, ZNF395, ZNF431, ZNF583, ZNF621, ZNF652, ZNF655, ZNF660, ZNF674, ZNF680, ZNF74, ZNF764, ZNF778, ZNF780A, ZNF79, ZNF827, ZNF837, ZNF839 or ZNF91.

[00899] In a specific embodiment of the foregoing aspect, as listed in Table 2, the gene is:

ABCA1, ABCB7, ABCC1, ABHD10, ABL2, ABLIM3, ACACA, ACADVL, ACAT2, ADAM12, ADAM15, ADAM17, ADAM33, AFF2, AGK, AGPAT3, AGPS, AHCYL2, AHDC1, AHRR, AJUBA, AK021888, AK310472, AKAP1, AKAP9, AKNA, ALCAM, ALDH4A1, AMPD2, ANK2, ANKFY1, ANKHD1-EIF4EBP3, ANKRD17, ANKS6, ANP32A, ANXA11, ANXA6, AP2B1, APAF1, APLP2, APP, APPL2, APTX, ARHGAP22, ARID1A, ARID2, ARMCX3, ASAP1, ASL, ASNS, ASPH, ATAD2B, ATF7IP, ATG9A, ATMIN, ATP2C1, ATXN3, AURKA, AXIN1, B4GALT2, BACE1, BAG2, BASP1, BC033281, BCAR3, BEND6, BICD1, BIN1, BNC1, BRD2, BRPF1, BSCL2, BTBD10, BZW1, C11orf30, C11orf73, C17orf76-AS1, C4orf27, C5orf24, C6orf48, C9orf69, CAB39, CALU, CAMKK1, CAPNS1, CASC3, CASP8AP2, CAV1, CCAR1, CCDC77, CCDC88A, CCDC92, CCT6A, CD276, CD46, CDC25B, CDC40, CDC42BPA, CDCA7, CDH11, CDH13, CDK11B, CDK16, CDKAL1, CEP68, CFLAR, CHD8, CIZ1, CLIC1, CLK4, CNOT1, COG1, COL12A1, COL1A1, COL6A1, COPS7B, CPEB2, CREB5, CRLS1, CRTAP, CSDE1, CSNK1A1, CTDSP2, CTNND1, CUL2,

CUL4A, CUX1, CYB5B, CYBRD1, CYP51A1, DAB2, DACT1, DARS, DAXX, DCAF10, DCAF11, DCBLD2, DCUN1D4, DDAH1, DDAH2, DDHD2, DDR1, DDX39B, DDX42, DENND1A, DENND1B, DENND5A, DGCR2, DGKA, DHCR24, DHCR7, DHFR, DHX9, DIAPH1, DIAPH3, DIS3L, DKFZp434M1735, DKK3, DLC1, DNM2, DOCK1, DPP8, DSEL, DST, DSTN, EBF1, EEA1, EEF1A1, EFCAB14, EGR1, EHMT2, EIF2B3, EIF4G1, EIF4G2, EIF4G3, ELF2, ENG, ENPP2, ENSA, EPN1, EPT1, ERC1, ERGIC3, ETV5, EXO1, EXTL2, EYA3, FADS1, FADS2, FAF1, FAM111A, FAM198B, FAM219A, FAM219B, FAM3C, FAM65A, FBXO10, FBXO18, FBXO31, FBXO34, FBXO9, FDFT1, FDPS, FER, FEZ1, FGD5-AS1, FGFR1, FHOD3, FLII, FLNB, FN1, FNBP1, FOCAD, FOS, FOSB, FOSL1, FOXK1, FOXM1, FUS, FYN, GABPB1, GALC, GALNT1, GAS7, GBA2, GCFC2, GGCT, GHDC, GIGYF2, GJC1, GMIP, GNA13, GNAS, GNL3L, GOLGA2, GOLGA4, GOLGB1, GORASP1, GPR1, GPR89A, GPSM2, GREM1, GRK6, GSE1, GTF2H2B, HAS2, HAT1, HAUS3, HAUS6, HDAC7, HEG1, HLA-A, HLA-E, HLTF, HMGA1, HMGB1, HMGCR, HMGC1, HMOX1, HNRNPR, HNRNPUL1, HP1BP3, HRH1, HSD17B12, HSD17B4, HTT, IARS, IDH1, IDI1, IGF2BP2, IL6ST, INHBA, INSIG1, IQCE, ITGAV, ITGB5, ITM2C, ITSN1, KANSL3, KCNK2, KIAA1033, KIAA1143, KIAA1199, KIAA1522, KIAA1524, KIAA1549, KIAA1715, KIF14, KIF2A, KIF3A, KLC1, KLC2, KLF6, KLHL7, KRT18, KRT19, KRT34, KRTAP2-3, LAMA2, LAMB1, LARP4, LARP7, LATS2, LDLR, LEMD3, LGALS8, LIMS1, LINC00341, LINC00657, LMAN2L, LMO7, LONP1, LOX, LRCH4, LRIG1, LRP8, LRRC8A, LSS, LTBR, LUC7L2, LZTS2, MADD, MAGED4, MAGED4B, MAN1A2, MAP4K4, MBD1, MBOAT7, MDM2, MED1, MEDAG, MEF2D, MEIS2, MEMO1, MEPCE, MFGE8, MICAL2, MINPP1, MKL1, MKLN1, MKNK2, MLLT4, MLST8, MMAB, MMS19, MMS22L, MPPE1, MPZL1, MRPL3, MSANTD3, MSC, MSH2, MSH6, MSL3, MSMO1, MSRB3, MTAP, MTERFD1, MTHFD1L, MTMR9, MTRR, MUM1, MVD, MVK, MYADM, MYLK, MYO1D, MYO9B, MYOF, NAA35, NADK, NASP, NAV1, NAV2, NCOA1, NCOA3, NCOA4, NCSTN, NELFA, NEO1, NEURL1B, NF2, NFE2L1, NFX1, NID1, NID2, NIPA1, NKX3-1, NOL10, NOMO3, NPEPPS, NRD1, NREP, NRG1, NSUN4, NT5C2, NT5E, NTNG1, NUDT4, NUP153, NUP35, NUP50, NUPL1, NUSAP1, ODF2, OS9, OSBPL6, OSMR, P4HA1, P4HB, PABPC1, PAK4, PAPD4, PARD3, PARN, PARP14, PARP4, PARVB, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PCNXL2, PCSK9, PDE4A, PDE7A, PDLIM7, PDXDC1, PEPD, PEX5, PFKP, PHF19, PHF8, PHRF1, PHTF2, PI4K2A, PIEZO1, PIGU, PIK3C2B, PITPNA,

PITPNB, PITPNM1, PLAU, PLEC, PLEKHB2, PLSCR3, PLXNB2, PLXNC1, PMS1, POLE3, POLR3D, POSTN, POU2F1, PPAPDC1A, PPARA, PPHLN1, PPIP5K1, PPP1R12A, PPP6R1, PPP6R2, PRKACB, PRKDC, PRMT1, PRNP, PRSS23, PSMA4, PSMC1, PSMD6, PTK2B, PTPN14, PUF60, PUS7, PVR, PXN, QKI, RAB23, RAB2B, RAB34, RAD1, RAD23B, RALB, RAP1A, RAP1GDS1, RARG, RASSF8, RBCK1, RBFOX2, RBM10, RCC1, RFTN1, RFWD2, RGS10, RGS3, RIF1, RNF14, RNF19A, RNF38, RNFT1, RPL10, RPS6KC1, RRBP1, RWDD4, SAMD9, SAMD9L, SAR1A, SART3, SCAF4, SCAF8, SCD, SCLT1, SCO1, SDCBP, SEC14L1, SEC22A, SEC24B, SEC61A1, SEPT9, SERPINE2, SF1, SGOL2, SH3RF1, SKIL, SLC25A17, SLC39A3, SLC41A1, SLC4A4, SLC7A6, SLC7A8, SMARCA4, SMARCC2, SMC4, SMC6, SMCHD1, SMG1, SMN2, SMPD4, SMYD3, SMYD5, SNAP23, SNHG16, SNX14, SOCS2, SON, SOS2, SPATA20, SPATS2, SPG20, SPRED2, SQLE, SQRDL, SQSTM1, SRCAP, SREBF1, SREK1, SRSF3, STARD4, STAT1, STAT3, STAU1, STC2, STEAP2, STRIP1, STRN3, STX16, SUPT20H, SYNE1, SYNE2, SYT15, SYTL2, TACC1, TAF2, TANC2, TARBP1, TARS, TBC1D15, TBL2, TCF7L2, TENC1, TENM2, TEP1, TET3, TFCP2, TGFBI, TGFBR1, TGFBRAP1, THADA, THAP4, THRB, TIMP2, TJP2, TLE3, TLK1, TMEM154, TMEM47, TMEM63A, TNC, TNFAIP3, TNFRSF12A, TNIP1, TNKS1BP1, TNPO3, TNS1, TNS3, TOE1, TOMM40, TOMM5, TOPORS, TP53INP1, TRAF3, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM26, TRIM28, TRIM65, TRMT1L, TRPS1, TSC2, TSHZ1, TSPAN2, TTC7A, TUBB2C, TUBB3, TXNL1, TXNRD1, U2SURP, UBAP2L, UBE2G2, UBE2V1, UBQLN4, UCHL5, UHMK1, UHRF1BP1L, UNC5B, USP19, USP7, VANGL1, VARS2, VCL, VIPAS39, VPS13A, VPS29, VPS51, VWA8, WDR19, WDR37, WDR48, WIPF1, WNT5B, WSB1, WWTR1, XIAP, XRN2, YAP1, YES1, YPEL5, YTHDF3, Z24749, ZAK, ZBTB10, ZBTB24, ZBTB7A, ZC3H12C, ZC3H14, ZC3H18, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZHX3, ZMIZ1, ZMYM2, ZNF12, ZNF148, ZNF219, ZNF227, ZNF24, ZNF268, ZNF28, ZNF281, ZNF335, ZNF37A, ZNF37BP, ZNF395, ZNF583, ZNF621, ZNF652, ZNF655, ZNF674, ZNF74, ZNF764, ZNF778, ZNF780A, ZNF827, ZNF839 or ZNF91.

[00900] In a specific embodiment of the foregoing aspect, the gene is: ABCB8, ANKRD36, APLP2, ARHGAP12, ARMCX6, ASAP1, ATG5, AXIN1, BIRC6, C1orf86, CDC42BPA, CLTA, DYRK1A, ERGIC3, FBXL6, FOXM1, GGCT, KAT6B, KDM6A, KIF3A, KMT2D, LARP7, LYRM1, MADD, MAN2C1, MRPL55, MYCBP2, MYO9B, PNISR, RAP1A,

RAPGEF1, SENP6, SH3YL1, SLC25A17, SMN2, SREK1, STRN3, TAF2, TMEM134, VPS29, ZFAND1 or ZNF431.

[00901] In another specific embodiment of the foregoing aspect, the gene is: ABCB8, ANKRD36, ARHGAP12, ARMCX6, ATG5, BIRC6, C1orf86, CLTA, DYRK1A, FBXL6, KAT6B, KDM6A, KMT2D, LYRM1, MAN2C1, MRPL55, MYCBP2, PNISR, RAPGEF1, SENP6, SH3YL1, TMEM134 or ZNF431.

[00902] In another specific embodiment of the foregoing aspect, the gene is: ABCA10, ABCC1, ACTA2, ADAL, ADAM12, ADAMTS1, ADAMTS5, ADD1, ADGRG6, ADH6, ADHFE1, AFF2, AFF3, AGK, AGPS, AKAP3, ANK1, ANK2, ANK3, ANKRD33B, ANXA11, ANXA6, AP4B1-AS1, ARHGEF16, ARID5B, ARL9, ARMCX3, ASAP1, ASIC1, ATP2A3, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BIN3-IT1, BIRC3, BTG2, C10orf54, C11orf70, C11orf73, C11orf94, C12orf56, C19orf47, C3, C4orf27, C7orf31, C8orf34, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CCDC79, CCER2, CCNF, CDCA7, CDKAL1, CELSR1, CEMIP, CEP170, CFH, CIITA, CLDN23, CMAHP, CNGA4, CNTD1, COL11A1, COL12A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CRISPLD2, CRLF1, CRYL1, CUX1, CYB5B, CYB5R2, CYGB, CYP1B1, DCLK1, DCN, DDIT4L, DDX42, DDX50, DEGS1, DENND1A, DENND5A, DEPTOR, DFNB59, DGKA, DHFR, DIAPH3, DIRAS3, DIS3L, DLG5, DNAH8, DNAJC27, DOCK1, DOCK11, DYNC1I1, DZIP1L, EBF1, EFEMP1, EGR3, EIF2B3, ELN, ELP4, EMX2OS, ENPP1, ERCC8, ESM1, EVC2, F2R, FAM160A1, FAM198B, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FCHO1, FER, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALT, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GNAQ, GOLGB1, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HECTD2-AS1, HEPH, HEY1, HLTF, HMGN3-AS1, HMOX1, HOOK3, HSD17B12, HSPA1L, HTATIP2, HTT, IGDCC4, IGF2R, IGFBP3, IL16, INA, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1524, KIAA1715, KIAA1755, KIT, KLF17, KLRG1, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LRBA, LRP4, LRRC32, LRRC39, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN1A2, MAN2A1, MAPK13, MASP1, MB, MC4R, MEDAG,

MEGF6, MEMO1, MIAT, MIR612, MLLT10, MMP10, MMP24, MMS19, MN1, MOXD1, MRV11, MSH4, MTERF3, MXRA5, MYO1D, NA, NAALADL2, NAE1, NAGS, NDNF, NEURL1B, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, NTNG1, OCLN, OLR1, OSBPL10, OXCT2, PAIP2B, PAPD4, PBLD, PCM1, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PDXDC1, PEAR1, PEPD, PHACTR3, PI4K2B, PIK3R1, PIM2, PITPNB, PITPNM3, PLAU, PLEK2, PLEKHA6, PLEKHH2, PLXNC1, PMS1, PODN, POLN, POLR1A, POSTN, PPM1E, PPP3CA, PRKCA, PRKDC, PRKG1, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, RAB30, RAB38, RAB44, RAD9B, RARS, RBBP8, RBKS, RCC1, RDX, RFWD2, RFX3-AS1, RGCC, RNFT1, ROR1, ROR2, RWDD4, SCARNA9, SCO1, SEC22A, SHROOM3, SIGLEC10, SLC24A3, SLC35F3, SLC39A10, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SMYD3, SNED1, SORBS2, SORCS2, SOX7, SPDYA, SPEF2, SQRDL, STAC2, STAT1, STAT4, STEAP2, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TARBP1, TEX21P, TGFA, TGFB2, TGFB3, TGM2, THADA, THBS2, THRB, TMEM102, TMEM119, TMEM256-PLSCR3, TMEM50B, TNC, TNFAIP8L3, TNFRSF14, TNRC18P1, TNS3, TNXB, TP53AIP1, TPRG1, TRAF3, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TXNIP, UNC5B, USP27X, UVRAG, VIM-AS1, VPS41, VSTM2L, VWA8, VWF, WDR91, WISP1, WNT10B, XRN2, YDJC, ZBTB26, ZCCHC5, ZFP82, ZMIZ1-AS1, ZNF212, ZNF350, ZNF660, ZNF79 or ZNF837.

[00903] In another specific embodiment of the foregoing aspect, the gene is: ABCA10, ACTA2, ADAL, ADAMTS1, ADAMTS5, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AKAP3, ANK1, ANK3, ANKRD33B, AP4B1-AS1, ARHGEF16, ARID5B, ARL9, ASIC1, ATP2A3, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BIN3-IT1, BIRC3, BTG2, C10orf54, C11orf70, C11orf94, C12orf56, C19orf47, C3, C7orf31, C8orf34, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CCDC79, CCER2, CCNF, CELSR1, CEMIP, CEP170, CFH, CIITA, CLDN23, CMAHP, CNGA4, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CRISPLD2, CRLF1, CRYL1, CYB5R2, CYGB, CYP1B1, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFN59, DIRAS3, DLG5, DNAH8, DNAJC27, DOCK11, DYNC11I, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENPP1, ERCC8, ESM1, EVC2, F2R, FAM160A1, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2,

GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HECTD2-AS1, HEPH, HEY1, HMGN3-AS1, HOOK3, HSPA1L, HTATIP2, IGDCC4, IGF2R, IGFBP3, IL16, INA, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LRBA, LRP4, LRRC32, LRRC39, LSAMP, LUM, LYPD1, MAFB, MAMDC2, MAN2A1, MAPK13, MASP1, MB, MC4R, MEGF6, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRVI1, MSH4, MTERF3, MXRA5, NA, NAALADL2, NAE1, NAGS, NDNF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PI4K2B, PIK3R1, PIM2, PITPNM3, PLEK2, PLEKHA6, PLEKHH2, PODN, POLN, POLR1A, PPM1E, PPP3CA, PRKCA, PRKG1, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, RAB30, RAB38, RAB44, RAD9B, RARS, RBBP8, RBKS, RDX, RFX3-AS1, RGCC, ROR1, ROR2, SCARNA9, SHROOM3, SIGLEC10, SLC24A3, SLC35F3, SLC39A10, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SORBS2, SORCS2, SOX7, SPDYA, SPEF2, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TEX2IP, TGFA, TGFB2, TGFB3, TGM2, THBS2, TMEM102, TMEM119, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TXNIP, USP27X, UVRAG, VIM-AS1, VPS41, VSTM2L, VWF, WDR91, WISP1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZFP82, ZMIZ1-AS1, ZNF212, ZNF350, ZNF660, ZNF79 or ZNF837.

[00904] In another specific embodiment of the foregoing aspect, as listed in Table 7, the gene is ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APLP2, APLP2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, AXIN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB,

DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DLGAP4, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERCC1, ERGIC3, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FAM198B, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GGCT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HAT1, HDX, HLTf, HMGA2, HNMT, HPS1, HSD17B12, HSD17B4, HTT, IFT57, INPP5K, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MADD, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPHLN1, PPIP5K2, PPP1R26, PRPF31, PRSS23, PRUNE2, PSMA4, PXX, RAF1, RAP1A, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RNFT1, RPA1, RPS10, RPS6KB2, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STRN3, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TRIM65, TSPAN2, TTC7B, TUBE1, TYW5, UBAP2L, UBE2V1, URGCP, VAV2, VPS29, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232, ZNF37BP or ZNF680.

[00905] In another specific embodiment of the foregoing aspect, the gene is ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTf, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45,

MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP.

[00906] In another specific embodiment of the foregoing aspect, the gene is APLP2, AXIN1, CECR7, DAGLB, DLGAP4, ERCC1, ERGIC3, FAM198B, GGCT, HAT1, HPS1, INPP5K, MADD, PPHLN1, PRUNE2, RAP1A, RNFT1, RPS6KB2, SH3YL1, SKA2, SPATA18, STRN3, TMEM189-UBE2V1, TRIM65, TUBE1, UBE2V1, VPS29 or ZNF680.

[00907] In another specific embodiment of the foregoing aspect, the gene is ABCB8, ABCC3, ADCY3, AGPAT4, ANKRA2, APIP, ARHGAP1, ARL15, ATXN1, BECN1, BHMT2, BTN3A1, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASP7, CCDC122, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DLGAP4, DNAJC13, DNMBP, DYRK1A, ENAH, EP300, ERCC1, ERLIN2, ERFFI1, EVC, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, GGACT, GLCE, GULP1, GXYLT1, HDX, HMGA2, HNMT, HPS1, IFT57, INPP5K, IVD, KDM6A, LETM2, LOC400927, LRRC42, LYRM1, MB21D2, MCM10, MED13L, MFN2, MRPL45, MRPS28, MTERF3, MYCBP2, NGF, OXCT1, PDS5B, PIGN, PIK3CD, PIK3R1, PIKFYVE, PLEKHA1, PLSCR1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRUNE2, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RPA1, RPS10, RPS6KB2, SAMD4A, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC44A2, SNX7, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STXBP6, TASP1, TCF12, TCF4, TIAM1, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TTC7B, TUBE1, TYW5, URGCP, VAV2, WDR27, WDR91, WNK1, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF680.

[00908] In another particular aspect, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene in a subject, wherein the precursor RNA

transcript transcribed from the gene comprises an intronic REMS (for example, an endogenous intronic REMS or a non-endogenous intronic REMS), the methods comprising administering to the subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00909] In another particular aspect, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene in a subject, wherein the precursor RNA transcript transcribed from the gene comprises a non-endogenous intronic REMS, the methods comprising administering to the subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00910] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the precursor RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00911] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or a protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn

(SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00912] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a nucleotide sequence encoding a first branch point and a nucleotide sequence encoding a first 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00913] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1A, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00914] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1B, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00915] In another embodiment, provided herein is a method for modulating the amount of a product of a gene (such as an RNA transcript or protein) in a subject, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1C, the method

comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00916] In a specific embodiment, the gene is a gene described in a table in this disclosure.

[00917] In another embodiment, provided herein are methods for modulating the amount of one, two, three or more RNA transcripts of a gene, disclosed in Table 7, *infra*, comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. See the example section for additional information regarding the genes in Table 7. In a specific embodiment, the RNA transcript contains in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS. In a specific embodiment, the method for modulating the amount of one or more RNA transcripts of a gene using a compound of Formula (I) or a form thereof is as described in the Examples described herein.

[00918] In certain embodiments, a compound of Formula (I) or a form thereof contacted or cultured with a cell(s), or administered to a subject is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI), Formula (XII), Formula (XIII), or Formula (XIV). In some embodiments, a compound of Formula (I) or a form thereof contacted or cultured with a cell(s), or administered to a subject is a compound described herein.

[00919] **Table 1** shows certain genes that are expected to demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of iExon generation in RNA having intronic REMS elements in the presence of a compound as described herein. The change in abundance is expected to have a statistically significant p value.

[00920] **Table 1**

Table 1
ABCA1, ABCA10, ABCB7, ABCB8, ABCC1, ABCC3, ABHD10, ABL2, ABLIM3, ACACA, ACADVL, ACAT2, ACTA2, ADAL, ADAM12, ADAM15, ADAM17, ADAM33, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF2, AFF3, AGK, AGPAT3, AGPAT4, AGPS, AHCYL2, AHDC1, AHRR, AJUBA, AK021888, AK310472, AKAP1, AKAP3, AKAP9, AKNA, ALCAM, ALDH4A1, AMPD2, ANK1, ANK2, ANK3, ANKFY1, ANKHD1-EIF4EBP3, ANKRA2, ANKRD17, ANKRD33B, ANKRD36, ANKS6, ANP32A, ANXA11, ANXA6, AP2B1, AP4B1-AS1, APAF1, APIP, APLP2, APP, APPL2, APTX, ARHGAP1, ARHGAP12, ARHGAP22, ARHGEF16, ARID1A, ARID2, ARID5B, ARL9,

Table 1

ARL15, ARMCX3, ARMCX6, ASAP1, ASIC1, ASL, ASNS, ASPH, ATAD2B, ATF7IP, ATG5, ATG9A, ATMIN, ATP2A3, ATP2C1, ATXN1, ATXN3, AURKA, AXIN1, B3GALT2, B3GNT6, B4GALT2, BACE1, BAG2, BASP1, BC033281, BCAR3, BCL2L15, BCYRN1, BECN1, BEND6, BHMT2, BICD1, BIN1, BIN3-IT1, BIRC3, BIRC6, BNC1, BRD2, BRPF1, BSCL2, BTBD10, BTG2, BTN3A1, BZW1, C1orf86, C10orf54, C11orf30, C11orf70, C11orf73, C11orf94, C12orf4, C12orf56, C14orf132, C17orf76-AS1, C19orf47, C3, C4orf27, C5orf24, C6orf48, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, C9orf69, CA13, CA3, CAB39, CACNA2D2, CACNB1, CADM1, CALU, CAMKK1, CAND2, CAPNS1, CASC3, CASP7, CASP8AP2, CAV1, CCAR1, CCDC77, CCDC79, CCDC88A, CCDC92, CCDC122, CCER2, CCNF, CCT6A, CD276, CD46, CDC25B, CDC40, CDC42BPA, CDCA7, CDH11, CDH13, CDK11B, CDK16, CDKAL1, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CEP68, CFH, CFLAR, CHD8, CHEK1, CIITA, CIZ1, CLDN23, CLIC1, CLK4, CLTA, CMAHP, CNGA4, CNOT1, CNRIP1, CNTD1, COG1, COL1A1, COL11A1, COL12A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A1, COL6A6, COL8A1, COLEC12, COMP, COPS7B, CPA4, CPEB2, CPQ, CPSF4, CREB5, CRISPLD2, CRLF1, CRLS1, CRTAP, CRYBG3, CRYL1, CSDE1, CSNK1A1, CSNK1E, CSNK1G1, CTDSP2, CTNND1, CUL2, CUL4A, CUX1, CYB5B, CYB5R2, CYBRD1, CYGB, CYP1B1, CYP51A1, DAB2, DACT1, DAGLB, DARS, DAXX, DCAF10, DCAF11, DCAF17, DCBLD2, DCLK1, DCN, DCUN1D4, DDAH1, DDAH2, DDHD2, DDIT4L, DDR1, DDX39B, DDX42, DDX50, DEGS1, DENND1A, DENND1B, DENND5A, DEPTOR, DFNB59, DGCR2, DGKA, DHCR24, DHCR7, DHFR, DHX9, DIAPH1, DIAPH3, DIRAS3, DIS3L, DKFZp434M1735, DKK3, DLC1, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNM2, DNMBP, DOCK1, DOCK11, DPP8, DSEL, DST, DSTN, DYNC1I1, DYRK1A, DZIP1L, EBF1, EEA1, EEF1A1, EFCAB14, EFEMP1, EGR1, EGR3, EHMT2, EIF2B3, EIF4G1, EIF4G2, EIF4G3, ELF2, ELN, ELP4, EMX2OS, ENAH, ENG, ENPP1, ENPP2, ENSA, EP300, EPN1, EPT1, ERC1, ERCC1, ERCC8, ERGIC3, ERLIN2, ERRF1, ESM1, ETV5, EVC, EVC2, EXO1, EXTL2, EYA3, F2R, FADS1, FADS2, FAF1, FAIM, FAM111A, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM198B, FAM20A, FAM219A, FAM219B, FAM3C, FAM46B, FAM65A, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXO9, FBXL6, FBXO10, FBXO18, FBXO31, FBXO34, FBXO9, FCHO1, FDFT1, FDPS, FER, FEZ1, FGD5-AS1, FGFR2, FGFR1, FGL2, FHOD3, FLII, FLNB, FLT1, FN1, FNBP1, FOCAD, FOS, FOSB, FOSL1, FOXK1, FOXM1, FRAS1, FSCN2, FUS, FYN, GABPB1, GAL3ST4, GALT, GALNT1, GALNT15, GAS7, GATA6, GBA2, GBGT1, GCFC2, GCNT1, GDF6, GGACT, GGCT, GHDC, GIGYF2, GJC1, GLCE, GMIP, GNA13, GNAQ, GNAS, GNL3L, GOLGA2, GOLGA4, GOLGB1, GORASP1, GPR1, GPR183, GPR50, GPR89A, GPRC5A, GPRC5B, GPSM2, GREM1, GRK6, GRTP1, GSE1, GTF2H2B, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS2, HAS3, HAT1, HAUS3, HAUS6, HAVCR2, HDAC5, HDAC7, HDX, HECTD2-AS1, HEG1, HEPH, HEY1, HLA-A, HLA-E, HLTF, HMGA1, HMGA2, HMGB1, HMGB2, HMGN3-AS1, HMGCS1, HOOK3, HMOX1, HNMT, HNRNP, HNRNPUL1, HP1BP3, HPS1, HRH1, HSD17B12, HSD17B4, HSPA1L, HTATIP2, HTT, IARS, IDH1, IDI1, IFT57, IGDCC4, IGF2BP2, IGF2R, IGFBP3, IL16, IL6ST, INA, INHBA, INPP5K, INSIG1, INTU, IQCE, IQCG, ITGA11, ITGA8, ITGAV, ITGB5, ITGB8, ITIH1, ITM2C, ITPKA, ITS1N1, IVD, KANSL3, KAT6B, KCNK2, KCNS1, KCNS2, KDM6A, KDSR, KIAA1033, KIAA1143, KIAA1199,

Table 1

KIAA1456, KIAA1462, KIAA1522, KIAA1524, KIAA1549, KIAA1715, KIAA1755, KIF14, KIF2A, KIF3A, KIT, KLC1, KLC2, KLF17, KLF6, KLHL7, KLRG1, KMT2D, KRT7, KRT18, KRT19, KRT34, KRTAP1-1, KRTAP1-5, KRTAP2-3, L3MBTL2, LAMA2, LAMB1, LAMB2P1, LARP4, LARP7, LATS2, LDLR, LEMD3, LETM2, LGALS8, LGI2, LGR4, LHX9, LIMS1, LINC00341, LINC00472, LINC00570, LINC00578, LINC00607, LINC00657, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMAN2L, LMO7, LMOD1, LOC400927, LONP1, LOX, LRBA, LRCH4, LRIG1, LRP4, LRP8, LRRC32, LRRC39, LRRC42, LRRC8A, LSAMP, LSS, LTBR, LUC7L2, LUM, LYPD1, LYRM1, LZTS2, MADD, MAFB, MAGED4, MAGED4B, MAMDC2, MAN1A2, MAN2A1, MAN2C1, MAP4K4, MAPK13, MASP1, MB, MB21D2, MBD1, MBOAT7, MC4R, MCM10, MDM2, MED1, MED13L, MEDAG, MEF2D, MEGF6, MEIS2, MEMO1, MEPCE, MFGE8, MFN2, MIAT, MICAL2, MINPP1, MIR612, MKL1, MKLN1, MKNK2, MLLT4, MLLT10, MLST8, MMAB, MMP10, MMP24, MMS19, MMS22L, MN1, MOXD1, MPPE1, MPZL1, MRPL3, MRPL45, MRPL55, MRPS28, MRV11, MSANTD3, MSC, MSH2, MSH4, MSH6, MSL3, MSMO1, MSRB3, MTAP, MTERF3, MTERFD1, MTHFD1L, MTMR9, MTRR, MUM1, MVD, MVK, MXRA5, MYADM, MYCBP2, MYLK, MYO1D, MYO9B, MYOF, NA, NAA35, NAALADL2, NADK, NAE1, NAGS, NASP, NAV1, NAV2, NCOA1, NCOA3, NCOA4, NCSTN, NDNF, NELFA, NEO1, NEURL1B, NF2, NFE2L1, NFX1, NGF, NGFR, NHLH1, NID1, NID2, NIPA1, NKX3-1, NLN, NOL10, NOMO3, NOTCH3, NOTUM, NOVA2, NOX4, NPEPPS, NRD1, NREP, NRG1, NRROS, NSUN4, NT5C2, NT5E, NTNG1, NUDT4, NUP153, NUP35, NUP50, NUPL1, NUSAP1, OCLN, ODF2, OLR1, OS9, OSBPL6, OSBPL10, OSMR, OXCT1, OXCT2, P4HA1, P4HB, PABPC1, PAIP2B, PAK4, PAPD4, PARD3, PARN, PARP14, PARP4, PARVB, PBLD, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PCNXL2, PCSK9, PDE1C, PDE4A, PDE5A, PDE7A, PDGFD, PDGFRB, PDLIM7, PDS5B, PDXDC1, PEAR1, PEPD, PEX5, PFKP, PHACTR3, PHF19, PHF8, PHRF1, PHTF2, PI4K2A, PIEZO1, PIGN, PIGU, PIK3C2B, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNA, PITPNB, PITPNM1, PITPNM3, PLAUI, PLEC, PLEK2, PLEKHA1, PLEKHA6, PLEKHB2, PLEKHH2, PLSCR1, PLSCR3, PLXNB2, PLXNC1, PMS1, PNISR, PODN, POLE3, POLN, POLR1A, POLR3D, POMT2, POSTN, POU2F1, PPAPDC1A, PPARA, PPARG, PPHLN1, PPIP5K1, PPIP5K2, PPM1E, PPP1R12A, PPP1R26, PPP3CA, PPP6R1, PPP6R2, PRKACB, PRKCA, PRKDC, PRKG1, PRMT1, PRNP, PRPF31, PRPH2, PRRG4, PRSS23, PRUNE2, PSMA4, PSMC1, PSMD6, PSMD6-AS2, PTGIS, PTK2B, PTPN14, PTX3, PUF60, PUS7, PVR, PXX, PXN, QKI, RAB23, RAB2B, RAB30, RAB34, RAB38, RAB44, RAD1, RAD9B, RAD23B, RAF1, RALB, RAP1A, RAP1GDS1, RAPGEF1, RARG, RARS, RARS2, RASSF8, RBBP8, RBCK1, RBFOX2, RBKS, RBM10, RCC1, RDX, RERE, RFTN1, RFWD2, RFX3-AS1, RGCC, RGS10, RGS3, RIF1, RNF14, RNF19A, RNF38, RNFT1, ROR1, ROR2, RPA1, RPL10, RPS10, RPS6KB2, RPS6KC1, RRBP1, RWDD4, SAMD4A, SAMD9, SAMD9L, SAR1A, SART3, SCAF4, SCAF8, SCARNA9, SCD, SCLT1, SCO1, SDCBP, SEC14L1, SEC22A, SEC24A, SEC24B, SEC61A1, SENP6, SEPT9, SERGEF, SERPINE2, SF1, SGK3, SGOL2, SH3RF1, SH3YL1, SHROOM3, SIGLEC10, SKA2, SKIL, SLC12A2, SLC24A3, SLC25A17, SLC35F3, SLC39A3, SLC39A10, SLC4A4, SLC4A11, SLC41A1, SLC44A2, SLC46A2, SLC6A15, SLC7A6, SLC7A8, SLC7A11, SLC9A3, SLIT3, SMARCA4, SMARCC2, SMC4, SMC6,

Table 1

SMCHD1, SMG1, SMG1P3, SMN2, SMPD4, SMTN, SMYD3, SMYD5, SNAP23, SNED1, SNHG16, SNX7, SNX14, SOCS2, SON, SORBS2, SORCS2, SOS2, SOX7, SPATA18, SPATA20, SPATA5, SPATS2, SPDYA, SPEF2, SPG20, SPIDR, SPRED2, SPRYD7, SQLE, SQRD1, SQSTM1, SRCAP, SREBF1, SREK1, SRGAP1, SRRM1, SRSF3, STAC2, STARD4, STAT1, STAT3, STAT4, STAU1, STC2, STEAP2, STK32B, STRIP1, STRN3, STRN4, STS, STX16, STXBP6, SULF1, SUPT20H, SVEP1, SYNE1, SYNE2, SYNGR2, SYNPO, SYNPO2, SYNPO2L, SYT15, SYTL2, TACC1, TAF2, TAGLN3, TANC2, TANGO6, TARBP1, TARS, TASP1, TBC1D15, TBL2, TCF12, TCF4, TCF7L2, TENC1, TENM2, TEPI1, TET3, TEX21P, TFCP2, TGFA, TGFB2, TGFB3, TGFBI, TGFB1, TGFB1P1, TGM2, THADA, THAP4, THBS2, THRB, TIAM1, TIMP2, TJP2, TLE3, TLK1, TMC3, TMEM102, TMEM119, TMEM134, TMEM154, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM47, TMEM50B, TMEM63A, TNC, TNFAIP3, TNFAIP8L3, TNFRSF12A, TNFRSF14, TNIP1, TNKS1BP1, TNPO3, TNRC18P1, TNRC6A, TNS1, TNS3, TNXB, TOE1, TOMM40, TOMM5, TOPORS, TP53AIP1, TP53INP1, TPRG1, TRAF3, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM26, TRIM28, TRIM65, TRIM66, TRMT1L, TRPC4, TRPS1, TSC2, TSHZ1, TSHZ2, TSPAN11, TSPAN18, TSPAN2, TSPAN7, TSSK3, TTC7A, TTC7B, TUBB2C, TUBB3, TUBE1, TXNIP, TXNL1, TXNRD1, TYW5, U2SURP, UBAP2L, UBE2G2, UBE2V1, UBQLN4, UCHL5, UHMK1, UHRF1BP1L, UNC5B, URGCP, USP19, USP7, USP27X, UVRAG, VANG1, VARS2, VAV2, VCL, VIM-AS1, VIPAS39, VPS13A, VPS29, VPS41, VPS51, VSTM2L, VWA8, VWF, WDR19, WDR27, WDR37, WDR48, WDR91, WIPF1, WISP1, WNK1, WNT5B, WNT10B, WSB1, WWTR1, XIAP, XRN2, YAP1, YDJC, YES1, YPEL5, YTHDF3, Z24749, ZAK, ZBTB10, ZBTB24, ZBTB26, ZBTB7A, ZC3H12C, ZC3H14, ZC3H18, ZCCHC5, ZCCHC8, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZFP82, ZHX3, ZMIZ1, ZMIZ1-AS1, ZMYM2, ZNF12, ZNF138, ZNF148, ZNF212, ZNF219, ZNF227, ZNF232, ZNF24, ZNF268, ZNF28, ZNF281, ZNF335, ZNF350, ZNF37A, ZNF37BP, ZNF395, ZNF431, ZNF583, ZNF621, ZNF652, ZNF655, ZNF660, ZNF674, ZNF680, ZNF74, ZNF764, ZNF778, ZNF780A, ZNF79, ZNF827, ZNF837, ZNF839 or ZNF91

[00921] **Table 2** shows certain genes that are expected to demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of iExon generation in RNA having intronic REMS elements in the presence of a compound as described herein. The change in abundance is expected to have a statistically significant p value.

