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(54) Title: COUMARIN COMPOUNDS AND THEIR USE FOR TREATING CANCER

(57) Abstract: Coumarin compounds are disclosed herein. Also disclosed is a method for treating cancer with coumarin compounds.



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COUMARIN COMPOUNDS AND THEIR USE FOR TREATING CANCER

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of the priority pursuant to 35 U.S.C. § 119(e) of U.S. Provisional Patent Application No. 61/060,917, filed June 12, 2008. The content of the prior application is incorporated herein by its
5 entirety.

BACKGROUND

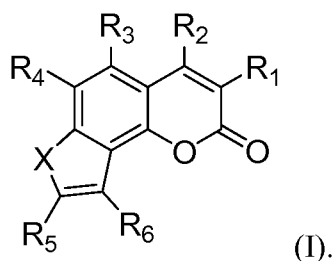
Cancer is a leading cause of death in developed countries. Despite continuing advances in diagnosis and treatment regimens, most existing treatment methods have undesirable side effects and limited efficacy.

10 Treatment of cancer is complicated by the variety of mechanisms involved in the formation and metastasis of tumors. Many of them are still not well understood. Chemotherapy is a major option for the first-line treatment in cancers such as leukemia and second-line treatment for cancers such as refractory solid tumor. Most current anticancer drugs are small molecule
15 chemicals.

SUMMARY

This invention is based on the discovery that certain coumarin compounds have potent anticancer activity. Thus, this invention relates to coumarin compounds and to their use in cancer treatment.

20 In one aspect, this invention features a coumarin compound of formula (I):



In formula (I), each of R₁, R₂, R₃, and R₄, independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl,
25 heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_a, C(O)OR_a, C(O)NR_aR_b, C(S)R_b, or C(NR_b)R_a, in which each of R_a and R_b,

independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R₂ and R₃, together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R₃ and R₄, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; R₅ is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, or C(NR_d)R_c, in which each of R_c and R_d, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; R₆ is cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, heteroaryl, halo, nitro, cyano, amino, hydroxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, C(NR_d)R_c, or aryl substituted with alkyl at the 3- position of the aryl, halo, nitro, cyano, amino, carboxyl, cycloalkyl, aryl, or heteroaryl; and X is O, S, or N(R_e), in which R_e is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

One subset of the above-described coumarin compounds includes those in which R₅ is alkyl, cycloalkyl, aryl, halo, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, or C(NR_d)R_c. In these compounds, R₅ can be C(O)R_c C(S)R_d, or C(NR_d)R_c, in which R_c can be aryl or heteroaryl and R_d can be amino or hydroxy; R₆ can be cycloalkyl, heteroaryl, or aryl substituted with alkyl at the 3- position of the aryl, halo, nitro, cyano, amino, cycloalkyl, aryl, or heteroaryl (e.g., phenyl substituted with alkyl at the 3- position of the phenyl, halo, nitro, or amino); each of R₁, R₂, R₃, and R₄, independently, can be H, alkyl, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, aryl, hydroxy, alkoxy, halo, cyano, nitro, or C(O)H; or X can be O.

Another subset of the above-described coumarin compounds includes those in which R₆ is cycloalkyl, heteroaryl, or aryl substituted with nitro, cyano, amino, cycloalkyl, or heteroaryl. In these compounds, R₅ can be C(O)R_c C(S)R_d, or C(NR_d)R_c, in which R_c can be aryl or heteroaryl and R_d can be amino or hydroxy; each of R₁, R₂, R₃, and R₄, independently, can be H,

alkyl, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, aryl, hydroxy, alkoxy, halo, cyano, nitro, or C(O)H; or X can be O.

Still another two subsets of the above-described coumarin compounds include those in which X is O and those in which each of R₁, R₂, R₃, and R₄,
5 independently, is H, alkyl, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, aryl, hydroxy, alkoxy, halo, cyano, nitro, or C(O)H.

The term “alkyl” refers to a straight or branched monovalent hydrocarbon containing, unless otherwise stated, 1-20 carbon atoms (e.g., C₁-C₁₀). Examples of alkyl include, but are not limited to, methyl, ethyl, *n*-propyl, *i*-propyl, *n*-butyl, *i*-butyl, and *t*-butyl. The term “alkylene” refers to a
10 straight or branched bivalent hydrocarbon, containing 1-20 carbon atoms (e.g., C₁-C₁₀). Examples of alkylene include, but are not limited to, methylene and ethylene. The term “alkenyl” refers to a straight or branched monovalent or bivalent hydrocarbon containing 2-20 carbon atoms (e.g., C₂-C₁₀) and one or
15 more double bonds. Examples of alkenyl include, but are not limited to, ethenyl, propenyl, propenylene, allyl, and 1,4-butadienyl. The term “alkynyl” refers to a straight or branched monovalent or bivalent hydrocarbon containing 2-20 carbon atoms (e.g., C₂-C₁₀) and one or more triple bonds. Examples of
20 alkynyl include, but are not limited to, ethynyl, ethynylene, 1-propynyl, 1- and 2-butyne, and 1-methyl-2-butyne. The term “alkoxy” refers to an -O-alkyl radical. Examples of alkoxy include, but are not limited to, methoxy, ethoxy, *n*-propoxy, *iso*-propoxy, *n*-butoxy, *iso*-butoxy, *sec*-butoxy, and *tert*-butoxy. The term “acyloxy” refers to an -O-C(O)-R radical in which R can be H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl,
25 heterocycloalkenyl, aryl, or heteroaryl. The term “amino” refers to NH₂, alkylamino, or arylamino. The term “alkylamino” refers to an -N(R)-alkyl radical in which R can be H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl. The terms “amido” and “carbamido” refer to -NRC(O)R’ and -C(O)NRR’ radicals respectively, in
30 which each of R and R’, independently, can be H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl.

The term “cycloalkyl” refers to a monovalent or bivalent saturated hydrocarbon ring system having 3 to 30 carbon atoms (e.g., C₃-C₁₂).

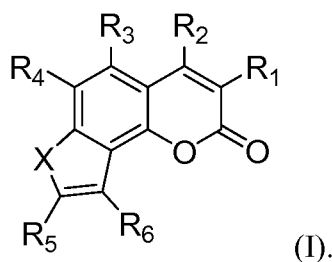
Examples of cycloalkyl include, but are not limited to, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, 1,4-cyclohexylene, cycloheptyl, cyclooctyl, and adamantine. The term "cycloalkenyl" refers to a monovalent or bivalent non-aromatic hydrocarbon ring system having 3 to 30 carbons (e.g., C₃-C₁₂) and one or more double bonds. Examples include cyclopentenyl, cyclohexenyl, and cycloheptenyl. The term "heterocycloalkyl" refers to a monovalent or bivalent nonaromatic 5-8 membered monocyclic, 8-12 membered bicyclic, or 11-14 membered tricyclic ring system having one or more heteroatoms (such as O, N, S, or Se). Examples of heterocycloalkyl groups include, but are not limited to, piperazinyl, pyrrolidinyl, dioxanyl, morpholinyl, and tetrahydrofuranyl. The term "heterocycloalkenyl" refers to a monovalent or bivalent nonaromatic 5-8 membered monocyclic, 8-12 membered bicyclic, or 11-14 membered tricyclic ring system having one or more heteroatoms (such as O, N, S, or Se) and one or more double bonds.

The term "aryl" refers to a monovalent 6-carbon monocyclic, 10-carbon bicyclic, 14-carbon tricyclic aromatic ring system. Examples of aryl groups include, but are not limited to, phenyl, naphthyl, and anthracenyl. The term "arylene" refers to a bivalent 6-carbon monocyclic, 10-carbon bicyclic, 14-carbon tricyclic aromatic ring system. The term "aryloxyl" refers to an -O-aryl. The term "arylamino" refers to an -N(R)-aryl in which R can be H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl. The term "heteroaryl" refers to a monvalent aromatic 5-8 membered monocyclic, 8-12 membered bicyclic, or 11-14 membered tricyclic ring system having one or more heteroatoms (such as O, N, S, or Se). Examples of heteroaryl groups include pyridyl, furyl, imidazolyl, benzimidazolyl, pyrimidinyl, thienyl, quinolinyl, indolyl, and thiazolyl. The term "heteroarylene" refers to a bivalent aromatic 5-8 membered monocyclic, 8-12 membered bicyclic, or 11-14 membered tricyclic ring system having one or more heteroatoms (such as O, N, S, or Se).

Alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, amino, aryl, heteroaryl, alkylene, arylene, and heteroarylene mentioned above include both substituted and unsubstituted moieties. Possible substituents on amino, cycloalkyl, heterocycloalkyl, cycloalkenyl, heterocycloalkenyl, aryl, arylene, heteroaryl, and heteroarylene

include, but are not limited to, C₁-C₁₀ alkyl, C₂-C₁₀ alkenyl, C₂-C₁₀ alkynyl, C₃-C₂₀ cycloalkyl, C₃-C₂₀ cycloalkenyl, C₁-C₂₀ heterocycloalkyl, C₁-C₂₀ heterocycloalkenyl, C₁-C₁₀ alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, amino, C₁-C₁₀ alkylamino, arylamino, hydroxy, halo, oxo (O=), thio (S=), thio, silyl, C₁-C₁₀ alkylthio, arylthio, C₁-C₁₀ alkylsulfonyl, arylsulfonyl, acylamino, aminoacyl, aminothioacyl, amidino, mercapto, amido, thioureido, thiocyanato, sulfonamido, guanidine, ureido, cyano, nitro, acyl, thioacyl, acyloxy, carbamido, carbamyl (-C(O)NH₂), carboxyl (-COOH), and carboxylic ester. On the other hand, possible substituents on alkyl, alkenyl, alkynyl, or alkylene include all of the above-recited substituents except C₁-C₁₀ alkyl. Cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, and heteroaryl can also be fused with each other.

In another aspect, this invention relates to a coumarin compound of formula (I):

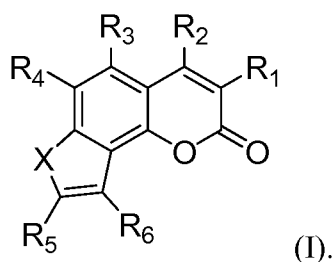


In formula (I), each of R₁, R₂, R₃, and R₄, independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_a, C(O)OR_a, C(O)NR_aR_b, C(S)R_b, or C(NR_b)R_a, in which each of R_a and R_b, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R₂ and R₃, together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R₃ and R₄, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; R₅ is alkyl substituted with aryl or hydroxy, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_dR_e, C(S)R_d, or C(NR_e)R_d, in which R_c is cycloalkyl, cycloalkenyl, heterocycloalkyl,

heterocycloalkenyl, heteroaryl, or aryl substituted with alkyl, halo, nitro, cyano, amino, amido, cycloalkyl, aryl, heteroaryl, hydroxy, alkoxy, acyloxy, silyloxy, or phosphate at the 3-position of the aryl, and each of R_d and R_e , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; R_6 is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, or aryloxy; and X is O, S, or N(R_f), in which R_f is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

One subset of the just-described coumarin compounds includes those in which R_6 is aryl or heteroaryl. In these compounds, R_6 can be phenyl; R_5 can be C(O) R_c , in which R_c can be heteroaryl or aryl substituted with alkyl, halo, hydroxy, or alkoxy at the 2- or 3-position of the aryl; R_5 can be C(S) R_d , or C(N R_e) R_d , in which R_d can be aryl or heteroaryl and R_e can be amino or hydroxy; R_2 can be methyl; or X can be O.

In yet another aspect, this invention relates to a coumarin compound of formula (I):

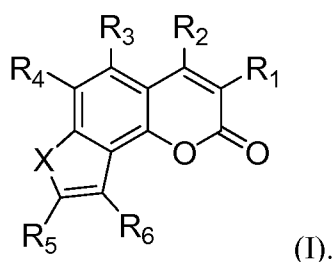


In formula (I), each of R_1 , R_3 , and R_4 , independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O) R_a , C(O)OR $_a$, C(O)NR $_a$ R $_b$, C(S)R $_b$, or C(NR $_b$)R $_a$, in which each of R_a and R_b , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; R_2 is H, C₂-C₁₀ alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O) R_a , C(O)OR $_a$, C(O)NR $_a$ R $_b$, C(S)R $_b$, or C(NR $_b$)R $_a$; or R_1 and R_2 , together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R_2 and R_3 , together with the carbon atoms to which they are bonded, are cycloalkenyl

or heterocycloalkenyl; or R₃ and R₄, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; R₅ is C(O)R_c, C(O)OR_c, C(O)NR_dR_e, C(S)R_d, or C(NR_e)R_d, in which, R_c is aryl or heteroaryl, and each of R_d and R_e, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; R₆ is aryl or heteroaryl; and X is O, S, or N(R_f), in which R_f is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

The coumarin compounds described herein include the compounds themselves, as well as their salts, their solvates, and their prodrugs, if applicable. A salt, for example, can be formed between an anion and a positively charged group (e.g., amino) on a coumarin compound. Suitable anions include chloride, bromide, iodide, sulfate, bisulfate, sulfamate, nitrate, phosphate, citrate, methanesulfonate, trifluoroacetate, glutamate, glucuronate, glutarate, malate, maleate, succinate, fumarate, tartrate, tosylate, salicylate, lactate, naphthalenesulfonate, and acetate. Likewise, a salt can also be formed between a cation and a negatively charged group (e.g., carboxylate) on a coumarin compound. Suitable cations include sodium ion, potassium ion, magnesium ion, calcium ion, and an ammonium cation such as tetramethylammonium ion. The coumarin compounds also include those salts containing quaternary nitrogen atoms. Examples of prodrugs include esters and other pharmaceutically acceptable derivatives, which, upon administration to a subject, are capable of providing active coumarin compounds.

Further, this invention relates to a method for treating cancer by administering to a subject in need thereof an effective amount of a coumarin compound of formula (I):



In this formula, each of R₁, R₂, R₃, and R₄, independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_a,

C(O)OR_a, C(O)NR_aR_b, C(S)R_b, or C(NR_b)R_a, in which each of R_a and R_b, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R₂ and R₃, together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R₃ and R₄, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; R₅ is H, alkyl substituted with aryl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, or C(NR_d)R_c, in which each of R_c and R_d, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; R₆ is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, or C(NR_d)R_c; or R₅ and R₆, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; and X is O, S, or N(R_e), in which R_e is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl. Examples of cancer include, but are not limited to, nasopharyngeal carcinoma, cervical carcinoma, gastric carcinoma, breast carcinoma, colorectal carcinoma, non-small cell lung carcinoma, lymphoma, leukemia, and hepatocellular carcinoma.