[00922] **Table 2**

Table 2

ABCA1, ABCB7, ABCC1, ABHD10, ABL2, ABLIM3, ACACA, ACADVL, ACAT2, ADAM12, ADAM15, ADAM17, ADAM33, AFF2, AGK, AGPAT3, AGPS, AHCYL2, AHDC1, AHRR, AJUBA, AK021888, AK310472, AKAP1, AKAP9, AKNA, ALCAM, ALDH4A1, AMPD2, ANK2, ANKFY1, ANKHD1-EIF4EBP3, ANKRD17, ANKS6, ANP32A, ANXA11, ANXA6, AP2B1, APAF1, APLP2, APP, APPL2, APTX, ARHGAP22, ARID1A, ARID2, ARMCX3, ASAP1, ASL, ASNS, ASPH, ATAD2B, ATF7IP, ATG9A,

Table 2

ATMIN, ATP2C1, ATXN3, AURKA, AXIN1, B4GALT2, BACE1, BAG2, BASP1, BC033281, BCAR3, BEND6, BICD1, BIN1, BNC1, BRD2, BRPF1, BSCL2, BTBD10, BZW1, C11orf30, C11orf73, C17orf76-AS1, C4orf27, C5orf24, C6orf48, C9orf69, CAB39, CALU, CAMKK1, CAPNS1, CASC3, CASP8AP2, CAV1, CCAR1, CCDC77, CCDC88A, CCDC92, CCT6A, CD276, CD46, CDC25B, CDC40, CDC42BPA, CDCA7, CDH11, CDH13, CDK11B, CDK16, CDKAL1, CEP68, CFLAR, CHD8, CIZ1, CLIC1, CLK4, CNOT1, COG1, COL12A1, COL1A1, COL6A1, COPS7B, CPEB2, CREB5, CRLS1, CRTAP, CSDE1, CSNK1A1, CTDSP2, CTNND1, CUL2, CUL4A, CUX1, CYB5B, CYBRD1, CYP51A1, DAB2, DACT1, DARS, DAXX, DCAF10, DCAF11, DCBLD2, DCUN1D4, DDAH1, DDAH2, DDHD2, DDR1, DDX39B, DDX42, DENND1A, DENND1B, DENND5A, DGCR2, DGKA, DHCR24, DHCR7, DHFR, DHX9, DIAPH1, DIAPH3, DIS3L, DKFZp434M1735, DKK3, DLC1, DNM2, DOCK1, DPP8, DSEL, DST, DSTN, EBF1, EEA1, EEF1A1, EFCAB14, EGR1, EHMT2, EIF2B3, EIF4G1, EIF4G2, EIF4G3, ELF2, ENG, ENPP2, ENSA, EPN1, EPT1, ERC1, ERGIC3, ETV5, EXO1, EXTL2, EYA3, FADS1, FADS2, FAF1, FAM111A, FAM198B, FAM219A, FAM219B, FAM3C, FAM65A, FBXO10, FBXO18, FBXO31, FBXO34, FBXO9, FDFT1, FDPS, FER, FEZ1, FGD5-AS1, FGFRL1, FHOD3, FLII, FLNB, FN1, FNBP1, FOCAD, FOS, FOSB, FOSL1, FOXK1, FOXM1, FUS, FYN, GABPB1, GALC, GALNT1, GAS7, GBA2, GCFC2, GGCT, GHDC, GIGYF2, GJC1, GMIP, GNA13, GNAS, GNL3L, GOLGA2, GOLGA4, GOLGB1, GORASP1, GPR1, GPR89A, GPSM2, GREM1, GRK6, GSE1, GTF2H2B, HAS2, HAT1, HAUS3, HAUS6, HDAC7, HEG1, HLA-A, HLA-E, HLTF, HMGA1, HMGB1, HMGCR, HMGCS1, HMOX1, HNRNPR, HNRNPUL1, HP1BP3, HRH1, HSD17B12, HSD17B4, HTT, IARS, IDH1, IDI1, IGF2BP2, IL6ST, INHBA, INSIG1, IQCE, ITGAV, ITGB5, ITM2C, ITSN1, KANSL3, KCNK2, KIAA1033, KIAA1143, KIAA1199, KIAA1522, KIAA1524, KIAA1549, KIAA1715, KIF14, KIF2A, KIF3A, KLC1, KLC2, KLF6, KLHL7, KRT18, KRT19, KRT34, KRTAP2-3, LAMA2, LAMB1, LARP4, LARP7, LATS2, LDLR, LEMD3, LGALS8, LIMS1, LINC00341, LINC00657, LMAN2L, LMO7, LONP1, LOX, LRCH4, LRIG1, LRP8, LRRC8A, LSS, LTBR, LUC7L2, LZTS2, MADD, MAGED4, MAGED4B, MAN1A2, MAP4K4, MBD1, MBOAT7, MDM2, MED1, MEDAG, MEF2D, MEIS2, MEMO1, MEPCE, MFGE8, MICAL2, MINPP1, MKL1, MKLN1, MKNK2, MLLT4, MLST8, MMAB, MMS19, MMS22L, MPPE1, MPZL1, MRPL3, MSANTD3, MSC, MSH2, MSH6, MSL3, MSMO1, MSRB3, MTAP, MTERFD1, MTHFD1L, MTMR9, MTRR, MUM1, MVD, MVK, MYADM, MYLK, MYO1D, MYO9B, MYOF, NAA35, NADK, NASP, NAV1, NAV2, NCOA1, NCOA3, NCOA4, NCSTN, NELFA, NEO1, NEURL1B, NF2, NFE2L1, NFX1, NID1, NID2, NIPA1, NKX3-1, NOL10, NOMO3, NPEPPS, NRD1, NREP, NRG1, NSUN4, NT5C2, NT5E, NTNG1, NUDT4, NUP153, NUP35, NUP50, NUPL1, NUSAP1, ODF2, OS9, OSBPL6, OSMR, P4HA1, P4HB, PABPC1, PAK4, PAPD4, PARD3, PARN, PARP14, PARP4, PARVB, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PCNXL2, PCSK9, PDE4A, PDE7A, PDLIM7, PDXDC1, PEPD, PEX5, PFKP, PHF19, PHF8, PHRF1, PHTF2, PI4K2A, PIEZO1, PIGU, PIK3C2B, PITPNA, PITPNB, PITPNM1, PLAUI, PLEC, PLEKHB2, PLSCR3, PLXNB2, PLXNC1, PMS1, POLE3, POLR3D, POSTN, POU2F1, PPAPDC1A, PPARA, PPHLN1, PPIP5K1, PPP1R12A, PPP6R1, PPP6R2, PRKACB, PRKDC, PRMT1, PRNP, PRSS23, PSMA4, PSMC1, PSMD6, PTK2B, PTPN14, PUF60, PUS7, PVR, PXN, QKI, RAB23,

Table 2

RAB2B, RAB34, RAD1, RAD23B, RALB, RAP1A, RAP1GDS1, RARG, RASSF8, RBCK1, RBFOX2, RBM10, RCC1, RFTN1, RFWD2, RGS10, RGS3, RIF1, RNF14, RNF19A, RNF38, RNFT1, RPL10, RPS6KC1, RRBP1, RWDD4, SAMD9, SAMD9L, SAR1A, SART3, SCAF4, SCAF8, SCD, SCLT1, SCO1, SDCBP, SEC14L1, SEC22A, SEC24B, SEC61A1, SEPT9, SERPINE2, SF1, SGOL2, SH3RF1, SKIL, SLC25A17, SLC39A3, SLC41A1, SLC4A4, SLC7A6, SLC7A8, SMARCA4, SMARCC2, SMC4, SMC6, SMCHD1, SMG1, SMN2, SMPD4, SMYD3, SMYD5, SNAP23, SNHG16, SNX14, SOCS2, SON, SOS2, SPATA20, SPATS2, SPG20, SPRED2, SQLE, SQRDL, SQSTM1, SRCAP, SREBF1, SREK1, SRSF3, STARD4, STAT1, STAT3, STAU1, STC2, STEAP2, STRIP1, STRN3, STX16, SUPT20H, SYNE1, SYNE2, SYT15, SYTL2, TACC1, TAF2, TANC2, TARBP1, TARS, TBC1D15, TBL2, TCF7L2, TENC1, TENM2, TEP1, TET3, TFCP2, TGFBI, TGFB1, TGFB1P1, THADA, THAP4, THRB, TIMP2, TJP2, TLE3, TLK1, TMEM154, TMEM47, TMEM63A, TNC, TNFAIP3, TNFRSF12A, TNIP1, TNKS1BP1, TNPO3, TNS1, TNS3, TOE1, TOMM40, TOMM5, TOPORS, TP53INP1, TRAF3, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM26, TRIM28, TRIM65, TRMT1L, TRPS1, TSC2, TSHZ1, TSPAN2, TTC7A, TUBB2C, TUBB3, TXNL1, TXNRD1, U2SURP, UBAP2L, UBE2G2, UBE2V1, UBQLN4, UCHL5, UHMK1, UHRF1BP1L, UNC5B, USP19, USP7, VANGL1, VARS2, VCL, VIPAS39, VPS13A, VPS29, VPS51, VWA8, WDR19, WDR37, WDR48, WIPF1, WNT5B, WSB1, WWTR1, XIAP, XRN2, YAP1, YES1, YPEL5, YTHDF3, Z24749, ZAK, ZBTB10, ZBTB24, ZBTB7A, ZC3H12C, ZC3H14, ZC3H18, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZHX3, ZMIZ1, ZMYM2, ZNF12, ZNF148, ZNF219, ZNF227, ZNF24, ZNF268, ZNF28, ZNF281, ZNF335, ZNF37A, ZNF37BP, ZNF395, ZNF583, ZNF621, ZNF652, ZNF655, ZNF674, ZNF74, ZNF764, ZNF778, ZNF780A, ZNF827, ZNF839 or ZNF91

[00923] Table 3 shows certain genes that are expected to demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of iExon generation in RNA having intronic REMS elements in the presence of a compound as described herein. The change in abundance is expected to have a statistically significant p value.

[00924] Table 3

Table 3

ABCA1, ABCC1, ABL2, ACACA, ACAT2, AFF2, AHRR, AK021888, AK310472, AKAP1, ANK2, ANKHD1-EIF4EBP3, AP2B1, APAF1, APLP2, ARID1A, ARMCX3, ASAP1, ASPH, ATAD2B, ATF7IP, ATG9A, AXIN1, BACE1, BIN1, BNC1, BRPF1, BZW1, C11orf30, C11orf73, C17orf76-AS1, C4orf27, C6orf48, CAB39, CAMKK1, CCDC88A, CCDC92, CDC25B, CDC42BPA, CDCA7, CDH11, CDH13, CEP68, CFLAR, COPS7B, CREB5, CUL2, CUL4A, CUX1, CYP51A1, DCUN1D4, DDR1, DDX39B, DDX42, DENND1A, DENND5A, DGKA, DHCR24, DHCR7, DIAPH1, DIAPH3, DNM2, DOCK1, EFCAB14, EIF2B3, EPN1, EPT1, ERC1, ETV5, FADS1, FADS2, FAF1, FAM198B, FAM219B, FBXO10, FBXO9, FDFT1, FDPS, FER, FEZ1, FHOD3, FLII, FLNB, FNBP1, FOS, FOSB, FOXM1, FYN, GABPB1, GALC, GAS7, GGCT, GJC1,

Table 3

GPSM2, GRK6, HAS2, HAT1, HLTF, HMGA1, HMGB1, HMGCRC, HMGCSC1, HMOX1, HP1BP3, HSD17B12, HTT, IDI1, INHBA, INSIG1, KANSL3, KIAA1199, KIAA1524, KIAA1715, KIF3A, KLF6, KRT19, KRT34, KRTAP2-3, LAMA2, LARP7, LDLR, LEMD3, LMAN2L, LRCH4, LRP8, LSS, MAGED4, MAGED4B, MAN1A2, MEDAG, MEF2D, MEMO1, MFGE8, MICAL2, MMAB, MMS19, MMS22L, MSL3, MSMD1, MTAP, MTERFD1, MVD, MVK, NASP, NAV2, NEURL1B, NFE2L1, NID1, NPEPPS, NREP, NRG1, NSUN4, NT5C2, NUP153, P4HA1, PABPC1, PAPD4, PCBP2, PCM1, PCSK9, PDXDC1, PEPD, PHF19, PHF8, PHTF2, PIK3C2B, PITPNB, PLEC, PMS1, POU2F1, PPHLN1, PRKDC, PRSS23, PSMC1, PTPN14, PUF60, PVR, RAB23, RAD23B, RAP1A, RASSF8, RBM10, RCC1, RFWD2, RNFT1, RWDD4, SAMD9L, SART3, SCAF4, SCD, SEC22A, SEC61A1, SERPINE2, SF1, SLC25A17, SLC7A6, SLC7A8, SMN2, SMYD3, SMYD5, SNAP23, SNHG16, SQLE, SQRDL, SQSTM1, SRCAP, SREBF1, STARD4, STAT1, STAU1, STEAP2, STRN3, SYNE1, TACC1, TAF2, TANC2, TARBP1, TBC1D15, TEP1, TFCP2, TGFBAP1, THADA, TIMP2, TLK1, TMEM154, TNS3, TOMM5, TRAF3, TRAK1, TRAPPC12, TRIM2, TRIM26, TRIM65, TSPAN2, U2SURP, UBAP2L, UBE2V1, UCHL5, UHRF1BP1L, VANG1, VARS2, VPS13A, VPS29, VWA8, WSB1, XIAP, XRN2, YPEL5, ZAK, ZC3H18, ZFAND5, ZMIZ1, ZMYM2, ZNF219, ZNF227, ZNF24, ZNF37A, ZNF37BP, ZNF395, ZNF652, ZNF674, ZNF74 or ZNF778

[00925] **Table 4** shows certain genes that are expected to demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of iExon generation in RNA having intronic REMS elements in the presence of a compound as described herein. The change in abundance is expected to have a statistically significant p value.

[00926] **Table 4**

Table 4

ABCC1, ACADVL, ADAM15, AGPAT3, AHRR, AJUBA, AKAP1, AKAP9, ALCAM, ALDH4A1, ANKFY1, AP2B1, APLP2, APP, ARID1A, ARID2, ASPH, ATMIN, BASP1, BC033281, BCAR3, C11orf73, C17orf76-AS1, C5orf24, C6orf48, CAB39, CASP8AP2, CAV1, CCAR1, CCT6A, CD276, CD46, CDC25B, CDK16, CEP68, CHD8, CLIC1, COL12A1, CPEB2, CREB5, CRLS1, CRTAP, CTNND1, CUX1, CYBRD1, DACT1, DCAF10, DCAF11, DDHD2, DDX39B, DIAPH3, DKK3, DLC1, DSTN, EBF1, EGR1, EIF4G1, EIF4G3, ENG, ERC1, ETV5, FAM198B, FAM219A, FAM3C, FEZ1, FGD5-AS1, FLII, FN1, FNBP1, FOS, FOSB, FOXK1, FOXM1, FYN, GABPB1, GALC, GALNT1, GBA2, GGCT, GHDC, GMIP, GNA13, GNAS, GNL3L, GOLGA2, GORASP1, GREM1, GSE1, HAUS6, HDAC7, HEG1, HLA-A, HLA-E, HMGA1, HP1BP3, IL6ST, ITGAV, KIAA1549, KIF14, KLC1, KLF6, KLHL7, KRT18, LAMA2, LAMB1, LARP7, LATS2, LGALS8, LIMS1, LINC00341, LONP1, LOX, MDM2, MEPCE, MINPP1, MLLT4, MPPE1, MRPL3, MSH2, MSH6, MSL3, MTMR9, MTRR, MUM1, MYADM, MYLK, NADK, NAV2, NCSTN, NFE2L1, NID1, NIPA1, NPEPPS, NRD1, NUDT4, NUSAP1, P4HB, PABPC1, PAK4, PAPD4, PCNXL2, PDE4A, PDXDC1, PHRF1, PHTF2, PI4K2A, PIK3C2B, PLAUI, PLEKHB2, PLSCR3, PLXNB2, POSTN, POU2F1, PPARA, PPP1R12A,

Table 4

PRKACB, PSMD6, PTPN14, PUS7, QKI, RAB34, RAD1, RAD23B, RASSF8, RBCK1, RBFOX2, RFTN1, RNF19A, RNF38, RPS6KC1, RWDD4, SEC14L1, SEC24B, SERPINE2, SF1, SLC39A3, SLC41A1, SLC4A4, SLC7A6, SMARCA4, SMN2, SNHG16, SNX14, SON, SPRED2, STAU1, STEAP2, STRIP1, STRN3, TBL2, TGFBI, TGFBR1, THAP4, TLE3, TMEM47, TNKS1BP1, TOMM40, TOPORS, TRAK1, TRAPPC12, TRIB1, TRIM2, TRIM23, TRIM65, TRMT1L, TRPS1, TXNL1, TXNRD1, U2SURP, UBE2G2, UBE2V1, UHMK1, USP7, VPS29, VWA8, WDR19, WDR37, WIPF1, YPEL5, YTHDF3, Z24749, ZBTB10, ZBTB7A, ZFAND5, ZMIZ1, ZNF12, ZNF148, ZNF335, ZNF395, ZNF583, ZNF621, ZNF655, ZNF74 or ZNF780A

[00927] **Table 5** shows certain genes that are expected to demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of iExon generation in RNA having intronic REMS elements in the presence of a compound as described herein. The change in abundance is expected to have a statistically significant p value.

[00928] **Table 5**

Table 5

ABCB7, ABHD10, ABLIM3, ACACA, ADAM12, ADAM17, ADAM33, AGK, AGPS, AHCYL2, AHDC1, AHRR, AK021888, AK310472, AKAP1, AKAP9, AKNA, AMPD2, ANKRD17, ANKS6, ANP32A, ANXA11, ANXA6, APLP2, APP, APPL2, APTX, ARHGAP22, ARMCX3, ASAP1, ASNS, ASPH, ATG9A, ATP2C1, AURKA, AXIN1, B4GALT2, BACE1, BASP1, BEND6, BICD1, BIN1, BRD2, BRPF1, BTBD10, C11orf30, C11orf73, C17orf76-AS1, C4orf27, C6orf48, CAB39, CAPNS1, CASC3, CCDC77, CCDC88A, CD46, CDC40, CDC42BPA, CDCA7, CDH13, CDK11B, CEP68, CIZ1, CLK4, CNOT1, COG1, COL12A1, COL1A1, COL6A1, COPS7B, CSDE1, CSNK1A1, CUX1, CYB5B, CYBRD1, DAB2, DARS, DCBLD2, DCUN1D4, DDAH2, DDR1, DDX39B, DDX42, DENND1A, DENND1B, DENND5A, DGKA, DHFR, DHX9, DIAPH1, DIAPH3, DIS3L, DNM2, DOCK1, DPP8, DSEL, EEA1, EFCAB14, EIF2B3, EIF4G1, EIF4G3, ELF2, ENG, ENPP2, EPN1, EXTL2, EYA3, FAF1, FAM198B, FAM3C, FBXO10, FBXO18, FBXO31, FBXO9, FER, FEZ1, FHOD3, FLII, FN1, FBNP1, FOCAD, FOSL1, FOXM1, GABPB1, GALT, GALNT1, GCFC2, GGCT, GIGYF2, GMIP, GNAS, GNL3L, GOLGB1, GPR89A, GPSM2, GREM1, GRK6, GTF2H2B, HAT1, HAUS3, HEG1, HLA-A, HLTF, HP1BP3, HRH1, HSD17B12, HSD17B4, HTT, IARS, IDH1, IGF2BP2, ITM2C, KCNK2, KIAA1033, KIAA1143, KIAA1522, KIAA1524, KIAA1715, KIF3A, KLHL7, LAMA2, LARP4, LARP7, LATS2, LIMS1, LINC00341, LINC00657, LMAN2L, LMO7, LRCH4, LRIG1, LRRC8A, LTBR, LUC7L2, LZTS2, MADD, MAGED4B, MAN1A2, MAP4K4, MED1, MEDAG, MEF2D, MEIS2, MEMO1, MICAL2, MKLN1, MLLT4, MMS19, MPZL1, MSANTD3, MSC, MSL3, MTAP, MTERFD1, MTHFD1L, MYADM, MYLK, MYO9B, MYOF, NASP, NAV2, NCOA3, NCOA4, NELFA, NEO1, NEURL1B, NF2, NID2, NOL10, NPEPPS, NRG1, NSUN4, NT5C2, NT5E, NTNG1, NUP153, NUP35, NUP50, NUSAP1, ODF2, OS9, OSBPL6, P4HA1, P4HB, PABPC1, PAPD4, PARN, PARP4, PCBP2, PCBP4, PCDHGB3, PCGF3, PCM1, PCMTD2, PDE7A, PDXDC1, PEPD,

Table 5

PFKP, PHF19, PHRF1, PHTF2, PIEZO1, PIGU, PITPNA, PITPNB, PITPNM1, PLAUI, PLSCR3, PLXNC1, PMS1, POU2F1, PPAPDC1A, PPHLN1, PPIP5K1, PPP1R12A, PRKDC, PRMT1, PRSS23, PSMA4, PTK2B, PUF60, PVR, RAB23, RAB2B, RAD1, RAD23B, RAP1A, RAP1GDS1, RARG, RASSF8, RBCK1, RCC1, RFWD2, RGS3, RNF14, RNFT1, RPL10, RRBPI, RWDD4, SAR1A, SCAF4, SCAF8, SCLT1, SCO1, SDCBP, SEC22A, SEPT9, SF1, SGOL2, SLC25A17, SLC4A4, SLC7A6, SMARCC2, SMC4, SMC6, SMCHD1, SMN2, SMPD4, SMYD3, SNAP23, SNHG16, SOCS2, SOS2, SPATA20, SPATS2, SPG20, SQRLD, SREBF1, SREK1, SRSF3, STAT1, STAU1, STEAP2, STRN3, STX16, SUPT20H, SYNE1, SYNE2, SYT15, SYTL2, TAF2, TARBP1, TARS, TBL2, TCF7L2, TENC1, TENM2, TEP1, TET3, TGFBR1, THADA, THRB, TJP2, TLE3, TMEM47, TMEM63A, TNFAIP3, TNIP1, TNPO3, TNS1, TNS3, TOE1, TOMM5, TP53INP1, TRAF3, TRAPPC12, TRIM2, TRIM23, TRIM65, TSC2, TSPAN2, TUBB2C, TXNRD1, UBAP2L, UBE2V1, UCHL5, USP19, VANGL1, VIPAS39, VPS29, VPS51, VWA8, WDR48, WNT5B, WSB1, WWTR1, XRN2, YAP1, YES1, YPEL5, YTHDF3, Z24749, ZBTB24, ZC3H14, ZFAND1, ZFAND5, ZHX3, ZMIZ1, ZMYM2, ZNF219, ZNF268, ZNF395, ZNF827 or ZNF91

[00929] Table 6 shows certain genes that are expected to demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of iExon generation in RNA having intronic REMS elements in the presence of a compound as described herein. The change in abundance is expected to have a statistically significant p value.

[00930] Table 6

Table 6

ACACA, ACADVL, AFF2, AHCYL2, AHRR, AKAP1, ALDH4A1, ANKRD17, AP2B1, APLP2, ASL, ASPH, ATG9A, ATMIN, ATXN3, BAG2, BASP1, BRPF1, BSCL2, C11orf30, C11orf73, C17orf76-AS1, C6orf48, C9orf69, CAB39, CALU, CDC25B, CDC42BPA, CDKAL1, CLIC1, COL12A1, COL1A1, COL6A1, CSNK1A1, CTDSP2, CUL2, CUL4A, DAXX, DCAF10, DDAH1, DDR1, DDX39B, DENND1A, DGCR2, DKFZp434M1735, DKK3, DNM2, DST, EEF1A1, EFCAB14, EHMT2, EIF4G1, EIF4G2, EIF4G3, ENSA, EXO1, FAM111A, FAM198B, FAM65A, FBXO34, FEZ1, FGD5-AS1, FGFR1, FLII, FN1, FOXK1, FOXM1, FUS, GALC, GALNT1, GAS7, GCFC2, GGCT, GJC1, GNA13, GNL3L, GOLGA4, GPR1, GREM1, HEG1, HLA-A, HLA-E, HLTF, HNRNPR, HNRNPUL1, IQCE, ITGB5, ITSN1, KIAA1033, KIF2A, KIF3A, KLC2, LATS2, LIMS1, LINC00341, LINC00657, LONP1, LOX, LUC7L2, MBD1, MBOAT7, MEF2D, MEIS2, MICAL2, MKL1, MKNK2, MLST8, MPPE1, MSL3, MSRB3, MTRR, MYADM, MYLK, MYO1D, NAA35, NAV1, NAV2, NCOA1, NFX1, NKX3-1, NOMO3, NRG1, NUDT4, NUPL1, NUSAP1, OSMR, P4HA1, P4HB, PAPD4, PARD3, PARN, PARP14, PARVB, PCBP2, PCBP4, PCGF3, PDLIM7, PDXDC1, PEX5, PFKP, PHRF1, PI4K2A, POLE3, POLR3D, POSTN, PPARA, PPP6R1, PPP6R2, PRNP, PXN, RAB34, RAD23B, RALB, RAP1A, RASSF8, RBCK1, RBFOX2, RGS10, RIF1, RNF14, RNF19A, SAMD9, SCAF4, SDCBP, SERPINE2, SF1, SH3RF1, SKIL, SLC25A17, SLC4A4, SMG1, SMN2,

Table 6

SNHG16, SREBF1, STAT3, STC2, STEAP2, STRN3, SYNE1, SYNE2, TACC1, TARS, TGFB1, TMEM47, TNC, TNFRSF12A, TNS1, TRAF3, TRIM28, TSC2, TSHZ1, TTC7A, TUBB2C, TUBB3, TXNL1, TXNRD1, UBE2G2, UBE2V1, UBQLN4, UNC5B, USP19, VARS2, VCL, VPS29, WDR37, WIPF1, WWTR1, ZC3H12C, ZCCHC11, ZEB1, ZEB2, ZFAND1, ZFAND5, ZMIZ1, ZNF28, ZNF281, ZNF655, ZNF764 or ZNF839

[00931] Table 7 shows genes that demonstrate an effect on change in isoform abundance as a result of having intronic REMS elements in the presence of Compound 774 (at doses ranging from 0.3 μ M to 3 μ M), having statistically significant adjusted Fisher's Exact Test p value.

[00932] Table 7

Table 7

ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APLP2, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, AXIN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DAGLB, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DLGAP4, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERCC1, ERGIC3, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FAM198B, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GGCT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HAT1, HDX, HLTf, HMGA2, HNMT, HPS1, HSD17B12, HSD17B4, HTT, IFT57, INPP5K, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MADD, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPHLN1, PPIP5K2, PPP1R26, PRPF31, PRSS23, PRUNE2, PSMA4, PXX, RAF1, RAP1A, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RNFT1, RPA1, RPS10, RPS6KB2, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SKA2, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA18, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STRN3, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM189-UBE2V1, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TRIM65, TSPAN2, TTC7B, TUBE1, TYW5, UBAP2L, UBE2V1, URGCP, VAV2, VPS29, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232, ZNF37BP or ZNF680

[00933] **Table 7a** shows genes that demonstrate an effect on inclusion of an iExon with a corresponding change in isoform abundance as a result of having intronic REMS elements in the presence of Compound 774 (at doses ranging from 0.3 μ M to 3 μ M), having statistically significant adjusted Fisher's Exact Test p value.

[00934] **Table 7a**

Table 7a
ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFF1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTF, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCMI, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP

[00935] **Table 7b** shows genes that demonstrate an effect on inclusion of an exon with a corresponding change in isoform abundance as a result of having iREMS elements in the presence of Compound 774 (at doses ranging from 0.3 μ M to 3 μ M), having statistically significant adjusted Fisher's Exact Test p value.

[00936] **Table 7b**

Table 7b
APLP2, AXIN1, CECR7, DAGLB, DLGAP4, ERCC1, ERGIC3, FAM198B, GGCT, HAT1, HPS1, INPP5K, MADD, PPHLN1, PRUNE2, RAP1A, RNFT1, RPS6KB2, SH3YL1, SKA2, SPATA18, STRN3, TMEM189-UBE2V1, TRIM65, TUBE1, UBE2V1, VPS29 or ZNF680

METHODS OF PREVENTING AND/OR TREATING DISEASES

[00937] In another aspect, provided herein are methods for preventing and/or treating a disease associated with the aberrant expression of a product of a gene (e.g., an mRNA transcript or protein), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00938] In certain embodiments, the gene is any one of the genes disclosed in Tables 2-7 or 1. In certain embodiments, the gene contains a nucleotide sequence encoding a non-endogenous intronic REMS. In certain embodiments, the gene contains a nucleotide sequence encoding an endogenous intronic REMS. In one embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (e.g., an mRNA, RNA transcript or protein), by way of nonlimiting example, disclosed in Table 1, *supra*, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one of the introns comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00939] In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (e.g., an mRNA, RNA transcript or protein), disclosed in Tables 2-7, *supra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00940] In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (e.g., an mRNA, RNA

transcript or protein), by way of nonlimiting example, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), by way of nonlimiting example, disclosed in International Patent Application No.

PCT/US2016/034864 (International Publication No. WO 2016/196386), wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), by way of nonlimiting example, not disclosed in either International Publication No. WO 2015/105657, International Publication No. WO 2016/196386, or both, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00941] In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene (*e.g.*, an mRNA, RNA transcript or protein), disclosed in Table 1, *supra*, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or

more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00942] In another embodiment, provided herein are methods for preventing and/or treating a disease associated with aberrant expression of a product of a gene, disclosed in Table 7, *supra*, (*e.g.*, an mRNA, RNA transcript or protein), comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. *See* the example section for additional information regarding the genes in Table 7. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00943] In another aspect, provided herein are methods for preventing and/or treating a disease in which a change in the level of expression of one, two, three or more RNA isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00944] In certain embodiments, the gene is any one of the genes disclosed in Tables 2-7 or 1. In certain embodiments, the gene contains a nucleotide sequence encoding a non-endogenous intronic REMS. In certain embodiments, the gene contains a nucleotide sequence encoding an endogenous intronic REMS. In one embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, by way of nonlimiting example, disclosed in Table 1, *supra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment,

the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00945] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in Tables 2-7, *supra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2014/071252 (International Publication No. WO 2015/105657), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, not disclosed in either International Publication No. WO 2015/105657, International Publication No. WO 2016/196386, or both, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene

comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00946] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in Table 1, *supra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00947] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more RNA isoforms encoded by a gene, disclosed in Table 1, *supra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, one, two, three or more RNA isoforms encoded by a gene, disclosed in Table 7, *supra*, are decreased following administration of a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. *See* the example section for additional information regarding the genes in Table 7. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00948] In another aspect, provided herein are methods for preventing and/or treating a disease in which a change in the level of expression of one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the

precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00949] In certain embodiments, the gene is any one of the genes disclosed in Tables 2-7 or 1. In certain embodiments, the gene contains a nucleotide sequence encoding a non-endogenous intronic REMS. In certain embodiments, the gene contains a nucleotide sequence encoding an endogenous intronic REMS. In one embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, by way of nonlimiting example, disclosed in Table 1, *supra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00950] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in Tables 2-7, *supra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00951] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in International Patent Application No.

PCT/US2014/071252 (International Publication No. WO 2015/105657), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in International Patent Application No. PCT/US2016/034864 (International Publication No. WO 2016/196386), is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00952] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in Table 1, *supra*, is beneficial to the prevention and/or treatment of the disease, wherein the precursor RNA transcript transcribed from the gene comprises an intronic REMS, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00953] In another embodiment, provided herein are methods for preventing and/or treating a disease in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene, disclosed in Table 1, *supra*, is beneficial to the prevention and/or treatment of the disease, the methods comprising administering to a human or non-human subject a compound of Formula (I) or a form thereof, or a pharmaceutical

composition comprising a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. In a specific embodiment, one, two, three or more RNA isoforms encoded by a gene, disclosed in Table 7, *supra*, are decreased following administration of a compound of Formula (I) or a form thereof and a pharmaceutically acceptable carrier, excipient or diluent. *See* the example section for additional information regarding the genes in Table 7. In a specific embodiment, the gene comprises one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS.

[00954] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00955] In another embodiment, provided herein is a method for either preventing, treating and preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the DNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a nucleotide sequence encoding a first branch point and a nucleotide sequence encoding a first 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and

wherein r is adenine or guanine and n is any nucleotide, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00956] In another embodiment, provided herein is a method for either preventing, treating and preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1A, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00957] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron, and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1B, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00958] In another embodiment, provided herein is a method for either preventing, treating or preventing and treating a disease in a subject in which the alteration (*e.g.*, increase or decrease) in the expression one, two, three or more protein isoforms encoded by a gene is beneficial to the prevention and/or treatment of the disease, wherein the gene comprises a DNA nucleotide sequence encoding two exons and an intron and wherein the DNA nucleotide sequence comprises exonic and intronic elements illustrated in Figure 1C, the method comprising administering a compound described herein (for example, a compound of Formula (I) or a form thereof) to the subject.

[00959] In a specific embodiment, the gene is a gene described in a table in this disclosure.

[00960] In some embodiments, the compound of Formula (I) or a form thereof that is administered to a subject is a compound of Formula (II), Formula (III), Formula (IV), Formula (V), Formula (VI), Formula (VII), Formula (VIII), Formula (IX), Formula (X), Formula (XI),

Formula (XII), Formula (XIII), or Formula (XIV). In some embodiments, the compound of Formula (I) or a form thereof that is administered to a subject is a compound described herein.

[00961] In a specific embodiment, the methods for preventing a disease described herein prevent the onset or development of one or symptoms of the disease. In another embodiment, the methods for preventing a disease described herein prevent the recurrence of the disease or delays the recurrence of the disease. In another embodiment, the methods for treating a disease described herein has one, two or more of the effects: (i) reduce or ameliorate the severity of the disease; (ii) inhibit the progression of the disease; (iii) reduce hospitalization of a subject; (iv) reduce hospitalization length for a subject; (v) increase the survival of a subject; (vi) improve the quality of life of a subject; (vii) reduce the number of symptoms associated with the disease; (viii) reduce or ameliorates the severity of a symptom(s) associated with the disease; (ix) reduce the duration of a symptom(s) associated with the disease; (x) prevent the recurrence of a symptom associated with the disease; (xi) inhibit the development or onset of a symptom of the disease; and/or (xii) inhibit of the progression of a symptom associated with the disease.

[00962] In certain embodiments, the disease or disorder prevented and/or treated in accordance with a method described herein is a disease or disorder associated with a gene listed in Table 1 or Table 7. In specific embodiments, the disease or disorder prevented and/or treated in accordance with a method described herein is leukemia, acute myeloid leukemia, colon cancer, gastric cancer, macular degeneration, acute monocytic leukemia, breast cancer, combined methylmalonic aciduria and homocystinuria, cblC type, hepatocellular carcinoma, cone-rod dystrophy, alveolar soft part sarcoma, myeloma, skin melanoma, prostatitis, pancreatitis, pancreatic cancer, retinitis, adenocarcinoma, adenoiditis, adenoid cystic carcinoma, cataract, retinal degeneration, gastrointestinal stromal tumor, Wegener's granulomatosis, sarcoma, myopathy, prostate adenocarcinoma, Alzheimer's disease, hyperprolinemia, acne, tuberculosis, succinic semialdehyde dehydrogenase deficiency, esophagitis, mental retardation, esophageal adenocarcinoma, glycine encephalopathy, Crohn's disease, spina bifida, tuberculosis, autosomal recessive disease, schizophrenia, neural tube defects, lung cancer, myelodysplastic syndromes, amyotrophic lateral sclerosis, neuronitis, germ cell tumors, Parkinson's disease, talipes equinovarus, dystrophinopathies, Hodgkin's lymphoma, ovarian cancer, non-Hodgkin's lymphoma, multiple myeloma, chronic myeloid leukemia, ischemia, acute lymphoblastic leukemia, renal cell carcinoma, transitional cell carcinoma, colorectal cancer, chronic

lymphocytic leukemia, anaplastic large cell lymphoma, kidney cancer, cerebritis, bladder related disorders, breast cancer, cervical cancer, cleft lip, cleft palate, cervicitis, spasticity, lipoma, scleroderma, Gitelman syndrome, poliomyelitis, paralysis, Aagenaes syndrome, or oculomotor nerve paralysis.

[00963] In specific embodiments, the disease or disorder prevented and/or treated in accordance with a method described herein is basal cell carcinoma, goblet cell metaplasia, or a malignant glioma. In other specific embodiments, the disease or disorder prevented and/or treated in accordance with a method described herein is a cancer of the liver, breast, lung, prostate, cervix, uterus, colon, pancreas, kidney, stomach, bladder, ovary, or brain.

[00964] In other specific embodiments, the disease or disorder prevented and/or treated in accordance with a method described herein is Duchenne muscular dystrophy, Beckers muscular dystrophy, Facioscapulohumeral muscular dystrophy, Limb-girdle muscular dystrophy, Charcot-Marie-Tooth disease (CMT), spinal muscular atrophy, Huntington's disease, amyotrophic lateral sclerosis, cystic fibrosis, congenital myopathies, muscle dystrophies, Alzheimer's disease, Parkinson's disease, schizophrenia, bipolar disorders, cognitive impairment, hereditary sensory and autonomic neuropathies, diseases of chronic inflammation, immune check point-dependent diseases, retinitis pigmentosa, aniridia, Dravet disease, or an epilepsy.