Referring to formula (I), a subset of the just-described compounds are those in which R₅ is alkyl substituted with aryl or hydroxy, cycloalkyl, aryl, halo, C(O)R_c, or C(O)OR_c. In these compounds, R₅ can be alkyl substituted with aryl or C(O)R_c, in which R_c can be aryl or heteroaryl; R₆ can be aryl or heteroaryl; R₂ can be alkyl or C(O)H; or X can be O.

Another subset of these coumarin compounds includes those in which R₆ is alkyl, cycloalkyl, aryl, heteroaryl. In these compounds, R₆ can be aryl or heteroaryl; R₅ can be C(S)R_d, or C(NR_d)R_c; R₂ can be alkyl or C(O)H; or X can be O.

Yet another subset of these compounds includes those in which R₅ is C(S)R_d, or C(NR_d)R_c. Still another two subsets of the compounds of formula

(I) include those in which X is O and those in which each of R₁, R₂, R₃, and R₄, independently, is H, alkyl, aryl, heteroaryl, nitro, hydroxy, alkoxy, aryloxy, or C(O)R_a; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl.

5 Also within the scope of this invention is a pharmaceutical composition containing one or more of the above-described coumarin compounds for use in treating cancer, as well as this therapeutic use and use of the compounds for the manufacture of a medicament for treating cancer.

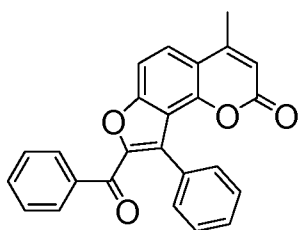
10 8-Benzoyl-4-methyl-9-phenylcyclopenta[*h*]chromen-2(7*H*)-one and its analogs, as well as their therapeutic use as described above, are also contemplated.

 The details of one or more embodiments of the invention are set forth in the description below. Other features, objects, and advantages of the invention will be apparent from the description and the claims.

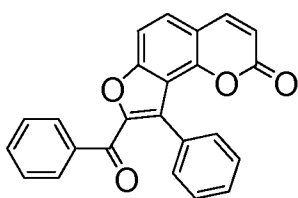
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DETAILED DESCRIPTION

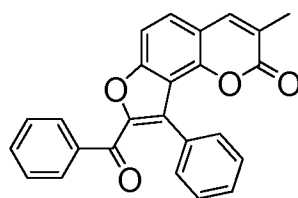
Shown below are exemplary compounds of this invention:



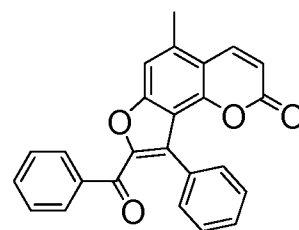
Compound 1



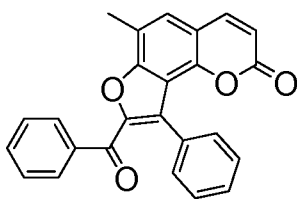
Compound 2



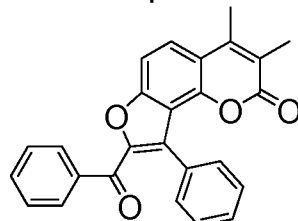
Compound 3



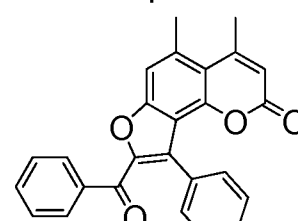
Compound 4



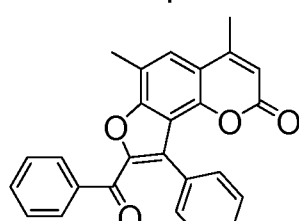
Compound 5



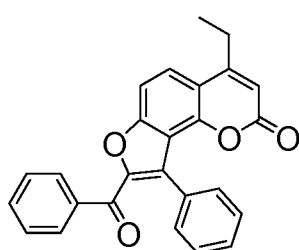
Compound 6



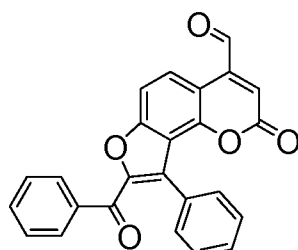
Compound 7



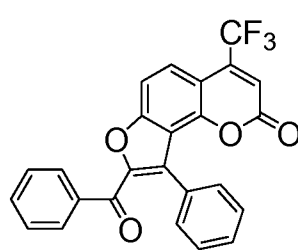
Compound 8



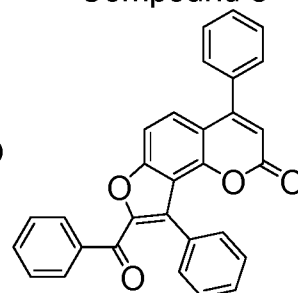
Compound 9



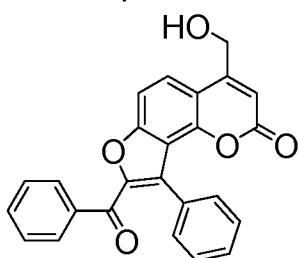
Compound 10



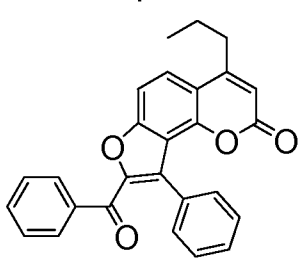
Compound 11



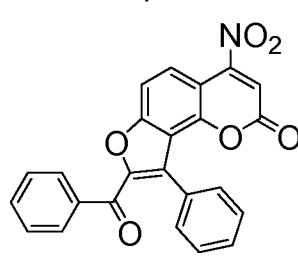
Compound 12



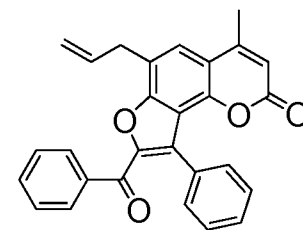
Compound 13



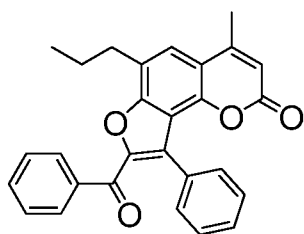
Compound 14



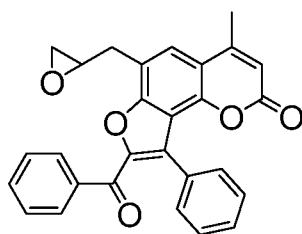
Compound 15



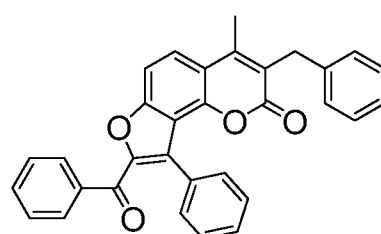
Compound 16



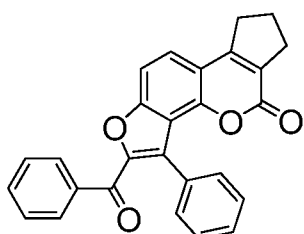
Compound 17



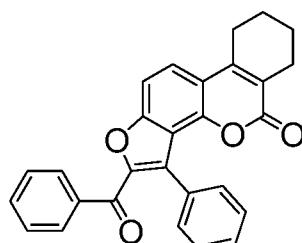
Compound 18



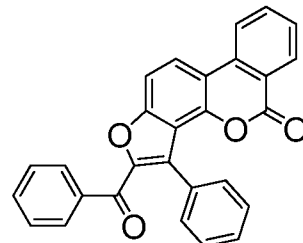
Compound 19



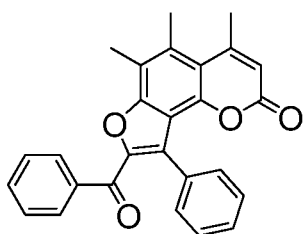
Compound 20



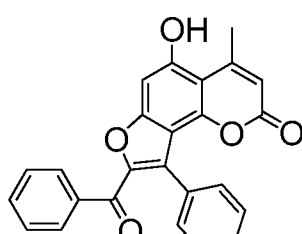
Compound 21



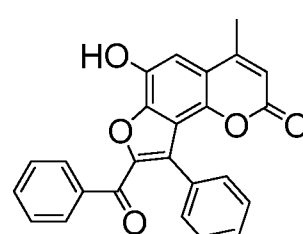
Compound 22



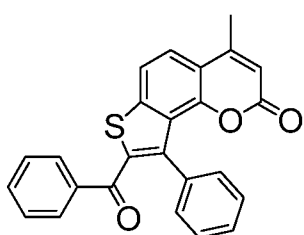
Compound 23



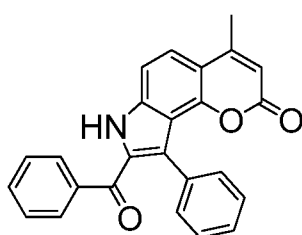
Compound 24



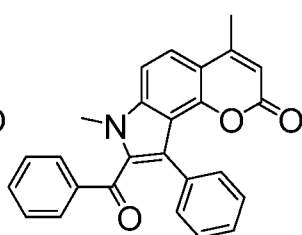
Compound 25



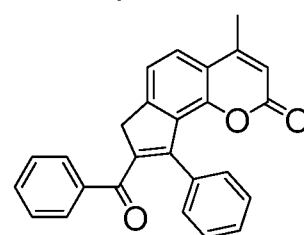
Compound 26



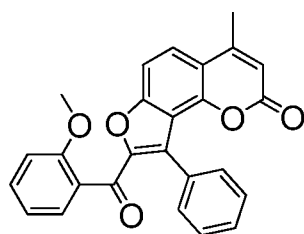
Compound 27



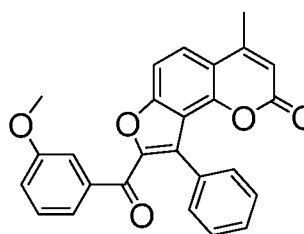
Compound 28



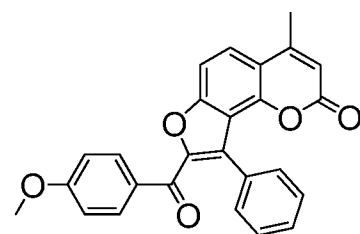
Compound 29



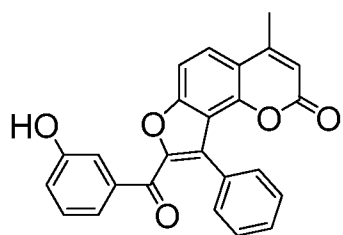
Compound 30



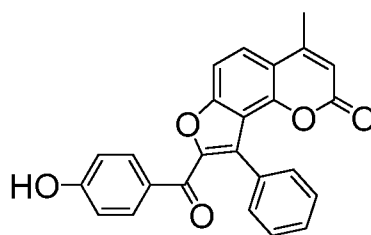
Compound 31



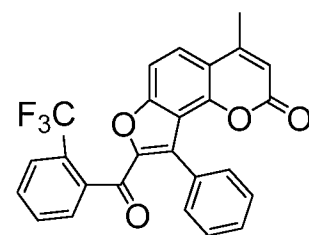
Compound 32



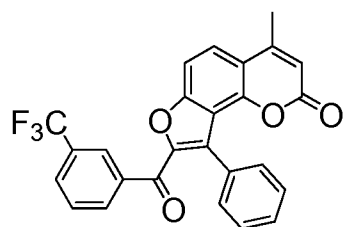
Compound 33



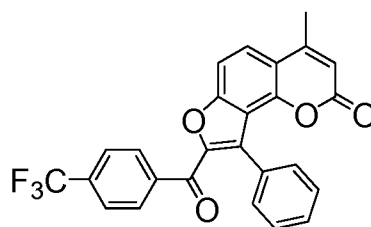
Compound 34



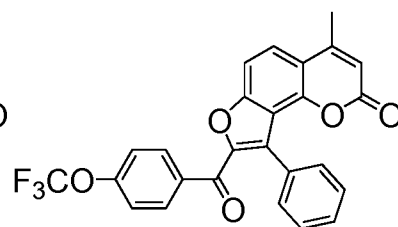
Compound 35



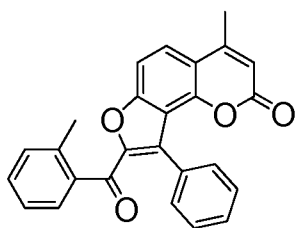
Compound 36



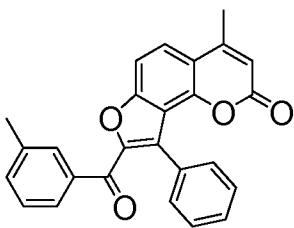
Compound 37



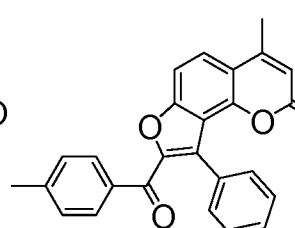
Compound 38



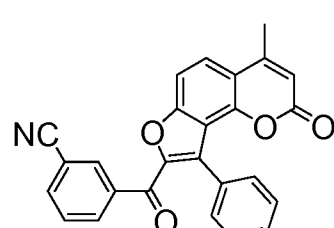
Compound 39



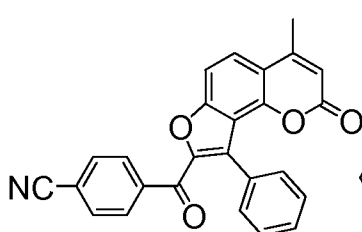
Compound 40



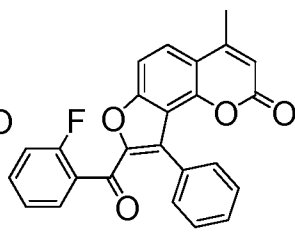
Compound 41



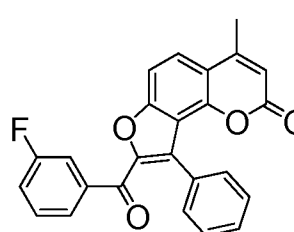
Compound 42



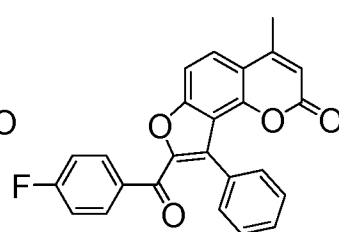
Compound 43



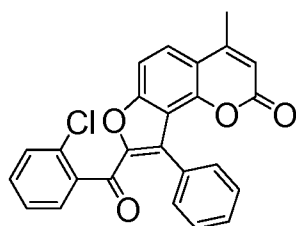
Compound 44



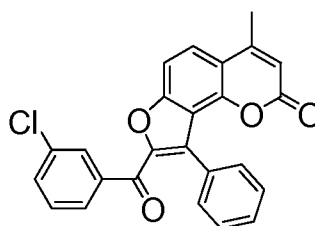
Compound 45



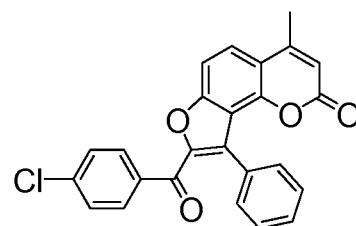
Compound 46



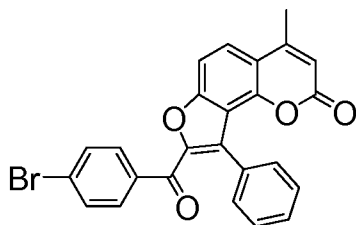
Compound 47



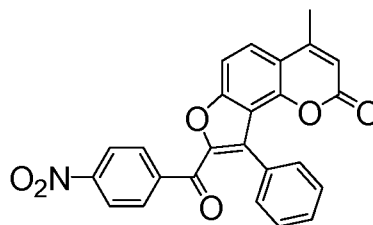
Compound 48



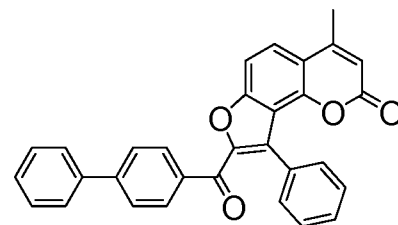
Compound 49



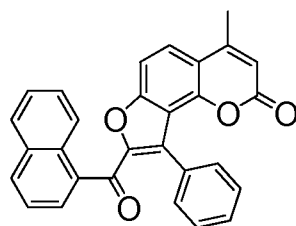
Compound 50



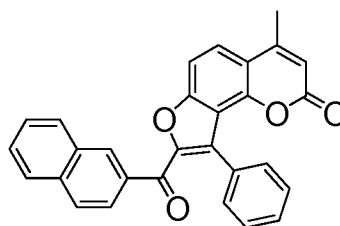
Compound 51



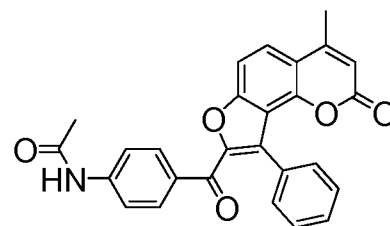
Compound 52



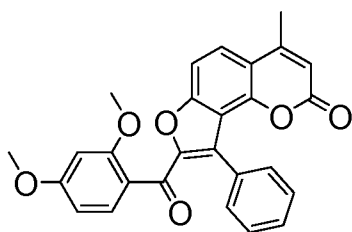
Compound 53



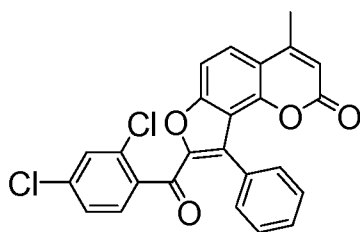
Compound 54



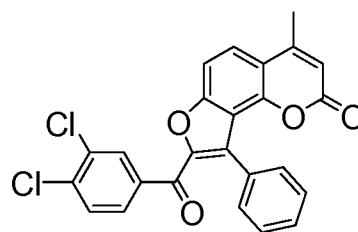
Compound 55



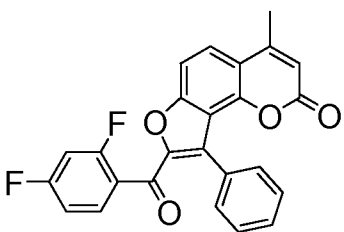
Compound 56



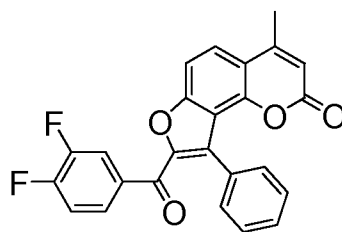
Compound 57



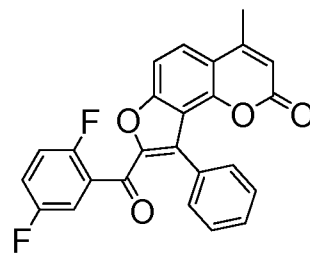
Compound 58



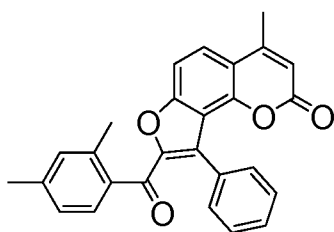
Compound 59



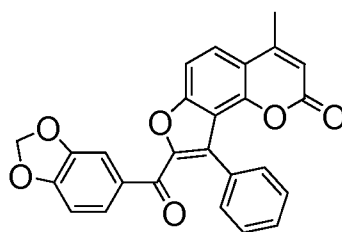
Compound 60



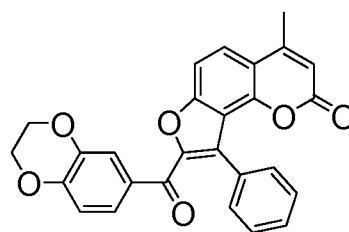
Compound 61



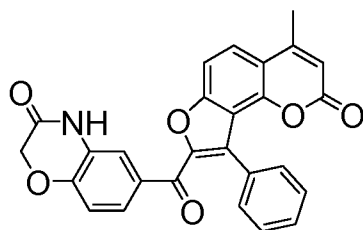
Compound 62



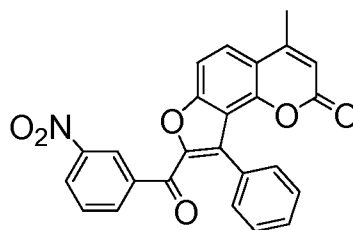
Compound 63



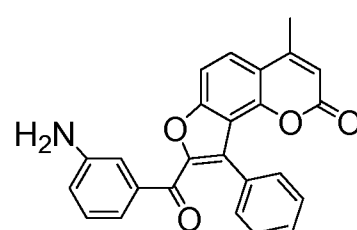
Compound 64



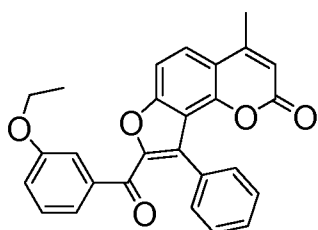
Compound 65



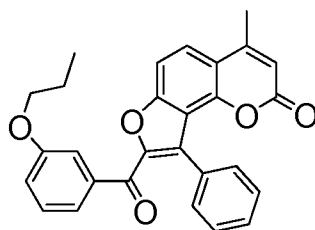
Compound 66



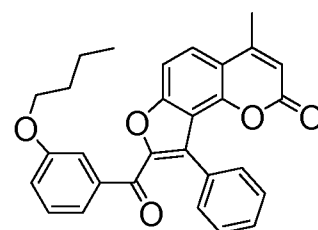
Compound 67



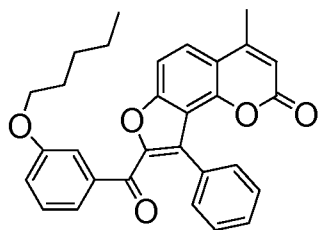
Compound 68



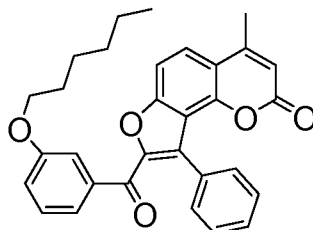
Compound 69



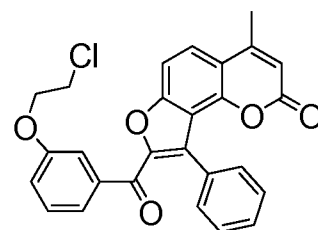
Compound 70



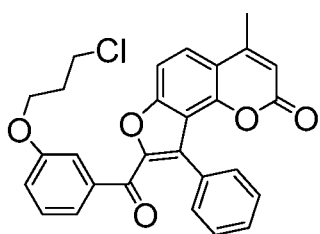
Compound 71



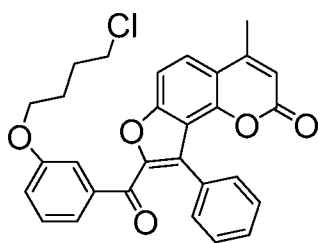
Compound 72



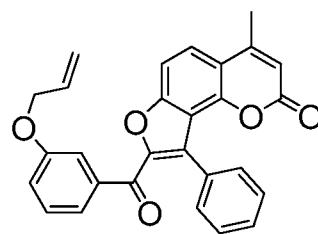
Compound 73



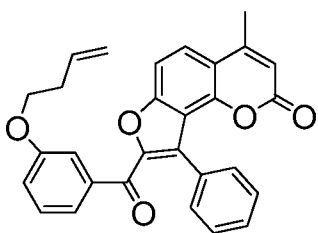
Compound 74



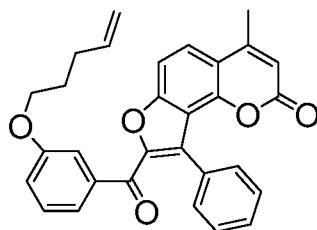
Compound 75



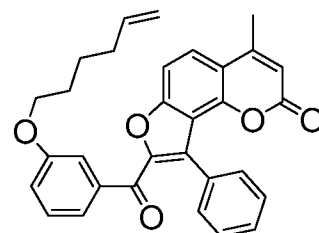
Compound 76



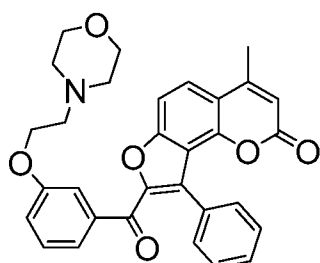
Compound 77



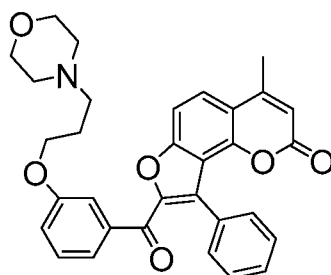
Compound 78



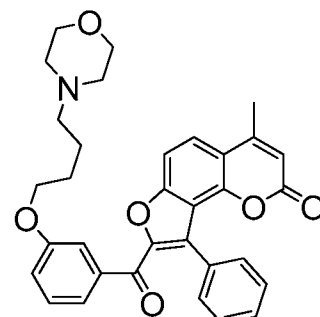
Compound 79



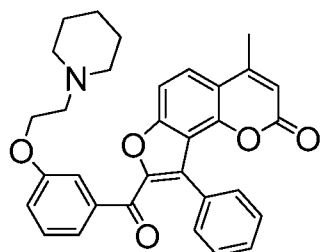
Compound 80



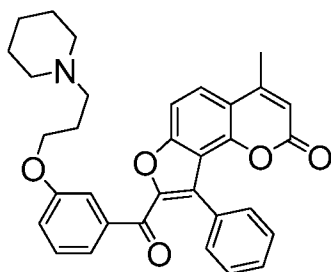
Compound 81



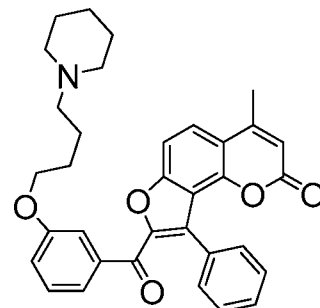
Compound 82



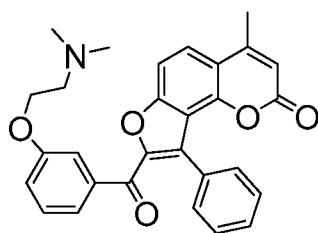
Compound 83



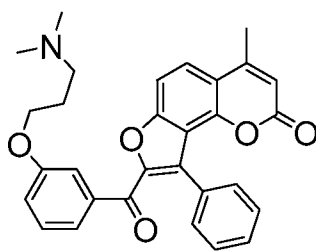
Compound 84



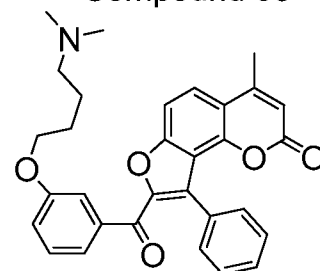
Compound 85



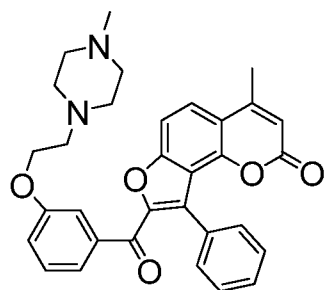
Compound 86



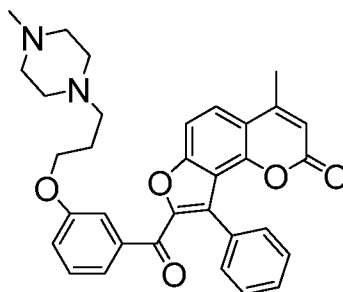
Compound 87



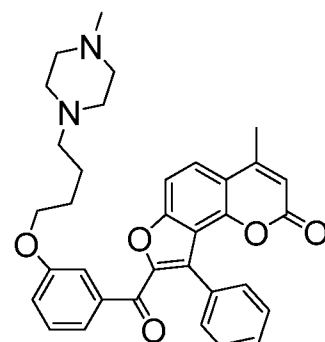
Compound 88



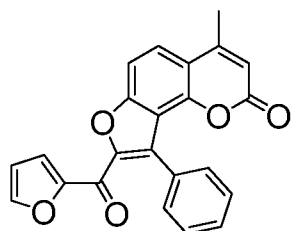
Compound 89



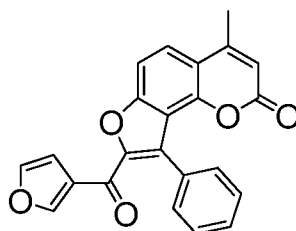
Compound 90



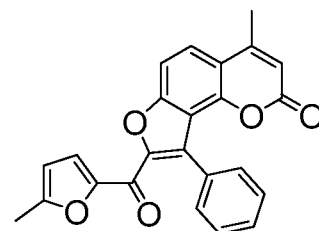
Compound 91



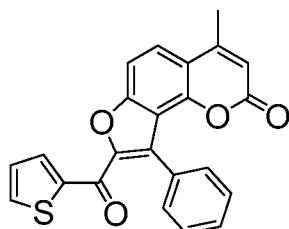
Compound 92



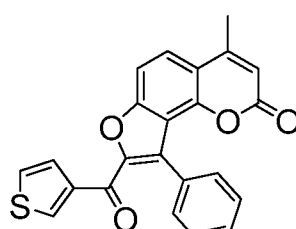
Compound 93



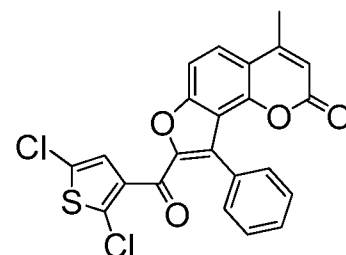
Compound 94



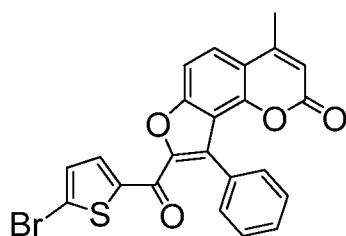
Compound 95



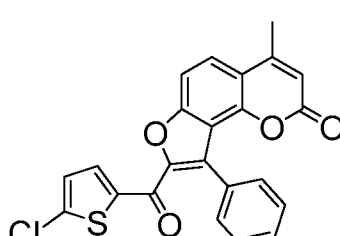
Compound 96



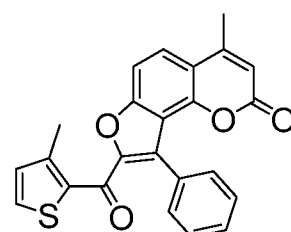
Compound 97



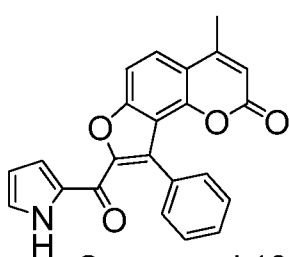
Compound 98



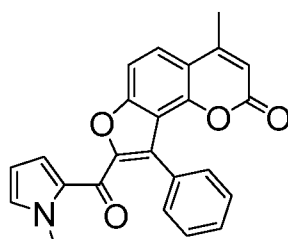
Compound 99



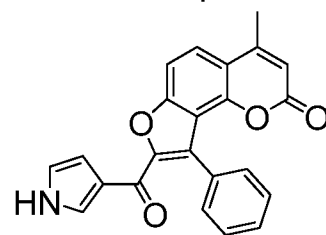
Compound 100



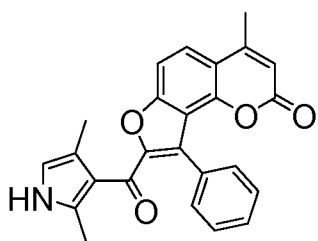
Compound 101



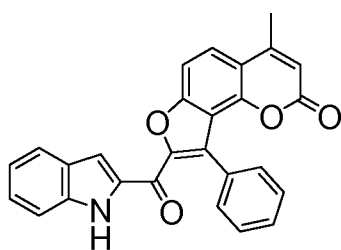
Compound 102



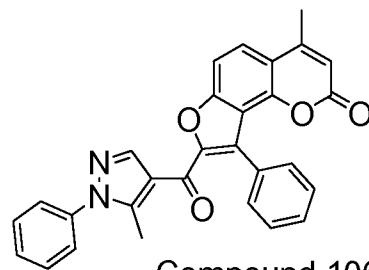
Compound 103



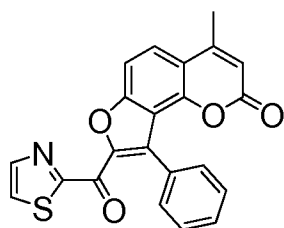
Compound 104



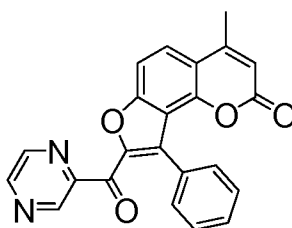
Compound 105



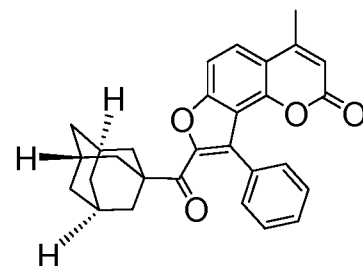
Compound 106



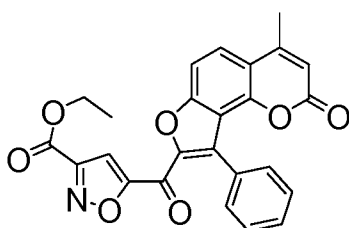
Compound 107



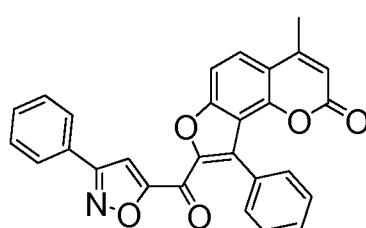
Compound 108



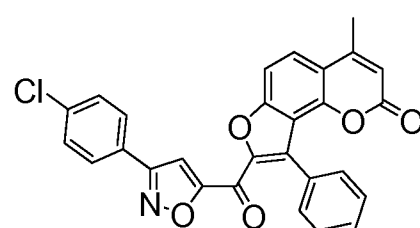
Compound 109



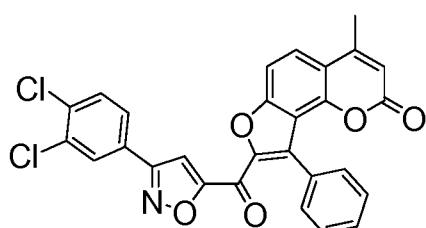
Compound 110



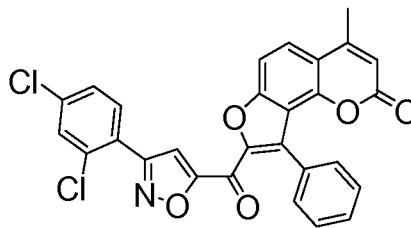
Compound 111



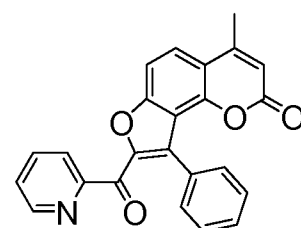
Compound 112



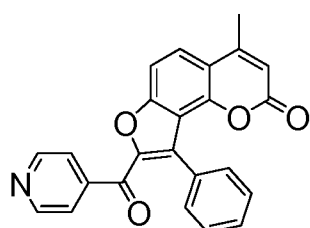
Compound 113



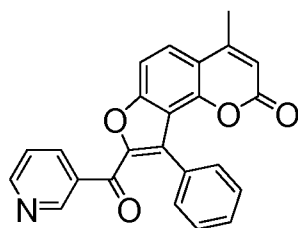
Compound 114



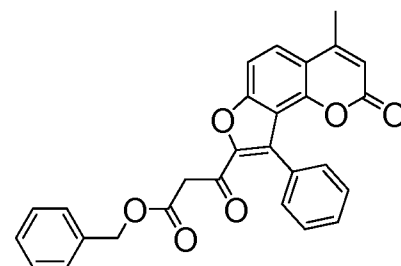
Compound 115



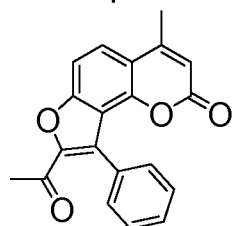
Compound 116



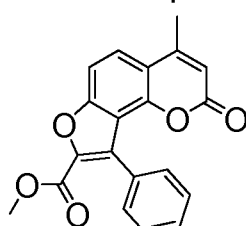
Compound 117



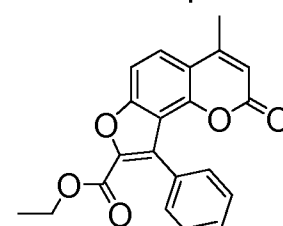
Compound 118



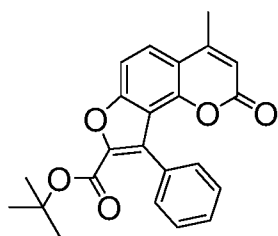
Compound 119



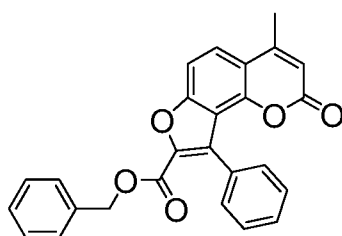
Compound 120



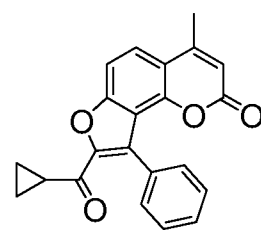
Compound 121



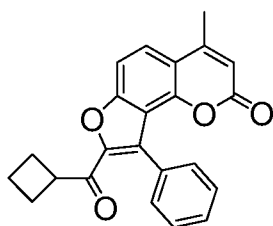
Compound 122



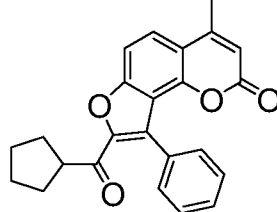
Compound 123



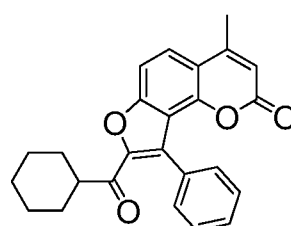
Compound 124



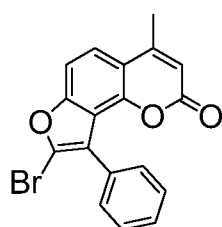
Compound 125



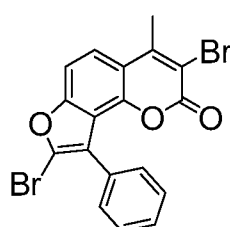
Compound 126



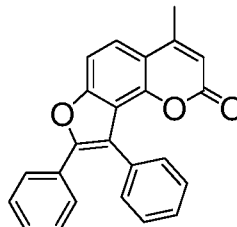
Compound 127



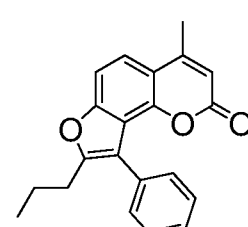
Compound 128



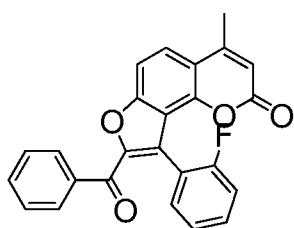
Compound 129



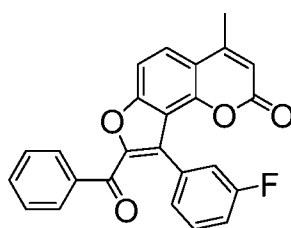
Compound 130



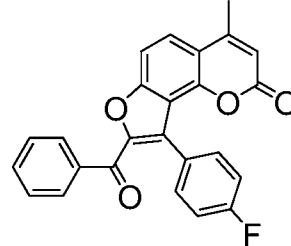
Compound 131



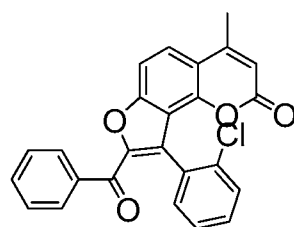
Compound 132



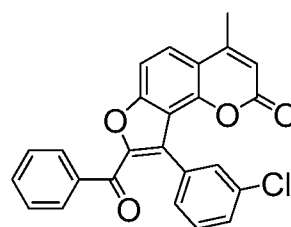
Compound 133



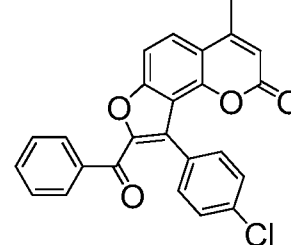
Compound 134



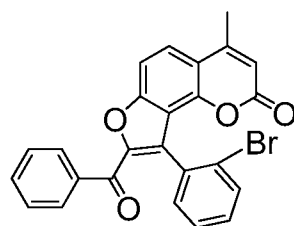
Compound 135



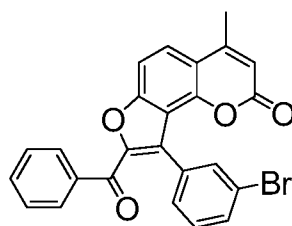
Compound 136



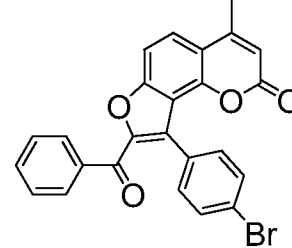
Compound 137



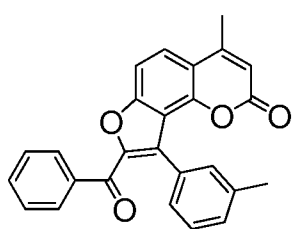
Compound 138



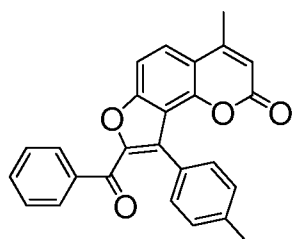
Compound 139



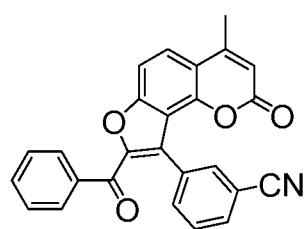
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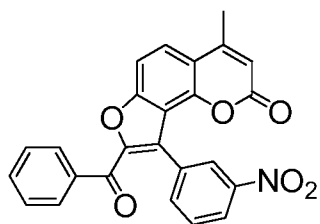
Compound 141