[00965] In certain embodiments, the disease prevented and/or treated in accordance with a method described herein is a disease caused by expression of one or more aberrant RNA transcripts, including a cancer amenable to treatment by downregulation of a gene or isoform thereof as described herein. In specific embodiments, cancers that can be prevented and/or treated in accordance with a method described herein include, but are not limited to, cancer of the head, neck, eye, mouth, throat, esophagus, esophagus, chest, bone, lung, kidney, colon, rectum or other gastrointestinal tract organs, stomach, spleen, skeletal muscle, subcutaneous tissue, prostate, breast, ovaries, testicles or other reproductive organs, skin, thyroid, blood, lymph nodes, kidney, liver, pancreas, brain or central nervous system.

[00966] Specific examples of cancers that can be prevented and/or treated in accordance with the methods provided herein include, but are not limited to, the following: renal cancer, kidney cancer, glioblastoma multiforme, metastatic breast cancer; breast carcinoma; breast sarcoma; neurofibroma; neurofibromatosis; pediatric tumors; neuroblastoma; malignant melanoma; carcinomas of the epidermis; leukemias such as but not limited to, acute leukemia, acute

lymphocytic leukemia, acute myelocytic leukemias such as myeloblastic, promyelocytic, myelomonocytic, monocytic, erythroleukemia leukemias and myelodysplastic syndrome, chronic leukemias such as but not limited to, chronic myelocytic (granulocytic) leukemia, chronic lymphocytic leukemia, hairy cell leukemia; polycythemia vera; lymphomas such as but not limited to Hodgkin's disease, non-Hodgkin's disease; multiple myelomas such as but not limited to smoldering multiple myeloma, nonsecretory myeloma, osteosclerotic myeloma, plasma cell leukemia, solitary plasmacytoma and extramedullary plasmacytoma; Waldenstrom's macroglobulinemia; monoclonal gammopathy of undetermined significance; benign monoclonal gammopathy; heavy chain disease; bone cancer and connective tissue sarcomas such as but not limited to bone sarcoma, myeloma bone disease, multiple myeloma, cholesteatoma-induced bone osteosarcoma, Paget's disease of bone, osteosarcoma, chondrosarcoma, Ewing's sarcoma, malignant giant cell tumor, fibrosarcoma of bone, chordoma, periosteal sarcoma, soft-tissue sarcomas, angiosarcoma (hemangiosarcoma), fibrosarcoma, Kaposi's sarcoma, leiomyosarcoma, liposarcoma, lymphangiosarcoma, neurilemmoma, rhabdomyosarcoma, and synovial sarcoma; brain tumors such as but not limited to, glioma, astrocytoma, brain stem glioma, ependymoma, oligodendroglioma, nonglial tumor, acoustic neurinoma, craniopharyngioma, medulloblastoma, meningioma, pineocytoma, pineoblastoma, and primary brain lymphoma; breast cancer including but not limited to adenocarcinoma, lobular (small cell) carcinoma, intraductal carcinoma, medullary breast cancer, mucinous breast cancer, tubular breast cancer, papillary breast cancer, Paget's disease (including juvenile Paget's disease) and inflammatory breast cancer; adrenal cancer such as but not limited to pheochromocytoma and adrenocortical carcinoma; thyroid cancer such as but not limited to papillary or follicular thyroid cancer, medullary thyroid cancer and anaplastic thyroid cancer; pancreatic cancer such as but not limited to, insulinoma, gastrinoma, glucagonoma, vipoma, somatostatin-secreting tumor, and carcinoid or islet cell tumor; pituitary cancers such as but not limited to Cushing's disease, prolactin-secreting tumor, acromegaly, and diabetes insipidus; eye cancers such as but not limited to ocular melanoma such as iris melanoma, choroidal melanoma, and ciliary body melanoma, and retinoblastoma; vaginal cancers such as squamous cell carcinoma, adenocarcinoma, and melanoma; vulvar cancer such as squamous cell carcinoma, melanoma, adenocarcinoma, basal cell carcinoma, sarcoma, and Paget's disease; cervical cancers such as but not limited to, squamous cell carcinoma, and adenocarcinoma; uterine cancers such as but not limited to endometrial carcinoma and uterine

sarcoma; ovarian cancers such as but not limited to, ovarian epithelial carcinoma, borderline tumor, germ cell tumor, and stromal tumor; cervical carcinoma; esophageal cancers such as but not limited to, squamous cancer, adenocarcinoma, adenoid cystic carcinoma, mucoepidermoid carcinoma, adenosquamous carcinoma, sarcoma, melanoma, plasmacytoma, verrucous carcinoma, and oat cell (small cell) carcinoma; stomach cancers such as but not limited to, adenocarcinoma, fungating (polypoid), ulcerating, superficial spreading, diffusely spreading, malignant lymphoma, liposarcoma, fibrosarcoma, and carcinosarcoma; colon cancers; KRAS-mutated colorectal cancer; PD-1-dependent cancers; PD-1L-dependent cancers; colon carcinoma; rectal cancers; liver cancers such as but not limited to hepatocellular carcinoma and hepatoblastoma, gallbladder cancers such as adenocarcinoma; cholangiocarcinomas such as but not limited to papillary, nodular, and diffuse; lung cancers such as KRAS-mutated non-small cell lung cancer, non-small cell lung cancer, squamous cell carcinoma (epidermoid carcinoma), adenocarcinoma, large-cell carcinoma and small-cell lung cancer; lung carcinoma; testicular cancers such as but not limited to germinal tumor, seminoma, anaplastic, classic (typical), spermatocytic, nonseminoma, embryonal carcinoma, teratoma carcinoma, choriocarcinoma (yolk-sac tumor), prostate cancers such as but not limited to, androgen-independent prostate cancer, androgen-dependent prostate cancer, adenocarcinoma, leiomyosarcoma, and rhabdomyosarcoma; penile cancers; oral cancers such as but not limited to squamous cell carcinoma; basal cancers; salivary gland cancers such as but not limited to adenocarcinoma, mucoepidermoid carcinoma, and adenoidcystic carcinoma; pharynx cancers such as but not limited to squamous cell cancer, and verrucous; skin cancers such as but not limited to, basal cell carcinoma, squamous cell carcinoma and melanoma, superficial spreading melanoma, nodular melanoma, lentigo malignant melanoma, acral lentiginous melanoma; kidney cancers such as but not limited to renal cell cancer, adenocarcinoma, hypernephroma, fibrosarcoma, transitional cell cancer (renal pelvis and/or uterine); renal carcinoma; Wilms' tumor; bladder cancers such as but not limited to transitional cell carcinoma, squamous cell cancer, adenocarcinoma, carcinosarcoma. In addition, cancers include myxosarcoma, osteogenic sarcoma, endotheliosarcoma, lymphangioendotheliosarcoma, mesothelioma, synovium, hemangioblastoma, epithelial carcinoma, cystadenocarcinoma, bronchogenic carcinoma, sweat gland carcinoma, sebaceous gland carcinoma, papillary carcinoma and papillary adenocarcinomas.

[00967] In certain embodiments cancers that can be prevented and/or treated in accordance with the methods provided herein include, the following: pediatric solid tumor, Ewing's sarcoma, Wilms tumor, neuroblastoma, neurofibroma, carcinoma of the epidermis, malignant melanoma, cervical carcinoma, colon carcinoma, lung carcinoma, renal carcinoma, breast carcinoma, breast sarcoma, metastatic breast cancer, HIV-related Kaposi's sarcoma, prostate cancer, androgen-independent prostate cancer, androgen-dependent prostate cancer, neurofibromatosis, lung cancer, non-small cell lung cancer, KRAS-mutated non-small cell lung cancer, malignant melanoma, melanoma, colon cancer, KRAS-mutated colorectal cancer, glioblastoma multiforme, renal cancer, kidney cancer, bladder cancer, ovarian cancer, hepatocellular carcinoma, thyroid carcinoma, rhabdomyosarcoma, acute myeloid leukemia, and multiple myeloma.

[00968] In certain embodiments, cancers and conditions associated therewith that are prevented and/or treated in accordance with the methods provided herein are breast carcinomas, lung carcinomas, gastric carcinomas, esophageal carcinomas, colorectal carcinomas, liver carcinomas, ovarian carcinomas, thecomas, arrhenoblastomas, cervical carcinomas, endometrial carcinoma, endometrial hyperplasia, endometriosis, fibrosarcomas, choriocarcinoma, head and neck cancer, nasopharyngeal carcinoma, laryngeal carcinomas, hepatoblastoma, Kaposi's sarcoma, melanoma, skin carcinomas, hemangioma, cavernous hemangioma, hemangioblastoma, pancreas carcinomas, retinoblastoma, astrocytoma, glioblastoma, Schwannoma, oligodendroglioma, medulloblastoma, neuroblastomas, rhabdomyosarcoma, osteogenic sarcoma, leiomyosarcomas, urinary tract carcinomas, thyroid carcinomas, Wilm's tumor, renal cell carcinoma, prostate carcinoma, abnormal vascular proliferation associated with phakomatoses, edema (such as that associated with brain tumors), or Meigs' syndrome. In specific embodiment, the cancer astrocytoma, an oligodendroglioma, a mixture of oligodendroglioma and an astrocytoma elements, an ependymoma, a meningioma, a pituitary adenoma, a primitive neuroectodermal tumor, a medulloblastoma, a primary central nervous system (CNS) lymphoma, or a CNS germ cell tumor. In specific embodiments, the cancer treated in accordance with the methods provided herein is an acoustic neuroma, an anaplastic astrocytoma, a glioblastoma multiforme, or a meningioma. In other specific embodiments, the cancer treated in accordance with the methods provided herein is a brain stem glioma, a craniopharyngioma, an ependyoma, a

juvenile pilocytic astrocytoma, a medulloblastoma, an optic nerve glioma, primitive neuroectodermal tumor, or a rhabdoid tumor.

[00969] Specific examples of conditions caused by expression of one or more aberrant RNA transcripts that can be prevented and/or treated in accordance with the methods described herein include cystic fibrosis, muscular dystrophy, polycystic autosomal-dominant kidney disease, cancer-induced cachexia, benign prostatic hyperplasia, rheumatoid arthritis, psoriasis, atherosclerosis, obesity, retinopathies (including diabetic retinopathy and retinopathy of prematurity), retrolental fibroplasia, neovascular glaucoma, age-related macular degeneration, exudative macular degeneration, thyroid hyperplasias (including Grave's disease), corneal and other tissue transplantation, epidemic keratoconjunctivitis, Vitamin A deficiency, contact lens overwear, atopic keratitis, superior limbic keratitis, and pterygium keratitis sicca, viral infections, inflammation associated with viral infections, chronic inflammation, lung inflammation, nephrotic syndrome, preeclampsia, ascites, pericardial effusion (such as that associated with pericarditis), pleural effusion, Sjogren's syndrome, acne rosacea, phlyctenulosis, syphilis, lipid degeneration, chemical burns, bacterial ulcers, fungal ulcers, Herpes simplex infection, Herpes zoster infections, protozoan infections, Mooren's ulcer, Terrien's marginal degeneration, marginal keratolysis, systemic lupus, polyarteritis, trauma, Wegener's sarcoidosis, Paget's disease, scleritis, Stevens-Johnson's disease, pemphigoid, radial keratotomy, Eales' disease, Behcet's disease, sickle cell anemia, pseudoxanthoma elasticum, Stargardt's disease, pars planitis, chronic retinal detachment, vein occlusion, artery occlusion, carotid obstructive disease, chronic uveitis/vitritis, ocular histoplasmosis, Mycobacteria infections, Lyme's disease, Best's disease, myopia, optic pits, hyperviscosity syndromes, toxoplasmosis, sarcoidosis, trauma, post-laser complications, diseases associated with rubeosis (neovascularization of the iris and of the angle), and diseases caused by the abnormal proliferation of fibrovascular or fibrous tissue, including all forms of proliferative vitreoretinopathy. Certain examples of non-neoplastic conditions that can be prevented and/or treated in accordance with the methods described herein include viral infections, including but not limited to, those associated with viruses belonging to Flaviviridae, flavivirus, pestivirus, hepacivirus, West Nile virus, hepatitis C virus (HCV) or human papilloma virus (HPV).

[00970] Particular examples of conditions caused by expression of one or more of aberrant RNA transcripts that can be prevented and/or treated in accordance with the methods described

herein include Duchenne muscular dystrophy, Beckers muscular dystrophy, Facioscapulohumeral muscular dystrophy, Limb-girdle muscular dystrophy, Charcot-Marie-Tooth disease (CMT), spinal muscular atrophy, Huntington's disease, amyotrophic lateral sclerosis, cystic fibrosis, congenital myopathies, muscle dystrophies, Alzheimer's disease, Parkinson's disease, schizophrenia, bipolar disorders, cognitive impairment, hereditary sensory and autonomic neuropathies, diseases of chronic inflammation, immune check point-dependent diseases, retinitis pigmentosa, aniridia, Dravet disease, or an epilepsy.

ARTIFICIAL GENE CONSTRUCTS

[00971] Also provided herein are artificial gene constructs comprising a DNA sequence encoding exons and one or more introns, wherein the nucleotide sequence of at least one intron encodes an intronic REMS downstream of the nucleotide sequence encoding a branch point and the nucleotide sequence encoding a 3' splice site in 5' to 3' order, and artificial gene constructs comprising an RNA sequence that comprises exons and one or more introns, wherein at least one intron comprises a branch point, a 3' splice site and an intronic REMS in 5' to 3' order. The DNA sequence described herein can be or derived from, for example, a genomic DNA sequence or a DNA analog thereof. The RNA sequence described herein can be or derived from, for example, a precursor RNA transcript or an RNA analog thereof. As used herein, the term "artificial gene construct" refers to a DNA or RNA gene construct that comprises a nucleotide sequence not found in nature.

[00972] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), and wherein r is adenine or guanine and n is any nucleotide.

[00973] In another aspect, provide herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a first branch point and a first 3' splice site, wherein the

iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), and wherein r is adenine or guanine and n is any nucleotide.

[00974] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein the RNA sequence comprises exonic and intronic elements illustrated in Figure 1A.

[00975] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein the RNA sequence comprises exonic and intronic elements illustrated in Figure 1B.

[00976] In another aspect, provided herein is an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein the RNA sequence comprises exonic and intronic elements illustrated in Figure 1C.

[00977] In another aspect, provided herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), and wherein r is adenine or guanine and n is any nucleotide.

[00978] In another aspect, provide herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the nucleotide sequence encoding the intron comprises in 5' to 3' order: an iREMS, a nucleotide sequence encoding a first branch point and a nucleotide sequence encoding a first 3' splice site, wherein the iREMS comprises an DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide.

[00979] In another aspect, provide herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the DNA sequence comprises exonic and intronic elements illustrated in Figure 1A.

[00980] In another aspect, provide herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the DNA sequence comprises exonic and intronic elements illustrated in Figure 1B.

[00981] In another aspect, provide herein is an artificial gene construct comprising a DNA sequence encoding two exons and an intron, wherein the DNA sequence comprises exonic and intronic elements illustrated in Figure 1C.

[00982] In one aspect, provided herein are artificial gene constructs comprising an intronic REMS. In one embodiment, an artificial gene construct comprises genomic DNA or DNA encoding exons and one, two or more introns, wherein a nucleotide sequence encoding an intronic REMS, which may be upstream or downstream of a nucleotide sequence encoding a branch point and a nucleotide sequence encoding a 3' splice site, is modified to introduce a nucleotide sequence encoding the intronic REMS. In another embodiment, an artificial gene construct comprises DNA encoding exons, an intronic REMS, a 3' splice site(s) and a branch point(s) sequence, wherein a nucleotide sequence encoding an intronic REMS, which may be upstream or downstream of at least one nucleotide sequence encoding a branch point and at least one nucleotide sequence encoding a 3' splice site, is modified to introduce a nucleotide sequence encoding an intronic REMS. In another embodiment, an artificial gene construct comprises genomic DNA or DNA encoding exons and one, two or more introns, wherein a nucleotide sequence encoding an intronic REMS, which may be upstream or downstream of a nucleotide sequence encoding a branch point and a nucleotide sequence encoding a 3' splice site, is introduced into an intron by genetic engineering. In another embodiment, an artificial gene construct comprises genomic DNA or DNA encoding exons and one, two or more introns, wherein a nucleotide sequence encoding an intronic REMS, which may be upstream or downstream of a nucleotide sequence encoding a branch point and a nucleotide sequence encoding a 3' splice site, is endogenously present in an intron. In some embodiments, an artificial gene construct comprises a DNA sequence that is genetically engineered to introduce a nucleotide sequence encoding an intronic REMS, wherein the location of the intronic REMS is as illustrated in any of Figures 1A-1C. In some embodiments, an artificial gene construct

comprises a DNA sequence that is genetically engineered to comprise one, two, or all of the following: intronic REMS, branch point, and 3' splice site. In some embodiments, an artificial gene construct comprises a DNA sequence that is genetically engineered to comprise a branch point, a 3' splice site and an intronic REMS, in 5' to 3' order. In certain embodiments, the DNA sequence chosen to be used in the production of an artificial gene construct may contain a nucleotide sequence encoding an intronic REMS and an additional nucleotide sequence encoding an intronic REMS or a branch point or a 3' splice site sequence is introduced. In specific embodiments, the nucleotide sequence encoding an intronic REMS or a branch point or a 3' splice site is a non-endogenous sequence, i.e., a sequence not naturally found in the DNA sequence of the artificial gene construct. In certain embodiments, the artificial gene construct comprises other elements, such as a promoter (*e.g.*, a constitutive, inducible or tissue specific promoter), a Poly(A) site, a transcription termination site, and a transcription binding site(s). In certain embodiments, the artificial gene construct comprises at least the sequences to encode a therapeutic protein. In some embodiments, the artificial gene construct comprises at least an intronic REMS for a gene listed in Table 1-7. In a specific embodiment, the artificial gene construct further comprises exons of a gene listed in Table 1-7. In certain embodiments, the artificial gene construct comprises at least the exons of a detectable reporter gene, such as green fluorescent protein (GFP), yellow fluorescent protein (YFP), red fluorescent protein, beta galactosidase, renilla luciferase, firefly luciferase, etc.

[00983] In certain embodiments, an artificial gene construct is produced as follows: a nucleotide sequence encoding an intronic REMS is introduced into a nucleotide sequence encoding an existing intronic branch point and intronic 3' splice site of genomic DNA or DNA, wherein the DNA encodes two or more exons and one or more introns, and wherein the nucleotide sequence encoding the intronic REMS is downstream (in a preferred embodiment) or upstream of a nucleotide sequence encoding a branch point and a 3' splice site. In some embodiments, an artificial gene construct is produced as follows: a nucleotide sequence encoding an intronic REMS is introduced downstream (in a preferred embodiment) or upstream of a nucleotide sequence encoding a branch point and a 3' splice site of genomic DNA or DNA, wherein the DNA encodes two or more exons and an intron(s). In a specific embodiment, the nucleotide sequence encoding the intronic REMS is introduced internally within a nucleotide sequence encoding an intron. In certain embodiments, an artificial gene construct is produced as

follows: a nucleotide sequence encoding an intronic REMS, a nucleotide sequence encoding a branch point, and a nucleotide sequence encoding a 3' splice site are introduced into a cDNA, wherein the nucleotide sequence encoding the intronic REMS may be upstream of the branch point and 3' splice site, respectively; or may be downstream (in a preferred embodiment) of the 3' splice site and branch point, respectively. The nucleotide sequence encoding the intronic REMS functions as a 5' splice site. In certain embodiments, the nucleotide sequence encoding the intronic REMS is internally within an intron. In a specific embodiment, the genomic DNA or DNA chosen for use in the production of an artificial gene construct does not contain one or more of a nucleotide sequence encoding an intronic REMS or a nucleotide sequence encoding a branch point or a nucleotide sequence encoding a 3' splice site. In certain embodiments, the genomic DNA or DNA chosen for use in the production of an artificial gene construct contains an intronic REMS and an additional intronic REMS is introduced. In some embodiments, in introducing a nucleotide sequence encoding an intronic REMS into a DNA sequence, care should be taken so as not to disrupt an open reading frame or introduce a stop codon. The introduction of a nucleotide sequence encoding an intronic REMS into a DNA sequence may or may not result in an amino acid change at the protein level. In certain embodiments, the introduction of a nucleotide sequence encoding an intronic REMS into a DNA sequence results in an amino acid change at the protein level. In some embodiments, this amino acid change is a conservative amino acid substitution. In other embodiments, the introduction of a nucleotide sequence encoding an intronic REMS into a DNA sequence does not result in an amino acid change at the protein level. Techniques known to one of skill in the art may be used to introduce an intronic REMS and other elements, such as a branch point sequence or 3' splice site sequence into a DNA sequence, *e.g.*, gene editing techniques such as the CRISPR-Cas approach, Transcription Activator-Like Effector Nucleases (TALENs), or Zinc finger nucleases (ZFNs) may be used.

[00984] In certain embodiments, an artificial gene construct comprises an RNA sequence comprising exons and one, two or more introns, wherein an intronic REMS 5' splice site, which is downstream of a 3' splice site, is introduced into an intron by genetic engineering. In another embodiment, an artificial gene construct comprises an RNA sequence comprising exons, one, two or more introns, a 5' splice site(s), a 3' splice site(s) and a branch point(s), wherein an intronic REMS, which is downstream of a 3' splice site, is introduced into an intron by genetic engineering. In some embodiments, an artificial gene construct comprises a DNA sequence that

is genetically engineered to comprise one, two, or all of the following: branch point, 3' splice site and/or intronic REMS. In some embodiments, an artificial gene construct comprises a DNA sequence that is genetically engineered to comprise a branch point, a 3' splice site and an intronic REMS, in 5' to 3' order. In another embodiment, an artificial gene construct comprises an RNA sequence comprising exons and one or more introns, wherein at least one intron comprises in 5' to 3' order: a branch point, a 3' splice site and an intronic REMS, wherein the intronic REMS is endogenously present in an intron. In another embodiment, an artificial gene construct comprises an RNA sequence comprising exons, endogenously having a 5' splice site(s), a 3' splice site(s) and a branch point(s), wherein an intron, which is upstream of a 3' splice site, is modified to introduce a non-endogenous branch point, a non-endogenous 3' splice site and a non-endogenous intronic REMS. In specific embodiments, the intronic REMS is non-endogenous, i.e., not naturally found in the RNA sequence of the artificial gene construct. In certain embodiments, the artificial gene construct comprises other elements, such as a promoter (*e.g.*, a tissue-specific promoter or constitutively expressed promoter), 5' untranslated region, 3' untranslated region, a binding site(s) for RNA binding proteins, a small molecule RNA sensor(s), *e.g.*, riboswitches, stem-loop structures, and/or internal ribosome entry sites (IRES), etc. In certain embodiments, the artificial gene construct comprises at least the introns of a gene encoding a therapeutic protein. In some embodiments, the artificial gene construct comprises at least the introns of a gene listed in Tables 1-7. In a specific embodiment, the artificial gene construct further comprises exons of a gene listed in Table 1-7. In a specific embodiment, the RNA transcript chosen to be used in the production of an artificial gene construct does not contain an intronic REMS. In certain embodiments, the RNA transcript chosen to use in the production of an artificial gene construct contains an intronic REMS and an additional exonic or intronic REMS is introduced. In certain embodiments, the RNA transcript chosen to use in the production of an artificial gene construct contains an intronic REMS and an additional intronic REMS is introduced. In other embodiments, the artificial gene construct comprises at least one intron and two exons of a detectable reporter gene, such as green fluorescent protein (GFP), yellow fluorescent protein (YFP), red fluorescent protein, beta galactosidase, renilla luciferase, firefly luciferase, etc.

[00985] In certain embodiments, an artificial gene construct is produced as follows: an intronic REMS is introduced into an existing 5' splice site of precursor RNA, wherein the RNA

comprises two or more exons and one or more introns, and wherein an intronic REMS is upstream of a branch point sequence and a 3' splice site sequence. In some embodiments, an artificial gene construct is produced as follows: an intronic REMS is introduced upstream of a 3' splice site of a precursor RNA, wherein the RNA comprises two or more exons and an intron(s). In a specific embodiment, the intronic REMS is introduced internally within an intron. In certain embodiments, an artificial gene construct is produced as follows: a branch point, a 3' splice site and an intronic REMS are introduced into a precursor RNA, wherein the REMS may be either downstream or upstream of the branch point and 3' splice site. In certain embodiments, an artificial gene construct is produced as follows: a branch point, a 3' splice site and an intronic REMS are introduced into an mRNA, wherein the REMS may be either downstream or upstream of the branch point and 3' splice site. The intronic REMS functions as a 5' splice site. In some embodiments, in introducing an intronic REMS into an RNA sequence, care should be taken so as not to disrupt an open reading frame or introduce a stop codon. The introduction of an intronic REMS into an RNA transcript may or may not result in an amino acid change at the protein level. In certain embodiments, the introduction of an intronic REMS into an RNA transcript results in an amino acid change at the protein level. In some embodiments, this amino acid change is a conservative amino acid substitution. In other embodiments, the introduction of an intronic REMS into an RNA transcript does not result in an amino acid change at the protein level. Techniques known to one of skill in the art may be used to introduce an intronic REMS and other elements, such as a branch point or 3' splice site into an RNA transcript.

[00986] In some embodiments, an artificial gene construct is present in a viral vector (*e.g.*, an adeno-associated virus (AAV), self-complimentary adeno-associated virus, adenovirus, retrovirus, lentivirus (*e.g.*, Simian immunodeficiency virus, human immunodeficiency virus, or modified human immunodeficiency virus), Newcastle disease virus (NDV), herpes virus (*e.g.*, herpes simplex virus), alphavirus, vaccina virus, etc.), a plasmid, or other vector (*e.g.*, non-viral vectors, such as lipoplexes, liposomes, polymerosomes, or nanoparticles).

[00987] In some embodiments, the artificial gene construct is an RNA molecule modified to enable cellular uptake. In certain embodiments, the artificial gene construct is an RNA molecule containing pseudouridine or other modified/artificial nucleotides for enhanced cellular uptake and gene expression.

[00988] The use of an artificial gene construct described herein in gene therapy allows one to regulate the amount and type of a protein produced from the construct depending on whether or not a compound described herein is present. The compound is essentially a tunable switch that, depending on the amount and duration of the dose of the compound, regulates the amount and type of protein produced.

[00989] In certain embodiments, an RNA transcript transcribed from an artificial gene construct that is DNA would not produce or produce substantially less functional protein in the presence of a compound described herein than the amount of functional protein produced in the absence of a compound described herein. For example, if the artificial gene construct comprises a nucleotide sequence encoding an intronic REMS, which is downstream of an intronic nucleotide sequence encoding a branch point and a 3' splice site, then the creation of an intronic exon would ultimately result in less amount of the original protein (*i.e.*, without amino acid sequence derived from the intronic exon) being produced in the presence of a compound described hererin. Alternatively, in certain embodiments, an RNA transcript transcribed from an artificial gene construct that is DNA would produce or would produce substantially less functional protein in the presence of a compound described herein than the amount of functional protein produced in the absence of a compound described herein.

[00990] In certain embodiments, an artificial gene construct or vector comprising an artificial gene construct is used in cell culture. For example, in a cell(s) transfected with an artificial gene construct or transduced with a vector comprising an artificial gene construct, the amount and type of a protein produced from the artificial gene construct can be altered depending upon whether or not a compound described herein is contacted with the transfected cell(s). For example, if the artificial gene construct comprises a nucleotide sequence encoding an intronic REMS, which is downstream of a nucleotide sequence encoding a branch point and a 3' splice site, then the likelihood of producing an intronic exon would be less in the absence of the compound. Thus, the use of an artificial gene construct described herein allows one to regulate the amount and type of a protein produced from the construct depending on whether or not a compound described herein is present. In other words, a compound described herein is essentially a switch that regulates the amount and type of protein produced. This regulation of the production of protein could be useful, *e.g.*, when trying to assess the role of certain genes or the effects of certain agents on pathways. The amount of the protein produced can be modified

based on the amount of a compound described herein that is contacted with the transfected cell and/or how long the compound is contacted with the transfected cell.

[00991] In certain embodiments, an animal (*e.g.*, a non-human animal, such as a mouse, rat, fly, etc.) is engineered to contain an artificial gene construct or a vector comprising an artificial gene construct. Techniques known to one of skill in the art may be used to engineer such animals. The amount of protein produced by this engineered animal can be regulated by whether or not a compound described herein is administered to the animal. The amount of the protein produced can be titrated based on the dose and/or the duration of administration of a compound described herein to the engineered animal. In certain embodiments, the artificial gene construct encodes a detectable reporter gene, such as green fluorescent protein (GFP), yellow fluorescent protein (YFP), red fluorescent protein, beta galactosidase, renilla luciferase, firefly luciferase, etc. In accordance with this embodiment, the engineered animal may be used to monitor development at different stages, visualize tissue function, etc. In other embodiments, the artificial gene construct encodes a therapeutic gene product, such as described the gene product of a gene in Tables 2-7 and 1. In accordance with this embodiment, the engineered animal may be used to monitor development at different stages or in functional biological studies where a certain protein or protein isoform needs to be expressed only for a period of time and not constitutively, etc.

[00992] In certain embodiments, an artificial gene construct or a vector comprising an artificial gene construct are used in gene therapy. Non-limiting examples of vectors include, but are not limited to, plasmids and viral vectors, such as vectors derived from replication defective retroviruses, adenoviruses, adeno-associated viruses and baculoviruses. The vector can be an RNA vector or preferably a DNA vector.

GENE THERAPY

[00993] In another aspect, provided herein are artificial gene constructs or vectors comprising an artificial gene construct for use in gene therapy. The use of an artificial gene construct described herein in gene therapy allows one to regulate the amount and type of a protein produced from the construct depending on whether or not a compound described herein is present. The compound is essentially a switch that regulates the amount and type of protein produced.

[00994] In certain embodiments, an RNA transcript transcribed from an artificial gene construct that is DNA would not produce or would produce substantially more protein in the absence of a compound described herein than the amount of protein produced in the presence of a compound described herein. In certain embodiments, an RNA transcript transcribed from an artificial gene construct would not produce or would produce substantially more protein in the absence of a compound described herein than the amount of protein produced in the presence of a compound described herein. For example, if the artificial gene construct comprises a nucleotide sequence encoding an intronic REMS, which is downstream of a nucleotide sequence encoding a branch point and a 3' splice site, then the likelihood of producing an intronic exon would be less in the absence of a compound described herein, which would ultimately result in more amount of the original protein (*i.e.*, without amino acid sequence derived from the intronic exon) being produced. Thus, the use of an artificial gene construct or a vector comprising an artificial gene construct may be useful in treating and/or preventing certain conditions or diseases associated with genes. The conditions or diseases may include those described herein.

Alternatively, in certain embodiments, an RNA transcript transcribed from an artificial gene construct that is DNA would produce substantially less functional protein in the presence of a compound described herein than the amount of functional protein produced in the absence of a compound described herein. For example, in certain embodiments, if the artificial gene construct comprises a nucleotide sequence encoding an intronic REMS, the production of the original protein (*i.e.*, without amino acid sequence derived from the intronic exon), which is a functional protein, would be reduced in the presence of a compound described herein. However, in the absence of a compound described herein, normal splicing would occur, and the production of the functional protein will not be reduced. The amount and type of the protein produced can be titrated based on dose and duration of dosing of the compound.

[00995] In a specific embodiment, the artificial gene construct used in gene therapy comprises an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), and wherein r is adenine or guanine and n is any nucleotide.

[00996] In another specific embodiment, the artificial gene construct used in gene therapy comprises an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a first branch point and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), and wherein r is adenine or guanine and n is any nucleotide.

[00997] In another specific embodiment, the artificial gene construct used in gene therapy comprises an RNA sequence comprising two exons and an intron, wherein the RNA sequence comprises exonic and intronic elements illustrated in Figure 1A.

[00998] In another specific embodiment, the artificial gene construct used in gene therapy comprises an RNA sequence comprising two exons and an intron, wherein the RNA sequence comprises exonic and intronic elements illustrated in Figure 1B.

[00999] In another specific embodiment, the artificial gene construct used in gene therapy comprises an RNA sequence comprising two exons and an intron, wherein the RNA sequence comprises exonic and intronic elements illustrated in Figure 1C.

[001000] In another specific embodiment, the artificial gene construct used in gene therapy comprises a DNA sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the nucleotide sequence encoding the intron comprises in 5' to 3' order: a nucleotide sequence encoding a first 5' splice site, a nucleotide sequence encoding a first branch point, a nucleotide sequence encoding a first 3' splice site, an iREMS, a nucleotide sequence encoding a second branch point and a nucleotide sequence encoding a second 3' splice site, wherein the iREMS comprises a DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide.

[001001] In another specific embodiment, the artificial gene construct used in gene therapy comprises a DNA sequence encoding two exons and an intron, wherein the nucleotide sequence encoding one exon is upstream of the nucleotide sequence encoding the intron and the nucleotide sequence encoding the other exon is downstream of the nucleotide sequence encoding the intron, wherein the nucleotide sequence encoding the intron comprises in 5' to 3' order: an iREMS, a nucleotide sequence encoding a first branch point and a nucleotide sequence encoding a first 3'

splice site, wherein the iREMS comprises an DNA sequence GAgtrngn (SEQ ID NO: 4), wherein r is adenine or guanine and n is any nucleotide.

[001002] In another specific embodiment, the artificial gene construct used in gene therapy comprises a DNA sequence encoding two exons and an intron, wherein the DNA sequence comprises exonic and intronic elements illustrated in Figure 1A.

[001003] In another specific embodiment, the artificial gene construct used in gene therapy comprises a DNA sequence encoding two exons and an intron, wherein the DNA sequence comprises exonic and intronic elements illustrated in Figure 1B.

[001004] In another specific embodiment, the artificial gene construct used in gene therapy comprises a DNA sequence encoding two exons and an intron, wherein the DNA sequence comprises exonic and intronic elements illustrated in Figure 1C.

[001005] An artificial gene construct, a vector comprising the artificial gene construct, or an RNA molecule comprising an artificial gene construct modified to enable cellular uptake may be introduced into cells or administered directly to patients. In one embodiment, an artificial gene construct or a vector comprising the artificial gene construct is introduced into cells *ex vivo* or *in vivo*. In a specific embodiment, an artificial gene construct or vector is introduced into a cell(s) *ex vivo* and the cell(s) may be administered to a subject. Various techniques known to one of skill in the art may be used to introduce an artificial gene construct or vector comprising the artificial gene construct into a cell(s), such as electroporation, transfection, transformation, etc. In another embodiment, an artificial gene construct or vector comprising the artificial gene construct is administered to a subject. The artificial gene construct or vector comprising the artificial gene construct may be administered to a subject by any technique known to one skilled in the art, *e.g.*, intramuscularly, intravenously, subcutaneously, intradermally, topically, intrathecally, intraperitoneally, intratumorally, etc. In some embodiments, the artificial gene construct or vector comprising the artificial gene construct is administered to a subject systemically. In other embodiments, the artificial gene construct or vector comprising the artificial gene construct is administered to a subject locally.

ALTERING ENDOGENOUS GENES

[001006] In another aspect, provided herein are method for altering an endogenous gene such that it contains a nucleotide sequence encoding an intronic REMS, or contains an additional

nucleotide sequence encoding an intronic REMS (in other words, an intronic REMS not naturally found in the endogenous gene, i.e., a non-endogenous intronic REMS). In a specific embodiment, provided herein are method for altering an endogenous gene such that it contains a nucleotide sequence encoding an intronic REMS and contains a nucleotide sequence encoding a branch point and a nucleotide sequence encoding a 3' splice site upstream of the nucleotide sequence encoding the intronic REMS. As used herein, the term "endogenous gene" refers to a gene naturally found in a cell or living subject. Techniques known to one of skill in the art can be used to introduce any one, two, or all of the following: a branch point, a 3' splice site, and an intronic REMS into an endogenous gene, e.g., the CRISPR-Cas approach, TALEN, or ZFN may be used. In certain embodiments, a nucleotide sequence encoding an existing 5' splice site can be replaced with an intronic REMS or an intronic REMS may be inserted internally within an intron. In certain embodiments, in introducing a nucleotide sequence encoding an intronic REMS into an endogenous gene, care should be taken so as not to disrupt an open reading frame or introduce a stop codon. The introduction of a nucleotide sequence encoding an intronic REMS into an endogenous gene may or may not result in an amino acid change at the protein level. In certain embodiments, the introduction of a nucleotide sequence encoding an intronic REMS into an endogenous gene results in an amino acid change at the protein level. In some embodiments, this amino acid change is a conservative amino acid substitution. In other embodiments, the introduction of a nucleotide sequence encoding an intronic REMS into an endogenous gene does not result in an amino acid change at the protein level.

KITS

[001007] In one aspect, provided herein are kits comprising, in a container, an artificial gene construct or a vector comprising an artificial construct. In certain embodiments, the kits further comprise a compound described herein, in a separate container, and/or a negative control, such as phosphate buffered saline or a compound that does not recognize an intronic REMS, in a separate container. In a specific embodiment, the kits further comprise a positive control, such as a compound described herein as a positive control. In some embodiments, the kits further comprise primers and/or antibodies, in one or more separate containers, for assessing the production of an mRNA transcript from an artificial gene construct and/or protein production therefrom.

[001008] In another aspect, provided herein are kits comprising, in one or more containers, the components and/or reagents necessary to produce an artificial gene construct and/or a vector comprising an artificial gene construct. In another aspect, provided herein are kits comprising, in one or more containers, the components and/or reagents necessary to alter an endogenous gene so that it contains a nucleotide sequence encoding an intronic REMS or an additional nucleotide sequence encoding an intronic REMS (in other words, a REMS not naturally found in the endogenous gene, i.e., a non-endogenous REMS). In another aspect, provided herein are kits comprising, in one or more containers, the components and/or reagents necessary to alter an endogenous gene so that it contains a nucleotide sequence encoding an intronic REMS and contains a nucleotide sequence encoding a branch point and a nucleotide sequence encoding a 3' splice site upstream of the nucleotide sequence encoding the intronic REMS. In some embodiments, the kits further comprise primers and/or antibodies, in one or more separate containers, for assessing the production of an mRNA transcript from altered endogenous gene and/or protein production therefrom.

[001009] In another aspect, provided herein are kits comprising, in a container, a compound described herein, and instructions for use. In some embodiments, the kits further comprise a negative control, such as phosphate buffered saline or a compound that does not recognize an intronic REMS, in a separate container.

EXAMPLES

[001010] To describe in more detail and assist in understanding the present description, the following non-limiting biological examples are offered to more fully illustrate the scope of the description and are not to be construed as specifically limiting the scope thereof. Such variations of the present description that may be now known or later developed, which would be within the purview of one skilled in the art to ascertain, are considered to fall within the scope of the present description and as hereinafter claimed. The example below illustrates the existence of an intronic recognition element for splicing modifier (REMS) that is important for the recognition of a compound described herein, and the binding of such a compound to the intronic REMS on a precursor RNA permits or enhances the splicing of the precursor RNA, and suggests the usefulness of the intronic REMS in combination with a compound described herein for modulating RNA splicing, and for modulating the amount of a gene product.

[001011] Materials and Methods

[001012] Cell treatment: GM04856 lymphocyte cells were diluted in a medium composed of DMEM, 10% FBS and 1x Pen/Strep to a concentration of 2.5×10^5 cells/mL. 2 mL (500K cells) were seeded in 6-well plates and recovered for 4h at 37°C, 5% CO₂. Compound dilutions were prepared as 2x compound stock in medium (e.g. for final 100 nM, make a 200 nM stock). After 4h recovery, 2 mL of the 2x compound stock were added to each well, resulting in 4 mL/well with 1x final compound concentration. The cells were incubated for ~20h at 37°C, 5% CO₂. After incubation, the cells were pelleted for 5 min at 1000 rpm. The supernatant was vacuum-removed and the cells were resuspended in 350 µl of RLT buffer (w/ 10 µl/mL beta-mercapto-ethanol, RNeasy kit). Total RNA was isolated using the RNeasy Mini Kit from Qiagen according to the manufacturer's instructions. The concentration of the resulting total RNA was determined using Nanodrop and diluted with water to a final concentration of 25 ng/µL.

[001013] Endpoint PCR: 20 µL endpoint RT-PCRs were set up in 96-well plates using the AgPath-ID One-Step RT-PCR Reagents (Applied Biosystems) according to the manufacturer. Each reaction contained 200 nM forward primer, 200 nM reverse primer, and 50 ng total RNA. The following RT-PCR protocol was used: reverse transcription at 48°C for 15 min, denaturation at 95°C for 10 min, 35 PCR cycles with denaturation at 95°C for 30 sec, annealing at 58°C for 30 sec, and elongation at 68°C for 1 min, final hold at 4°C. 10 µL of each RT-PCR reactions were analyzed on 2% 48-well E-Gels (Invitrogen) (pre-run 1 min, run 14 min) and imaged using an BioRad Gel Doc EZ Imager. The following size markers were used: TrackIt 1 Kb Plus DNA ladder and TrackIt 100 bp DNA ladder (10 µL/well, both Invitrogen).

[001014] Results: Oligonucleotides corresponding to exons that flank the intron where an iExon is located were used to amplify total RNA purified from untreated (DMSO) or cells treated with Compound 774 (at dose levels 10nM, 1µM or 10µM). The resulting products were run on an agarose gel and the resulting bands of interest are demarcated by arrowheads, as shown in Figures 2A-D and 3-6A. In all cases, the increase of compound concentration results in appearance of a slower migrating PCR product containing the intronic-derived exon. In all cases, additional bands seen are intermediate spliced products.

[001015] Endpoint RT-PCR: Analysis of alternatively spliced mRNAs in cultured cells

[001016] GM03813 cells (Coriell Institute) derived from a patient with SMA type I (Coriell Institute) were plated at 5,000 cells/well in 200 µL DMEM with 10% FBS in 96-well plates, and

incubated for 6 hours in a cell culture incubator (37 °C, 5% CO₂, 100% relative humidity). Cells were then treated with certain representative compounds (e.g., Compound 774, Compound 702 and Compound 170) at different concentrations (in 0.5% DMSO) in duplicate for 24 hours. After removal of the supernatant, cells were lysed in Cells-To-Ct lysis buffer (Life Technologies, Inc.). Reverse transcription was performed using 5 µL of cell lysate and the iScript RT enzyme kit (Bio-Rad Laboratories, Inc). PCR was performed using 5 µL of cDNA and Platinum Taq HiFi DNA Polymerase (Life Technologies, Inc.) under the following PCR conditions: Step1: 94°C (2 min), Step 2: 94°C (30 sec), Step 3: 55°C (30 sec), Step 4: 68°C (1 min), then repeat Steps 2 to 4 for 33 cycles, then hold at 4°C. Alternatively spliced mRNAs were identified using primers listed in **Tables 8** and **9**. PCR products were separated on 2% agarose E-gels, stained with ethidium bromide and visualized using a gel imager (UVP). Results for genes affected by intronic exons generated by treatment with Compound 774 are shown in **Table 10**.

[001017] **Table 8**

Gene	Forward Primer	Sequence 5'-3'	SEQ ID NO.
ABCB8	ABCB_54-73	GCCGGCGGCTCCTGTTTTAC	3629
ANXA11	ANXA_101-120	AGTCGCTGTACCACGACATC	3630
ARL15	ARL1_87-106-1a-KE	GCTGCCGGATGTCTGATCTC	3631
DCAF17	DECA_23-43-KE	TGCTGTACCTTGCAGTGTTC	3632
DHFR	DHFR_5-24	CCATGAATCACCCAGGCCAT	3633
FAIM	FAIM_197-217-KE	GTGAAACCTACCCAGAGCCT	3634
GXYLT1	GXYL_57-77	GGAAGCAATTGCCAAGAAGCA	3635
HTT	HTT_E49 For	TGCCCAGTCATTGACACCTT	3636
MADD	MADD_137-156-KE	TGCCACAGGAAAGGGTCCTA	3637
MEMO1	MEMO_37-56	TGGAGCTCTGAGTGAGTCAA	3638
OXCT1	OXCT_55-75-KE	GGCCTGACAGTGGATGACGTA	3639
PAPD4	PAPD_46-65-KE	CCCGGAGCAGTGATGGTGAT	3640
PDXDC1	*PDXD_23-42	TGTGCCGTGTACCCTGTAAC	3641
PMS1	PMS1_104-127-KE	TCTCCTCATGAGCTTTGGTATCCT	3642
PPIP5K2	PPIP_34-57-KE	TCAGTTGACCTATCTCCCTCATGG	3643
PPP1R26	PPP1R26e3F1	CGTGTGGGAACACTGGCTG	3644
PRPF31	RPRF_50-69-KE	GCCAACCGTATGAGCTTCGG	3645
RARS2	RARS_30-53-KE	TTGGACATTTGCGTTCTACCATCA	3646
TNS3	TNS3_6-29-KE	CCAGGTGATAAACTTGTGATCGTG	3647
WNK1	Wnk1_45-67	GCTGGTGTTTTTAAGATGGGACG	3648
SF3B	SF3B_107-127-2a	GGCATCAGCTTTGCCATTCAT	3649

Gene	Forward Primer	Sequence 5'-3'	SEQ ID NO.
SF3B	SF3B_134-153-9a	TTGGACAGCCTCTCTCCCAT	3650
MEMO1	MEMO_37-56	TGGAGCTCTGAGTGAGTCAA	3651
DHFR	DHFR_5-24	CCATGAATCACCCAGGCCAT	3652
GCFC2	GCFC2e2F1	GGAGAAAAAGAACTTTCATCAACAG	3653
FAM174A	FAM174Ae2F1	CAGGATGATGAGGATGATGACAAC	3654
SOS2	SOS2e19F1	CTGAAAAAGAGTTTACAGATTATTTGTTC	3655
COPS7B	COPS7Be2F1	CGGAGTGTATGTCTTTGGAGAACTT	3656
LMBRD2	LMBRD2e16R1	GGAATCTTCTCTATTGTGTCCATAACG	3657
ASAP1	ASAP1e11F1	TACCCCTTCTTTTCACTGCCAT	3658
PPP1R26	PPP1R26e3F1	CGTGTGGGAACACTGGCTG	3659
NT5C2	NT5C2e12F1	AAACCACTCTTTTTTGGAGAAAGGC	3660
ELMO2	ELMO2e2F1	AGGTGTAGAAAGAGGTACATGGAGAA	3661

[001018] Table 9

Gene	Reverse Primer	Sequence 5'-3'	SEQ ID NO.
ABCB8	ABCB_235-254	AGGAGCTGCGGTAGCCATCA	3662
ANXA11	ANXA_302-321	GAGCCACCAGTCACTGTTCA	3663
ARL15	ARL1_392-411-1a-KE	TGAGGCCTATGCAAACCAGG	3664
DCAF17	DECA_168-190-KE	CCATGAGACAAGGTAGCATCTGT	3665
DHFR	DHFR_209-228	TGCCTTTCTCCTCCTGGACA	3666
FAIM	FAIM_367-388-KE	AGCAACATCCCAAACAGCTACG	3667
GXYLT1	GXYL_246-268	AGGAACGGATGTTGTCATCTTCA	3668
HTT	HTT_E51_Rev	GGGTATTTGTCCTTCTTTCT	3669
MADD	MADD_288-309-KE	TCTCCTCTGTCTCACCAAGGTC	3670
MEMO1	MEMO_218-239	TCCCCCTGGGATTCATCATAGT	3671
OXCT1	OXCT_236-256-KE	AATGAAAAACACGCAGCCTGG	3672
PAPD4	PAPD_183-205-KE	AAGGTGAGTATATGCCGTGCTTC	3673
PDXDC1	*PDXD_179-199	CAAGCAACAGGGGCAGTCTTC	3674
PMS1	PMS1_285-308-KE	ACATGAGAGCCATCTTGTGATCTG	3675
PPIP5K2	PPIP_149-172-KE	TTCACCTCCCCATTTTAGAACCAA	3676
PPP1R26	PPP1R26e4R1	GCGATGCTTTATTTCTCTACCG	3677
PRPF31	RPRF_218-237-KE	TCGTTTACCTGTGTCTGCCG	3678
RARS2	RARS_251-270-KE	ATGCCCCAATCGCCAAGGTA	3679
TNS3	TNS3_96-116-KE	CGGCTCCTTGTCTTCAACAT	3680
WNK1	Wnk1_187-207	CTGAGGACTCTGAGGTGCTGG	3681
SF3B	SF3B_256-275-2a	GTACTTTGCCAGTGTTGGGG	3682
SF3B	SF3B_304-324-9a	ACTCTCAGAGATGATCGGGGT	3683
MEMO1	MEMO_218-239	TCCCCCTGGGATTCATCATAGT	3684

Gene	Reverse Primer	Sequence 5'-3'	SEQ ID NO.
DHFR	DHFR_209-228	TGCCTTTCTCCTCCTGGACA	3685
GCFC2	GCFC2e3R1	GAATAAAAGCTGCATCTGGGATC	3686
FAM174A	FAM174Ae3R1	CAACATTGATATAGTGGCTTCTTATTC	3687
SOS2	SOS2e20R1	CTGAAGAAGCAGATACTGGTGGAG	3688
COPS7B	COPS7Be3R1	GTATGTCCCATAGGCAAACAGGTT	3689
LMBRD2	LMBRD2e15F1	AAAGGCAAGAAGAAGGTGAAAATC	3690
ASAP1	ASAP1e12R1	GCTAACTGCACTCCGAGACTTAAT	3691
PPP1R26	PPP1R26e4R1	GCGATGCTTTATTTCTCTACCG	3692
NT5C2	NT5C2e13R1	TAGACGATACCATGCTGTAGGGG	3693
ELMO2	ELMO_232-252	TTGATAATGGATGCCAGGGGC	3694

[001019] Results: The statistically significant value for the likelihood of iExon production (Δ PSI) according to the Fisher's Exact Test (FET) for PNN and HDF cell lines treated with Compound 774 at 3 μ M and Fold Decrease (FD) for certain genes tested, where NR represents "Not Reported," is shown in **Table 10**.

[001020] The Δ PSI for inclusion of an iExon and resulting modulated expression of RNA transcripts identified is represented by stars, where one star (*) represents $\leq 25\%$ change in expression, where two stars (**) represent change in expression in a range from $< 26\%$ to $\leq 50\%$ change, where three stars (***) represent change in expression in a range from $< 51\%$ to $\leq 75\%$ change, and, where four stars (****) represent change in expression in a range from $< 75\%$ to $\leq 100\%$ change.

[001021] Table 10

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
ABCB8	i1	**	9.42E-16	NR	**	3.66E-09	NR
ABCC3	i30	**	6.00E-07	-0.25	*	1	-1.03
ADAM17	i1	**	7.83E-11	NR	*	4.87E-08	NR
ADCY3	i6	*	0.003	NR	*	0.656286	NR
AGPAT4	i1	*	1.13E-05	NR	**	1.21E-06	NR
ANKRA2	i5	*	0.28	-1.05	*	0.001	0.73
ANXA11	i16	*	9.07E-56	NR	*	2.24E-20	NR
APIP	i1	*	2.52E-11	NR	*	1.42E-19	NR
APPL2	i1	*	4.28E-06	NR	*	0.47	NR
ARHGAP1	i1	*	0.34	-0.11	*	0.01	-1.02
ARL15	i4	**	1.77E-08	NR	*	1.94E-05	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
ARL15	i1	****	1.20E-17	NR	***	2.25E-18	NR
ASAP1	i12	*	0	-0.79	*	0	-1.40
ASAP1	i19	*	0	-0.79	*	0	-1.40
ASAP1	i19	*	0.0003	-0.79	*	0.22	-1.40
ASAP1	i12	*	0.004	-0.79	*	1	-1.40
ASPH	i24	*	1	NR	*	0.19	NR
ATAD2B	i27	*	0.51	NR	*	0.47	NR
ATXN1	i7	*	0.08	NR	*	1	NR
BECN1	i11	*	3.01E-18	NR	*	5.27E-06	NR
BHMT2	i2	*	0.05	NR	*	1	NR
BICD1	i5	*	2.64E-05	NR	*	0.06	NR
BTN3A1	i1	*	0.02	NR	*	0.0001	NR
C11orf30	i20	***	3.45E-12	-0.82	***	3.57E-10	-1.06
C11orf73	i2	**	1.10E-47	-1.44	*	2.53E-40	0.52
C12orf4	i1	****	2.07E-43	NR	****	1.91E-66	NR
C14orf132	i1	*	0.16	NR	*	0.04	NR
C8orf44	i1	***	0.004	NR	*	1	NR
C8orf44-SGK3	i1	***	1.17E-08	NR	**	0.06	NR
C8orf88	i3	*	0.13	NR	*	4.31E-05	NR
CASC3	i3	*	0.04	-0.48	*	0.08	-1.14
CASP7	i2	*	0.001	NR	*	1.99E-06	NR
CCDC122	i6	*	0.29	-1.07	*	1	0.41
CDH13	i7	*	0.0003	-2.06	*	1.32E-05	-0.76
CECR7	i3	****	3.06E-07	NR	****	0.14	NR
CENPI	i19	****	1.62E-50	NR	***	1.78E-58	NR
CEP112	i24	*	0.11	-0.96	*	0.02	-0.62
CEP192	i13	*	0.03	NR	*	0.34	NR
CHEK1	i13	**	3.38E-05	NR	*	0.0002	NR
CMAHP	i6	*	1	-1.59	***	0.002	-0.47
CNRIP1	i2	*	3.10E-22	NR	*	1.70E-42	NR
CNRIP1	i15	*	1.62E-17	NR	*	2.06E-34	NR
COPS7B	i2	*	1.45E-22	NR	*	4.58E-14	NR
CPSF4	i2	*	0.009	NR	*	0.40	NR
CRISPLD2	i1	***	0.009	-0.25	***	0.001	-1.29
CRYBG3	i17	*	1	-0.33	*	1	-1.08
CSNK1E	i3	****	1.50E-07	NR	***	0.004	NR
CSNK1G1	i2	*	0.004	NR	*	1	NR
DCAF17	i2	*	0.06	NR	*	1	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
DCAF17	i6	****	1.01E-17	NR	**	9.85E-15	NR
DCUN1D4	i8	*	0.05	-1.16	*	3.90E-17	-0.01
DDX42	i8	*	9.24E-17	-1.26	*	0.0002	-1.62
DENND1A	i10	**	0.0005	-2.20	***	8.97E-07	-2.09
DENND5A	i3	*	0	-2.48	*	0	-2.09
DENND5A	i8	*	0	-2.48	*	0	-2.09
DGKA	i10	*	0.02	NR	*	0.22	NR
DHFR	i5	****	2.99E-06	NR	***	0.0006	NR
DHFR	i5	****	5.92E-08	NR	***	0.0004	NR
DIAPH3	i27	*	8.17E-12	-2.51	*	4.97E-12	-2.14
DIAPH3	i15	**	8.33E-15	-2.51	*	1.10E-08	-2.14
DNAJC13	i43	*	0.05	-0.23	*	0.33	-1.05
DNMBP	i1	*	0.66	-0.32	*	0.62	-0.99
DNMBP	i11	*	0.001	-0.32	*	0.11	-0.99
DOCK1	i23	*	2.18E-13	-1.29	*	0.0006	-1.28
DYRK1A	i3	*	0.01	NR	*	0.33	NR
EIF2B3	i6	*	0.0005	-1.86	*	1.49E-06	-0.82
ENAH	i1	**	9.79E-34	NR	**	7.69E-23	NR
ENOX1	i5	*	0	-1.28	*	0	-0.68
EP300	i1	*	0.0006	0.13	*	1	-1.19
ERC1	i18	**	4.96E-20	-0.53	*	0.0002	-1.49
ERLIN2	i1	*	4.62E-06	NR	*	0.12	NR
ERRFI1	i1	****	0.004	NR	*	1	NR
EVC	i5	*	1.62E-12	-0.53	*	0.23	-0.96
FAF1	i14	*	0.21	-1.32	*	0.009	-0.83
FAIM	i2	*	0.08	NR	*	0.30	NR
FAM126A	i7	*	5.38E-10	NR	*	1.31E-05	NR
FAM13A	i4	*	0.49	NR	*	0.04	NR
FAM162A	i1	****	2.03E-84	NR	***	6.15E-83	NR
FAM174A	i2	*	0.001	NR	*	0.0006	NR
FBN2	i5	**	5.89E-26	-0.69	**	9.15E-22	-1.75
FER	i13	**	0.02	-1.81	*	0.001	-1.26
FHOD3	i21	*	2.20E-06	-0.60	*	2.48E-05	-1.23
FOCAD	i6	*	0.01	NR	*	1	NR
GALC	i6	***	2.48E-07	-2.21	***	2.31E-06	-2.14
GCFC2	i11	*	1	-1.34	*	0.18	-0.27
GGACT	i2	*	0.24	NR	*	0.49	NR
GLCE	i2	*	0.01	NR	*	0.01	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
GOLGA4	i1	*	1	-0.24	*	0.31	-0.98
GOLGB1	i14	*	1	-1.32	*	1.24E-05	-1.24
GPSM2	i1	**	0.0004	NR	*	0.14	NR
GULP1	i1	***	0.001	NR	**	0.0006	NR
GXYLT1	i7	*	4.54E-05	NR	*	0.02	NR
HDX	i1	****	1.66E-05	NR	***	1.11E-05	NR
HLTF	i14	*	1	-1.76	*	0.19	-1.75
HMGA2	i3	*	2.99E-06	NR	*	0.003	NR
HNMT	i1	*	0.03	NR	*	0.89	NR
HSD17B12	i6	***	3.41E-16	-2.92	**	1.16E-39	-2.39
HSD17B4	i2	*	5.71E-06	NR	*	0.002	NR
HTT	i49	**	6.23E-08	-1.21	***	2.98E-05	-1.86
IFT57	i5	*	2.26E-15	NR	*	1.31E-18	NR
IVD	i7	*	6.58E-13	NR	*	4.50E-12	NR
KDM6A	i26	**	4.61E-14	NR	**	1.87E-11	NR
KIAA1524	i11	*	0	-1.43	*	0	-0.62
KIAA1715	i6	*	0	-1.41	*	0	0.05
LETM2	i8	**	5.73E-05	NR	*	1	NR
LOC400927	i3	****	1.50E-07	NR	*	0.004	NR
LRRC42	i2	**	8.25E-09	NR	*	0.01	NR
LUC7L3	i1	*	4.59E-06	NR	*	0.003	NR
LYRM1	i2	*	3.63E-06	NR	*	4.98E-14	NR
MB21D2	i1	*	0.007	NR	*	0.002	NR
MCM10	i15	*	0.0009	NR	*	1	NR
MED13L	i3	*	1	-0.17	*	1	-1.11
MED13L	i22	*	0.07	-0.17	*	1	-1.11
MEDAG	i2	**	0.0004	-2.40	*	0.01	-1.60
MEMO1	i6	**	2.42E-35	-1.30	*	5.11E-40	-0.56
MFN2	i1	****	1.08E-90	NR	***	8.82E-42	NR
MMS19	i2	*	0	-1.36	*	0	-1.75
MRPL45	i4	*	4.39E-11	NR	*	1.75E-10	NR
MRPS28	i2	*	1.43E-09	NR	*	0.003	NR
MTERF3	i3	*	1.38E-07	-1.63	*	1.74E-18	-0.19
MYCBP2	i80	*	2.71E-06	-0.36	*	0.04	-1.12
MYCBP2	i55	***	1.44E-05	-0.36	**	0.03	-1.12
MYLK	i5	*	5.54E-09	0.23	*	3.75E-06	-1.10
MYOF	i29	*	0.01	-0.82	*	0.003	-1.75
NGF	i1	****	1.75E-69	NR	***	2.47E-53	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
NREP	i3	*	0.0002	-1.31	*	0.46	-0.10
NSUN4	i5	**	1.90E-09	-1.48	*	1.80E-08	-0.67
NT5C2	i11	*	2.32E-11	-1.26	*	4.54E-07	-0.05
OSMR	i3	*	0.004	-0.14	*	0.03	-0.97
OXCT1	i16	*	0.0005	NR	*	0.46	NR
PAPD4	i7	****	2.37E-32	-2.33	****	3.72E-52	-1.40
PCM1	i15	*	0.06	-1.30	*	0.10	-0.86
PDE7A	i2	***	1.46E-10	NR	***	3.25E-09	NR
PDS5B	i13	*	0.03	-0.42	*	0.03	-1.02
PDXDC1	i7	***	1.09E-13	NR	***	4.13E-18	NR
PIGN	i22	**	1.35E-20	NR	*	1.27E-26	NR
PIK3CD	i3	**	3.02E-06	NR	*	0.32	NR
PIK3R1	i2	*	0.02	-0.83	**	6.81E-10	-1.06
PIKFYVE	i12	*	0.02	NR	*	0.002	NR
PITPNB	i7	*	1	-1.45	*	0.03	-1.17
PITPNB	i7	*	4.52E-05	-1.45	*	2.70E-07	-1.17
PLEKHA1	i1	**	0.006	NR	**	0.002	NR
PLSCR1	i1	*	0.0008	NR	*	1	NR
PMS1	i5	****	1.49E-07	-2.57	***	3.56E-24	-1.02
POMT2	i13	****	2.02E-40	NR	****	5.83E-53	NR
PPARG	i4	*	0.04	NR	*	1	NR
PPIP5K2	i13	*	4.52E-11	NR	*	1.70E-05	NR
PPP1R26	i3	**	3.54E-09	NR	*	0.0007	NR
PRPF31	i11	**	2.66E-39	NR	*	8.15E-18	NR
PRSS23	i3	*	9.82E-07	NR	*	0.10	NR
PSMA4	i4	*	1.45E-09	NR	*	1.80E-20	NR
PXK	i1	*	8.38E-05	NR	*	2.07E-06	NR
RAF1	i7	*	4.10E-37	NR	*	3.85E-24	NR
RAPGEF1	i11	***	1.30E-07	NR	****	5.56E-05	NR
RARS2	i6	*	2.50E-20	NR	*	5.90E-08	NR
RBKS	i1	**	0.0004	NR	**	0.002	NR
RERE	i13	**	3.04E-07	0.02	**	3.70E-05	-1.06
RFWD2	i11	*	1.50E-13	-2.40	*	3.95E-16	-0.90
RPA1	i1	*	3.28E-12	NR	*	0.006	NR
RPS10	i5	*	9.72E-28	NR	*	3.15E-20	NR
SAMD4A	i1	*	0.003	NR	*	0.001	NR
SAR1A	i1	*	1.85E-48	NR	*	8.33E-65	NR
SCO1	i4	*	5.88E-07	NR	*	6.67E-08	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
SEC24A	i7	*	0.003	NR	*	0.008	NR
SENP6	i2	****	5.51E-84	NR	****	3.10E-77	NR
SERGEF	i1	****	0.14	-1.02	*	1	-0.81
SGK3	i1	***	1.17E-08	NR	**	0.06	NR
SLC12A2	i10	***	7.56E-18	NR	*	0.0008	NR
SLC25A17	i2	***	7.32E-38	NR	***	3.49E-74	NR
SLC44A2	i21	*	1.56E-06	0.06	*	0.002	-0.99
SMYD3	i5	*	0.0001	-1.40	*	9.36E-06	0.33
SNAP23	i3	****	6.29E-112	-2.82	***	1.22E-150	-0.89
SNHG16	i1	*	1.92E-18	-1.68	*	5.75E-14	-0.99
SNX7	i7	*	3.44E-26	NR	*	8.14E-24	NR
SOS2	i19	**	1.39E-10	NR	*	2.76E-05	NR
SPATA5	i10	*	1	NR	*	0.27	NR
SPIDR	i1	*	3.23E-08	NR	*	0.007	NR
SPRYD7	i4	*	2.80E-05	NR	*	7.62E-07	NR
SRGAP1	i1	*	0.001	-0.16	*	0.0002	-0.99
SRRM1	i3	*	1	0.14	*	1	-1.05
STAT1	i21	*	7.01E-09	-3.06	*	7.52E-31	-1.86
STXBP6	i2	*	9.26E-08	NR	*	1	NR
STXBP6	i1	****	6.15E-14	NR	***	2.75E-05	NR
SUPT20H	i24	*	5.05E-07	NR	*	0.22	NR
TAF2	i20	*	0	-1.03	*	0	-0.57
TAF2	i23	***	6.92E-18	-1.02754	**	3.95E-12	-0.57
TASP1	i13	***	7.02E-08	NR	**	6.32E-05	NR
TBC1D15	i5	*	0.12	NR	*	1	NR
TCF12	i3	*	1.21E-22	NR	*	3.63E-15	NR
TCF4	i4	*	3.51E-22	NR	*	7.89E-07	NR
TIAM1	i4	***	0.05	NR	*	1	NR
TJP2	i1	*	0.02	NR	*	0.25	NR
TMC3	i2	**	0.18	NR	*	0.45	NR
TMEM214	i8	*	1.97E-56	NR	*	4.75E-07	NR
TNRC6A	i4	***	1.38E-21	NR	**	1.08E-10	NR
TNS3	i23	**	0.0007	-2.76	*	0.007	-2.74
TOE1	i4	*	3.34E-05	NR	*	0.002	NR
TRAF3	i8	*	0.0004	-0.54	*	0.14	-0.97
TSPAN2	i4	***	1.12E-18	-1.06	**	1.81E-08	-0.58
TTC7B	i5	*	3.09E-06	NR	*	8.95E-05	NR
TYW5	i1	*	0.0009	NR	*	0.10	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
UBAP2L	i24	**	5.24E-52	NR	*	1.43E-35	NR
URGCP	i1	*	0.15	NR	*	0.32	NR
VAV2	i4	**	2.55E-08	NR	**	1.65E-07	NR
WDR27	i2	**	0.003	NR	*	1	NR
WDR27	i9	**	0.008	NR	**	0.09	NR
WDR37	i9	**	0.0009	NR	**	0.03	NR
WDR91	i5	***	7.69E-06	NR	**	0.0006	NR
WNK1	i23	*	0.01	0.071985	*	1	-1.26
XRN2	i3	*	1	-1.29088	*	1	-0.55
XRN2	i16	*	3.25E-07	-1.29088	*	1.05E-08	-0.55
ZCCHC8	i11	*	5.24E-10	NR	*	4.65E-08	NR
ZFP82	i4	**	9.95E-06	NR	**	1.56E-08	NR
ZNF138	i3	***	0.025	NR	*	0.07	NR
ZNF232	i4	*	0.23	NR	*	0.02	NR
ZNF37BP	i4	****	0.003	NR	***	0.03	NR

[001022] Results: The statistically significant value for the likelihood of exon inclusion (Δ PSI) according to the Fisher's Exact Test (FET) for PNN and HDF cell lines treated with Compound 774 at 3 μ M and Fold Decrease (FD) for certain genes tested, where NR represents "Not Reported," is shown in **Table 10a**.

[001023] The Δ PSI for inclusion of an exon and resulting modulated expression of RNA transcripts identified is represented by stars, where one star (*) represents $\leq 25\%$ change in expression, where two stars (**) represent change in expression in a range from $< 26\%$ to $\leq 50\%$ change, where three stars (***) represent change in expression in a range from $< 51\%$ to $\leq 75\%$ change, and, where four stars (****) represent change in expression in a range from $< 75\%$ to $\leq 100\%$ change.

[001024] Table 10a

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
APLP2	e7	**	0	NR	**	2.69E-271	NR
AXIN1	e9	**	0.004	NR	*	1	NR
CECR7	e5	*	0.02	NR	*	1	NR
DAGLB	e4	*	0.74	NR	*	0.43	NR
DLGAP4	e8	*	1.12E-13	NR	*	1.12E-07	NR

Gene Symbol	Inclusion Position	Δ PSI (PNN)	FET Δ PSI (PNN)	FD PNN	Δ PSI (HDF)	FET Δ PSI (HDF)	FD HDF
ERCC1	e8	*	0.0009	NR	*	0.20	NR
ERGIC3	e8	*	1.44E-220	NR	*	2.39E-209	NR
FAM198B	e3	*	0.003	-1.81	*	0.20	-0.35
GGCT	e2	**	1.36E-30	NR	**	5.86E-45	NR
HAT1	e3	*	6.50E-11	NR	*	1.34E-10	NR
HPS1	e5	*	0.01	NR	*	0.34	NR
INPP5K	e2	*	0.53	NR	*	0.14	NR
MADD	e21	*	2.28E-08	NR	*	7.00E-07	NR
PPHLN1	e3	***	8.22E-83	NR	**	8.90E-66	NR
PRUNE2	e18	*	0.52	-0.52	**	0.05	-1.74
RAP1A	e2	*	3.80E-15	NR	*	4.27E-07	NR
RNFT1	e3	*	0.02	NR	*	6.02E-07	NR
RPS6KB2	e2	*	0.14	NR	*	1	NR
SH3YL1	e9	*	0.009	NR	*	0.08	NR
SKA2	e3	*	0.0001	NR	*	0.05	NR
SPATA18	e4	**	1.50E-05	NR	*	0.29	NR
STRN3	e8	****	4.13E-54	NR	***	4.39E-44	NR
TMEM189-UBE2V1	e6	*	2.19E-30	NR	*	4.66E-20	NR
TRIM65	e5	***	2.49E-11	NR	**	0.0002	NR
TUBE1	e4	*	7.36E-05	NR	*	2.05E-10	NR
UBE2V1	e3	*	2.19E-30	NR	*	4.66E-20	NR
VPS29	e2	**	3.05E-17	NR	**	2.61E-38	NR
ZNF680	e3	*	0.13	NR	*	0.32	NR

[001025] Details on the location of the iExon produced in affected genes from **Table 10** are shown in **Table 11**.