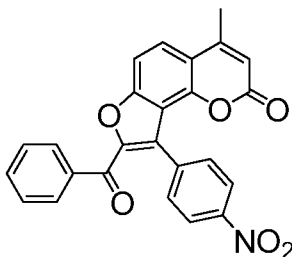
Compound 142



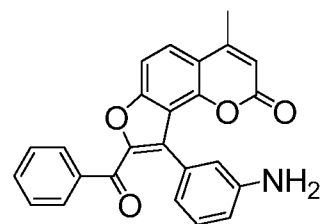
Compound 143



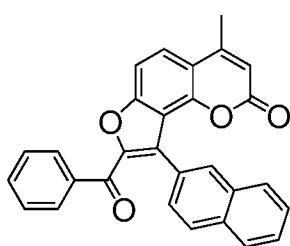
Compound 144



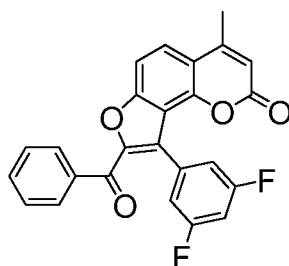
Compound 145



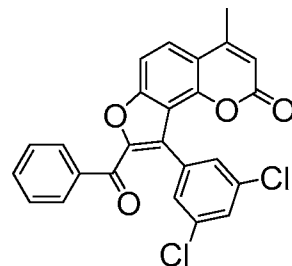
Compound 146



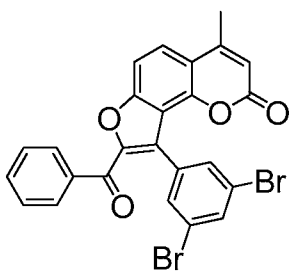
Compound 147



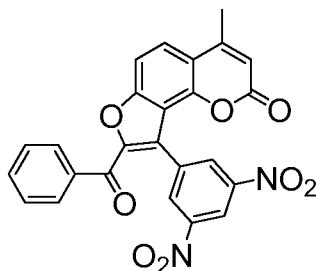
Compound 148



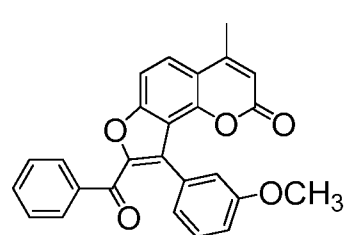
Compound 149



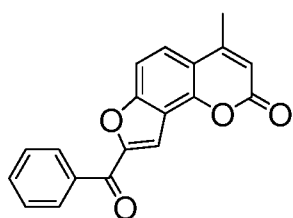
Compound 150



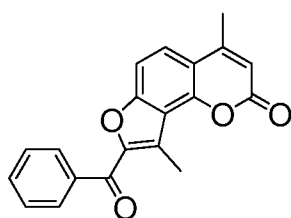
Compound 151



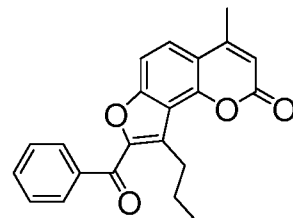
Compound 152



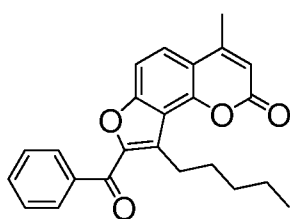
Compound 153



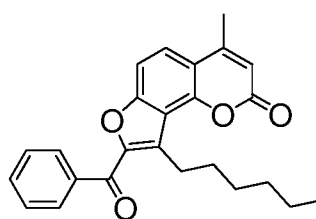
Compound 154



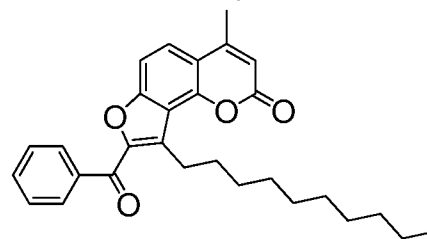
Compound 155



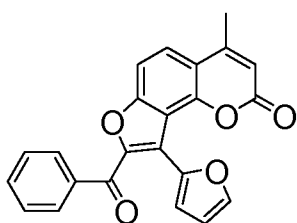
Compound 156



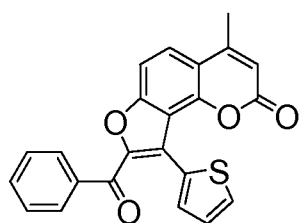
Compound 157



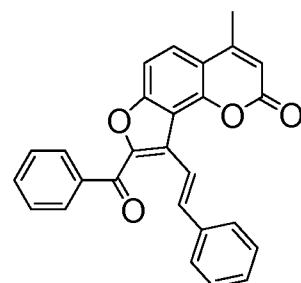
Compound 158



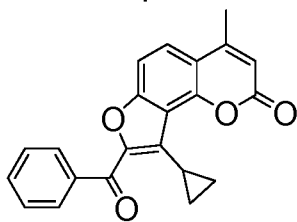
Compound 159



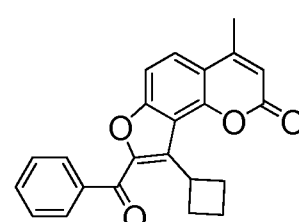
Compound 160



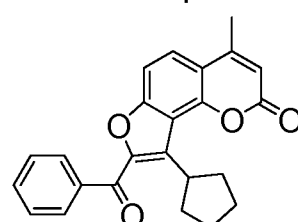
Compound 161



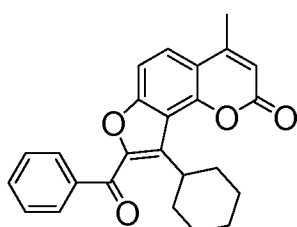
Compound 162



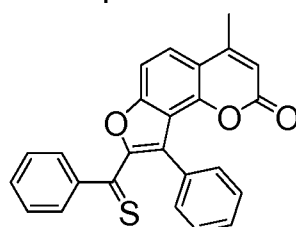
Compound 163



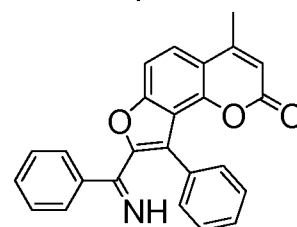
Compound 164



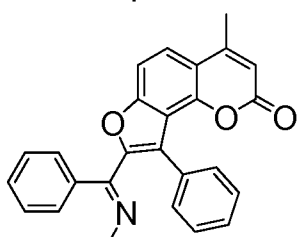
Compound 165



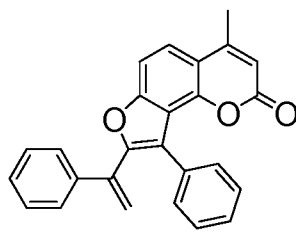
Compound 166



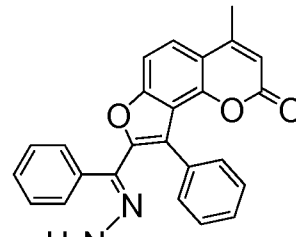
Compound 167



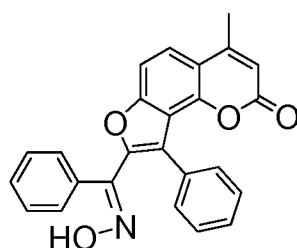
Compound 168



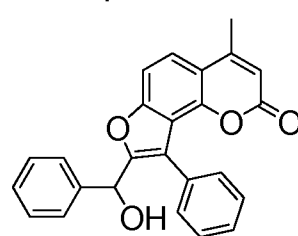
Compound 169



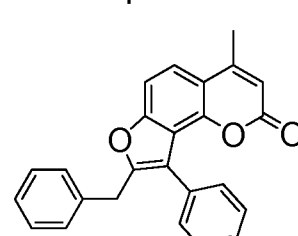
Compound 170



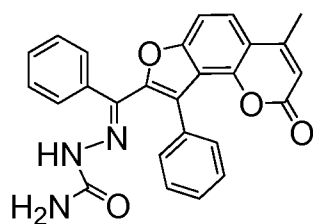
Compound 171



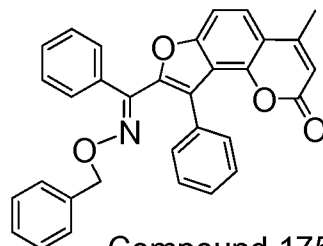
Compound 172



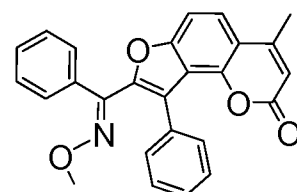
Compound 173



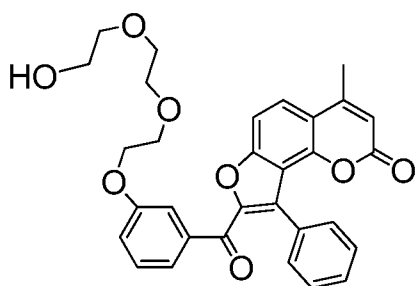
Compound 174



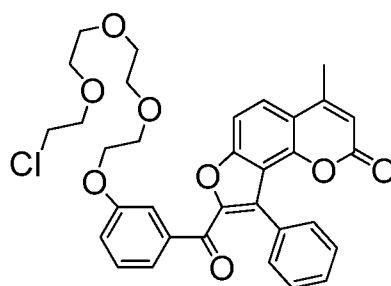
Compound 175



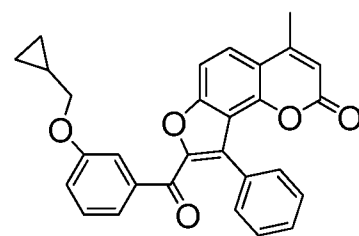
Compound 176



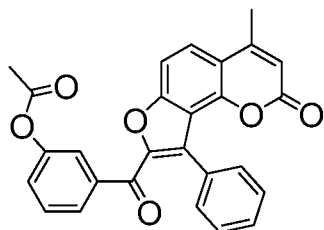
Compound 177



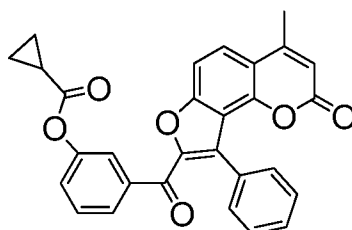
Compound 178



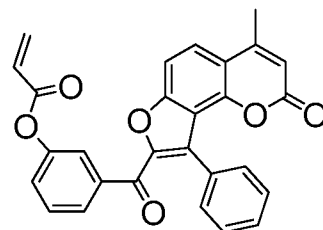
Compound 179



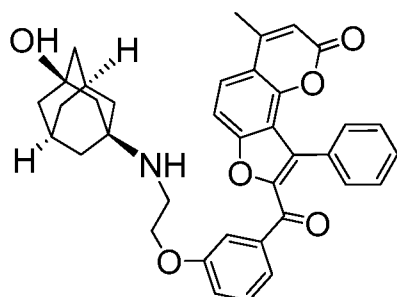
Compound 180



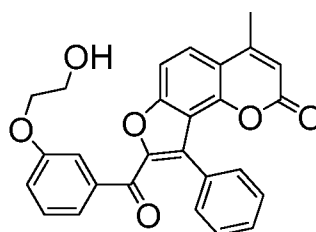
Compound 181



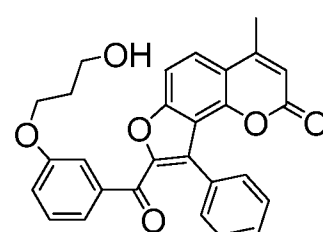
Compound 182



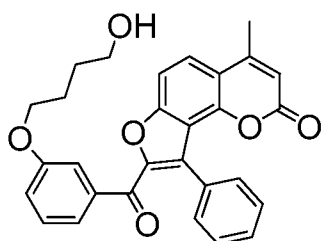
Compound 183



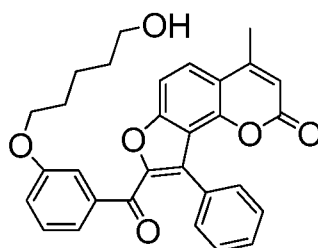
Compound 184



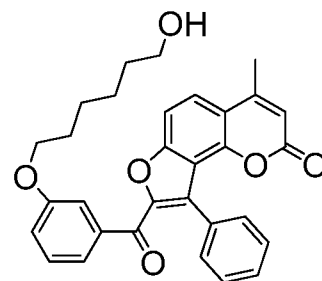
Compound 185



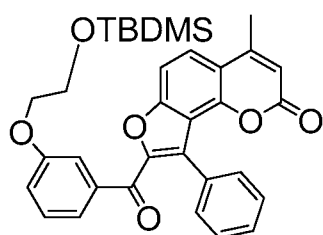
Compound 186



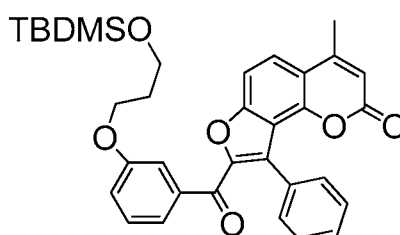
Compound 187



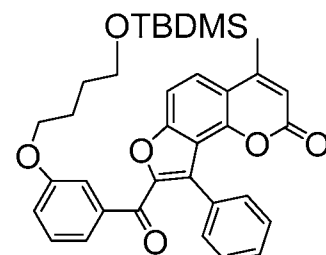
Compound 188



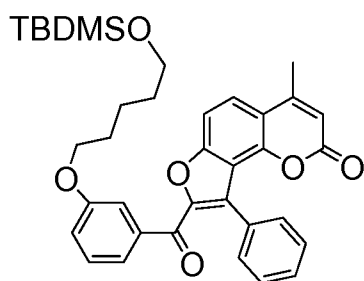
Compound 189



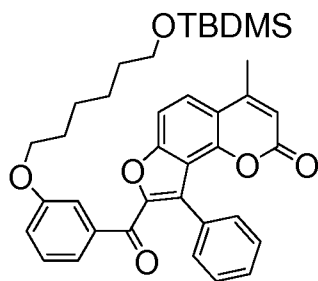
Compound 190



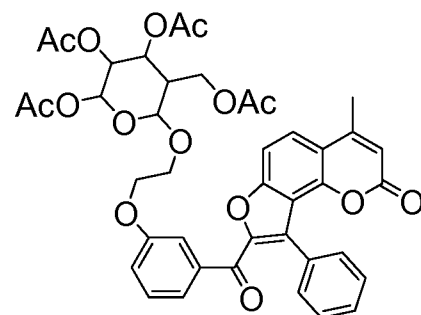
Compound 191



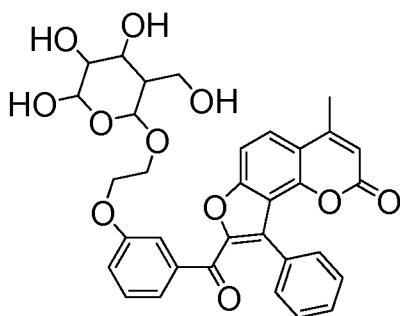
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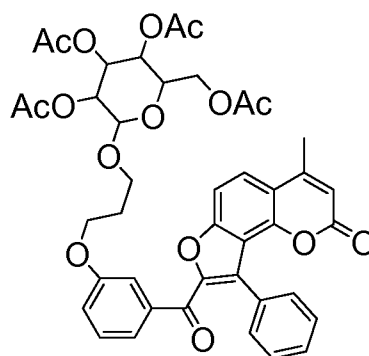
Compound 193