[001026] **Table 11**

Gene Symbol	Ref SeqID	Coordinates	Description
ABCB8	NM_007188	chr7:150728328-150728378	ATP-binding cassette, sub-family B (MDR/TAP), member 8
ABCC3	NM_003786	chr17:48767318-48767437	ATP-binding cassette, sub-family C (CFTR/MRP), member 3
ADAM17	NM_003183	chr2:9683889-9683825	ADAM metalloproteinase domain 17
ADCY3	NM_004036	chr2:25061781-25061716	adenylate cyclase 3
AGPAT4	NM_020133	chr6:161687802-161687740	1-acylglycerol-3-phosphate O-acyltransferase 4

Gene Symbol	Ref SeqID	Coordinates	Description
ANKRA2	NM_023039	chr5:72851082-72850950	ankyrin repeat, family A (RFXANK-like), 2
ANXA11	NM_001278407	chr10:81916254-81916134	annexin A11
APIP	NM_015957	chr11:34933660-34933520	APAF1 interacting protein
APLP2	NM_001642	chr11:129993507-129993674	amyloid beta (A4) precursor-like protein 2
APPL2	NM_018171	chr12:105625422-105625147	adaptor protein, phosphotyrosine interaction, PH domain and leucine zipper containing 2
ARHGAP1	NM_004308	chr11:46718619-46718571	Rho GTPase activating protein 1
ARL15	NM_019087	chr5:53212951-53212826	ADP-ribosylation factor-like 15
ASAP1	NM_001247996	chr8:131173039-131173031	ArfGAP with SH3 domain, ankyrin repeat and PH domain 1
ASAP1	NM_001247996	chr8:131135828-131135650	ArfGAP with SH3 domain, ankyrin repeat and PH domain 1
ASAP1	NM_001247996	chr8:131135731-131135650	ArfGAP with SH3 domain, ankyrin repeat and PH domain 1
ASAP1	NM_001247996	chr8:131173046-131173031	ArfGAP with SH3 domain, ankyrin repeat and PH domain 1
ASPH	NM_004318	chr8:62,421,470-62,421,527	aspartate beta-hydroxylase
ATAD2B	NM_001242338	chr2:23976387-23976214	ATPase family, AAA domain containing 2B
ATXN1	NM_000332	chr6:16409524-16409426	ataxin 1
AXIN1	NM_003502	chr16:341297-341190	axin 1
BECN1	NM_003766	chr17:40963348-40963310	beclin 1, autophagy related
BHMT2	NM_017614	chr5:78374568-78374655	betaine--homocysteine S-methyltransferase 2
BICD1	NM_001714	chr12:32486172-32486263	bicaudal D homolog 1 (Drosophila)
BTN3A1	NM_001145008	chr6:26404363-26404455	butyrophilin, subfamily 3, member A1
C11orf30	NM_020193	chr11:76259972-76260061	chromosome 11 open reading frame 30
C11orf73	NR_024596	chr11:86037555-86037718	chromosome 11 open reading frame 73
C12orf4	NM_020374	chr12:4646680-4646546	chromosome 12 open reading frame 4
C14orf132	NM_001252507	chr14:96506612-96506704	chromosome 14 open reading frame 132
C8orf44	NM_019607	chr8:67588980-67589137	chromosome 8 open reading frame 44

Gene Symbol	Ref SeqID	Coordinates	Description
C8orf44-SGK3	NM_001204173	chr8:67697924-67698031	C8orf44-SGK3 readthrough
C8orf88	NM_001190972	chr8:91990874-91990807	chromosome 8 open reading frame 88
CASC3	NM_007359	chr17:38298307-38298353	cancer susceptibility candidate 3
CASP7	NM_033340	chr10:115477382-115477512	caspase 7, apoptosis-related cysteine peptidase
CCDC122	NM_144974	chr13:44431087-44431054	coiled-coil domain containing 122
CDH13	NM_001220488	chr16:83402146-83402179	cadherin 13
CECR7	NM_014339	chr22:17,535,915-17,535,996	cat eye syndrome chromosome region, candidate 7 (non-protein coding)
CECR7	NR_015352	chr22:17535855-17535996	cat eye syndrome chromosome region, candidate 7 (non-protein coding)
CENPI	NM_006733	chrX:100411511-100411544	centromere protein I
CEP112	NM_001199165	chr17:63684725-63684629	centrosomal protein 112kDa
CEP192	NM_032142	chr18:13038514-13038578	centrosomal protein 192kDa
CHEK1	NM_001114121	chr11:125526101-125526230	checkpoint kinase 1
CMAHP	NR_002174	chr6:25107418-25107336	cytidine monophospho-N-acetylneuraminic acid hydroxylase, pseudogene
CNRIP1	NM_001111101	chr2:68542975-68542840	cannabinoid receptor interacting protein 1
CNRIP1	NM_000945	chr2:68,542,833-68,542,986	cannabinoid receptor interacting protein 1
COPS7B	NM_001282950	chr2:232655806-232655883	COP9 signalosome subunit 7B
CPSF4	NM_006693	chr7:99045396-99045536	cleavage and polyadenylation specific factor 4, 30kDa
CRISPLD2	NM_031476	chr16:84869783-84870041	cysteine-rich secretory protein LCCL domain containing 2
CRYBG3	NM_153605	chr3:97635177-97635237	beta-gamma crystallin domain containing 3
CSNK1E	NM_001289912	chr22:38766050-38765991	casein kinase 1, epsilon
CSNK1G1	NM_022048	chr15:64575350-64575317	casein kinase 1, gamma 1
DAGLB	NM_139179	chr7:6474651-6474425	diacylglycerol lipase, beta
DCAF17	NM_025000	chr2:172298369-172298546	DDB1 and CUL4 associated factor 17
DCAF17	NM_025000	chr2:172309926-172309987	DDB1 and CUL4 associated factor 17

Gene Symbol	Ref SeqID	Coordinates	Description
DCUN1D4	NM_001040402	chr4:52775086-52775141	DCN1, defective in cullin neddylation 1, domain containing 4
DDX42	NM_007372	chr17:61883354-61883511	DEAD (Asp-Glu-Ala-Asp) box helicase 42
DENND1A	NM_020946	chr9:126385380-126385322	DENN/MADD domain containing 1A
DENND5A	NM_015213	chr11:9227781-9227736	DENN/MADD domain containing 5A
DENND5A	NM_015213	chr11:9198449-9198319	DENN/MADD domain containing 5A
DGKA	NM_201445	chr12:56333603-56333699	diacylglycerol kinase, alpha 80kDa
DHFR	NM_000791	chr5:79929807-79929696	dihydrofolate reductase
DHFR	NM_000791	chr5:79928121-79928051	dihydrofolate reductase
DIAPH3	NM_001042517	chr13:60266972-60266851	diaphanous-related formin 3
DIAPH3	NM_001042517	chr13:60548266-60548219	diaphanous-related formin 3
DLGAP4	NM_014902	chr20:35127645-35127724	discs, large (Drosophila) homolog-associated protein 4
DNAJC13	NM_015268	chr3:132227720-132227883	DnaJ (Hsp40) homolog, subfamily C, member 13
DNMBP	NM_015221	chr10:101762780-101762699	dynamin binding protein
DNMBP	NM_015221	chr10:101654399-101654318	dynamin binding protein
DOCK1	NM_001380	chr10:128901890-128901944	dedicator of cytokinesis 1
DYRK1A	NM_101395	chr21:38794884-38794954	dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1A
EIF2B3	NM_020365	chr1:45350395-45350311	eukaryotic translation initiation factor 2B, subunit 3 gamma, 58kDa
ENAH	NM_001008493	chr1:225788060-225787910	enabled homolog (Drosophila)
ENOX1	NM_017993	chr13:43,984,307-43,984,398	ecto-NOX disulfide-thiol exchanger 1
EP300	NM_001429	chr22:41496302-41496407	E1A binding protein p300
ERC1	NR_027948	chr12:1536281-1536343	ELKS/RAB6-interacting/CAST family member 1
ERCC1	NM_001983	chr19:45917292-45917221	excision repair cross-complementation group 1
ERGIC3	NM_198398	chr20:34142143-34142157	ERGIC and golgi 3
ERLIN2	NM_007175	chr8:37594849-37594946	ER lipid raft associated 2

Gene Symbol	Ref SeqID	Coordinates	Description
ERRFI1	NM_018948	chr1:8,080,640-8,080,926	ERBB receptor feedback inhibitor 1
EVC	NM_153717	chr4:5743061-5743168	Ellis van Creveld protein
FAF1	NM_007051	chr1:51003153-51003085	Fas (TNFRSF6) associated factor 1
FAIM	NM_001033030	chr3:138335412-138335506	Fas apoptotic inhibitory molecule
FAM126A	NM_032581	chr7:23011932-23011871	family with sequence similarity 126, member A
FAM13A	NM_014883	chr4:89890343-89890310	family with sequence similarity 13, member A
FAM162A	NM_014367	chr3:122120223-122120382	family with sequence similarity 162, member A
FAM174A	NM_198507	chr5:99917051-99917108	family with sequence similarity 174, member A
FAM198B	NM_001031700	chr4:159091499-159091399	family with sequence similarity 198, member B
FBN2	NM_001999	chr5:127850450-127850370	fibrillin 2
FER	NM_005246	chr5:108321155-108321188	fer (fps/fes related) tyrosine kinase
FHOD3	NM_001281740	chr18:34322340-34322431	formin homology 2 domain containing 3
FOCAD	NM_017794	chr9:20737106-20737152	focadhesin
GALC	NM_001201402	chr14:88447791-88447758	galactosylceramidase
GCFC2	NM_003203	chr2:75913102-75913000	GC-rich sequence DNA-binding factor 2
GGACT	NM_001195087	chr13:101194723-101194628	gamma-glutamylamine cyclotransferase
GGCT	NM_001199815	chr7:30540297-30540152	gamma-glutamylcyclotransferase
GLCE	NM_015554	chr15:69517534-69517591	glucuronic acid epimerase
GOLGA4	NM_002078	chr3:37285619-37285734	golgin A4
GOLGB1	NM_001256486	chr3:121401810-121401764	golgin B1
GPSM2	NM_013296	chr1:109420153-109420396	G-protein signaling modulator 2
GULP1	NM_001252668	chr2:189164835-189164866	GULP, engulfment adaptor PTB domain containing 1
GXYLT1	NM_173601	chr12:42489016-42488953	glucoside xylosyltransferase 1
HAT1	NM_003642	chr2:172803228-172803303	histone acetyltransferase 1

Gene Symbol	Ref SeqID	Coordinates	Description
HDX	NM_001177479	chrX:83756519-83756437	highly divergent homeobox
HLTF	NM_139048	chr3:148769931-148769832	helicase-like transcription factor
HMGA2	NM_003483	chr12:66267911-66267926	high mobility group AT-hook 2
HNMT	NM_006895	chr2:138724667-138724956	histamine N-methyltransferase
HPS1	NM_000195	chr10:100195171-100195029	Hermansky-Pudlak syndrome 1
HSD17B12	NM_016142	chr11:43838189-43838222	hydroxysteroid (17-beta) dehydrogenase 12
HSD17B4	NM_001199291	chr5:118792986-118793063	hydroxysteroid (17-beta) dehydrogenase 4
HTT	NM_002111	chr4:3215349-3215463	huntingtin
IFT57	NM_018010	chr3:107911373-107911323	intraflagellar transport 57
INPP5K	NM_001135642	chr17:1419412-1419182	inositol polyphosphate-5-phosphatase K
IVD	NM_002225	chr15:40706629-40706723	isovaleryl-CoA dehydrogenase
KDM6A	NM_021140	chrX:44965787-44965894	lysine (K)-specific demethylase 6A
KIAA1524	NM_020890	chr3:108284925-108284745	KIAA1524
KIAA1715	NM_030650	chr2:176835145-176834927	KIAA1715
LETM2	NM_001286787	chr8:38262801-38262912	leucine zipper-EF-hand containing transmembrane protein 2
LOC400927	NR_002821	chr22:38766050-38765991	TPTE and PTEN homologous inositol lipid phosphatase pseudogene
LRRC42	NM_001256409	chr1:54413535-54413654	leucine rich repeat containing 42
LUC7L3	NM_006107	chr17:48798190-48798241	LUC7-like 3 pre-mRNA splicing factor
LYRM1	NM_001128301	chr16:20922505-20922586	LYR motif containing 1
MADD	NM_003682	chr11:47314094-47314147	MAP-kinase activating death domain
MB21D2	NM_178496	chr3:192555098-192555020	Mab-21 domain containing 2
MCM10	NM_182751	chr10:13239941-13240039	minichromosome maintenance complex component 10
MED13L	NM_015335	chr12:116547674-116547579	mediator complex subunit 13-like
MED13L	NM_015335	chr12:116419435-116419344	mediator complex subunit 13-like

Gene Symbol	Ref SeqID	Coordinates	Description
MEDAG	NM_032849	chr13:31492953-31493127	mesenteric estrogen-dependent adipogenesis
MEMO1	NM_015955	chr2:32112156-32112104	Methylation modifier for class I HLA
MFN2	NM_014874	chr1:12041867-12041910	mitofusin 2
MMS19	NM_022362	chr10:99241240-99241106	MMS19 homolog, cytosolic iron-sulfur assembly component
MRPL45	NM_032351	chr17:36468550-36468624	mitochondrial ribosomal protein L45
MRPS28	NM_014018	chr8:80915355-80915234	mitochondrial ribosomal protein S28
MTERF3	NM_001286643	chr8:97263851-97263810	mitochondrial transcription termination factor 3
MYCBP2	NM_015057	chr13:77628142-77628054	MYC binding protein 2, E3 ubiquitin protein ligase
MYCBP2	NM_015057	chr13:77692630-77692475	MYC binding protein 2, E3 ubiquitin protein ligase
MYLK	NM_053025	chr3:123459382-123459323	myosin light chain kinase
MYOF	NM_013451	chr10:95117679-95117562	myoferlin
NGF	NM_002506	chr1:115843104-115843018	nerve growth factor (beta polypeptide)
NREP	NM_001142476	chr5:111086122-111086049	neuronal regeneration related protein
NSUN4	NR_045789	chr1:46823248-46823331	NOP2/Sun domain family, member 4
NT5C2	NM_012229	chr10:104853974-104853926	5'-nucleotidase, cytosolic II
OSMR	NM_003999	chr5:38876877-38876923	oncostatin M receptor
OXCT1	NM_000436	chr5:41734751-41734677	3-oxoacid CoA transferase 1
PAPD4	NM_173797	chr5:78937278-78937340	PAP associated domain containing 4
PCM1	NM_006197	chr8:17818551-17818653	pericentriolar material 1
PDE7A	NM_001242318	chr8:66693182-66693079	phosphodiesterase 7A
PDS5B	NM_015032	chr13:33263018-33263158	PDS5 cohesin associated factor B
PDXDC1	NM_001285447	chr16:15103356-15103418	pyridoxal-dependent decarboxylase domain containing 1
PIGN	NM_176787	chr18:59764997-59764914	phosphatidylinositol glycan anchor biosynthesis, class N
PIK3CD	NM_005026	chr1:9774095-9774189	phosphatidylinositol-4,5-bisphosphate 3-kinase, catalytic subunit delta

Gene Symbol	Ref SeqID	Coordinates	Description
PIK3R1	NM_181523	chr5:67538784-67538973	phosphoinositide-3-kinase, regulatory subunit 1 (alpha)
PIKFYVE	NM_015040	chr2:209176229-209176294	phosphoinositide kinase, FYVE finger containing
PITPNB	NM_012399	chr22:28288318-28288117	phosphatidylinositol transfer protein, beta
PITPNB	NM_012399	chr22:28290410-28290364	phosphatidylinositol transfer protein, beta
PLEKHA1	NM_001195608	chr10:124148798-124148900	pleckstrin homology domain containing, family A (phosphoinositide binding specific) member 1
PLSCR1	NM_021105	chr3:146255831-146255783	phospholipid scramblase 1
PMS1	NM_000534	chr2:190683464-190683555	PMS1 homolog 1, mismatch repair system component
POMT2	NM_013382	chr14:77753614-77753576	protein-O-mannosyltransferase 2
PPARG	NM_138712	chr3:12427535-12427591	peroxisome proliferator-activated receptor gamma
PPHLN1	NM_016488	chr12:42745687-42745851	periphrin 1
PIP5K2	NM_015216	chr5:102492916-102492948	diphosphoinositol pentakisphosphate kinase 2
PPP1R26	NM_014811	chr9:138376071-138376135	protein phosphatase 1, regulatory subunit 26
PRPF31	NM_015629	chr19:54632112-54632180	pre-mRNA processing factor 31
PRSS23	NR_120591	chr11:86651889-86652069	protease, serine, 23
PRUNE2	NM_015225	chr9:79234303-79234256	prune homolog 2 (Drosophila)
PSMA4	NM_001102667	chr15:78834921-78834987	proteasome subunit alpha 4
PXK	NM_017771	chr3:58321084-58321179	PX domain containing serine/threonine kinase
RAF1	NM_002880	chr3:12645036-12644977	Raf-1 proto-oncogene, serine/threonine kinase
RAP1A	NM_001010935	chr1:112170092-112170148	RAP1A, member of RAS oncogene family
RAPGEF1	NM_005312	chr9:134479440-134479348	Rap guanine nucleotide exchange factor (GEF) 1
RARS2	NM_020320	chr6:88257102-88256965	arginyl-tRNA synthetase 2, mitochondrial
RBKS	NM_001287580	chr2:28111807-28111741	ribokinase
RERE	NM_012102	chr1:8456591-8456504	arginine-glutamic acid dipeptide (RE) repeats
RFWD2	NM_022457	chr1:176044514-176044399	ring finger and WD repeat domain 2, E3 ubiquitin protein ligase

Gene Symbol	Ref SeqID	Coordinates	Description
RNFT1	NM_016125	chr17:58039977-58039901	ring finger protein, transmembrane 1
RPA1	NM_002945	chr17:1745069-1745127	replication protein A1, 70kDa
RPS10	NM_001204091	chr6:34385627-34385575	ribosomal protein S10
RPS6KB2	NM_003952	chr11:67196453-67196493	ribosomal protein S6 kinase, 70kDa, polypeptide 2
SAMD4A	NM_015589	chr14:55115465-55115566	sterile alpha motif domain containing 4A
SAR1A	NM_001142648	chr10:71926149-71926032	secretion associated, Ras related GTPase 1A
SCO1	NM_004589	chr17:10594966-10594907	SCO1 cytochrome c oxidase assembly protein
SEC24A	NM_021982	chr5:134013731-134013842	SEC24 homolog A, COPII coat complex component
SENP6	NM_015571	chr6:76331643-76331687	SUMO1/sentrin specific peptidase 6
SERGEF	NR_104040	chr11:18031686-18031622	secretion regulating guanine nucleotide exchange factor
SGK3	NM_001033578	chr8:67697924-67698031	serum/glucocorticoid regulated kinase family, member 3
SH3YL1	NM_015677	chr2:224920-224868	SH3 and SYLF domain containing 1
SKA2	NM_182620	chr17:57196856-57196757	spindle and kinetochore associated complex subunit 2
SLC12A2	NM_001046	chr5:127478818-127478874	solute carrier family 12 (sodium/potassium/chloride transporter), member 2
SLC25A17	NM_006358	chr22:41193340-41193288	solute carrier family 25 (mitochondrial carrier; peroxisomal membrane protein, 34kDa), member 17
SLC44A2	NM_001145056	chr19:10753573-10753697	solute carrier family 44 (choline transporter), member 2
SMYD3	NM_001167740	chr1:246394576-246394501	SET and MYND domain containing 3
SNAP23	NM_003825	chr15:42805372-42805407	synaptosomal-associated protein, 23kDa
SNHG16	NR_038109	chr17:74554456-74554545	small nucleolar RNA host gene 16
SNX7	NR_033716	chr1:99204216-99204359	sorting nexin 7
SOS2	NM_006939	chr14:50600608-50600526	son of sevenless homolog 2 (Drosophila)
SPATA18	NM_145263	chr4:52928386-52928498	spermatogenesis associated 18
SPATA5	NM_145207	chr4:123901321-123901384	spermatogenesis associated 5

Gene Symbol	Ref SeqID	Coordinates	Description
SPIDR	NM_001080394	chr8:48185929-48186042	scaffolding protein involved in DNA repair
SPRYD7	NM_020456	chr13:50492357-50492229	SPRY domain containing 7
SRGAP1	NM_020762	chr12:64319388-64319457	SLIT-ROBO Rho GTPase activating protein 1
SRRM1	NM_005839	chr1:24973570-24973640	serine/arginine repetitive matrix 1
STAT1	NM_007315	chr2:191843332-191843254	signal transducer and activator of transcription 1, 91kDa
STRN3	NM_001083893	chr14:31398517-31398407	striatin, calmodulin binding protein 3
STXBP6	NM_014178	chr14:25411028-25410930	syntaxin binding protein 6 (amisyn)
STXBP6	NM_014178	chr14:25457178-25457092	syntaxin binding protein 6 (amisyn)
SUPT20H	NM_001014286	chr13:37585794-37585696	suppressor of Ty 20 homolog (S. cerevisiae)
TAF2	NM_003184	chr8:120771346-120771264	TAF2 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 150kDa
TAF2	NM_003184	chr8:120757276-120757121	TAF2 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 150kDa
TASP1	NM_017714	chr20:13395909-13395770	taspase, threonine aspartase, 1
TBC1D15	NM_022771	chr12:72278640-72278801	TBC1 domain family, member 15
TCF12	NM_207037	chr15:57227695-57227728	transcription factor 12
TCF4	NM_001243226	chr18:53202868-53202790	transcription factor 4
TIAM1	NM_003253	chr21:32641011-32640727	T-cell lymphoma invasion and metastasis 1
TJP2	NM_004817	chr9:71792959-71793045	tight junction protein 2
TMEM189-UBE2V1	NM_199203	chr20:48713357-48713209	TMEM189-UBE2V1 readthrough
TMEM214	NM_017727	chr2:27260130-27260168	transmembrane protein 214
TNRC6A	NM_014494	chr16:24769760-24769920	trinucleotide repeat containing 6A
TMC3	NR_120365	chr15:81633491-81633560	transmembrane channel like 3
TNS3	NM_022748	chr7:47337036-47336903	tensin 3
TOE1	NM_025077	chr1:45807382-45807415	target of EGR1, member 1 (nuclear)
TRAF3	NM_145725	chr14:103356688-103356763	TNF receptor-associated factor 3

Gene Symbol	Ref SeqID	Coordinates	Description
TRIM65	NM_173547	chr17:73887959-73887894	tripartite motif containing 65
TSPAN2	NM_005725	chr1:115601892-115601858	tetraspanin 2
TTC7B	NM_001010854	chr14:91171677-91171544	tetratricopeptide repeat domain 7B
TUBE1	NM_016262	chr6:112405449-112405392	tubulin, epsilon 1
TYW5	NR_004862	chr2:200813345-200813295	tRNA-yW synthesizing protein 5
UBAP2L	NM_001287816	chr1:154234649-154234678	ubiquitin associated protein 2-like
UBE2V1	NM_199144	chr20:48713357-48713209	ubiquitin-conjugating enzyme E2 variant 1
URGCP	NM_001077664	chr7:43945050-43944971	upregulator of cell proliferation
VAV2	NM_001134398	chr9:136698500-136698469	vav 2 guanine nucleotide exchange factor
VPS29	NM_057180	chr12:110937351-110937340	VPS29 retromer complex component
WDR27	NM_182552	chr6:170087077-170087013	WD repeat domain 27
WDR27	NM_182552	chr6:170061846-170061799	WD repeat domain 27
WDR37	NM_014023	chr10:1148398-1148517	WD repeat domain 37
WDR91	NM_014149	chr7:134890341-134890209	WD repeat domain 91
WNK1	NM_018979	chr12:1004327-1004362	WNK lysine deficient protein kinase 1
XRN2	NM_012255	chr20:21307793-21307903	5'-3' exoribonuclease 2
XRN2	NM_012255	chr20:21326472-21326525	5'-3' exoribonuclease 2
ZCCHC8	NM_017612	chr12:122963343-122963211	zinc finger, CCHC domain containing 8
ZFP82	NM_133466	chr19:36891305-36891187	ZFP82 zinc finger protein
ZNF138	NM_001160183	chr7:64277652-64277713	zinc finger protein 138
ZNF232	NM_014519	chr17:5012080-5012041	zinc finger protein 232
ZNF37BP	NR_026777	chr10:43046910-43046848	zinc finger protein 37B, pseudogene
ZNF680	NM_178558	chr7:64002295-64002108	zinc finger protein 680

[001027] The sequences for iExons produced in certain affected genes at the indicated coordinates from **Table 11** are shown in **Table 12**. In certain instances, detection and analysis of the amount and type of iExon sequences are useful biomarkers produced as a result of contacting a cell with a compound as described herein or administering to a subject in need thereof a compound as described herein.

[001028] **Table 12**

Gene Symbol	Coordinates	Sequence
ABCC3	chr17:48767318-48767437	GGCCCATAGGAAGGACGCAAAGGCCTGTGTGTGCAGGCC AGAAAAAGGCTATCCACACAGGGTGGCCAGGACACTTTCT CCTGTAAGGAAGGGATGCACCAGCCAGGCCTGAAAGAAT GA (SEQ ID NO: 3695)
ADCY3	chr2:25061781-25061716	CGGATCAAAGATTGAAGAAAGATTGTACTCCTGTGTCGTG GCTCCAACACTGAGGCTGAGATGGGA (SEQ ID NO: 3696)
AGPAT4	chr6:161687802-161687740	GATACTGCAGCCATCAGCAGACAATCAATGCAATCATCTC AGACTGTGTCTCTGCGTCCCAGGA (SEQ ID NO: 3697)
ANKRA2	chr5:72851082-72850950	AAGTACTGTGACGCTTTGAAGGAGAAGGCTTCATGGAGGAG CTGTGACTTGACTCCAGAGTGAAAGGATAATTAGGATTGA TACAGGACGGAGGAAGGAAGGCATCCAGGCAATCTCAAT AAAAGCATCCATGA (SEQ ID NO: 3698)
ANXA11	chr10:81916254-81916134	AGTATCTCCTGCATGCCAGCAAGCTATGGACATCTGGAAG AAGCCACATGCCTTGCCCTCAAGTTGCTTAGGGTGGAAGG AAATGATTAGAAATGAGCCAAGCCGAGCCTGCACTCTTAG A (SEQ ID NO: 3699)
APIP	chr11:34933660-34933520	CTCTGAAATTAAATCCCTACTGACTGGCCCTTGAACTGATT TTTTCTAACATCAGCAAAAGTCAAGGAGTGTTTCCCTAAA AAAGAAAGCATTTACTCAGAAACCGTATATTGAAGTCCAG GCTGAAAAATGCAAACATGA (SEQ ID NO: 3700)
APPL2	chr12:105625422-105625147	TCAGGGCTGTACGCTGTGGACCAAAGATCATGCTCGCTGA TGAGAGCCACCCTGCTGGTGACCTCAGTGCTGCCGACCCA TTTACATCCCAGCCCTGCCACATTCCTACAGTGGGAGGTT GAACACATTTCTTAACCTTGATGAGCCTCAGTTTCATCATC AGTAAAATGAAGTTAATGGAACCATGGAATCTACCTTGGA GAGTTGCTAGAAGAATTAAATGAAGTCACATATGTTTAGT GCCCAGCACAGCGTCCAGCACATAGGTGGTACAGA (SEQ ID NO: 3701)
ARHGAP1	chr11:46718619-46718571	GGCCGTCAACCTTTCCACCTTGAAACTGGTGTGTCAGGAGCA CCCTGCAGA (SEQ ID NO: 3702)
ASAP1	chr8:131173039-131173031	GTTGTTGCAGCTGCGCACCTGCTCTGTGAAGCACAGATTG TCATGGGGGCAGTTCTCTCAAAAACATGGCATATTGTGAT GA (SEQ ID NO: 3703)

Gene Symbol	Coordinates	Sequence
ASAP1	chr8:131135828-131135650	AGCAAACCCCATTGTCAGGGGAAAGCAGAACAAAGAAAA GTATTTAGAAATGTATTTCCGGGATGCACAGATTCTTTTCA CCCTCACCTTCCCCTAGGTTGTTGCAGCTGCGCACCTGCTC TGTGAAGCACAGATTGTCATGGGGGCAGTTCTCTCAAAAA CATGGCATATTGTGATGA (SEQ ID NO: 3704)
ASAP1	chr8:131135731-131135650	TCTAGGAGA (SEQ ID NO: 3705)
ASAP1	chr8:131173046-131173031	ATCGAAGTCTAGGAGA (SEQ ID NO: 3706)
ASPH	chr8:62,421,470-62,421,527	TCATTCTGATCTACTGAAATCCCCAGTTCAGACTCCATTG AAAGCCCTGGGATGGCA (SEQ ID NO: 3707)
ATAD2B	chr2:23976387-23976214	GTCATCTGAGCAAATGTAATCACTCATCTACCCACAAAAT GGCTAAATGACTTAATTCAACTCCCTTTGTTGATTTGCCTG TTAGTTTGTATCTGTTGTTGTTGTTGTTGTTGTTGTTGTTG AGTACCTGCAGTGCCAGATGCTGTGCTGGGTGTTTGAAT GCAAAAAATGA (SEQ ID NO: 3708)
ATXN1	chr6:16409524-16409426	TTTCATAAAGAGGACAGACGCTAAGGCAATTGTGTGGAAC AGAGCAGCTTCTCGGGGTAACCATCTCCTGCTGATGTATA AATATCGGGGCAAACTGA (SEQ ID NO: 3709)
BECN1	chr17:40963348-40963310	GATCCCATTGATGGATGGAACTCTAGTTTTTACTTAGA (SEQ ID NO: 3710)
BHMT2	chr5:78374568-78374655	GATGTTTTTCATCTGGCCCAAGAAGAACTTGTTCTTAATGTT AAAAGACCTTTTTTGCTAAACTGGGAAGAAAGTGCTGGAAT AACAAGA (SEQ ID NO: 3711)
BICD1	chr12:32486172-32486263	GTCAATTTCTGCCTTGTGGATAATTTTCTGAATCTGTAATA TTTCTGAAGATTCTCCTCCAAGTATTTACAGAACATACAGAA GTATTTTATGA (SEQ ID NO: 3712)
BTN3A1	chr6:26404363-26404455	ATCTTGTTCTCAGAGGCCATTCCCAGACCCACAGCAAGAG GGATTATGGCTGCAGGCCTCATGCTCCTTTGTTTTGGAAGA AACTGTTGAGGA (SEQ ID NO: 3713)
C11orf30	chr11:76259972-76260061	GCCTTGTTCAAAGCTCTGGGCATCTAGCAATGAGTAAGAT AGTCAAGATCTGTGCTCTGTCCACGTTCTCTTGAGCTTAC ATTTTAAGA (SEQ ID NO: 3714)
C11orf73	chr11:86037555-86037718	GTAATTATTGAACATCTACTTGCTGCCTACTTTCAACATCT GCATGTGTGTGTGAATATTAATATCACACCAAGACATTG TTCAGAGGAGACAGAATAGTGAGCTGAGATAAATGAGAA TCTCTCTATGGAAGATTAGACTGGAGCATGAACTTGAAAT ATGA (SEQ ID NO: 3715)
C14orf132	chr14:96506612-96506704	AACAAAGACAAATCCCGGATTTCTCCATCAGTCTGTGACC CTAGAGAAGACCCAGAGCTGGCTCCAGGGAAGGGCTGCG TTTGGCCTGGGAGA (SEQ ID NO: 3716)
C8orf88	chr8:91990874-91990807	TGTTCCCTTTCAACTTTCAAACGAATATCCATGCAACACT CAGTGCATACAAAGTGAGTTAGCAGA (SEQ ID NO: 3717)

Gene Symbol	Coordinates	Sequence
CASC3	chr17:38298307-38298353	GAGAAAGTTTCCTGTCTTTTGGATAAACTACTAGAGATGC CATCAGA (SEQ ID NO: 3718)
CASP7	chr10:115477382-115477512	GGTTGCAGAGAGCACTGGTTGAAGCCTATCCTGAAGCTAC CTTGGTAGAGGAGTTAATTGCACCAGGAGACCTAATTTCA GAAAGGTCACAGATTATATTCCACCCTCCACAAAAGTAAC CTGGAAGATGA (SEQ ID NO: 3719)
CCDC122	chr13:44431087-44431054	TAACATATTTTATTGAGGTATAATTGTCATAAGA (SEQ ID NO: 3720)
CDH13	chr16:83402146-83402179	GTTTTTTGGGAACAGGTGGTGGTTGGTTACATGA (SEQ ID NO: 3721)
CECR7	chr22:17,535,915-17,535,996	CGAGAGGAAGAGGAGAAGCATGCAGGAGTGTACATGAAA CAAGATTGGCCACGAGATGACAAATATCTGAATCCGCTGA TGA (SEQ ID NO: 3722)
CEP112	chr17:63684725-63684629	AACCAACTTCAAGATGGCTGCAGCAGTGCCAGGCATTCTG CCCAGATCTGCACTATTCGGAGGCAGAAAAGGGCTGCCAG TTTCTAGGGCCTAATGA (SEQ ID NO: 3723)
CMAHP	chr6:25107418-25107336	AATGAACACTCCATGAGAGCAGGGACCTGCTTTGCCTTGT TCACCACTTTATTCCCAGTGGCTAGAACCACGTCTGACAC AGA (SEQ ID NO: 3724)
CNRIP1	chr2:68,542,833-68,542,986	GTCTTACTCTTGTACCGAGGCTGGAGTGCAGTGGTGTGA TCATAGCTCACTGCAGCCTCAACCTCCTGGATCCAAGTGA TCCTCCTGCCTCAGCCTCCCAAGTTGCTGGCACTACAGGTG TGGTATCACACACCCGGTTAACTAAAAAAAT (SEQ ID NO: 3725)
CNRIP1	chr2:68542975-68542840	TTAACCGGGTGTGGTGATACCACACCTGTAGTGCCAGCAA CTTGGGAGGCTGAGGCAGGAGGATCACTTGGATCCAGGA GGTGAGGCTGCAGTGAGCTATGATCACACCACTGCACTC CAGCCTCGGTGACAAGA (SEQ ID NO: 3726)
CPSF4	chr7:99045396-99045536	AAGAGACAGGATTTACCGTGACAGCCAGGATGGTCTCCG TGCCAGCCAGGATGGTCTCGATCTCCTGACCTTGTGATCC GCCACCTCGGCCTTCCAAAGTGCTGGGATTACCAGCGTG ATCCACTGCGCCCGGCCATGA (SEQ ID NO: 3727)
CRISPLD2	chr16:84869783-84870041	ATTGGGTCTTATCCCCAAGATATCTCATTATGTACATGCAA ATCAGCGGAGCATCGTCATGACACCAGGAGGACACCCCGT GACGCCGATTACCGCACTCTCAACCTCAACCCAGCGTCAG AGTTTTCTGGCATCTCTTCTTTGAGCCTGGCCGCCTGCAGC TGGAAATGCTCATATATGGTGGTGTGACTAACCTGAGAGA GAGAGATCAGGGATCCTGAGAAGTTCTGCATTCTTGGTCT GCTTCCAGTGGGACGA (SEQ ID NO: 3728)
CRYBG3	chr3:97635177-97635237	GGCCTTTCTGTCTGGTGTGTGCAGAATGATCTGGGTCACCT CTGAGGCCCATATTTATAGA (SEQ ID NO: 3729)
CSNK1G1	chr15:64575350-64575317	GTTATTGGGGTACAGATGGTGGTTGGTTACATGA (SEQ ID NO: 3730)

Gene Symbol	Coordinates	Sequence
DAGLB	chr7:6474651-6474425	TTGGATCATCATCGCTGCCACAGTGGTTTCCATTATCATTG TCTTTGACCCTCTTGGGGGGAAAATGGCTCCATATTCCTCT GCCGGCCCCAGCCACCTGGATAGTCATGATTCAAGCCAGT TACTTAATGGCCTCAAGACAGCAGCTACAAGCGTGTGGGA AACCAGAATCAAGCTCTTGTGCTGTTGCATTGGGAAAGAC GACCATACTCGGGTTGCTTTTTTCGA (SEQ ID NO: 3731)
DCAF17	chr2:172298369-172298546	TTTTGCCAAGGAGTTTGTCCACAGAGCTCTTCATGCCCTCA TGCTGGAAGTGGAAATCTGGACATGTTATCTTATCATGTC ATTATCACACCTAGGAAAATGAGCAACAATTCTTCAGGAT CATTTAATGTCAAGTTTATAACTTCCTGCTTTAACTTAAAA AAAAAATTAAATTAGA (SEQ ID NO: 3732)
DCUN1D4	chr4:52775086-52775141	GCCGAAGATGGTGTAGTGATTGCGAGCTGCTGGCTGGCA CCCTTGCAAGCAGGA (SEQ ID NO: 3733)
DDX42	chr17:61883354-61883511	GTGCAGTTTGAACAGGGCTTGACAGTGGCTGGACCATCAC TAAGTGAGACTTTAATTCATCAAGCATAACTGAAAATGGA GGCAGTAGATTATATCTTGGTAGCCAGCATGTGTAGACTT GTCTTATTTGGAGCCCACCTTGGAATTTTCATTTCAAGA (SEQ ID NO: 3734)
DENND1A	chr9:126385380-126385322	CTGTGGCATAAGAATGAAAAGAAAAGAAACAAAAGCAGA TGGCAGAGAAAACGAAAGGA (SEQ ID NO: 3735)
DENND5A	chr11:9227781-9227736	GCCAAAATCATATTATATGATCAACCTCAAGTGCATGGGA AGCTGTGAAAGTGAACATTGAACTGGGTATAATGTTACCC TGAACAGTATGAAGGTCTATGAGCAAGAAAGAAGGGGTG AATGAATTATGA (SEQ ID NO: 3736)
DENND5A	chr11:9198449-9198319	ATAGGACAGCATTTAAAAATCTCATGTGGAAGAATATACC ACTAGA (SEQ ID NO: 3737)
DGKA	chr12:56333603-56333699	ACCTGGGCCTCCCAAGCATTATCCAGCTCAGTTCCTGCCTG GCACATGGATGGTGTGGGGCAGGCATGCAGTAGCAGCTG ATCTTTTAGGAGGAAGA (SEQ ID NO: 3738)
DIAPH3	chr13:60266972-60266851	GTAAATTAGACCCAAAATAACTCCCAGGGAGCAATACAC AGCCTGGAAAACATGAAACAAGGAGCGGCTGTTTGGTGT AATAAAGGAGGAGCACCAGGCTGAATTTTCAGAGGCCTA ATAGA (SEQ ID NO: 3739)
DIAPH3	chr13:60548266-60548219	GGTTTTGTTCCTAATGTACATGTTTCCTAAGTAATTCAGC ATAAAGA (SEQ ID NO: 3740)
DLGAP4	chr20:35127645-35127724	GAGAGGACTAGAAGGAACGGTTCCACCTCTCGGAGGAC AACGGACCCAAAGCGATCGATGTGATGGCACCCCTCCTCAG A (SEQ ID NO: 3741)
DNAJC13	chr3:132227720-132227883	CCCACTGTGGAGACCTACTGCTCAGGAAAAAAGAGCTTT CAAAATACTACTGCTCGTTGGCAATGCACCTGGTCACCCA AGAGCTCCGATGGAGATGTACAAGGAGATTAATGTTTTCA TGCCTGCTAATACAGCATCCATTTTGCAGCCCATGGATCA AGGA (SEQ ID NO: 3742)

Gene Symbol	Coordinates	Sequence
DNMBP	chr10:101762780-101762699	TTTGAAAATCAAATATTGAATGCAAAAGCTAGGAAGCTGTAAACAGGAAACGTAAACGAGAAAGAACAAGCAGTGAATACGA (SEQ ID NO: 3743)
DNMBP	chr10:101654399-101654318	CATTGGCCAGGACTACTAGAACTGTGTCAAAACAGCTGCTACACTAACGGGCATCTTTGTCTTGTCTCAGTCTTAAAAAGA (SEQ ID NO: 3744)
DOCK1	chr10:128901890-128901944	GAACGTTGGGGATGCAGATGACCAGTATCTAGTGCTGCGTGACTTTGGATTACGA (SEQ ID NO: 3745)
DYRK1A	chr21:38794884-38794954	G TTCAGGGATGCTGGAAAGGACACTGAAGTAGGCCTTGGCTGATGGGCCTTTCAGAAGTGAACACTTAAGA (SEQ ID NO: 3746)
EIF2B3	chr1:45350395-45350311	GGAAGTACTTGTCTTTTCCAATGGAGGAGGAACATTTGCTGCCTACACTGGTTTGAAGCATTAAAAGGGGAGAAAAAGAGCTAAGA (SEQ ID NO: 3747)
ENOX1	chr13:43,984,307-43,984,398	TTACTCTAGAAGTCGTA CTACTACATTTTCTGAGAGAAGTAGGAGGTGAGACGAGAGTAAGTAACTTCTGCTCTCTGAATATTCAATTAGGCAG (SEQ ID NO: 3748)
ERC1	chr12:1536281-1536343	ACAGACCCTTCCAGAACCAGATGACCATCAAGACAAAAGCATACTCAAGCAGACAAGAAAGGA (SEQ ID NO: 3749)
ERCC1	chr19:45917292-45917221	GTGACTGAATGTCTGACCACCGTGAAGTCAGTCAACAAAA CGGACAGTCAGACCCTCCTGACCACATTTGGA (SEQ ID NO: 3750)
ERGIC3	chr20:34142143-34142157	TACATGCTGTGGAGA (SEQ ID NO: 3751)
ERLIN2	chr8:37594849-37594946	GGCCAAAGGAATAACTGGGAAGGTGGATGCGAGGCCAACGAATCCTACCTTGAACTCTGCTCGCCTGCTGGCTCTGCCACTCCAGCATCTGAAAGGA (SEQ ID NO: 3752)
EVC	chr4:5743061-5743168	TTCCATACA ACTATCCCCTGATTCTTTCTTCAAAGAAGCAAACCCTCCTTTGCTTTTATATTTTCTTCACACATGGAAATGGGGGATGTGGAGGGCCTTGACACAGA (SEQ ID NO: 3753)
FAF1	chr1:51003153-51003085	TAATTTTTTAACAGTGTAAGGGGTCCTGAGACCAAAAAGTTGAGAACTGCTGCAATCAACTATAAAGA (SEQ ID NO: 3754)
FAIM	chr3:138335412-138335506	GCTGGTCTCGAGTTCCTGGCTTCAAATGATTCTCCTGTCTCAGCCTCTCAAAGTGCGGGGATTACAGGGATGAGCCACCATGCACACTCCAAGGA (SEQ ID NO: 3755)
FAM126A	chr7:23011932-23011871	GTCAATTTTTCTGACCACCTGAACAGATTGTTTTCTGTCAATTAAGGGCAGCTTTGTTACGA (SEQ ID NO: 3756)
FAM13A	chr4:89890343-89890310	GTTTTGGGGAAACAGATGGTGTGTTGCTTACATGA (SEQ ID NO: 3757)
FAM174A	chr5:99917051-99917108	ACTGCTGTGGAATTCCTGAGAAAGAGCAACTGAGGGATAGCAACATGGATTTCCTGA (SEQ ID NO: 3758)

Gene Symbol	Coordinates	Sequence
FAM198B	chr4:159091499-159091399	CAGCAGCAGCAGCGTGTCTTTCCATGCGCTTGGCATTCTTT ATTTTCCCAGCCTGGGAGGATATGAGAGTTCCAGGGAAAT GCTGTATTGGACATGCAAGA (SEQ ID NO: 3759)
FBN2	chr5:127850450-127850370	GATTAATTACCGTTAATGTCTTGGAGACTATAACGTACAC TGCACGTTGTAATAACACAAAAGGACAAGCAAGATGTAA GA (SEQ ID NO: 3760)
FER	chr5:108321155-108321188	GTTTCTGGGGAGCAGGTGGTGTGTTGCTTACATGA (SEQ ID NO: 3761)
FHOD3	chr18:34322340-34322431	GACAAAAAGCAAAGAAGAAGACTGTGGTCTAGAAGCCGA AGGAAGATGAGAAGGAAGAGTGTCCGAGGAGTCAGCCAC AGCCAGAAAGGAGA (SEQ ID NO: 3762)
FOCAD	chr9:20737106-20737152	CATTGACTCCGTTATCTACACAATAAAATCTGGATCCACA GATAAGA (SEQ ID NO: 3763)
GALC	chr14:88447791-88447758	GTTTTTGGAGAATAGGTGGTATTTGGTTACATGA (SEQ ID NO: 3764)
GCFC2	chr2:75913102-75913000	CAAGAGAGAAAGAGAGGAATCAAGAATGGGTCCATTGAG GAATTGGCCTGAGCAACTGGAAGGACAGAGGTGCCATTTCT TGAAATGAAAAAGTCTGACAGGA (SEQ ID NO: 3765)
GGACT	chr13:101194723-101194628	TAAGATGCTATGAGGAAATCCGTGCACGAGGGATGACAG CGTGGCAGGCTGGAACACGCTTTTGTAGATTTACTTTCGTGG ACTGGATCTGTAAAGA (SEQ ID NO: 3766)
GLCE	chr15:69517534-69517591	GGCAGAGGTGGAGAGGGGTTAGATTATTTTCATCTGCCCTA CAGTTGGCATAATAAAGA (SEQ ID NO: 3767)
GOLGA4	chr3:37285619-37285734	GTCCAGGGATTGAAGGCTGGGGAGTAGAGCCATCCTGGGT CAGGCTGCTGGTAGGAGCGGTGGGACCTGAAAGACGTGG CGGCGTGGCCGGCGTCCAGCGCCCGAGGCTGTCACGA (SEQ ID NO: 3768)
GOLGB1	chr3:121401810-121401764	AGGTGCCTGATGCTGTTAATTCCTGAGCCTTTTGAAGATTC TGCAGA (SEQ ID NO: 3769)
GXYLT1	chr12:42489016-42488953	GGATTGTTTGTATTCTGCCAATGATTTGTGAGACAGTCTG TTCCCCACATCCTCGTCAACAGA (SEQ ID NO: 3770)
HAT1	chr2:172803228-172803303	TTCGTTTTCTGAAGATCTTGAAAATGACATTAGAACTTTC TTTCTGAGTATACCCATCAACTCTTTGGGGATGA (SEQ ID NO: 3771)
HLTF	chr3:148769931-148769832	TCTTGCTCTGTCGCCCAGGCTGGAGTGCAATGGCGCGATC TCAGCTCACTGCAACCTCCACCTCCAGGTTCAAGTGATC CTGCTGCCTCAGCCTCTTGA (SEQ ID NO: 3772)
HMGA2	chr12:66267911-66267926	CTTGTTGGGAATAAGA (SEQ ID NO: 3773)

Gene Symbol	Coordinates	Sequence
HNMT	chr2:138724667-138724956	ATACCAGAATTGCTGTTAACAAATAAAATACTGGCCAGATGTGTTGGTTCACGCCTGTAATCCTAGCACTTCGGGAGGCTGAGGCGGGAGGATTACTTGAGCCTAGGAGTTTGAGACCA GCCTGGGCAACATAGCAAGATCCCATCTCTACAAAAAAGT GAAAAAGTTAGCTGAACAAGGCGGCATGCACATGCTACTC CAGACGCTGAAGTGGGAAGATCACTTAAGTCCGAGAGAT CGAGGCTTCAGTGAGATATGGCTGAGACACTGCTCTCAGC CTGGATGACAGA (SEQ ID NO: 3774)
HPS1	chr10:100195171-100195029	TTTGGAGAATGCCTGTTCATTGCCATCAATGGTGACCACA CCGAGAGCGAGGGGGACCTGCGGCGGAAGCTGTATGTGC TCAAGTACCTGTTTGAAGTGCACCTTTGGGCTGGTGACTGT GGACGGTCATCTTATCCGAAAGGA (SEQ ID NO: 3775)
HSD17B12	chr11:43838189-43838222	GTTATTGGGGAACAGGTGGTGTGTTGGTTACATGA (SEQ ID NO: 3776)
HSD17B4	chr5:118792986-118793063	CTTCTGACATCTTAACGAGGCAATACAGAGAGACGAATT TTCATCAGTTTGTTCAGGGAGACACATATAACAAAAGA (SEQ ID NO: 3777)
HTT	chr4:3215349-3215463	AGGCAAGCCCTGGTGCTGTGGGAGCCCCAAGGAAGAGCC TCTGGCCTGGTGGCCACGTAGCCCAGGAGAGATTTCTACA GGAGCCCACAGCGCTGAAGGAGAGAGAGGCAGCAGA (SEQ ID NO: 3778)
IFT57	chr3:107911373-107911323	ATCCATACATACTTAATGCTGAAATGTGAAGGGCTGAGAA AAAAGAAAAGA (SEQ ID NO: 3779)
INPP5K	chr17:1419412-1419182	CACATACATCAGGAGGTCTGCCTGATCCCATGGTGAACCC CGGGAATCCGAAATCAGATTGAGATAAGATCCTTTAGGGA AGTGACTTAGCCTGGTCTCTTGCTGCTCTTTCACGGGGAA CAACGCTAATCGCCCACTTAGTCTAAGTCACGATGCTTGG ATTTGCTGCTAATCGTCGGATTTGAGAGTGGGAACAAGAA ATCCGGACTTTTGCTCTCCATCCTCTTAGA (SEQ ID NO: 3780)
IVD	chr15:40706629-40706723	CTCTGAATGGCCTGTCTCCTGGACAAAGAAGCTTTCACGG ACTACTCTGCAGGGAGGTGACATTGGACCAGAGCTGACTC CACCTGGGGGAAAGA (SEQ ID NO: 3781)
KIAA1524	chr3:108284925-108284745	GTCAGGAATTATGGTTAAAGGTGGATTTTCACTGATGGTA ATAAGATATTACTTTATACCCCTTCCCTCCTCATGAATTAA GTCCATCTAATCTTTACTGAGGACCTGCTGAGTGGTAGAC ACTATGATTTGTTTCTGTTTCCACAGATGTCACAATTGTCA GTAATTGTGGACCTTTAGA (SEQ ID NO: 3782)
KIAA1715	chr2:176835145-176834927	TTCTCAGGTTTTCTTGACACCAAGAAAGAGAGGGAATCAA GAAGATCGGTTGTAAGAGAGCAATTCAACATGAAAATACT GAAGAAGAGATGGGAGAGAGAGAGAGATAATTGTTTTCT TCAGAGTTTTCCACTTTCTATCAGTAACTCTGATCACATGG ATATCTATTGTGGGGCTAGTTGATGCATCCCTTCAGATGTG TTGGAAGAGGACCAAGA (SEQ ID NO: 3783)

Gene Symbol	Coordinates	Sequence
LUC7L3	chr17:48798190-48798241	TGTAGGAAAGCAAGTTGGTGCTAGATGACTCCTTTTAGGA CTTTAAGAAAGA (SEQ ID NO: 3784)
LYRM1	chr16:20922505-20922586	GTGAAGTAGTATTTGAAGCTTTTCATCAGTTGGCTCATTCT TTA CTCAAGAATAAACCTCAAGAAACGTCATCAGGGTCAG A (SEQ ID NO: 3785)
MADD	chr11:47314094-47314147	AATTGTGGAACAAGCACCAGGAAGTGAAAAAGCAAAAAG CTTTGGA AAAACAGA (SEQ ID NO: 3786)
MB21D2	chr3:192555098-192555020	GCATGTTTATGTGGGAATGTCTCTCCATGTTTACAACTTC AGAAGGCCCTTTGGGAAAGAAAACCTCTCAGAGAAGA (SEQ ID NO: 3787)
MCM10	chr10:13239941-13240039	TCTTGCTCTGTTGCCAGGCTAGAGTGCAGTGGCGCAGTCTT GGCTCGCTACAGCCTCTGCCTCCTGGGTTC AAGCGATCCTC CTGCCTCAGCCTCACGA (SEQ ID NO: 3788)
MED13L	chr12:116547674-116547579	GTCATTTTAAACATGGATTCTTAGATGCTGACAAATATTGC CAAATTCCATTCCAAAAGAGGTTACACTTATTTCTTTCAT CAGTGAATGA (SEQ ID NO: 3789)
MED13L	chr12:116419435-116419344	CTCCTCTGAGTGTTCCTCCAAATCTGTCTTTTGGAGTAGAC CTAGAAATCATCTGTTACTAAGGTGTACTATGCATGTGGA ACCATTGATTAAAGA (SEQ ID NO: 3790)
MEDAG	chr13:31492953-31493127	GAGAGGCCAGGAACAGAATGCCAGTAACAAGAAGTGCT CATTAGAACATCTGAAGCCCACGTGTTCTTTGGCTTGATTA TAACCAGAAAGCCAGATAGTTCTTTAGGAATGTAATTCAC AGCTGTATCAAGTACACCTCCTGCACCGATCACTCAGGAG GAATCTAAAAAAGA (SEQ ID NO: 3791)
MEMO1	chr2:32112156-32112104	AAAGCGTGCTCTGGAATGGATTACAAATGAGCTACCCTC CTTCCCTCAAAGA (SEQ ID NO: 3792)
MMS19	chr10:99241240-99241106	CATTAATTTACAGAAATACACGTATTCTCCTTGTTTTGGTG GAAGCTGCAGCTGCCAATCATCTCTCAAACCCTGTGGGTA GCTGCTAAGCTGTATTTAGAGGAATGTCACAATCATACC ACTGGGGAGAAAGA (SEQ ID NO: 3793)
MRPL45	chr17:36468550-36468624	GTCTGGGTGGTGGCTCATACCCGTAATCCAGCACTTTTGG AGGCCGAAGTGGGAGGATTGTTTCTGGGCAGCAGA (SEQ ID NO: 3794)
MRPS28	chr8:80915355-80915234	ATGGGACCTGCAAAGGATAAACTGGTCATTGGACGGATCT TTCATATTGTGGAGAATGATCTGTACATAGATTTTGGTGG AAAGTTTCATTGTGTATGTAGAAGACCAGAAGTGGATGGA GA (SEQ ID NO: 3795)
MTERF3	chr8:97263851-97263810	GGACGTGTCTCCGTGCTAAAGACCTAGAGATTACAACGAT GA (SEQ ID NO: 3796)
MYCBP2	chr13:77628142-77628054	GCATCTAGCATAGAACTCCCTATTCTGCATTATGACTACTG GACCACTTATCTCTCTGCCCTACTTGATAAGTTCCATGAGG ACAAAGA (SEQ ID NO: 3797)

Gene Symbol	Coordinates	Sequence
MYCBP2	chr13:77692630-77692475	GTGACCAACTGAGTGCCATATTGAATTCCATTTCAGTCACG ACCCAATCTCCCAGCTCCTTCCATCTTTGATCAAGCTGCAA AACCTCCCTCTTCCCTAGTACACAGCCCATTTGTGTTCGGA CAGCCCCCTTTCCTTCCAGCAGCCTCAGCTTCAGA (SEQ ID NO: 3798)
MYOF	chr10:95117679-95117562	GGTGAGAAGTTTCTGAAGGTGCTTGAACGCTCTTCTTCCA CACGAGGGCACCAAGTTGAAGCGGGAAGAACTGAGCC ATCAGTTAGAAGGCTCAGGATATGGTCCAGTTCTAACGA (SEQ ID NO: 3799)
NREP	chr5:111086122-111086049	TGTTCCAGGGCGCCATTAACGATTGGAGTTGGCACAAAAT TTGAACTAGAAGTGGACTATTTGCTCCTTGAGA (SEQ ID NO: 3800)
NSUN4	chr1:46823248-46823331	GGGCTCAGGAGTCCAGCGGTCCTAAGTATACCTTGCAGCC ATCTTCCTAAAAGTTCTGACCATGACTGAGGACACTGAGA AGGA (SEQ ID NO: 3801)
NT5C2	chr10:104853974-104853926	AGTTTTGGTCTTAACTGAAACAGTCAAACAAACCCACTAA TTGAAAAGA (SEQ ID NO: 3802)
OSMR	chr5:38876877-38876923	CTTCCTGAGAGTTTCTTGGCCTATACCCAGCTGAAGTGCA GGGAAGA (SEQ ID NO: 3803)
OXCT1	chr5:41734751-41734677	ATTTTGAAAGAAGTCTGTCTCTCAAATATTTAAAGAATCA AAATGATGTCGTATTAAAGCTTGACAAGCTAATGA (SEQ ID NO: 3804)
PAPD4	chr5:78937278-78937340	AGCTCTACCTCTGTTTTGAAATGTCATTAGTTTGGATATGT TACCAGGATGCAGCAAAGAAGA (SEQ ID NO: 3805)
PCM1	chr8:17818551-17818653	TTATGGACCAGCATTTCCATCTTTTACTGGCCTGAAATAAT ATAATAAAATCTTTAAGCCACCATAAGATATCTAAGGAAA ATAACTGTATGTGGTTTAAAGA (SEQ ID NO: 3806)
PDS5B	chr13:33263018-33263158	GCATTAGAAACATTCATATTATGAAAATACTACCTTTTTAT TCTCACTTGGTGTACTGATGTGCATTACGGTGGAGAGCAG TAGGCTGCAGATTTTGTGCTGCATAGCCTGAGCAGCACCG TGTTATAGTTTGACATAAGA (SEQ ID NO: 3807)
PIK3R1	chr5:67538784-67538973	TGCTCTACAAGTATAGAAAGAAGCCTTCCTCTTCCCACCG TCCCCAGACACCACATAATGGAAAAAGCAAGAATTTTCTG CATAAGCAAGGCCTTAAAAAAAAAAAAAGCCAGCCTCTGA TGGGACTTCTTTCCTGCCAGAAATCCCACTGGTCCACTGTC GCAATTTTACAAAAGGCCACGATGAAAGA (SEQ ID NO: 3808)
PIKFYVE	chr2:209176229-209176294	TGGAAAGAACCTCATTTGAGCTATGCTTGGTCACAGACCT AGAGAAAGTTCACGGGGAAGTAAAGA (SEQ ID NO: 3809)

Gene Symbol	Coordinates	Sequence
PITPNB	chr22:28288318-28288117	GCGAAAATGGGCAGTGTTTACAGGCATGAATGCTGGTGGAAAGAGCAGAGTAAGGGCAGATTGCACAAGAACCGTGGAGGCCCTGGTTCCCATCACCTCCACCTCAGCACAGACTTCAGAGAGGAGAGGAGGCACTGGATGCATGACAGCAGCACTTGAGATAGGTGCTCCAGGTGGAAGGCACTGCACATGCAAAGGCTGA (SEQ ID NO: 3810)
PITPNB	chr22:28290410-28290364	TGAGCTTGGAGTGAAGTCTAGTACGTCTGTGCAGCAAAGAGACCAGA (SEQ ID NO: 3811)
PLSCR1	chr3:146255831-146255783	GACCACATAAACCCATTTTGAATTATTCAACCATTGCTGAACCTTCTGA (SEQ ID NO: 3812)
PMS1	chr2:190683464-190683555	GGATTCCCCCAGCAGACGTTTTTCATCTAAGAAATGGCTTGAGTGCTTCCTTTTATCGGGTGCTGTGATAGATTCTCAAAATATGAAAATGA (SEQ ID NO: 3813)
PIIP5K2	chr5:102492916-102492948	AACCCAACACAGATCTTAATACCATGAAAAGGA (SEQ ID NO: 3814)
PRSS23	chr11:86651889-86652069	AGCAATCTCTTTGTATTTATACAATTATGACAACAGTAGTAAGAGAAGAAGGTTTCAGAGGATACAAGGTAACACACCTACATAAACGACCTACTGGGTACAAATATTGTAAATCAACATAGGCCTAGAAAAGGTGGTCAGATGCTGAATTTTGACTAAATACCTCCGATGGCACATAATGA (SEQ ID NO: 3815)
PRUNE2	chr9:79234303-79234256	AACTAGCTGCCTTTACAATGATCCAGAAATGTCTTCTATGGAGAAGGA (SEQ ID NO: 3816)
PSMA4	chr15:78834921-78834987	AGAGACGCAACATCCACAAGCTTCTTGATGAAGTCTTTTTTTCTGAAAAAATTTATAAACTCAATGA (SEQ ID NO: 3817)
PXK	chr3:58321084-58321179	CTGTAAAGTTTGACTGAGAAATGTTGCATCAGCCCTGAAGTTTATTGAGAAAATCTTACGCTGATGCAAACCTTTTGGACTGTTAGTGTCTTATGA (SEQ ID NO: 3818)
RAF1	chr3:12645036-12644977	AATAACAACCTGAGTGCTTCTCCAGGGCGTGGTCCAGACGATTTTGTGTTGAGGGGAAGA (SEQ ID NO: 3819)
RARS2	chr6:88257102-88256965	AATTGGAGAAATTAGTACTTGTGGCATAGATTGTTGTGCGGTCAGCTCTTACTGTTCTTGAGCAGCATTTTAAAGAGAAGAAATGACAGGACTTGATGAAAAAGTATAAGAAATATACAGTATAAAAAAAGCTATATGA (SEQ ID NO: 3820)
RFWD2	chr1:176044514-176044399	GACTAAGATTTGAATTTATTATGTATATGAAGATCTTAAATTTAAGCCATTAGCTAAAGAACTATTGGAGGAGATCTTTATTGTATTCTGTCAGCTGTTTAACTCAGTAATGA (SEQ ID NO: 3821)
RNFT1	chr17:58039977-58039901	GAATTTCTCTTGGAATTGGGCTGCTAACAACTTTTATGTATGCAAACAAAAGCATTGTAAATCAGGTTTTTCTAAGA (SEQ ID NO: 3822)
RPA1	chr17:1745069-1745127	ACGTCAGCTATCAGTTTAAAGCATTACTTCTATGCCTAGTTTGCTGAGACTTTATAATGA (SEQ ID NO: 3823)

Gene Symbol	Coordinates	Sequence
RPS6KB2	chr11:67196453-67196493	GACGCATGTCCCCTTGCCGAGTTGAGGGCAGCTGGCCTAG A (SEQ ID NO: 3824)
SAMD4A	chr14:55115465-55115566	ATGTGATGGGAAGTCTCTGGAAGAGTTGAGAAGGAGAAT GAAGGCGCTTCATTGACCCTTGAAAATGACCACTCTGAAT GCGGCACAGAGAGTAATGAAAGA (SEQ ID NO: 3825)
SAR1A	chr10:71926149-71926032	TGCATCTAAGTGGCATTCTGATTACATTATTGATAAGACT GATTCCTAGAGTTGTTCTTCACTGGATGACAGCAGTCGTA TGTCTAGGGAATGTGAATGAACCGCTGCCTGGAGGA (SEQ ID NO: 3826)
SCO1	chr17:10594966-10594907	AGAAAGGATTTGAACTTGGCCTTCATGTATCAACTAAGTT AATCGAGCCTTGAATTGAGA (SEQ ID NO: 3827)
SEC24A	chr5:134013731-134013842	AGACCGGGTCTCTCGTTGTCACCCAGGTTAGAGTGCAGTT CCATGATCATAGCTCACTGCAGCCTTGAACCTTTGGGCTC AAGCAGTCCTCCTGCCTCAGCCTCCAGACAGA (SEQ ID NO: 3828)
SERGEF	chr11:18031686-18031622	GTGTCTTCAAAAACAAACATATTTAAAAGATTTTACTTCTC ATCTCCAGGAAGAACCAGCTAGGA (SEQ ID NO: 3829)
SH3YL1	chr2:224920-224868	GTAACAGAAATGAATATAAGCTCTATCCTGGACTTTCCAG CTATCATGAGAGA (SEQ ID NO: 3830)
SKA2	chr17:57196856-57196757	AAAAATCCAGTTACACTCTTAAAGGAATTGTCAGTGATAA AGTCTCGATATCAAACCTTTGTATGCCCGCTTTAAACCAGTT GCTGTTGAGCAGAAAGAGA (SEQ ID NO: 3831)
SMYD3	chr1:246394576-246394501	CTATATCAGAAAAGCAGGAAACCAGAGAAAAATATACCTA TTTGAAAGTGGCATGTGAGCTGGGATGAGAGAGAAGA (SEQ ID NO: 3832)
SNAP23	chr15:42805372-42805407	TATTGGAATATGACAGGGAAGATGAATTCATATGA (SEQ ID NO: 3833)
SNHG16	chr17:74554456-74554545	AGGCCTTTCTTTGTTTGGCATCTGCAGAGACGGTGAAAAG CAGAGCTCCAGGTTGAAGGATCAGAGTAATAGATGGAGC CCTTAACATGA (SEQ ID NO: 3834)
SNX7	chr1:99204216-99204359	AGTTTGCAAAGGAAGGAAAGGAGCAGAGACTTGAATGAG CAGAAAATCATTTTCAGGGCCTGTTCTCTATGTCCTTGCTAT CCCTGTCTTCTGTAGCTATTCTGAAACCATCAACAAAGGA GCACACCATTCCATCAGCAAAAGA (SEQ ID NO: 3835)
SPATA5	chr4:123901321-123901384	AACCTTTATATAAATGGAATCATACTGTATACAACCTTTTG GAATTAGCTTTTTTCACATATGA (SEQ ID NO: 3836)
SPIDR	chr8:48185929-48186042	GTATTCAGTAGAAGCAGATGAACAGCCAGATGAAGAGAT GGATAGAGCAAGACATGGACATTATAAAGGAATTCAATA GAAGCACATGAACGGCCAGATGAAGAGATGGATAGA (SEQ ID NO: 3837)

Gene Symbol	Coordinates	Sequence
SPRYD7	chr13:50492357-50492229	GTGTGGTTGTACGTGCCTGTAGTCCCAGCTACTTGAGAGGCTGAGCTGAGAGGATCTCTTGAGCCGGGGAGGTCAAGTCTCCTGTGAGCAGTGATCATCGTGCCGCTGCACTCCAGCCTTGGCACCAGA (SEQ ID NO: 3838)
SRGAP1	chr12:64319388-64319457	TCACAGATACCACGTGTTAATATCTAAAGTAGAAAAAGGAATAAAGCAAAGGAGGACAAAAAGAAAAGGA (SEQ ID NO: 3839)
STAT1	chr2:191843332-191843254	GTTTGTATCTGCAGATCAAGGATGTGAGTCAATGTAATCTGCAACCCGTTCTTGGAAGGAATCACATTTCCCACAGGA (SEQ ID NO: 3840)
STXBP6	chr14:25411028-25410930	GTGGTCCCTGAGTTAAGAACATGCAATGGCACTCTCTCAAGGAGAGGAAGGAGCCAAAGAAGAAAGAGGGTCCAAAGCAGAAAAGAGCAGACAGCTAAGA (SEQ ID NO: 3841)
SUPT20H	chr13:37585794-37585696	TTGAAGACGATAATTCTAACTTCCTGTCAGTTGAAGACGATAATTCTAACTTCACACTTAATTAAGA (SEQ ID NO: 3842)
TAF2	chr8:120771346-120771264	GAAGATGATCACCTTGCCAAGGAAGCATCATGTAATATATCAGCTCATCAGCAGGGAGTGAAGAGGAAGTCTGATACACACTGGGGTCCCCACTAGAACCTGGTCAAATACTGGAGAA GAATGAGGATAGCAGTAAAGTCAAACCTCAAATCAGA (SEQ ID NO: 3843)
TAF2	chr8:120757276-120757121	TTTTGAGATCCACCAAATATGTCATTGTTGCCAGTCTTCTT TCCCAAGATGTATGGATAGTTTTTAATGTCTCATAAATATG A (SEQ ID NO: 3844)
TBC1D15	chr12:72278640-72278801	TTTGACAGACCTGAAATCAATCAAGCAAAACAAAGAGGGTATGGGCTGGTCCTATTTGGTATTCTGTCTAAAGGATGACGTCGTTCTCCCTGCTCTACACTTTCATCAAGGAGATAGCAAACTACTGATTGAATCTCTTGAAAAATATGTGGTATTGTGTGA (SEQ ID NO: 3845)
TCF12	chr15:57227695-57227728	GTTTTTGGGGAACAGGTGGTATTTGGTGACATGA (SEQ ID NO: 3846)
TJP2	chr9:71792959-71793045	GGATTGGTGTCTCTATCATCCAGCTGGCCATTAAACAACC AAAGCTTCATCATCCTAGATAACCTGTGAGCTCTCAGAGGAGACAGA (SEQ ID NO: 3847)
TMEM189-UBE2V1	chr20:48713357-48713209	GAGTAAAAGTCCCTCGCAATTTCCGACTGTTGGAAGAACTCGAAGAAGGCCAGAAAGGAGTAGGAGATGGCACAGTTAGCTGGGGTCTAGAAGATGACGAAGACATGACACTTACAAGATGGACAGGGATGATAATTGGGCCTCCAAGA (SEQ ID NO: 3848)
TMEM214	chr2:27260130-27260168	CCATCCTAGATCTGAGATTTGCAACCTGGAAGTTCAAGA (SEQ ID NO: 3849)

Gene Symbol	Coordinates	Sequence
TNS3	chr7:47337036-47336903	GCAGGCCCCACCCATGAAACATACACGACACCACAGAGACCTCCCTGAAGGTCCCTCAACTGCATGGACATGTAGTTCTTCAGCCAAGCAGAGGGATCCCGGCCAGGTCCCCACTGATCCAGTTTGCAAAAAGA (SEQ ID NO: 3850)
TOE1	chr1:45807382-45807415	GTTTATGGGGAACAGGTGGTGTGTTGGTTAAATGA (SEQ ID NO: 3851)
TRAF3	chr14:103356688-103356763	CACCAATACATTATTATGAAGTCAGTACAGAGAGATTGGCATCTTAGTATTTTCTGAGGAAGAGAACAGCCAAAGA (SEQ ID NO: 3852)
TSPAN2	chr1:115601892-115601858	GTTTTGTGGGGAACAGGTGGTGTGTTGGTTACATGA (SEQ ID NO: 3853)
TUBE1	chr6:112405449-112405392	AGTGGTTGGTGATGGTGGGAAGTATTTCCAAGGGAAAAATATGTTCTTTAAAGCACGA (SEQ ID NO: 3854)
TYW5	chr2:200813345-200813295	TGACAGCATGAACTGTCAGAAGCTTTGAGTTCAAGCATCTTGGGAGCAAGA (SEQ ID NO: 3855)
UBE2V1	chr20:48713357-48713209	GAGTAAAAGTCCCTCGCAATTTCCGACTGTTGGAAGAACTCGAAGAAGGCCAGAAAGGAGTAGGAGATGGCACAGTTAGCTGGGGTCTAGAAGATGACGAAGACATGACACTTACAAGATGGACAGGGATGATAATTGGGCCTCCAAGA (SEQ ID NO: 3856)
URGCP	chr7:43945050-43944971	GCTTTGGGGCAGTGGTCATTTCCGGGACCAGGCCTTTTCAT TGCCAGCTGACTACCCAGCACTTTGAGCTCATGAATAGA (SEQ ID NO: 3857)
XRN2	chr20:21307793-21307903	GTGGTTTGAATTGAGAAGGGAAGTATAGCAAAAGCTTGA GAAAGCCTTACCGTCTGGAGTTTGGACTGTATCCTATAGG CAATGAGTAGTCATGAAAATGATTTGAGAGGA (SEQ ID NO: 3858)
XRN2	chr20:21326472-21326525	CCATCAACAACTCTTAGCTGAAAGAGGGGATAAGGCCCAA GCAAGGATAGAGAGA (SEQ ID NO: 3859)
ZNF232	chr17:5012080-5012041	GTGAGAGACTTTGCCTGTTTCATCACTCATAAAATTAGGA (SEQ ID NO: 3860)
ZNF680	chr7:64002295-64002108	GCAGAACTGGCCGTGAACTGTGGCTCAGGGAGCTGGAAGT GAGTCATCGAACTGCTTCAGAAACCACAGTAAAGGACAA GGTCTGCAGGCCTGCCTGCGTGGCTATAAATGGCTGTCTT CCTCCAGGCCTCTGGAAGGGCACGGTCTCTCCAGACTGT GGCTGGGAGGAGTTTGGGATGATTAGAGA (SEQ ID NO: 3861)

[001029] Diseases or disorders associated with expression of an aberrant gene product for certain genes described herein are listed in **Table 15**, wherein contacting a patient cell with a compound described herein or administering to a subject in need thereof a compound described

herein has been demonstrated to modulate the expression of associated RNA transcripts and are thus expected to be useful in preventing or ameliorating a disease or disorder caused by expression of an aberrant gene product.

[001030] Table 15 Diseases or disorders associated with expression of an aberrant gene product for certain genes.

Gene	GeneID	Example(s) of Associated Disease or Disorder
ABCC3	8714	Cholestasis, Colorectal Neoplasms, Peripheral Nervous System Diseases
ADAM17	6868	Blister, Inflammatory Skin and Bowel Disease, Neonatal
ANXA11	311	Sarcoidosis
APLP2	334	Nerve Degeneration, Myocardial Ischemia
ASPH	444	Ectopia Lentis, Spontaneous Filtering Blebs, and Craniofacial Dysmorphism
ATXN1	6310	Spinocerebellar Ataxia 1, Spinocerebellar Ataxias
AXIN1	8312	Carcinoma, Hepatocellular, Caudal Duplication Anomaly
BECN1	8678	Status Epilepticus, Colonic Neoplasms, Lewy Body Disease, Myocardial Infarction, Lung Neoplasms
BHMT2	23743	Cleft Lip, Cleft Palate
C11orf30	56946	Dermatitis, Atopic, Breast Neoplasms, Polycystic Ovary Syndrome
C11orf73	51501	Stomach Neoplasms, Melanoma, Disease Progression
CASP7	840	Myocardial Reperfusion Injury, Vitiligo, Breast Neoplasms, Leukemia, Myeloid, Acute
CDH13	1012	Lung Neoplasms, Carcinoma, Hepatocellular, Prostatic Neoplasms, Carcinoma, Non-Small-Cell Lung, Esophageal Neoplasms, Amphetamine-Related Disorders, Substance-Related Disorders, Barrett Esophagus
CHEK1	1111	Glomerulonephritis, IGA, Peripheral Nervous System Diseases
CRISPLD2	83716	Neurotoxicity Syndromes, Lung Diseases, Liver Diseases
DCAF17	80067	Woodhouse Sakati syndrome
DHFR	1719	Megaloblastic Anemia due to Dihydrofolate Reductase Deficiency, Osteosarcoma, Autistic Disorder, Folic Acid Deficiency, Neoplasm Metastasis, Colorectal Neoplasms, Nervous System Diseases, Anemia, Megaloblastic, Drug-Related Side Effects and Adverse Reactions, Metabolism, Inborn Errors, Infertility, Female, Abortion, Spontaneous, Pancytopenia
DIAPH3	81624	Neuropathy, auditory neuropathy, benign epilepsy with centrotemporal spikes, prostate cancer, pancreatitis, prostatitis, sensorineural hearing loss
DENND5A	23258	Stomatitis
DNAJC13	23317	Parkinson Disease
DOCK1	1793	Substance-Related Disorders
DYRK1A	1859	Mental Retardation, Autosomal Dominant 7

Gene	GeneID	Example(s) of Associated Disease or Disorder
EIF2B3	8891	Leukoencephalopathy with Vanishing White Matter, Vanishing White Matter Leukodystrophy with Ovarian Failure
ENAH	55740	Glomerulonephritis, IGA
EP300	2033	Rubinstein-Taybi Syndrome, Endometrial Neoplasms, Carcinoma, Transitional Cell, Esophageal Squamous Cell Carcinoma, Urinary Bladder Neoplasms, Colorectal Neoplasms, Carcinoma, Adenoid Cystic, Small Cell Lung Carcinoma, Colon Carcinoma, Rubinstein-Taybi Syndrome 2
ERCC1	2067	Cerebrooculofacioskeletal Syndrome 4, Carcinoma, Non-Small-Cell Lung, Stomach Neoplasms, Neoplasms, Neoplasm Metastasis, Melanoma, Testicular Neoplasms, Peripheral Nervous System Diseases, Adenocarcinoma of lung, Nasopharyngeal carcinoma, Uterine Cervical Neoplasms, Arsenic Poisoning, Neoplasms, Germ Cell and Embryonal
ERLIN2	11160	Intellectual Disability, Spastic Paraplegia 18, Autosomal Recessive
ERRFI1	54206	Endometriosis, Polycystic Ovary Syndrome
EVC	2121	Ellis-Van Creveld Syndrome, Weyers acrofacial dysostosis
FAM126A	84668	Leukodystrophy, Hypomyelinating, 5, Substance-Related Disorders, Intellectual Disability, Peripheral Nervous System Diseases
FAM13A	10144	Pulmonary Disease, Chronic Obstructive, Idiopathic Pulmonary Fibrosis
FAM198B	51313	Glomerulonephritis, IGA
FBN2	2201	Congenital contractural arachnodactyly, Colorectal Neoplasms
FHOD3	80206	Substance-Related Disorders
GALC	2581	Krabbe disease, leukodystrophy, metachromatic leukodystrophy, lipid storage disease, infantile krabbe disease, chron's disease, neuropathy, neuronitis, motor neuron disease, hereditary spastic paraplegia, cerebritis, peripheral neuropathy, paraplegia, spasticity, Gaucher's disease, blindness, lysosomal storage disease, gangliosidosis, farber lipogranulomatosis, lipogranulomatosis, open-angle glaucoma, primary open angle glaucoma, glaucoma, multiple sclerosis, hepatitis, squamous cell carcinoma, hematopoietic stem cell transplantation, late-infantile or juvenile krabbe disease, adult krabbe disease
GGCT	79017	Meningioma, osteosarcoma, tuberculosis, gestational diabetes, leukemia, eczema, eczema herpeticum, myoblastoma
GOLGA4	2803	Arsenic Poisoning, Prostatic Neoplasms, Skin Diseases
GPSM2	29899	Chudley-Mccullough syndrome
GULP1	51454	Thyroid Diseases
HLTF	6596	Colon cancer, adenocarcinoma, colorectal cancer, adenoma, gastric cancer, squamous cell carcinoma, cervical squamous cell carcinoma, cervical adenocarcinoma, endometrial adenocarcinoma, cervicitis, gastric cardia adenocarcinoma, cervical cancer, esophagitis, laryngeal squamous cell carcinoma, laryngitis, esophageal squamous cell carcinoma
HMGA2	8091	Neoplasms, Lipomatosis, Multiple, Birth Weight
HNMT	3176	Asthma, Urticaria, Rhinitis, Drug Hypersensitivity, Susceptibility to Asthma