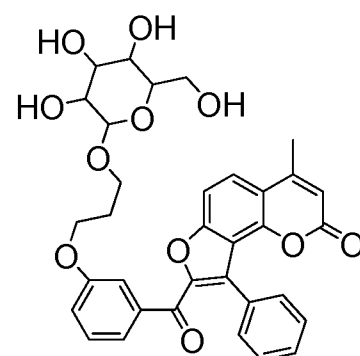
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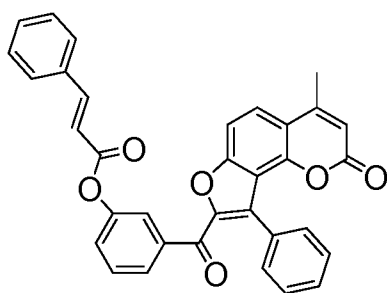
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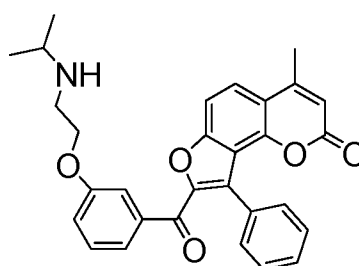
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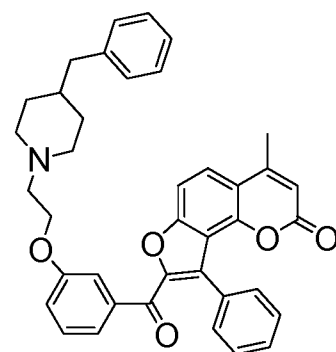
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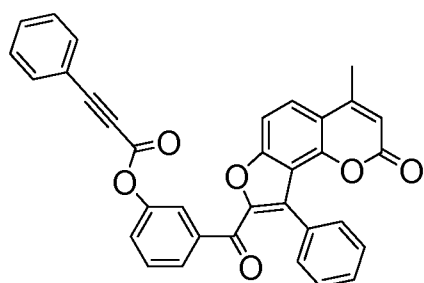
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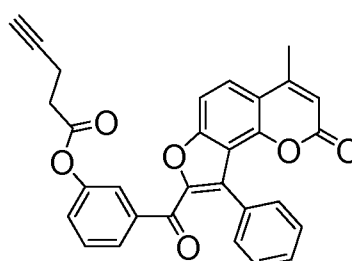
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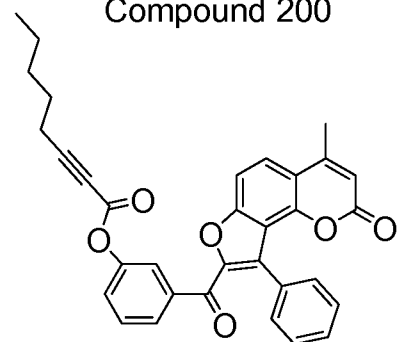
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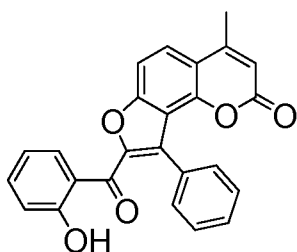
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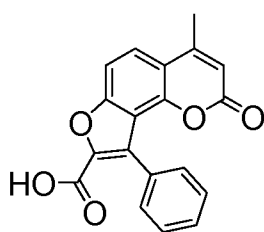
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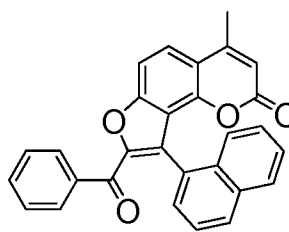
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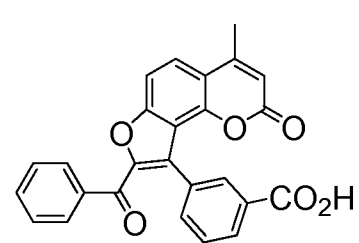
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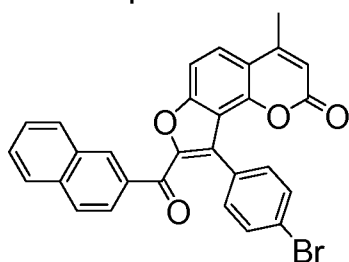
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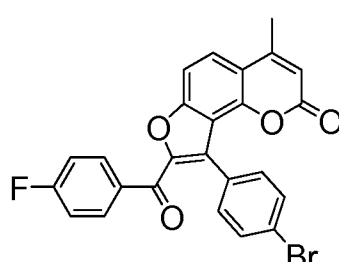
Compound 206



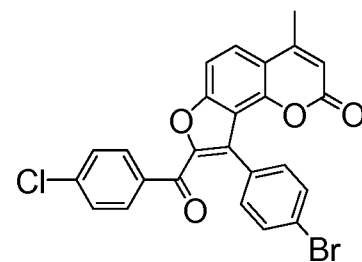
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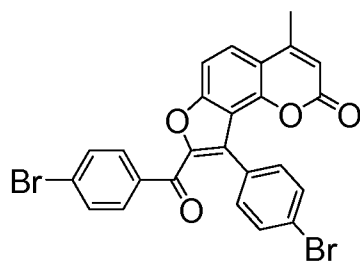
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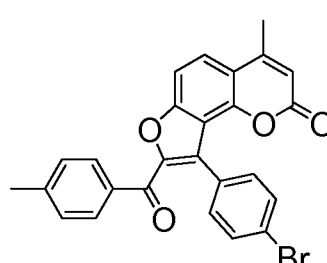
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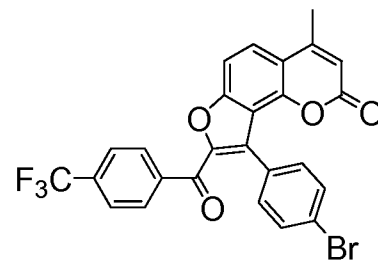
Compound 210



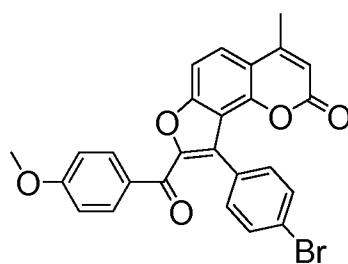
Compound 211



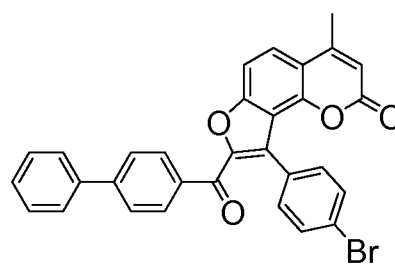
Compound 212



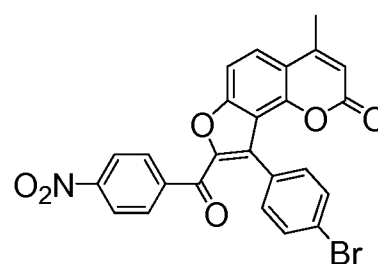
Compound 213



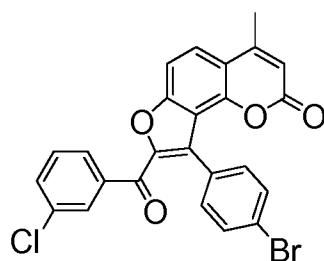
Compound 214



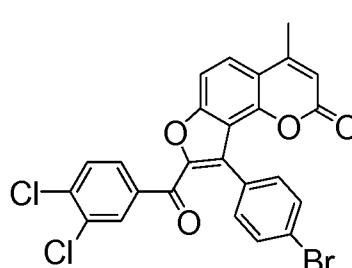
Compound 215



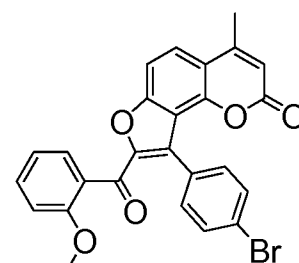
Compound 216



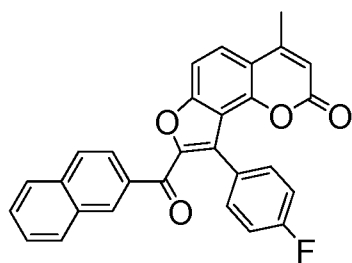
Compound 217



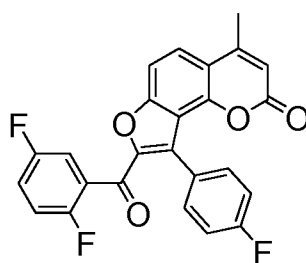
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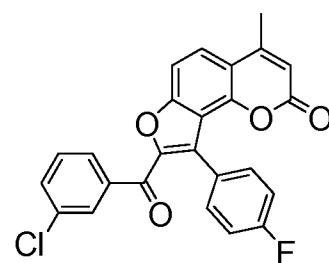
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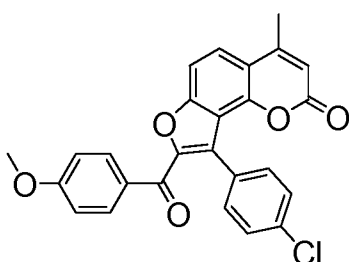
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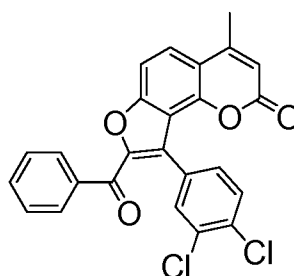
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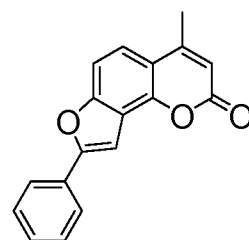
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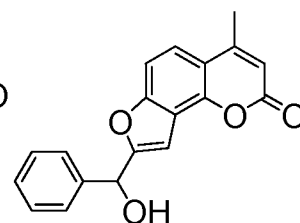
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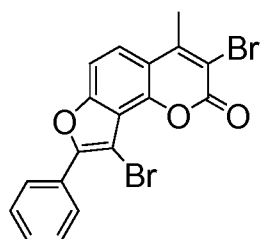
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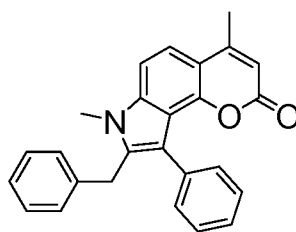
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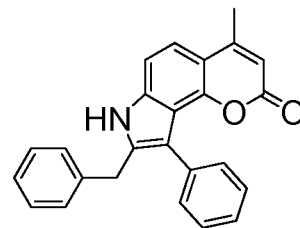
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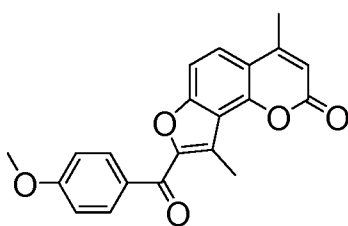
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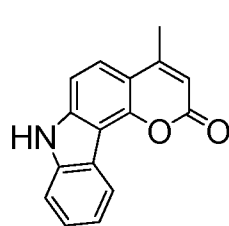
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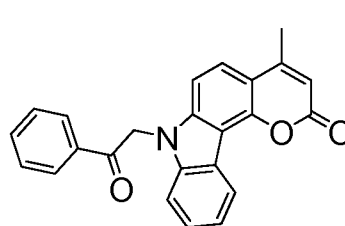
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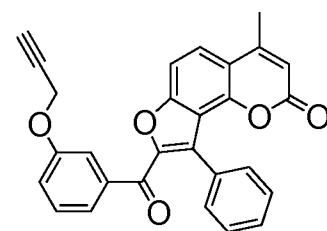
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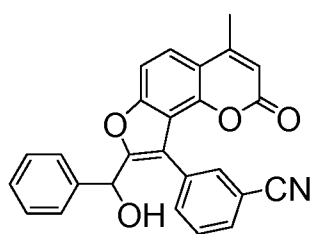
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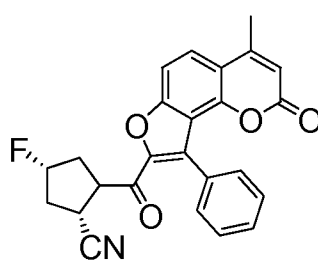
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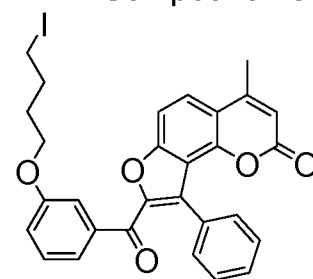
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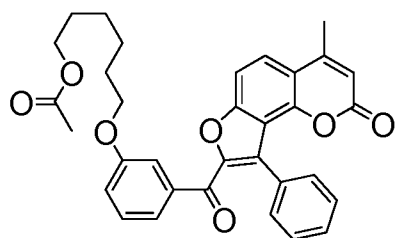
Compound 234



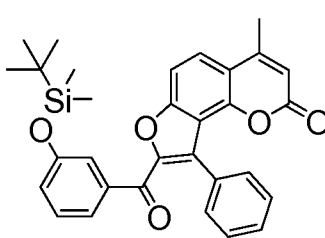
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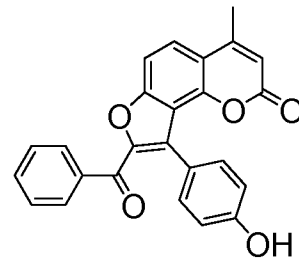
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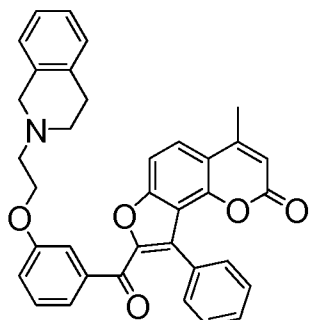
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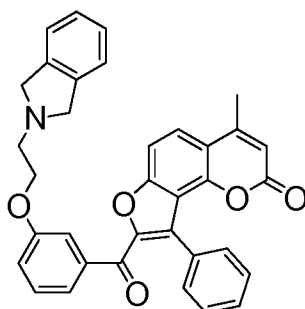
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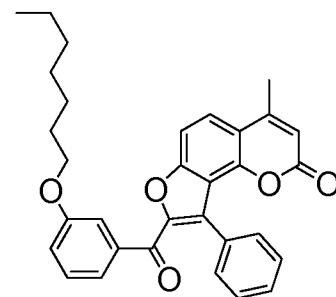
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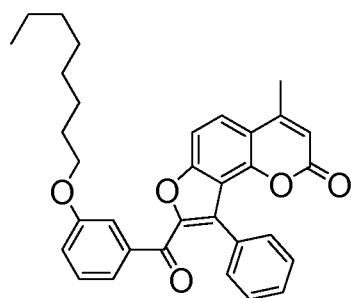
Compound 240