Gene	GeneID	Example(s) of Associated Disease or Disorder
HPS1	3257	Albinism with hemorrhagic diathesis and pigmented reticuloendothelial cells
HSD17B4	3295	Bifunctional peroxisomal enzyme deficiency, Gonadal dysgenesis XX type deafness, Zellweger Syndrome, Peroxisomal Disorders, Spasms, Infantile
HTT	3064	Huntington Disease, Movement Disorders, Manganese Poisoning, Cadmium Poisoning
IVD	3712	Acidemia, isovaleric
KDM6A	7403	Esophageal Squamous Cell Carcinoma, Urinary Bladder Neoplasms, Neoplasms, Carcinoma, Adenoid Cystic, Carcinoma, Transitional Cell, KABUKI SYNDROME 2
MED13L	23389	Transposition of the Great Arteries, Dextro-Looped 1, Intellectual Disability
MFN2	9927	Charcot-Marie-Tooth Disease, Axonal, Type 2A2, Hereditary Motor And Sensory Neuropathy VI, Charcot-Marie-Tooth Disease, Cardiomegaly
MRPS28	28957	Breast Neoplasms
MYLK	4638	Aortic Aneurysm, Familial Thoracic 7, Acute Lung Injury, Pneumonia, Neoplasm Metastasis, Glaucoma, Gastrointestinal Diseases, Vascular Diseases, Hypersensitivity, Brain Edema, Neoplasm Invasiveness, Glioma, Hypercholesterolemia
NGF	4803	Neuropathy, Hereditary Sensory And Autonomic, Type V, Inflammation, Cystitis, Hyperalgesia, Urinary Bladder, Overactive, Hereditary Sensory and Autonomic Neuropathies, Glomerulonephritis, Heroin Dependence, Peripheral Nervous System Diseases, Epilepsy, Tonic-Clonic, Hyperkinesia, Neurogenic Inflammation, Lewy Body Disease, Kidney Failure, Chronic, Nerve Degeneration, Lung Injury, Seizures, Bronchial Hyperreactivity, Nervous System Diseases, Renal Insufficiency, Chronic, Skin Ulcer, Corneal Ulcer, Parkinsonian Disorders, Neurodegenerative Diseases, Amnesia, Status Epilepticus, Parkinson Disease, Cocaine-Related Disorders, Neurobehavioral Manifestations, Nephritis, Interstitial
NT5C2	22978	Precursor Cell Lymphoblastic Leukemia-Lymphoma, Recurrence, Spastic Paraplegia 45, Autosomal Recessive
OSMR	9180	Amyloidosis IX, Glomerulonephritis, IGA, Carcinoma, Non-Small-Cell Lung, Amyloidosis, Primary Cutaneous
OXCT1	5019	Succinyl-CoA:3-oxoacid CoA transferase deficiency, Osteoporosis
PAPD4	167153	Sleeping sickness
PCM1	5108	Schizophrenia, Thyroid cancer, papillary
PDXDC1	23042	Carcinoma, Renal Cell, Glomerulonephritis, IGA, Carboxy-lyase activity, pyridoxal phosphate binding
PIGN	23556	Multiple Congenital Anomalies-Hypotonia-Seizures Syndrome 1

Gene	GeneID	Example(s) of Associated Disease or Disorder
PIK3CD	5293	Activated PI3K-delta Syndrome, Lymphoma, Large B-Cell, Diffuse, Prostatic Neoplasms
PIK3R1	5295	Short Syndrome, Insulin Resistance, Carcinoma, Mammary Neoplasms, Experimental, Burkitt Lymphoma, Mammary Neoplasms, Animal, Autosomal Recessive Agammaglobulinemia 7
PIKFYVE	200576	Corneal Dystrophy, Fleck
PITPNB	23760	Obesity
PLEKHA1	59338	Macular Degeneration, Age-Related, 1
PLSCR1	5359	Influenza, Human
POMT2	29954	Muscular Dystrophy-Dystroglycanopathy (Limb-Girdle), Type C, 2, Muscular Dystrophy-Dystroglycanopathy (Congenital with Mental Retardation), Type B, 2, Muscular Dystrophy-Dystroglycanopathy (Congenital with Brain and Eye Anomalies), Type A, 2, Walker-Warburg Syndrome, Congenital muscular dystrophy
PPARG	5468	Obesity, Familial Partial Lipodystrophy Type 3, Hypertension, Diabetes Mellitus, Type 2, Inflammation, Acute Lung Injury, Acute Kidney Injury, Diabetes Mellitus, Experimental, Insulin Resistance, Diabetes Mellitus, Atherosclerosis, Colonic Neoplasms, Colorectal Neoplasms, Thyroid Neoplasms, Alzheimer Disease, Adenocarcinoma, Stomach Neoplasms, Dyslipidemias, Pancreatic Neoplasms, Melanoma, Lipodystrophy, Familial Partial, Crohn Disease, Metabolic Diseases, Carcinoma, Hepatocellular, Colon Carcinoma, Psoriasis, Ischemia, Reperfusion Injury, Osteoarthritis, Glioma, Liver Neoplasms, Polycystic Kidney, Autosomal Dominant, Leukostasis, Thyroid cancer, follicular, Lipidoses, Glomerulonephritis, Nerve Degeneration, Pituitary ACTH Hypersecretion, Carotid Intimal Medial Thickness 1, Barrett Esophagus, Lymphoma, T-Cell, Chronobiology Disorders, Obesity, Morbid
PPHLN1	51535	Nervous system disorders, for example, interacts with synphilin-1, mutations of which are implicated in Parkinson's disease, gastric cancer, ichthyosis
PRPF31	26121	Retinitis Pigmentosa 11, Retinitis Pigmentosa
PRSS23	11098	Melanoma
PSMA4	5685	Carcinoma, Mammary Neoplasms, Experimental, HIV Infections, Mammary Neoplasms, Animal, Liver Neoplasms
PXK	54899	Lupus Erythematosus, Systemic, Arthritis, Rheumatoid
RAF1	5894	Noonan Syndrome 5, Noonan Syndrome, Leopard syndrome, 2, Leopard Syndrome, Glioma, Cardiomyopathy, Hypertrophic, Carcinoma, Non-Small-Cell Lung, Lung Neoplasms, Breast Neoplasms, Liver Neoplasms, Kidney Neoplasms, Cardiomyopathy, Dilated, Hyperalgesia
RARS2	57038	Pontocerebellar Hypoplasia Type 6
RFWD2	64326	Autistic Disorder

Gene	GeneID	Example(s) of Associated Disease or Disorder
RPA1	6117	Chloracne
RPS10	6204	Diamond-Blackfan Anemia 9
RPS6KB2	6199	Breast Neoplasms
SAMD4A	23034	Substance-Related Disorders
SCO1	6341	Cytochrome-c Oxidase Deficiency, Mitochondrial Diseases
SLC12A2	6558	Hypertension, Epilepsy, Epilepsy, Temporal Lobe, Carcinoma, Mammary Neoplasms, Experimental, Glucose Intolerance, Prostatic Neoplasms, Movement Disorders, Cardiovascular Diseases, Mammary Neoplasms, Animal
SMYD3	64754	Amphetamine-Related Disorders
SNAP23	8773	Myocardial Ischemia
SPATA5	166378	Schizophrenia
STAT1	6772	Susceptibility ToMycobacterial and Viral Infections, Autosomal Recessive, Candidiasis, Familial, 7, Arthritis, Experimental, Carcinoma, Hepatocellular, Mycobacterium Infections, Candidiasis, Chronic Mucocutaneous, Liver Cirrhosis, Arthritis, Rheumatoid, Cytomegalovirus Infections, Hearing Loss, Disease Progression, Mycobacterium Infections, Nontuberculous, Influenza, Human
STRN3	29966	Cerebritis, cerebral cavernous malformation, cavernous malformation, cerebral cavernous malformations 3, neuronitis
STXBP6	29091	Autistic Disorder
TAF2	6873	Mental Retardation, Autosomal Recessive 40, Intellectual Disability
TCF12	6938	Craniosynostosis 3, Craniosynostoses
TCF4	6925	Pitt-Hopkins syndrome, Seizures, Peripheral Nervous System Diseases, Craniofacial Abnormalities, Heart Diseases, Microcephaly, Liver Neoplasms
TIAM1	7074	Amyotrophic lateral sclerosis 1
TJP2	9414	Hypercholanemia, Familial, Hearing Loss, Cholestasis, Intrahepatic
TRAF3	7187	Susceptibility to Herpes Simplex Encephalitis, 3
VPS29	51699	Down syndrome, paraplegia
WNK1	65125	Neuropathy, Hereditary Sensory and Autonomic, Type IIA, Pseudohypoaldosteronism, Type IIc, Hypertension, Kidney Diseases, Pseudohypoaldosteronism, Peripheral Nervous System Diseases
ZCCHC8	55596	Intellectual Disability

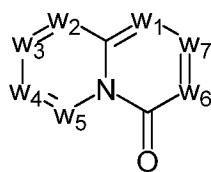
[001031] It will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, the invention described herein is not to be limited in scope by the specific embodiments herein disclosed. These embodiments are intended as illustrations of several aspects of the invention. Any equivalent embodiments are intended to be

within the scope of this invention. Indeed, various modifications of the invention in addition to those shown and described herein will become apparent to those skilled in the art from the foregoing description, which modification also intended to be within the scope of this invention.

[001032] All references cited herein are incorporated herein by reference in their entirety and for all purposes to the same extent as if each individual publication or patent or patent application was specifically and individually indicated to be incorporated by reference in its entirety for all purposes.

What is claimed is:

1. A method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a pre-mRNA transcript with a compound of Formula (I) or a form thereof, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DHFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFFI1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALC, GCFC2, GGACT, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLTF, HMGA2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRC42, LUC7L3, LYRM1, MB21D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSCR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXX, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP, and wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,

C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

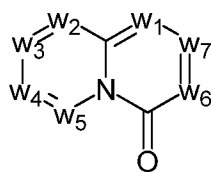
R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

2. A method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting the pre-mRNA transcript with a compound of Formula (I) or a form thereof, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein the pre-mRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCA10, ABCB8, ABCC3, ACTA2, ADAL, ADAMTS1, ADCY3, ADD1, ADGRG6, ADH6, ADHFE1, AFF3, AGPAT4, AKAP3, ANK1, ANK3, ANKRA2, ANKRD33B, ANKRD36, AP4B1-AS1, APIP, ARHGAP1, ARHGAP12, ARHGEF16, ARID5B, ARL15, ARL9, ARMCX6, ASIC1, ATG5, ATP2A3, ATXN1, B3GALT2, B3GNT6, BCL2L15, BCYRN1, BECN1, BHMT2, BIN3-IT1, BIRC3, BIRC6, BTG2, BTN3A1, C10orf54, C11orf70, C11orf94, C12orf4, C12orf56, C14orf132, C19orf47, C1orf86, C3, C7orf31, C8orf34, C8orf44, C8orf44-SGK3, C8orf88, CA13, CA3, CACNA2D2, CACNB1, CADM1, CAND2, CASP7, CCDC122, CCDC79, CCER2, CCNF, CECR7, CELSR1, CEMIP, CENPI, CEP112, CEP170, CEP192, CFH, CHEK1, CIITA, CLDN23, CLTA, CMAHP, CNGA4, CNRIP1, CNTD1, COL11A1, COL14A1, COL15A1, COL5A1, COL5A3, COL6A6, COL8A1, COLEC12, COMP, CPA4, CPQ, CPSF4, CRISPLD2, CRLF1, CRYBG3, CRYL1, CSNK1E, CSNK1G1, CYB5R2, CYGB, CYP1B1, DAGLB, DCAF17, DCLK1, DCN, DDIT4L, DDX50, DEGS1, DEPTOR, DFNBS9, DIRAS3, DLG5, DLGAP4, DNAH8, DNAJC13, DNAJC27, DNMBP, DOCK11, DYNC1H1, DYRK1A, DZIP1L, EFEMP1, EGR3, ELN, ELP4, EMX2OS, ENAH, ENPP1, EP300, ERCC1, ERCC8, ERGIC3, ERLIN2, ERFF1, ESM1, EVC, EVC2, F2R, FAIM, FAM126A, FAM13A, FAM160A1, FAM162A, FAM174A, FAM20A, FAM46B, FAM65B, FAP, FARP1, FBLN2, FBN2, FBXL6, FCHO1, FGFR2, FGL2, FLT1, FRAS1, FSCN2, GAL3ST4, GALNT15, GATA6, GBGT1, GCNT1, GDF6, GGACT, GLCE, GNAQ, GPR183, GPR50, GPRC5A, GPRC5B, GRTP1, GUCA1B, GULP1, GXYLT1, HAPLN1, HAPLN2, HAS3, HAVCR2, HDAC5, HDX, HECTD2-AS1, HEPH, HEY1, HMGA2, HMGN3-AS1, HNMT, HOOK3, HPS1, HSPA1L, HTATIP2, IFT57, IGDCC4, IGF2R, IGFBP3, IL16, INA, INPP5K, INTU, IQCG, ITGA11, ITGA8, ITGB8, ITIH1, ITPKA, IVD,

KAT6B, KCNS1, KCNS2, KDM6A, KDSR, KIAA1456, KIAA1462, KIAA1755, KIT, KLF17, KLRG1, KMT2D, KRT7, KRTAP1-1, KRTAP1-5, L3MBTL2, LAMB2P1, LETM2, LGI2, LGR4, LHX9, LINC00472, LINC00570, LINC00578, LINC00607, LINC00678, LINC00702, LINC00886, LINC00961, LINC01011, LINC01118, LINC01204, LMOD1, LOC400927, LRBA, LRP4, LRRC32, LRRC39, LRRC42, LSAMP, LUM, LYPD1, LYRM1, MAFB, MAMDC2, MAN2A1, MAN2C1, MAPK13, MASP1, MB, MB21D2, MC4R, MCM10, MED13L, MEGF6, MFN2, MIAT, MIR612, MLLT10, MMP10, MMP24, MN1, MOXD1, MRPL45, MRPL55, MRPS28, MRV11, MSH4, MTERF3, MXRA5, MYCBP2, NA, NAALADL2, NAE1, NAGS, NDNF, NGF, NGFR, NHLH1, NLN, NOTCH3, NOTUM, NOVA2, NOX4, NRROS, OCLN, OLR1, OSBPL10, OXCT1, OXCT2, PAIP2B, PBLD, PDE1C, PDE5A, PDGFD, PDGFRB, PDS5B, PEAR1, PHACTR3, PIGN, PIK3CD, PIK3R1, PIKFYVE, PIM2, PITPNM3, PLEK2, PLEKHA1, PLEKHA6, PLEKHH2, PLSCR1, PNISR, PODN, POLN, POLR1A, POMT2, PPARG, PPIP5K2, PPM1E, PPP1R26, PPP3CA, PRKCA, PRKG1, PRPF31, PRPH2, PRRG4, PRUNE2, PSMD6-AS2, PTGIS, PTX3, PXX, RAB30, RAB38, RAB44, RAD9B, RAF1, RAPGEF1, RARS, RARS2, RBBP8, RBKS, RDX, RERE, RFX3-AS1, RGCC, ROR1, ROR2, RPA1, RPS10, RPS6KB2, SAMD4A, SCARNA9, SEC24A, SENP6, SERGEF, SGK3, SH3YL1, SHROOM3, SIGLEC10, SKA2, SLC12A2, SLC24A3, SLC35F3, SLC39A10, SLC44A2, SLC46A2, SLC4A11, SLC6A15, SLC7A11, SLC9A3, SLIT3, SMG1P3, SMTN, SNED1, SNX7, SORBS2, SORCS2, SOX7, SPATA18, SPATA5, SPDYA, SPEF2, SPIDR, SPRYD7, SRGAP1, SRRM1, STAC2, STAT4, STK32B, STRN4, STS, STXBP6, SULF1, SVEP1, SYNGR2, SYNPO, SYNPO2, SYNPO2L, TAGLN3, TANGO6, TASP1, TCF12, TCF4, TGFA, TGFB2, TGFB3, TGM2, THBS2, TIAM1, TMC3, TMEM102, TMEM119, TMEM134, TMEM189-UBE2V1, TMEM214, TMEM256-PLSCR3, TMEM50B, TNFAIP8L3, TNFRSF14, TNRC18P1, TNRC6A, TNXB, TP53AIP1, TPRG1, TRIM66, TRPC4, TSHZ2, TSPAN11, TSPAN18, TSPAN7, TSSK3, TTC7B, TUBE1, TXNIP, TYW5, URGCP, USP27X, UVRAG, VAV2, VIM-AS1, VPS41, VSTM2L, VWF, WDR27, WDR91, WISP1, WNK1, WNT10B, YDJC, ZBTB26, ZCCHC5, ZCCHC8, ZFP82, ZMIZ1-AS1, ZNF138, ZNF212, ZNF232, ZNF350, ZNF431, ZNF660, ZNF680, ZNF79, or ZNF837, and, wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,

C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

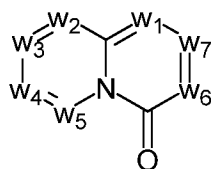
R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

3. The method of claim 2, wherein the intron further comprises a first 5' splice site, a second branch point, and a second 3' splice site upstream of the iREMS.

4. A method for producing a mature mRNA transcript comprising an iExon, the method comprising contacting a pre-mRNA transcript with a compound of Formula (I) or a form thereof, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, a non-endogenous intronic recognition element for splicing modifier (iREMS), a second branch point, and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,
 (amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,
 C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,
 (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,
 C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,
 C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,
 (halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,
 hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,
 (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,
 (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,
 (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,
 [(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl, heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino, heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino, (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl, (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

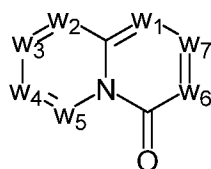
R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

5. A method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the method comprising contacting the pre-mRNA transcript with the a compound of Formula (I) or a form thereof, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: a non-endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide, and wherein wherein Formula (I) is:



(I),

wherein:

w₁ and w₅ are independently C-R_a or N;

w₂ is C-R_b or N;

w₃, w₄ and w₇ are independently C-R₁, C-R₂, C-R_a or N;

w₆ is C-R₁, C-R₂, C-R_c or N;

wherein one of w₃, w₄, w₆ and w₇ is C-R₁ and one other of w₃, w₄, w₆ and w₇ is C-R₂, provided that,

when w₃ is C-R₁, then w₆ is C-R₂ and w₄ and w₇ are independently C-R_a or N; or,

when w₃ is C-R₂, then w₆ is C-R₁ and w₄ and w₇ are independently C-R_a or N; or,

when w₄ is C-R₁, then w₇ is C-R₂ and w₃ is C-R_a or N and w₆ is C-R_c or N; or,

when w₄ is C-R₂, then w₇ is C-R₁ and w₃ is C-R_a or N and w₆ is C-R_c or N; and,

wherein any one, two or three of w₁, w₂, w₃, w₄, w₅, w₆ and w₇ may optionally be N;

R₁ is C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino,

(C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, amino-C₁₋₈alkyl,

C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino,

(amino-C₁₋₈alkyl)₂-amino, (amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

[(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, amino-C₁₋₈alkoxy,

C₁₋₈alkyl-amino-C₁₋₈alkoxy, (C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy,

(C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy, amino-C₂₋₈alkenyl,

C₁₋₈alkyl-amino-C₂₋₈alkenyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkenyl, amino-C₂₋₈alkynyl,

C₁₋₈alkyl-amino-C₂₋₈alkynyl, (C₁₋₈alkyl)₂-amino-C₂₋₈alkynyl, halo-C₁₋₈alkyl-amino,

(halo-C₁₋₈alkyl)₂-amino, (halo-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl,

hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkoxy, (hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkoxy,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkoxy,

hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino,

(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino,

(hydroxy-C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino,

(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl-amino,

[(hydroxy-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino,
 [(hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, heterocyclyl,
 heterocyclyl-C₁₋₈alkyl, heterocyclyl-C₁₋₈alkoxy, heterocyclyl-amino,
 (heterocyclyl)(C₁₋₈alkyl)amino, heterocyclyl-amino-C₁₋₈alkyl,
 heterocyclyl-C₁₋₈alkyl-amino, (heterocyclyl-C₁₋₈alkyl)₂-amino,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heterocyclyl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl,
 (heterocyclyl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heterocyclyl-oxy,
 heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C₃₋₁₄cycloalkyl, aryl-C₁₋₈alkyl-amino,
 (aryl-C₁₋₈alkyl)₂-amino, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, aryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (aryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, (aryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl, heteroaryl,
 heteroaryl-C₁₋₈alkyl, heteroaryl-C₁₋₈alkoxy, heteroaryl-amino,
 heteroaryl-C₁₋₈alkyl-amino, (heteroaryl-C₁₋₈alkyl)₂-amino,
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino, heteroaryl-C₁₋₈alkyl-amino-C₁₋₈alkyl,
 (heteroaryl-C₁₋₈alkyl)₂-amino-C₁₋₈alkyl or
 (heteroaryl-C₁₋₈alkyl)(C₁₋₈alkyl)amino-C₁₋₈alkyl;

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R₃ substituents and optionally, with one additional R₄ substituent; or,

wherein, each instance of heterocyclyl, C₃₋₁₄cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R₃ substituents;

R₂ is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino;

wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R₆ substituents and optionally, with one additional R₇ substituent;

R_a is, in each instance, independently selected from hydrogen, halogen, C₁₋₈alkyl or deuterium;

R_b is hydrogen, halogen, C₁₋₈alkyl, C₁₋₈alkoxy or deuterium;

R_c is hydrogen, halogen, C₁₋₈alkyl or deuterium;

R₃ is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkyl-carbonyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy,

C₁₋₈alkoxy-C₁₋₈alkyl, C₁₋₈alkoxy-carbonyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino,

amino-C₁₋₈alkyl, C₁₋₈alkyl-amino-C₁₋₈alkyl, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl, amino-C₁₋₈alkyl-amino, C₁₋₈alkyl-amino-C₁₋₈alkyl-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)₂-amino, (C₁₋₈alkyl)₂-amino-C₁₋₈alkyl-amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl]₂-amino, (C₁₋₈alkyl-amino-C₁₋₈alkyl)(C₁₋₈alkyl)amino, [(C₁₋₈alkyl)₂-amino-C₁₋₈alkyl](C₁₋₈alkyl)amino, C₁₋₈alkoxy-C₁₋₈alkyl-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)₂-amino, (C₁₋₈alkoxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino, C₁₋₈alkyl-carbonyl-amino, C₁₋₈alkoxy-carbonyl-amino, hydroxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkoxy-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl-amino, (hydroxy-C₁₋₈alkyl)₂-amino or (hydroxy-C₁₋₈alkyl)(C₁₋₈alkyl)amino;

R₄ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-C₁₋₈alkyl, C₃₋₁₄cycloalkyl-amino, aryl-C₁₋₈alkyl, aryl-C₁₋₈alkoxy-carbonyl, aryl-sulfonyloxy-C₁₋₈alkyl, heterocyclyl or heterocyclyl-C₁₋₈alkyl; wherein, each instance of C₃₋₁₄cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R₅ substituents;

R₅ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, halo-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio;

R₆ is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C₁₋₈alkyl, C₂₋₈alkenyl, halo-C₁₋₈alkyl, hydroxy-C₁₋₈alkyl, C₁₋₈alkoxy, halo-C₁₋₈alkoxy, C₁₋₈alkoxy-C₁₋₈alkyl, amino, C₁₋₈alkyl-amino, (C₁₋₈alkyl)₂-amino or C₁₋₈alkyl-thio; and, R₇ is C₃₋₁₄cycloalkyl, C₃₋₁₄cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl.

6. The method of any one of claims 1-5, wherein the iREMS comprises an RNA sequence GAguragu, and wherein r is adenine or guanine.

7. The method of any one of claims 1-5, wherein the iREMS comprises an RNA sequence NNGAgurngn (SEQ ID NO: 1), and wherein r is adenine or guanine and n or N is any nucleotide.

8. The method of claim 7, wherein the RNA sequence NNGAgurngn (SEQ ID NO: 1) is selected from the group consisting of ANGAgurngn (SEQ ID NO: 29), CNGAgurngn (SEQ ID NO: 35), GNGAgurngn (SEQ ID NO: 41), UNGAgurngn (SEQ ID NO: 47), NAGAgurngn (SEQ ID NO: 30), NCGAgurngn (SEQ ID NO: 36),

NGGAgurngn (SEQ ID NO: 42), NUGAgurngn (SEQ ID NO: 48), AAGAgurngn (SEQ ID NO: 31), ACGAgurngn (SEQ ID NO: 37), AGGAgurngn (SEQ ID NO: 43), AUGAgurngn (SEQ ID NO: 49), CAGAgurngn (SEQ ID NO: 32), CCGAgurngn (SEQ ID NO: 38), CGGAgurngn (SEQ ID NO: 44), CUGAgurngn (SEQ ID NO: 50), GAGAgurngn (SEQ ID NO: 33), GCGAgurngn (SEQ ID NO: 39), GGGAgurngn (SEQ ID NO: 45), GUGAgurngn (SEQ ID NO: 51), UAGAgurngn (SEQ ID NO: 34), UCGAgurngn (SEQ ID NO: 40), UGGAgurngn (SEQ ID NO: 46) and UUGAgurngn (SEQ ID NO: 52), wherein r is adenine or guanine and n or N is any nucleotide.

9. The method of any one of claims 1-5, wherein the iREMS comprises an RNA sequence NNGAguragu (SEQ ID NO: 3862), wherein r is adenine or guanine and N is any nucleotide.

10. The method of claim 9, wherein the RNA sequence NNGAguragu (SEQ ID NO: 3862) is selected from the group consisting of ANGAguragu (SEQ ID NO: 437), CNGAguragu (SEQ ID NO: 443), GNGAguragu (SEQ ID NO: 449), UNGAguragu (SEQ ID NO: 455), NAGAguragu (SEQ ID NO: 438), NCGAguragu (SEQ ID NO: 444), NGGAguragu (SEQ ID NO: 450), NUGAguragu (SEQ ID NO: 456), AAGAguragu (SEQ ID NO: 439), ACGAguragu (SEQ ID NO: 445), AGGAguragu (SEQ ID NO: 451), AUGAguragu (SEQ ID NO: 457), CAGAguragu (SEQ ID NO: 440), CCGAguragu (SEQ ID NO: 446), CGGAguragu (SEQ ID NO: 452), CUGAguragu (SEQ ID NO: 458), GAGAguragu (SEQ ID NO: 441), GCGAguragu (SEQ ID NO: 447), GGGAguragu (SEQ ID NO: 453), GUGAguragu (SEQ ID NO: 459), UAGAguragu (SEQ ID NO: 442), UCGAguragu (SEQ ID NO: 448), UGGAguragu (SEQ ID NO: 454) and UUGAguragu (SEQ ID NO: 460), wherein r is adenine or guanine, and N is any nucleotide.

11. An artificial gene construct comprising an RNA sequence comprising exons and one or more introns, wherein at least one intron comprises an iREMS that is downstream of a

branch point and a 3' splice site, and wherein the iREMS comprises the sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

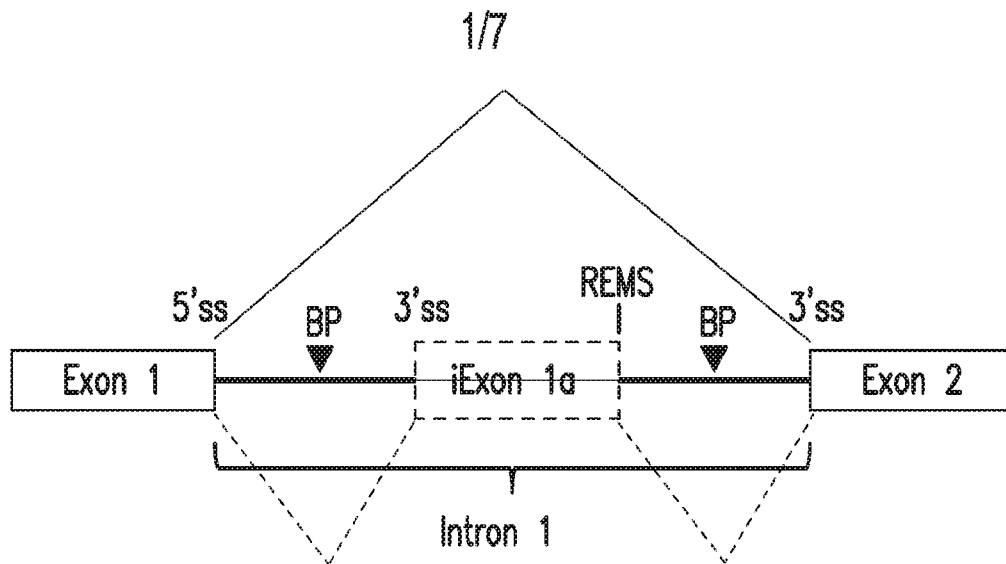
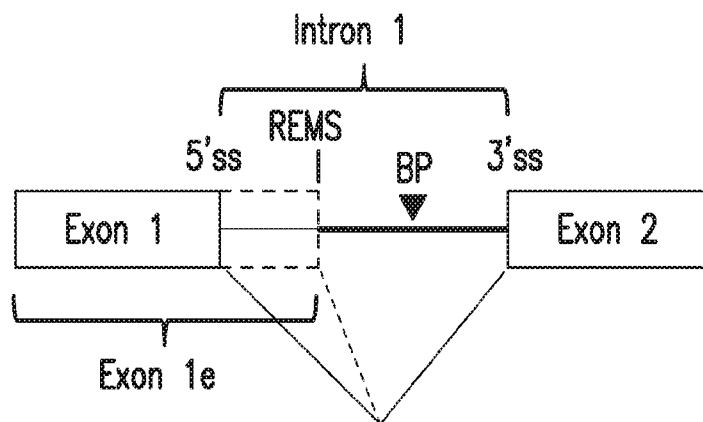
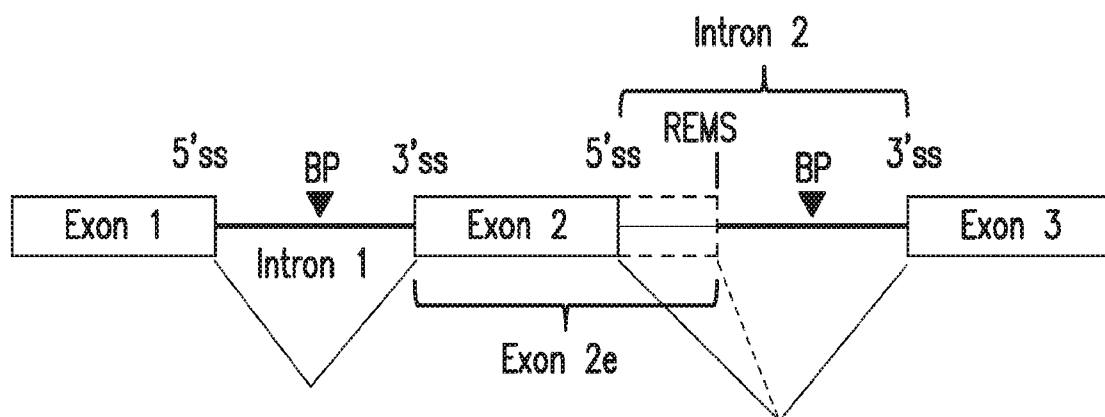
12. An artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: a first 5' splice site, a first branch point, a first 3' splice site, an iREMS, a second branch point and a second 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

13. An artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the RNA nucleotide sequence of the intron comprises in 5' to 3' order: an iREMS, a first branch point and a first 3' splice site, wherein the iREMS comprises an RNA sequence GAgurngn (SEQ ID NO: 2), wherein r is adenine or guanine and n is any nucleotide.

14. The method of any one of claims 1-10, wherein the pre-mRNA transcript is in a cell or a lysate of the cell and the method comprises contacting the cell or cell lysate with the compound.

15. The method of claim 14, wherein the modulation of the production of the mature mRNA transcript modulates the amount and/or type of a protein translated from the mature mRNA transcript and produced in the cell or lysate of the cell.

16. The method of any one of claims 1-10, 14 and 15, wherein the pre-mRNA transcript encodes a detectable reporter protein.

**FIG. 1A****FIG. 1B****FIG. 1C**

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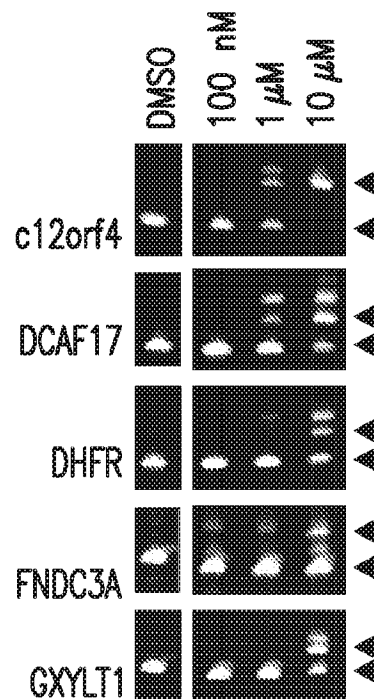


FIG. 2A

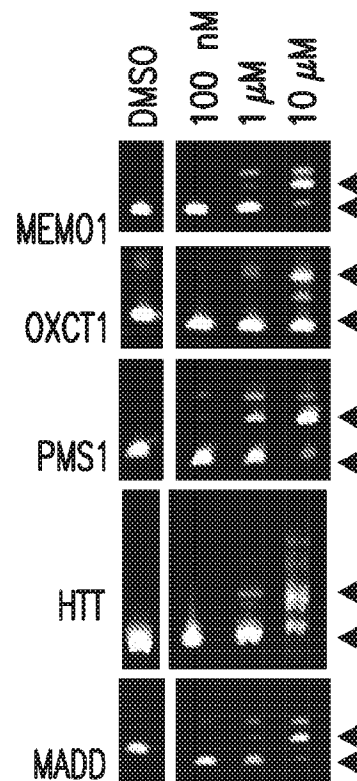


FIG. 2B

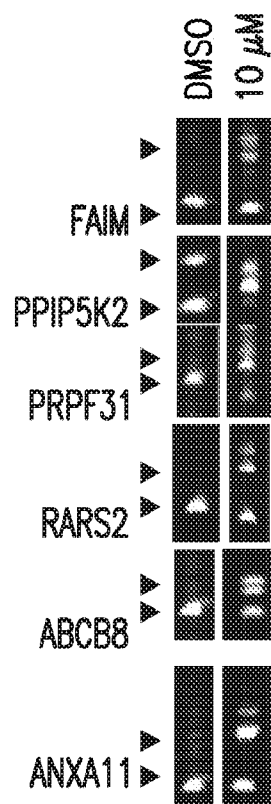


FIG. 2C

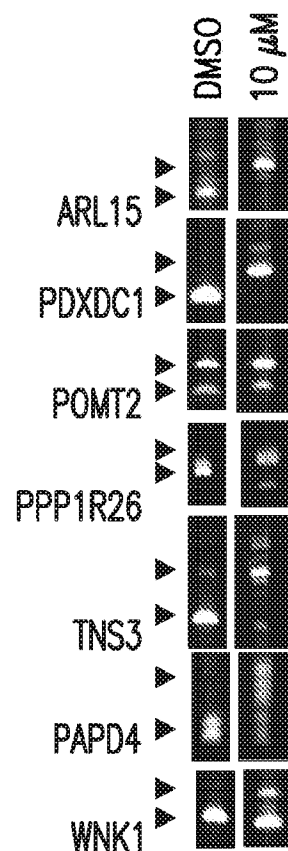


FIG. 2D

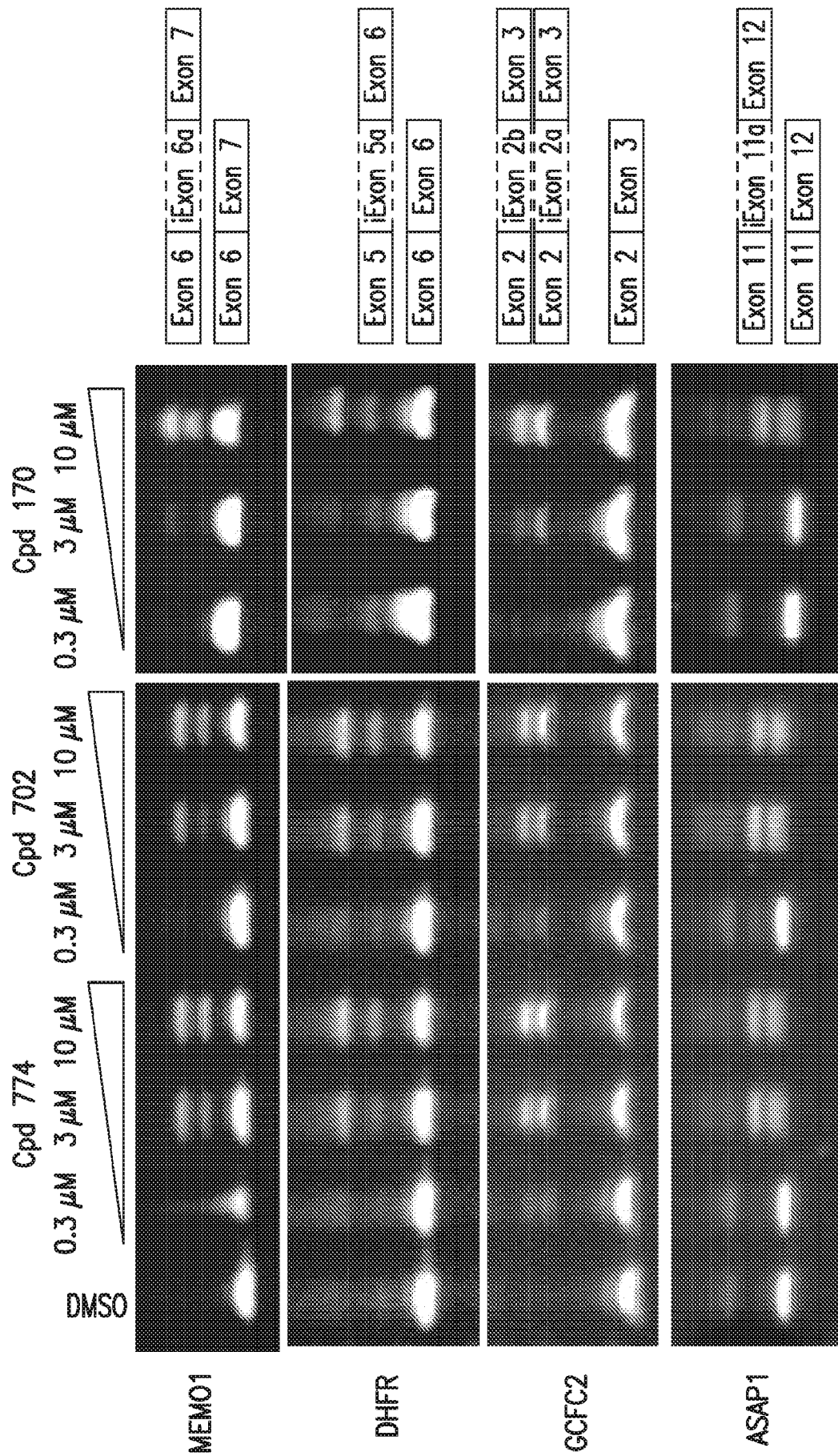


FIG. 3

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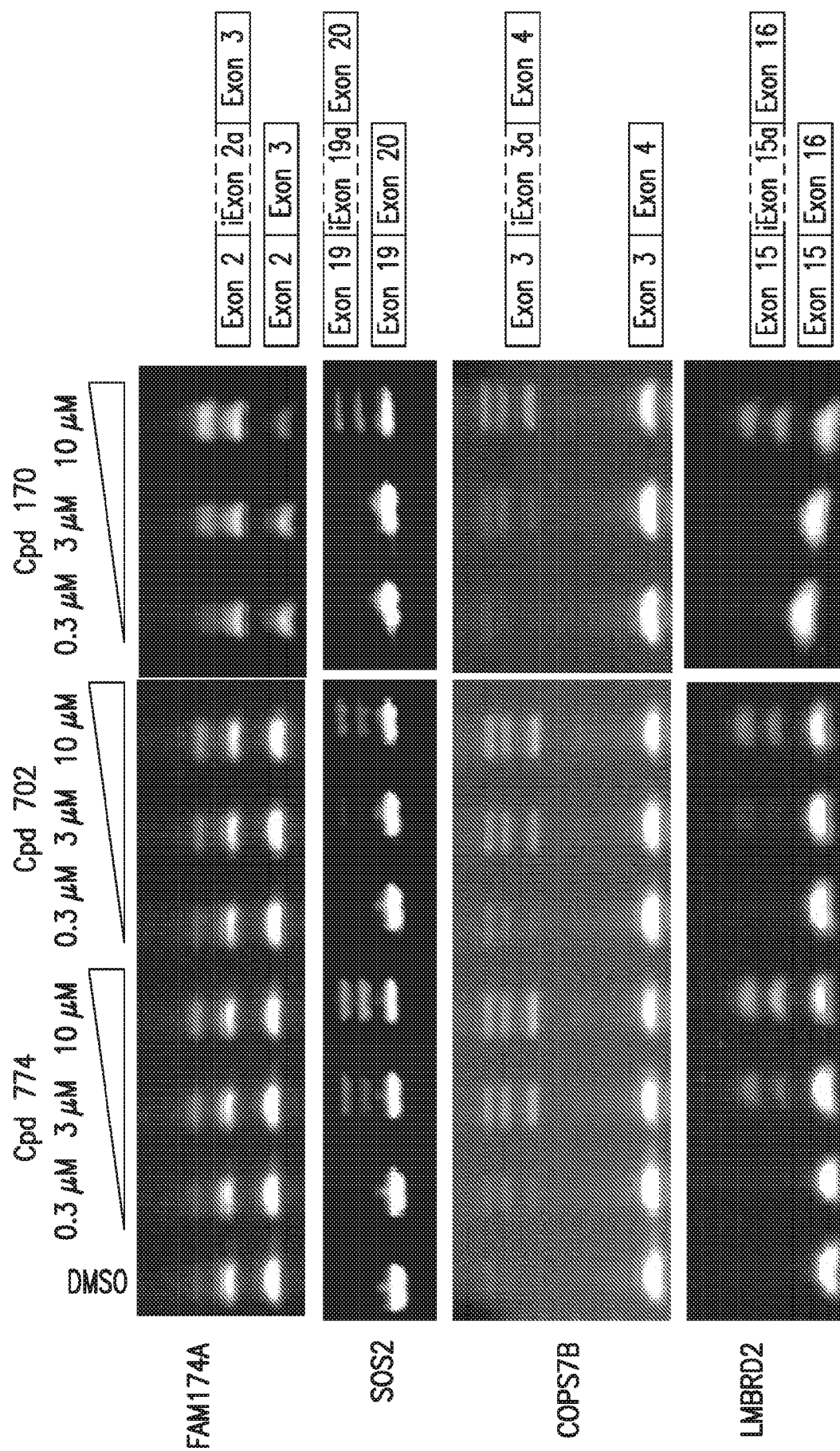