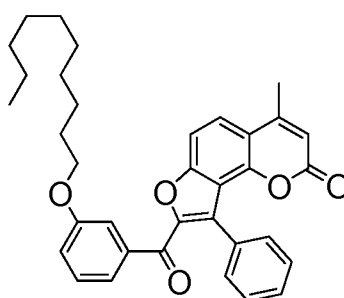
Compound 241



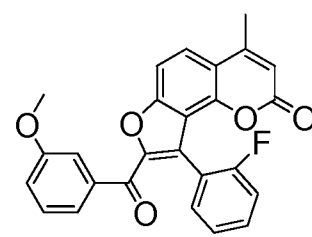
Compound 242



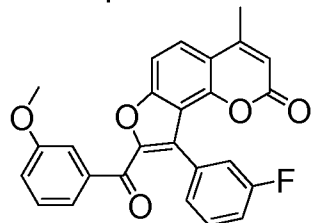
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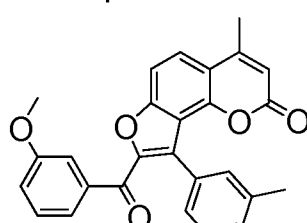
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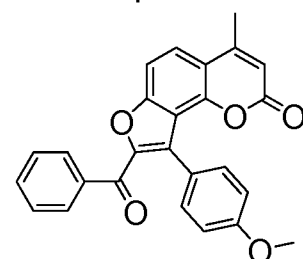
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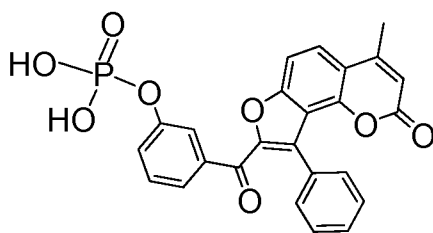
Compound 246



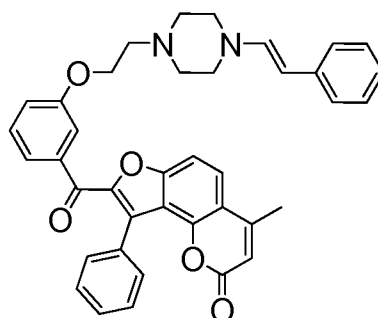
Compound 247



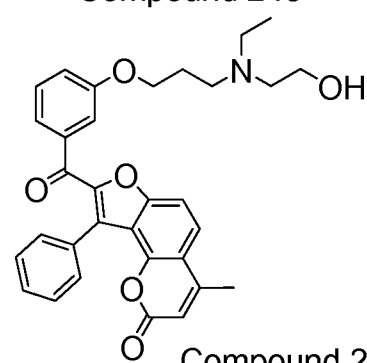
Compound 248



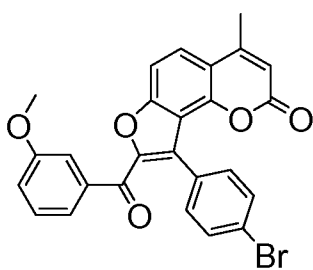
Compound 249



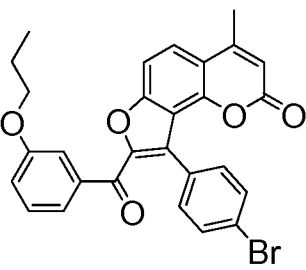
Compound 250



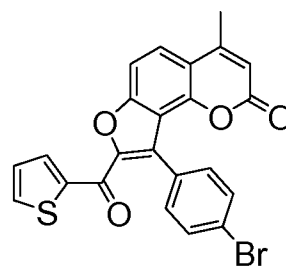
Compound 251



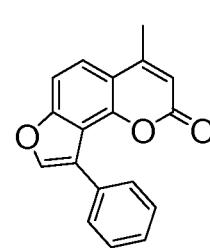
Compound 252



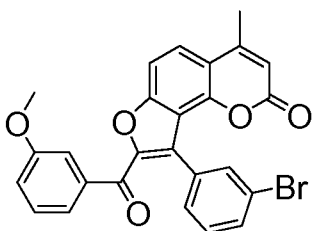
Compound 253



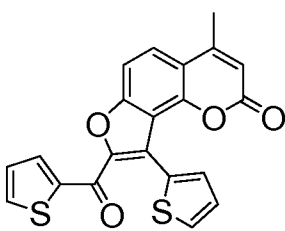
Compound 254



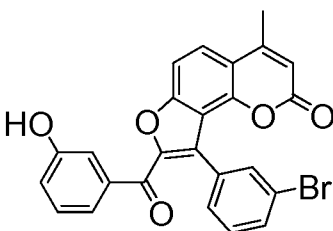
Compound 255



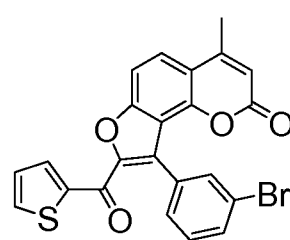
Compound 256



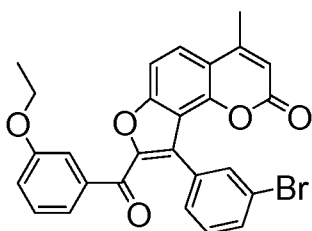
Compound 257



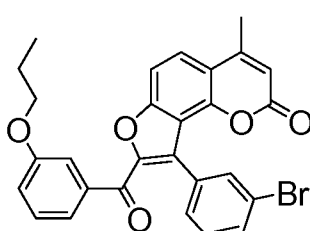
Compound 258



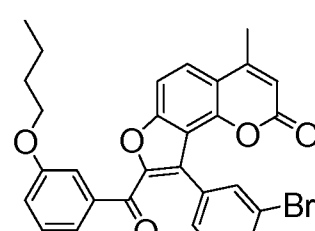
Compound 259



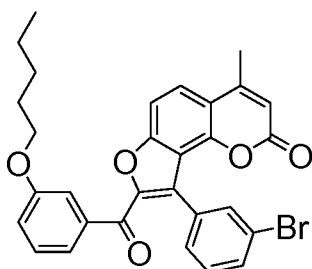
Compound 260



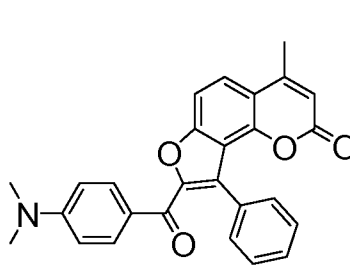
Compound 261



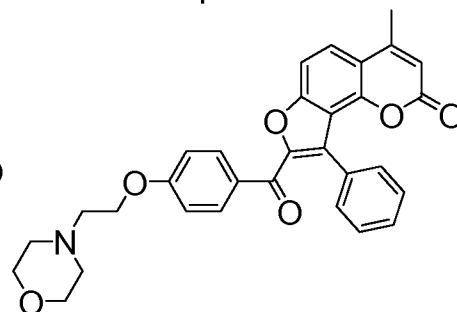
Compound 262



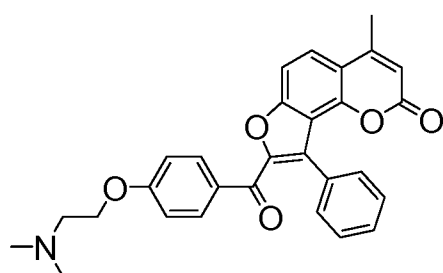
Compound 263



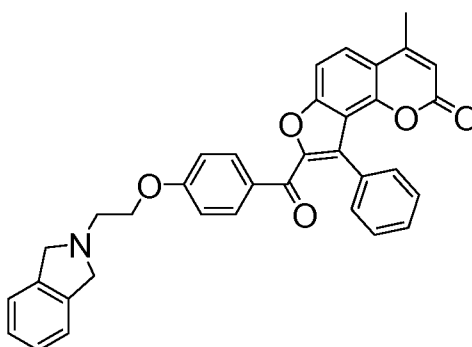
Compound 264



Compound 265



Compound 266



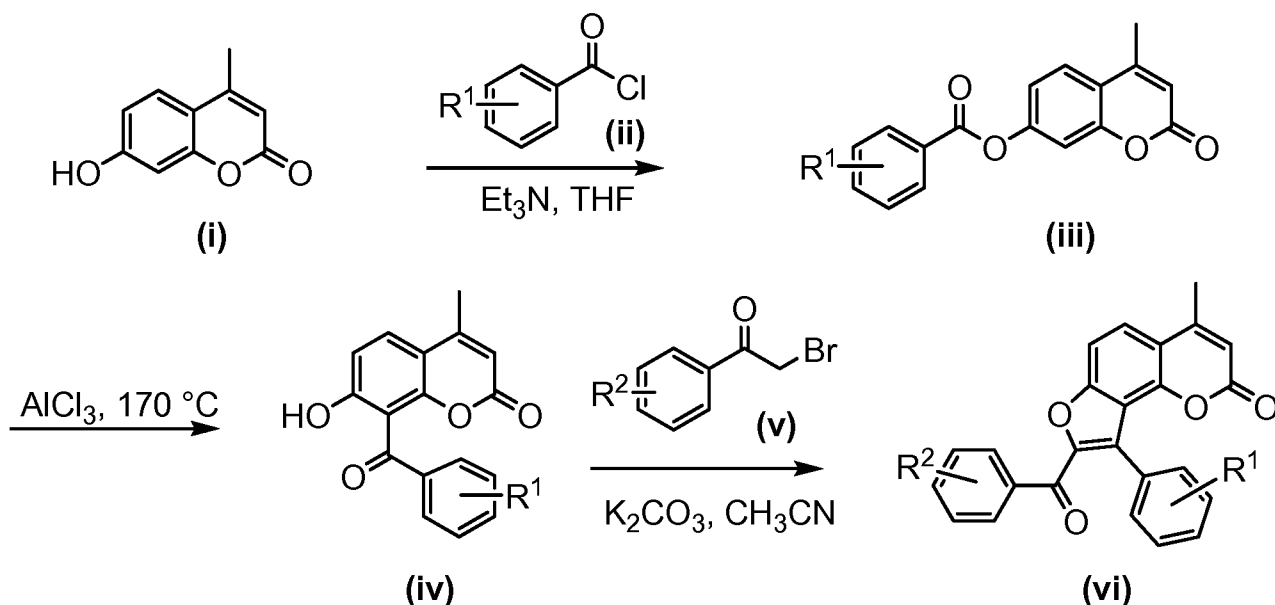
Compound 267

The coumarin compounds of this invention can be prepared by conventional chemical transformations (including protecting group

methodologies), e.g., those described in R. Larock, *Comprehensive Organic Transformations*, VCH Publishers (1989); T.W. Greene and P.G.M. Wuts, *Protective Groups in Organic Synthesis*, 3rd Ed., John Wiley and Sons (1999); L. Fieser and M. Fieser, *Fieser and Fieser's Reagents for Organic Synthesis*, John Wiley and Sons (1994); and L. Paquette, ed., *Encyclopedia of Reagents for Organic Synthesis*, John Wiley and Sons (1995) and subsequent editions thereof. The coumarin compounds of this invention can also be synthesized in manners similar to those described, e.g., in Brubaker et al., *J. Med. Chem.*, **1986**, 29, 1094 – 1099, Limaye, *Chem. Ber.*, **1934**, 67, 12-14, and Geetanjali et al., *Indian J. Chem. Sect. B*, **1983**, 22, 164-165, with necessary modifications as recognized by those skilled in the art.

The route shown in Scheme 1 exemplifies synthesis of the coumarin compounds of the present invention. Triethylamine is added to a solution of 7-hydroxy-4-methyl-chromen-2-one (i) and a benzoyl chloride (ii) in THF at room temperature. The reaction mixture is stirred at room temperature overnight and filtered. The filtrate is concentrated to afford a 7-benzoyloxy-4-methyl-coumarin (iii). A mixture of compound (iii) and finely powdered aluminum chloride is heated at 170 °C for 2 hours to afford an 8-benzoyl-7-hydroxy-4-methyl-chromen-2-one (iv). A mixture of compound (iv), 2-bromoacetophenone (v), and K₂CO₃ in CH₃CN is refluxed overnight. The reaction mixture is filtered and the filtrate is concentrated. The residue is purified by column chromatography to afford a pure 8-benzoyl-4-methyl-9-phenyl-furo[2,3-*h*]chromen-2-one (vi).

Scheme 1



A coumarin compound thus synthesized can be further purified by flash column chromatography, high performance liquid chromatography, crystallization, or any other suitable methods.

The coumarin compounds mentioned herein may contain a non-aromatic double bond and one or more asymmetric centers. Thus, they can occur as racemates and racemic mixtures, single enantiomers, individual diastereomers, diastereomeric mixtures, and cis- or trans- isomeric forms. All such isomeric forms are contemplated.

Also within the scope of this invention are (1) a pharmaceutical composition that contains an effective amount of at least one of the coumarin compounds of this invention and a pharmaceutically acceptable carrier, and (2) a method for treating cancer by administering to a subject in need of this treatment an effective amount of such a coumarin compound.

As used herein, the term “treating” refers to administering a coumarin compound to a subject that has cancer, or has a symptom of or a predisposition toward it, with the purpose to prevent, cure, heal, alleviate, relieve, alter, remedy, ameliorate, improve, or affect the disorder, the symptoms of or the predisposition toward the cancer. The term “an effective amount” refers to the amount of the active agent that is required to confer the intended therapeutic effect in the subject. Effective amounts may vary, as recognized by those skilled in the art, depending on route of administration, excipient usage, and the possibility of co-usage with other agents.

Cancer that can be treated by the methods of the invention includes both solid and haematological tumours of various organs. Examples of solid tumors include pancreatic cancer; bladder cancer; colorectal cancer; breast cancer, including metastatic breast cancer; prostate cancer, including
5 androgen-dependent and androgen-independent prostate cancer; renal cancer, including, e.g., metastatic renal cell carcinoma; hepatocellular cancer; lung cancer, including, e.g., non-small cell lung cancer (NSCLC), bronchioloalveolar carcinoma (BAC), and adenocarcinoma of the lung; ovarian cancer, including, e.g., progressive epithelial or primary peritoneal
10 cancer; cervical cancer; gastric cancer; esophageal cancer; head and neck cancer, including, e.g., squamous cell carcinoma of the head and neck; melanoma; neuroendocrine cancer, including metastatic neuroendocrine tumors; brain tumors, including, e.g., glioma, anaplastic oligodendroglioma, adult glioblastoma multiforme, and adult anaplastic astrocytoma; bone cancer;
15 and soft tissue sarcoma. Examples of hematologic malignancy include acute myeloid leukemia (AML); chronic myelogenous leukemia (CML), including accelerated CML and CML blast phase (CML-BP); acute lymphoblastic leukemia (ALL); chronic lymphocytic leukemia (CLL); Hodgkin's disease (HD); non-Hodgkin's lymphoma (NHL), including follicular lymphoma and
20 mantle cell lymphoma; B-cell lymphoma; T-cell lymphoma; multiple myeloma (MM); Waldenstrom's macroglobulinemia; myelodysplastic syndromes (MDS), including refractory anemia (RA), refractory anemia with ringed siderblasts (RARS), (refractory anemia with excess blasts (RAEB), and RAEB in transformation (RAEB-T); and myeloproliferative syndromes.