FIG. 4

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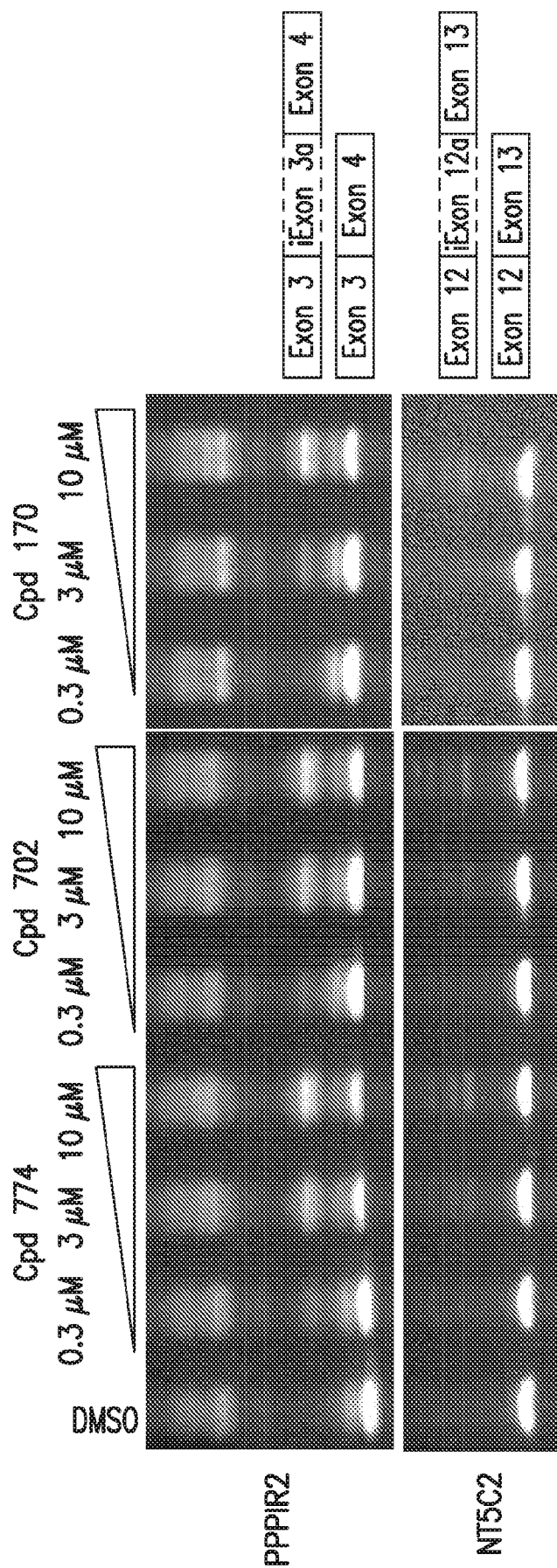


FIG. 5

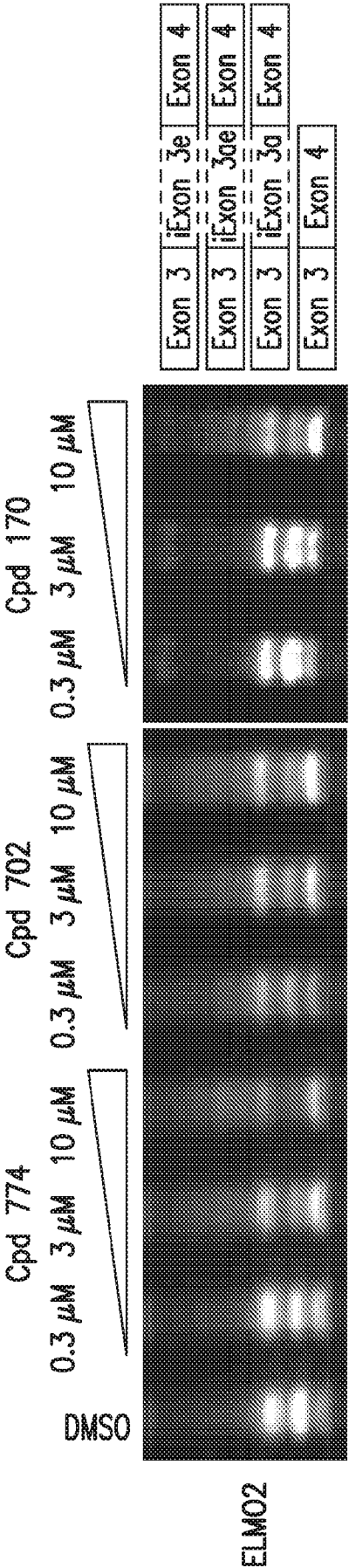


FIG. 6A

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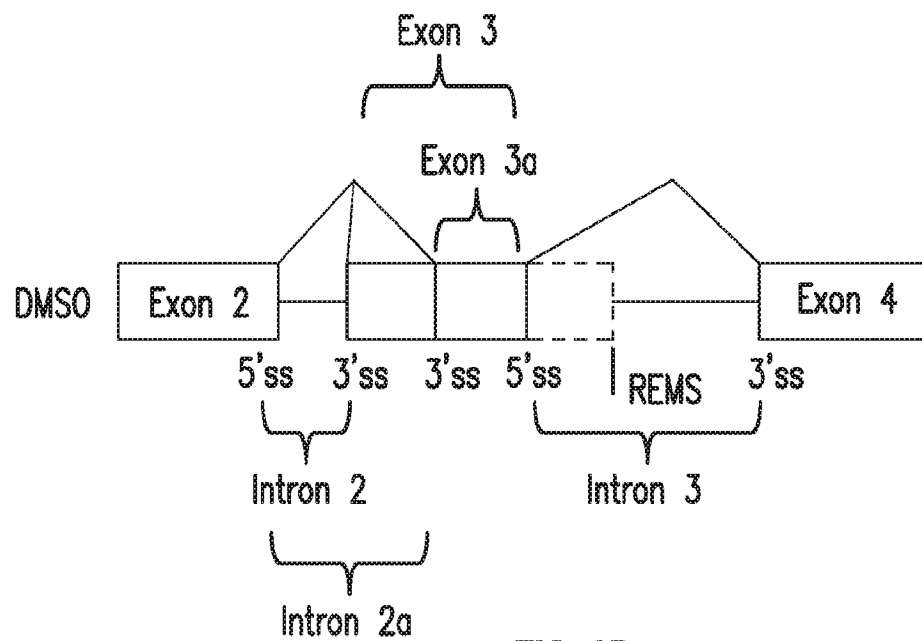


FIG. 6B

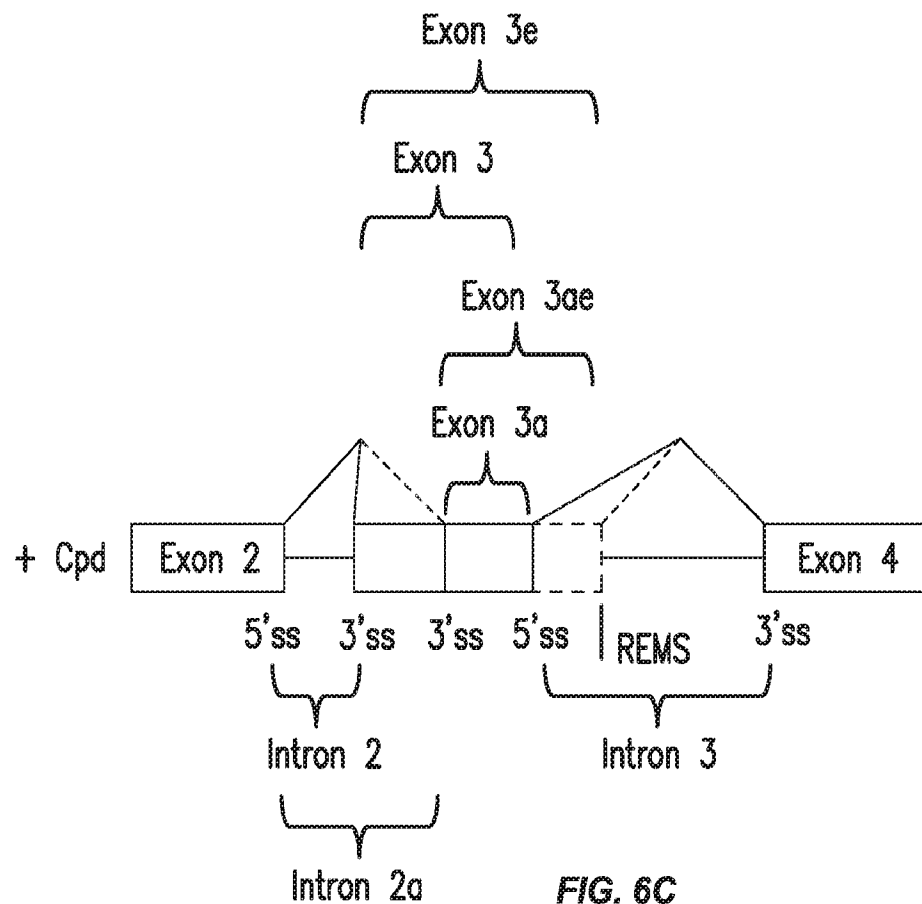


FIG. 6C

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/063323

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:

- a. ☒ forming part of the international application as filed:
☒ in the form of an Annex C/ST.25 text file.
☐ on paper or in the form of an image file.
- b. ☐ furnished together with the international application under PCT Rule 13ter. I(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
- c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
☐ in the form of an Annex C/ST.25 text file (Rule 13ter. I(a)).
☐ on paper or in the form of an image file (Rule 13ter. I(b) and Administrative Instructions, Section 713).

2. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments.

SEQ ID NOs: 2, 439, 849, and 1039 were searched.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/063323

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☒ Claims Nos.: 14-16
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See extra sheet(s).

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
1-13 to the extent that they read on a pre-mRNA transcript of ABCB8 or POMT2; compound 1 or compound 774; and an iREMS RNA sequence of SEQ ID NO:849 or SEQ ID NO:1039.
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/063323

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A01N 43/90; A61K 31/519; C07D 239/70 (2018.01)

CPC - G01N 33/564; G01N 33/60; G01N 2500/04; G01N 2800/10; G01N 2800/52 (2018.02)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC - 435/6.12; 514/44A; 514/44R; 536/24.1 (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009/0305900 A1 (BELOUCHI et al) 10 December 2009 (10.12.2009) entire document	1-13
A	WO 2016/042015 A1 (CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS) et al) 24 March 2016 (24.03.2016) entire document	1-13
A	US 2014/0249210 A1 (PHILADELPHIA HEALTH & EDUCATION CORPORATION D/B/A DREXEL UNIVERSITY COLLEGE OF MEDICINE) 04 September 2014 (04.09.2014) entire document	1-13
A	WO 2015/173181 A1 (F. HOFFMANN-LA ROCHE AG) 19 November 2015 (19.11.2015) entire document	1-13
A	FALALEEVA et al. "Dual function of C/D box small nucleolar RNAs in rRNA modification and alternative pre-mRNA splicing," PNAS, 08 March 2016 (08.03.2016), Vol. 113, No. 12, Pgs. E1625-E1634. entire document	1-13
A	US 2015/0005289 A1 (PTC THERAPEUTICS INC. et al) 01 January 2015 (01.01.2015) entire document	1-13
P, X	WO 2016/196386 A1 (PTC THERAPEUTICS, INC.) 08 December 2016 (08.12.2016) entire document	1-13

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

28 March 2018

Date of mailing of the international search report

13 APR 2018

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313-1450

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Authorized officer

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Continued from Box No. III Observations where unity of invention is lacking

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees need to be paid.

Group I+: claims 1-13 are drawn to pre-mRNA transcripts and compounds of Formula (I) and RNA sequences, methods and artificial gene constructs comprising the same.

The first invention of Group I+ is restricted to a pre-mRNA transcript and a compound of Formula (I) and RNA sequences, methods and artificial gene constructs comprising the same, wherein the pre-mRNA transcript is selected to be ABCB8; wherein the compound of Formula (I) is selected to be compound 1 (see instant Para. [00641]); and wherein the RNA sequence is selected to be gagaguaagc (SEQ ID NO: 849). It is believed that claims 1-13 read on this first named invention and thus these claims will be searched without fee to the extent that they read on a pre-mRNA transcript of ABCB8, compound 1, and a RNA sequence of SEQ ID NO:849.

Applicant is invited to elect additional pre-mRNA transcripts and/or compounds of Formula (I), each with defined chemical structure, and/or RNA sequences, each with specified SEQ ID NO to be searched in a specific combination by paying an additional fee for each set of election. An exemplary election would be a pre-mRNA transcript and a compound of Formula (I) and RNA sequences, methods and artificial gene constructs comprising the same, wherein the pre-mRNA transcript is selected to be ABCC3; wherein the compound of Formula (I) is selected to be compound 2 (see instant Para. [00641]); and wherein the RNA sequence is selected to be CUGAguragu (SEQ ID NO: 458), wherein r is selected to be guanine. Additional pre-mRNA transcripts and/or compounds of Formula (I) and/or RNA sequences will be searched upon the payment of additional fees. Applicants must specify the claims that read on any additional elected inventions. Applicants must further indicate, if applicable, the claims which read on the first named invention if different than what was indicated above for this group. Failure to clearly identify how any paid additional invention fees are to be applied to the "+" group(s) will result in only the first claimed invention to be searched/examined.

The inventions listed in Groups I+ do not relate to a single general inventive concept under PCT Rule 13.1, because under PCT Rule 13.2 they lack the same or corresponding special technical features for the following reasons:

The Groups I+ formulas do not share a significant structural element responsible for producing a mature mRNA transcript comprising an iExon and/or modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, requiring the selection of alternatives for the pre-mRNA transcripts, compounds of Formula (I), and RNA sequences, where "the premRNA transcript is a pre-mRNA transcript of a gene that is selected from ABCB8, ABCC3, ADAM17, ADCY3, AGPAT4, ANKRA2, ANXA11, APIP, APPL2, ARHGAP1, ARL15, ASAP1, ASPH, ATAD2B, ATXN1, BECN1, BHMT2, BICD1, BTN3A1, C11orf30, C11orf73, C12orf4, C14orf132, C8orf44, C8orf44-SGK3, C8orf88, CASC3, CASP7, CCDC122, CDH13, CECR7, CENPI, CEP112, CEP192, CHEK1, CMAHP, CNRIP1, COPS7B, CPSF4, CRISPLD2, CRYBG3, CSNK1E, CSNK1G1, DCAF17, DCUN1D4, DDX42, DENND1A, DENND5A, DGKA, DIFR, DIAPH3, DNAJC13, DNMBP, DOCK1, DYRK1A, EIF2B3, ENAH, ENOX1, EP300, ERC1, ERLIN2, ERFF1, EVC, FAF1, FAIM, FAM126A, FAM13A, FAM162A, FAM174A, FBN2, FER, FHOD3, FOCAD, GALT, GCFC2, GGA2, GLCE, GOLGA4, GOLGB1, GPSM2, GULP1, GXYLT1, HDX, HLT, HMG2, HNMT, HSD17B12, HSD17B4, HTT, IFT57, IVD, KDM6A, KIAA1524, KIAA1715, LETM2, LOC400927, LRRF4, LRRF4L, LYRM1, M821D2, MCM10, MED13L, MEDAG, MEMO1, MFN2, MMS19, MRPL45, MRPS28, MTERF3, MYCBP2, MYLK, MYOF, NGF, NREP, NSUN4, NT5C2, OSMR, OXCT1, PAPD4, PCM1, PDE7A, PDS5B, PDXDC1, PIGN, PIK3CD, PIK3R1, PIKFYVE, PITPNB, PLEKHA1, PLSR1, PMS1, POMT2, PPARG, PPIP5K2, PPP1R26, PRPF31, PRSS23, PSMA4, PXK, RAF1, RAPGEF1, RARS2, RBKS, RERE, RFWD2, RPA1, RPS10, SAMD4A, SAR1A, SCO1, SEC24A, SENP6, SERGEF, SGK3, SLC12A2, SLC25A17, SLC44A2, SMYD3, SNAP23, SNHG16, SNX7, SOS2, SPATA5, SPIDR, SPRYD7, SRGAP1, SRRM1, STAT1, STXBP6, SUPT20H, TAF2, TASP1, TBC1D15, TCF12, TCF4, TIAM1, TJP2, TMC3, TMEM214, TNRC6A, TNS3, TOE1, TRAF3, TSPAN2, TTC7B, TYW5, UBAP2L, URGCP, VAV2, WDR27, WDR37, WDR91, WNK1, XRN2, ZCCHC8, ZFP82, ZNF138, ZNF232 or ZNF37BP" and "Formula (I) (see instant claim 1 for structure), wherein w1 and w5 are independently C-Ra or N; w2 is C-Rb or N; w3, w4 and w7 are independently C-R1, C-R2, C-Ra or N; w6 is C-R1, C-R2, C-Rc or N; wherein one of w3, w4, w6 and w7 is C-R1 and one other of w3, w4, w6, and w7 is C-R2, provided that, when w3 is C-R1, then w6 is C-R2 and w4 and w7 are independently C-Ra or N; or, when w3 is C-R2, then w6 is C-R1 and w4 and w7 are independently C-Ra or N; or, when w4 is C-R1, then w7 is C-R2 and w3 is C-Ra or N and w6 is C-Rc or N; or, when w4 is C-R2, then w7 is C-R1 and w3 is C-Ra or N and w6 is C-Rc or N; and, wherein any one, two or three of w1, w2, w3, w4, w5, w6 and w7 may optionally be N; R1 is C1-8alkyl, amino, C1-8alkyl-amino, (C1-8alkyl)2-amino, C1-8alkoxy-C1-8alkyl-amino, (C1-8alkoxy-C1-8alkyl)2-amino, (C1-alkoxy-C1-8alkyl)(C1-8alkyl)amino, amino-C1-8alkyl, C1-8alkyl-amino-C1-8alkyl, (C1-8alkyl)2-amino-C1-alkyl, C1-8alkoxy-C1-8alkyl-amino-C1-8alkyl, (C1-8alkoxy-C1-8alkyl)2-amino-C1-alkyl, (C1-8alkoxy-C1-8alkyl)(C1-8alkyl)amino-C1-8alkyl, amino-C1-8alkyl-amino, (amino-C1-8alkyl)2-amino, (amino-C1-8alkyl)(C1-8alkyl)amino, C1-8alkyl-amino-C1-8alkyl-amino, (C1-8alkyl-amino-C1-8alkyl)2-amino, (C1-8alkyl-amino-C1-8alkyl)2-amino, (C1-8alkyl)amino, (C1-8alkyl)2-amino-C1-8alkyl-amino, [(C1-8alkyl)2-amino-C1-8alkyl](C1-8alkyl)amino, amino-C1-8alkoxy, C1-8alkyl-amino-C1-8alkoxy, (C1-8alkyl)2-amino-C1-8alkoxy, C1-8alkoxy-C1-8alkyl-amino-C1-8alkoxy, C1-8alkoxy-C1-8alkyl-amino-C1-8alkoxy, (C1-8alkoxy-C1-8alkyl)(C1-8alkyl)amino-C1-8alkoxy, amino-C2-8alkenyl, C1-8alkyl-amino-C2-8alkenyl, (C1-8alkyl)2-amino-C2-8alkenyl, amino-C2-8alkenyl, C1-8alkyl-amino-C2-8alkenyl, (C1-8alkyl)2-amino-C2-8alkenyl, halo-C1-8alkyl-amino, (halo-C1-8alkyl)2-amino, (halo-C1-8alkyl)(C1-8alkyl)amino, hydroxy-C1-8alkyl, hydroxy-C1-8alkoxy-C1-8alkyl, hydroxy-C1-8alkyl-amino, (hydroxy-C1-8alkyl)2-amino, (hydroxy-C1-8alkyl)(C1-8alkyl)amino, hydroxy-C1-8alkyl-amino-C1-8alkyl, (hydroxy-C1-8alkyl)2-amino-C1-8alkyl, (hydroxy-C1-8alkyl)(C1-8alkyl)amino-C1-8alkyl, hydroxy-C1-8alkyl-amino-C1-8alkoxy, (hydroxy-C1-8alkyl)2-amino-C1-alkoxy, (hydroxy-C1-8alkyl)(C1-8alkyl)amino-C1-8alkoxy, hydroxy-C1-8alkyl-amino-C1-8alkyl-amino, (hydroxy-C1-8alkyl-amino-C1-8alkyl)2-amino, (hydroxy-C1-8alkyl)2-amino-C1-8alkyl-amino, (hydroxy-C1-8alkyl-amino-C1-8alkyl)(C1-8alkyl)amino, (hydroxy-C1-8alkyl)(C1-8alkyl)amino-C1-8alkyl-amino, [(hydroxy-C1-8alkyl)2-amino-C1-alkyl](C1-8alkyl)amino, heterocyclyl, heterocyclyl-C1-8alkyl, heterocyclyl-C1-8alkoxy, heterocyclyl-amino, (heterocyclyl)(C1-8alkyl)amino, heterocyclyl-amino-C1-8alkyl, heterocyclyl-C1-8alkyl-amino, (heterocyclyl-C1-8alkyl)2-amino, (heterocyclyl-C1-8alkyl)(C1-8alkyl)amino, heterocyclyl-C1-8alkyl-amino-C1-8alkyl, (heterocyclyl-C1-8alkyl)2-amino-C1-alkyl, (heterocyclyl-C1-8alkyl)(C1-8alkyl)amino-C1-8alkyl, heterocyclyl-oxy, heterocyclyl-carbonyl, heterocyclyl-carbonyl-oxy, C3-14cycloalkyl, aryl-C1-8alkyl-amino, (aryl-C1-8alkyl)2-amino, (aryl-C1-8alkyl)(C1-8alkyl)amino, aryl-C1-8alkyl-amino-C1-8alkyl, (aryl-C1-8alkyl)2-amino-C1-alkyl, (aryl-C1-8alkyl)(C1-8alkyl)

amino-C1-8alkyl, heteroaryl, heteroaryl-C1-8alkyl, heteroaryl-C1-8alkoxy, heteroaryl-amino, heteroaryl-C1-8alkyl-amino, (heteroaryl-C1-8alkyl)2-amino, (heteroaryl-C1-8alkyl)(C1-8alkyl)amino, heteroaryl-C1-8alkyl-amino-C1-8alkyl, (heteroaryl-C1-8alkyl)2-amino-C1-alkyl or (heteroaryl-C1-8alkyl)(C1-8alkyl)amino-C1-8alkyl; wherein, each instance of heterocyclyl, C3-14cycloalkyl, aryl and heteroaryl is optionally substituted with one, two or three R3 substituents and optionally, with one additional R4 substituent; or, wherein, each instance of heterocyclyl, C3-14cycloalkyl, aryl and heteroaryl is optionally substituted with one, two, three or four R3 substituents; R2 is aryl, aryl-amino, aryl-amino-carbonyl, heterocyclyl, heteroaryl or heteroaryl-amino; wherein, each instance of aryl, heterocyclyl and heteroaryl is optionally substituted with one, two or three R6 substituents and optionally, with one additional R7 substituent; Ra is, in each instance, independently selected from hydrogen, halogen, C1-8alkyl or deuterium; Rb is hydrogen, halogen, C1-8alkyl, C1-8alkoxy or deuterium; R, is hydrogen, halogen, C1-8alkyl or deuterium; R3 is, in each instance, independently selected from cyano, halogen, hydroxy, oxo, C1-8alkyl, halo-C1-8alkyl, C1-8alkyl-carbonyl, C1-8alkoxy, halo-C1-8alkoxy, C1-8alkoxy-C1-8alkyl, C1-8alkoxy-carbonyl, amino, C1-8alkyl-amino, (C1-8alkyl)2-amino, amino-C1-8alkyl, C1-8alkyl-amino-C1-8alkyl, (C1-8alkyl)2-amino-C1-alkyl, amino-C1-8alkyl-amino, C1-8alkyl-amino-C1-8alkyl-amino, (C1-8alkyl-amino-C1-8alkyl)2-amino, (C1-8alkyl)2-amino-C1-8alkyl-amino, [(C1-8alkyl)2-amino-C1-8alkyl]2-amino, (C1-alkyl-amino-C1-8alkyl)(C1-8alkyl)amino, [(C1-8alkyl)2-amino-C1-alkyl](C1-8alkyl)amino, C1-8alkoxy-C1-8alkyl-amino, (C1-8alkoxy-C1-8alkyl)2-amino, (C1-8alkoxy-C1-8alkyl)(C1-8alkyl)amino, C1-8alkyl-carbonyl-amino, C1-8alkoxy-carbonyl-amino, hydroxy-C1-8alkyl, hydroxy-C1-8alkoxy-C1-8alkyl, hydroxy-C1-8alkyl-amino, (hydroxy-C1-8alkyl)2-amino or (hydroxy-C1-8alkyl)(C1-8alkyl)amino; R4 is C3-14cycloalkyl, C3-14cycloalkyl-C1-8alkyl, C3-14cycloalkyl-amino, aryl-C1-8alkyl, aryl-C1-8alkoxy-carbonyl, aryl-sulfonyloxy-C1-8alkyl, heterocyclyl or heterocyclyl-C1-8alkyl; wherein, each instance of C3-14cycloalkyl, aryl and heterocyclyl is optionally substituted with one, two or three R5 substituents; R5 is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C1-8alkyl, halo-C1-8alkyl, C1-8alkoxy, halo-C1-8alkoxy, amino, C1-8alkyl-amino, (C1-8alkyl)2-amino or C1-8alkyl-thio; R6 is, in each instance, independently selected from halogen, hydroxy, cyano, nitro, C1-8alkyl, C2-balkenyl, halo-C1-8alkyl, hydroxy-C1-8alkyl, C1-8alkoxy, halo-C1-8alkoxy, C1-8alkoxy-C1-8alkyl, amino, C1-8alkyl-amino, (C1-8alkyl)2-amino or C1-8alkyl-thio; and, R7 is C3-14cycloalkyl, C3-14cycloalkyl-oxy, aryl, heterocyclyl or heteroaryl" and "the RNA sequence NNGAgurngn (SEQ ID NO: 1) is selected from the group consisting of ANGAgurngn (SEQ ID NO: 29), CNGAgurngn (SEQ ID NO: 35), GNGAgurngn (SEQ ID NO: 41), UNGAgurngn (SEQ ID NO: 47), NAGAgurngn (SEQ ID NO: 30), NCGAgurngn (SEQ ID NO: 36), NGGAgurngn (SEQ ID NO: 42), NUGAgurngn (SEQ ID NO: 48), AAGAgurngn (SEQ ID NO: 31), ACGAgurngn (SEQ ID NO: 37), AGGAgurngn (SEQ ID NO: 43), AUGAgurngn (SEQ ID NO: 49), CAGAgurngn (SEQ ID NO: 32), CCGAgurngn (SEQ ID NO: 38), CGGAgurngn (SEQ ID NO: 44), CUGAgurngn (SEQ ID NO: 50), GAGAgurngn (SEQ ID NO: 33), GCGAgurngn (SEQ ID NO: 39), GGGAgurngn (SEQ ID NO: 45), GUGAgurngn (SEQ ID NO: 51), UAGAgurngn (SEQ ID NO: 34), UCGAgurngn (SEQ ID NO: 40), UGGAgurngn (SEQ ID NO: 46) and UUGAgurngn (SEQ ID NO: 52), wherein r is adenine or guanine and n or N is any nucleotide".

Additionally, even if Groups I+ were considered to share the technical features of a method for producing a mature mRNA transcript comprising an iExon and a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript, the methods comprising contacting the pre-mRNA transcript with a compound of Formula (I) or a form thereof, wherein the pre-mRNA transcript comprises two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron, wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence; an artificial gene construct comprising an RNA sequence comprising exons and one or more introns, wherein at least one intron comprises an iREMS that is downstream of a branch point and a 3' splice site, and wherein the iREMS comprises a sequence, an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron; these shared technical features do not represent a contribution over the prior art.

Specifically, US 2014/0249210 A1 to Philadelphia Health & Education Corporation d/b/a Drexel University College of Medicine discloses a method for producing a mature mRNA transcript (a pharmaceutical composition comprising a splice modulating oligonucleotide (SMO) that targets a pre-mRNA that matures to a 5HT2CR, Para. [0054]; and modulates the splicing of the S-HT2CR premRNA to include exon 5b in the mature mRNA, Para. [0166]) comprising an iExon (specifically binds to the complementary sequence, the exon adjacent to the intron-exon boundary, Para. [0031]), a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript (The present invention encompasses a class of compounds known as splice modulating oligonucleotides (SMOs) that modulate pre-mRNA splicing, thereby affecting expression and functionality of a specific protein in a cell, Para. [0108]), wherein the pre-mRNA transcript comprises two exons and an intron (to quantify amounts of S-HT2CR containing exon 5a and 5b, Para. [0241]; sequence and enhances inclusion of intron 3, Para. [0186]), wherein one exon is upstream of the intron and the other exon is downstream of the intron (The present invention provides SMOs based on the consensus sequence of the 5-HT2CR (HTR2c; MIM: 312861 GeneID: 3358), including upstream and downstream nucleotides... to mimic the function of HBII-52. In another embodiment, a SMO of the invention functions to increase expression of a functional 5-HT2CR transcript containing exon 5b, Para. [0111]), wherein the intron comprises a RNA nucleotide sequence comprising in 5' to 3' order: an endogenous intronic recognition element for splicing modifier (iREMS) (where the SMO specifically binds to a complementary sequence on a premRNA in at least one of the group consisting of an intron exon splice site, an exonic splice enhancer (ESE) site, and an intronic splice enhancer (ISE) site, where when the SMO specifically binds to the complementary sequence, Para. [0031]), a first branch point, and a first 3' splice site, wherein the iREMS comprises an RNA sequence (the exon adjacent to the intron-exon boundary is excluded from the resulting mRNA. In one aspect, Para. [0031]); an artificial gene construct comprising an RNA sequence comprising exons and one or more introns (Recombinant methods known in the art can also be used to achieve oligonucleotide reagent-induced modulation of splicing in a target nucleic acid. For example, vectors containing oligonucleotides can be employed to express, e.g., an antisense oligonucleotide to modulate splicing of an exon of a targeted pre-mRNA, Para. [0203]; where the SMO specifically binds to a complementary sequence on a premRNA in at least one of the group consisting of an intron exon splice site, an exonic splice enhancer (ESE) site, and an intronic splice enhancer (ISE) site, where when the SMO specifically binds to the complementary sequence, Para. [0031]), wherein at least one intron comprises an iREMS that is downstream of a branch point and a 3' splice site (The present invention provides SMOs based on the consensus sequence of the 5-HT2CR (HTR2c; MIM: 312861 GeneID: 3358), including upstream and downstream nucleotides... to mimic the function of HBII-52. In another embodiment, a SMO of the invention functions to increase expression of a functional 5-HT2CR transcript containing exon 5b, Para. [0111]), and wherein the iREMS comprises a sequence, an artificial gene construct comprising an RNA sequence comprising two exons and an intron, wherein one exon is upstream of the intron and the other exon is downstream of the intron. Recombinant methods known in the art can also be used to achieve oligonucleotide reagent-induced modulation of splicing in a target nucleic acid. For example, vectors containing oligonucleotides can be employed to express, e.g., an antisense oligonucleotide to modulate splicing of an exon of a targeted pre-mRNA, Para. [0203]; where the SMO specifically binds to a complementary sequence on a premRNA in at least one of the group consisting of an intron exon splice site, an exonic splice enhancer (ESE) site, and an intronic splice enhancer (ISE) site, where when the SMO specifically binds to the complementary sequence, Para. [0031]).

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/063323

Further, WO 2015/173181 A1 to F. Hoffman-La Roche AG discloses a method for modulating the amount of a mature mRNA transcript produced by a pre-mRNA transcript (the present invention relates to compounds of formula (I) or their pharmaceutically acceptable salts as defined above for the use in the treatment or prevention of diseases caused by an inactivating mutation or deletion in the SMN1 gene, Pg. 30, Lns. 3-5; compounds of formula (I) also enhance the inclusion of exon 7 of SMN1 into mRNA transcribed from the SMN1 gene and increase levels of SMN protein produced from the SMN1 gene, Pg. 58, Lns. 16-17), comprising contacting a pre-mRNA transcript with a compound of instant Formula (I) (2-(2-methylimidazo[1, 2-b]pyridazin-6-yl)-7-(4-methylpiperazin-1-yl)pyrido[1, 2-a]pyrimidin-4-one, Pg. 36, Lns. 5-7).

The inventions listed in Groups I+ therefore lack unity under Rule 13 because they do not share a same or corresponding special technical features.