25 The compounds described herein can be administered in conjunction with another therapeutic agent such as a cytotoxic agent, or be applied in combination with another therapy such as radiotherapy and immunotherapy. Non-limiting examples of cytotoxic agents suitable for use in combination with the coumarin compounds of the invention include: antimetabolites,
30 including, e.g., capecitabine, gemcitabine, 5-fluorouracil or 5-fluorouracil/leucovorin, fludarabine, cytarabine, mercaptopurine, thioguanine, pentostatin, and methotrexate; topoisomerase inhibitors, including, e.g., etoposide, teniposide, camptothecin, topotecan, irinotecan, doxorubicin, and daunorubicin; vinca alkaloids, including, e.g., vincristine and vinblastin;

taxanes, including, e.g., paclitaxel and docetaxel; platinum agents, including, e.g., cisplatin, carboplatin, and oxaliplatin; antibiotics, including, e.g., actinomycin D, bleomycin, mitomycin C, adriamycin, daunorubicin, idarubicin, doxorubicin and pegylated liposomal doxorubicin; alkylating agents such as melphalan, chlorambucil, busulfan, thiotepa, ifosfamide, carmustine, lomustine, semustine, streptozocin, decarbazine, and cyclophosphamide; thalidomide and related analogs, including, e.g., CC-5013 and CC-4047; protein kinase inhibitors, including, e.g., imatinib mesylate, gefitinib, dasatinib, erlotinib, lapatinib, sunitinib, nilotinib, and sorafenib; antibodies, including, e.g., trastuzumab, rituximab, cetuximab, and bevacizumab; mitoxantrone; dexamethasone; prednisone; and temozolomide.

To practice the method of this invention, the above-described pharmaceutical composition can be administered orally, parenterally, by inhalation spray, topically, rectally, nasally, buccally, vaginally or via an implanted reservoir. The term "parenteral" as used herein includes subcutaneous, intracutaneous, intravenous, intramuscular, intraarticular, intraarterial, intrasynovial, intrasternal, intrathecal, intralesional, and intracranial injection or infusion techniques.

A sterile injectable composition, e.g., a sterile injectable aqueous or oleaginous suspension, can be formulated according to techniques known in the art using suitable dispersing or wetting agents (such as Tween 80) and suspending agents. The sterile injectable preparation can also be a sterile injectable solution or suspension in a non-toxic parenterally acceptable diluent or solvent, for example, as a solution in 1,3-butanediol. Among the acceptable vehicles and solvents that can be employed are mannitol, water, Ringer's solution and isotonic sodium chloride solution. In addition, sterile, fixed oils are conventionally employed as a solvent or suspending medium (e.g., synthetic mono- or diglycerides). Fatty acids, such as oleic acid and its glyceride derivatives are useful in the preparation of injectables, as are natural pharmaceutically-acceptable oils, such as olive oil or castor oil, especially in their polyoxyethylated versions. These oil solutions or suspensions can also contain a long-chain alcohol diluent or dispersant, or carboxymethyl cellulose or similar dispersing agents. Other commonly used surfactants such as Tweens or Spans or other similar emulsifying agents or bioavailability

enhancers which are commonly used in the manufacture of pharmaceutically acceptable solid, liquid, or other dosage forms can also be used for the purposes of formulation.

5 A composition for oral administration can be any orally acceptable dosage form including, but not limited to, capsules, tablets, emulsions and aqueous suspensions, dispersions and solutions. In the case of tablets for oral use, carriers that are commonly used include lactose and corn starch. Lubricating agents, such as magnesium stearate, are also typically added. For oral administration in a capsule form, useful diluents include lactose and dried
10 corn starch. When aqueous suspensions or emulsions are administered orally, the active ingredient can be suspended or dissolved in an oily phase combined with emulsifying or suspending agents. If desired, certain sweetening, flavoring, or coloring agents can be added. A nasal aerosol or inhalation composition can be prepared according to techniques well known in the art of pharmaceutical formulation. A coumarin compound-containing composition
15 can also be administered in the form of suppositories for rectal administration.

The carrier in the pharmaceutical composition must be "acceptable" in the sense of being compatible with the active ingredient of the formulation (and preferably, capable of stabilizing it) and not deleterious to the subject to
20 be treated. One or more solubilizing agents (e.g., cyclodextrins) which form more soluble complexes with the active coumarin compounds can be utilized as pharmaceutical carriers for delivery of the active compounds. Examples of other carriers include colloidal silicon dioxide, magnesium stearate, sodium lauryl sulfate, and D&C Yellow # 10.

25 Suitable *in vitro* assays can be used to preliminarily evaluate the efficacy of the coumarin compounds of this invention in anticancer activities such as inhibiting growth of tumor cells. The compounds can further be examined for their efficacy in treating cancer. For example, a compound can be administered to an animal (e.g., a mouse model) having cancer and its
30 therapeutic effects are then assessed. Based on the results, an appropriate dosage range and administration route can also be determined.

Without further elaboration, it is believed that the above description has adequately enabled the present invention. The following examples are, therefore, to be construed as merely illustrative, and not limitative of the

remainder of the disclosure in any way whatsoever. All of the publications cited herein are hereby incorporated by reference in their entirety.

Example 1: Synthesis of 8-benzoyl-4-methyl-9-phenyl-furo[2,3-h]chromen-2-one

5 (Compound 1)

7-benzoyloxy-4-methyl-coumarin: To a solution of 7-hydroxy-4-methyl-chromen-2-one (0.5210 g, 3.0 mmol) and benzoyl chloride (0.4844 g, 0.4 mL,

d = 1.211 g/mL, 3.4 mmol) in THF (40 mL) was added Et₃N (1 mL) at room
10 temperature. The reaction mixture was stirred at room temperature overnight and filtered. The filtrate was concentrated to give the crude product 7-benzoyloxy-4-methyl-coumarin.

¹H NMR δ 8.230-7.210 (m, 8H), 6.297 (d, *J* = 0.9 Hz, 1H), 2.466 (d, *J* = 0.9 Hz, 3H).

15 **8-benzoyloxy-7-hydroxy-4-methyl-chromen-2-one:** A mixture of 7-benzoyloxy-4-methyl-coumarin (0.28g, 1 mmol) and finely powdered aluminum chloride (0.40g, 3 mmol) was heated at 170 °C for 2 hours. After the mixture was cooled to room temperature, ice and dilute hydrochloric acid were added. The mixture was extracted with ethyl acetate. The ethyl acetate
20 solution was washed successively with dilute acid, water, and sat. NaHCO₃ (aq). The organic layer was concentrated to provide 8-benzoyloxy-7-hydroxy-4-methyl-chromen-2-one (0.21 g) as a grayish material.

¹H NMR (300 MHz, CDCl₃): δ 10.85 (br, OH), 7.717-7.657 (m, 3H), 7.637~7.573 (m, 1H), 7.501-7.429 (m, 2H), 7.021 (d, *J*=9 Hz, 1H), 6.072 (s, 1H), 2.415 (d, *J*=0.6Hz, 3H)
25

8-benzoyl-4-methyl-9-phenyl-furo[2,3-h]chromen-2-one: A mixture of 8-benzoyl-7-hydroxy-4-methyl-chromen-2-one (30 mg, 0.1 mmol), 2-bromoacetophenone (22 mg, 0.11 mmol), and K₂CO₃ (143 mg, 1.03 mmol) in CH₃CN (5 mL) was refluxed overnight. The reaction mixture was filtered and
30 the filtrate was concentrated. The residue was purified by silica gel column chromatography (hexane/ethyl acetate = 3/1 then hexane / ethyl acetate = 1/1, R_f = 0.33 hexane/ethyl acetate = 1/1) to provide 8-benzoyl-4-methyl-9-phenyl-furo[2,3-h]chromen-2-one as a yellow solid (71 % yield).

^1H NMR δ 7.783-7.323 (m, 12H), 6.240 (d, J = 0.9 Hz, 1H), 2.487 (d, J = 1.2 Hz, 3H). ^{13}C NMR δ 185.454, 159.440, 156.417, 152.814, 149.928, 148.096, 136.540, 132.845, 130.616, 129.624, 128.708, 128.647, 128.036, 127.716, 124.189, 116.311, 115.304, 113.487, 108.907, 19.491.

5

Example 2: Syntheses of Compounds 2-4, 6, 8-12, 14, 16-22, 26, 30-92, 94-98, 100-102, 105-107, 109-122, 127-151, 153-161, 165, 166, 170-191, and 193-267.

Compounds 2-4, 6, 8-12, 16-22, 26, 30-92, 94-98, 100-102, 105-107, 109-122, 127-151, 153-161, 165, 166, 170-191, and 193-267 were prepared in a manner similar to that described in Example 1. ^1H NMR, ^{13}C NMR, IR, or MS data of these compounds are listed in Table 1 below:

Table 1

Cpd#	Analytical Data
2	^1H NMR (400 MHz, CDCl_3): δ 7.78-7.74 (m, 3H), 7.58-7.41 (m, 5H), 7.32-7.26 (m, 5H), 6.35 (d, J = 9.6 Hz, 1H). ^{13}C NMR (125 MHz, CDCl_3): δ 185.4, 159.4, 156.6, 150.5, 148.2, 144.0, 136.6, 132.9, 130.6, 129.7, 129.5, 128.8, 128.4, 128.1, 127.8, 127.5, 116.4, 114.9, 114.3, 109.4. HRMS (M^+): Calcd. for $\text{C}_{24}\text{H}_{14}\text{O}_4$ 366.0892, found 366.0876.
3	^1H NMR (600 MHz, CDCl_3): δ 7.76-7.75 (m, 2H), 7.57 (d, J = 1.1 Hz, 1H), 7.51-7.41 (m, 5H), 7.31-7.26 (m, 5H), 2.15 (s, 3H). ^{13}C NMR (150 MHz, CDCl_3): δ 185.5, 160.9, 155.8, 149.1, 147.9, 139.7, 136.6, 132.8, 130.6, 129.6, 128.7, 128.4, 128.0, 127.7, 126.8, 124.1, 116.1, 114.9, 109.1, 17.7. HRMS (M^+): Calcd. for $\text{C}_{25}\text{H}_{16}\text{O}_4$ 380.1049, found 380.1039.
4	^1H NMR (400 MHz, CDCl_3): δ 7.97 (d, J = 10.0 Hz, 1H), 7.77-7.75 (m, 2H), 7.74-7.38 (m, 4H), 7.32-7.26 (m, 5H), 6.38 (d, J = 10.0 Hz, 1H), 2.66 (s, 3H).
6	^1H NMR (600 MHz, CDCl_3): δ 7.76-7.72 (m, 1H), 7.73 (d, J = 9.0 Hz, 1H), 7.54 (d, J = 9.0 Hz, 1H), 7.46-7.41 (m, 2H), 7.30-7.26 (m, 5H), 2.46 (s, 3H), 2.17 (s, 3H). ^{13}C NMR (150 MHz, CDCl_3): δ 185.6, 160.7, 155.7, 148.1, 148.0, 146.3, 136.7, 132.8, 130.7, 129.8, 129.7, 128.8, 128.7, 128.0, 127.7, 124.2, 120.8, 116.1, 115.9, 108.7, 15.9, 13.4. HRMS (M^+): Calcd. for $\text{C}_{26}\text{H}_{18}\text{O}_4$ 394.1205, found 394.1194.
8	^1H NMR (300 MHz, CDCl_3): δ 8.02-7.96 (m, 1H), 7.81-7.78 (m, 2H), 7.54-7.42 (m, 4H), 7.34-7.26 (m, 4H), 6.09 (s, 1H), 2.63 (s, 3H), 2.47 (s, 3H).
9	^1H NMR (600 MHz, CDCl_3): δ 7.76-7.73 (m, 2H), 7.54 (d, J = 8.9 Hz, 1H), 7.45-7.42 (m, 3H), 7.30-7.27 (m, 5H), 6.23 (q, J = 2.0 Hz, 1H), 2.85 (qd, J = 7.4, 2.0 Hz, 2H), 1.33 (t, J = 7.4 Hz, 3H). ^{13}C NMR (150 MHz, CDCl_3): δ 185.5, 159.8, 157.8, 156.3, 150.1, 148.1, 136.6, 132.8, 130.6, 129.6, 128.7, 128.0, 127.7, 123.8, 116.5, 114.6, 111.5, 108.9, 25.4, 12.2. HRMS (M^+): Calcd. for $\text{C}_{26}\text{H}_{18}\text{O}_4$ 394.1205, found 394.1205.
10	^1H NMR (600 MHz, CDCl_3): δ 10.09 (s, 1H), 8.77 (d, J = 9.1 Hz, 1H), 7.77 (d, J = 7.2 Hz, 1H), 7.63 (d, J = 9.1 Hz, 1H), 7.46-7.44 (m, 4H), 7.33-7.27 (m, 5H), 6.83 (s, 1H). ^{13}C NMR (150 MHz, CDCl_3): δ 191.5 (CH), 185.3 (C), 159.0 (C), 156.8 (C), 144.1 (C),

	136.4 (C), 133.1 (CH), 130.5 (CH), 129.7 (CH x2, C), 129.4 (C), 128.9 (CH), 128.2 (C), 128.1 (CH x2), 127.9 (CH x2), 125.5 (CH), 124.2 (CH), 116.4 (C), 113.6 (C), 110.1 (CH), 109.0 (C). EIMS m/z (relative intensity): 394 (M^+ , 27), 380 (26), 379 (36), 235 (45), 221 (49), 133 (73), 119 (82), 105 (100), 97 (56), 85 (74). HRMS Calcd. for $C_{25}H_{14}O_4$ 394.3757, found 394.0847. IR (neat): 2920, 2851, 1734, 1709, 1653, 1600, 1446, 1356, 1239, 1078 cm^{-1} .
11	1H NMR (600 MHz, $CDCl_3$): δ 8.03-8.00 (m, 1H), 7.77-7.75 (m, 1H), 7.62 (d, J = 9.1 Hz, 1H), 7.45-7.43 (m, 3H), 7.32-7.28 (m, 5H), 6.86 (s, 1H), 6.72 (s, 1H). ^{13}C NMR (150 MHz, $CDCl_3$): δ 185.3 (C), 158.7 (C), 156.5 (C), 156.5 (C), 150.9 (C), 150.2 (C), 148.4 (C), 136.5 (C), 134.2 (q, J = 90.2 Hz, C), 133.0 (CH), 130.6 (CH x2), 129.7 (CH x2), 129.4 (C), 128.9 (CH), 128.1 (CH x2), 127.8 (CH x2), 124.1 (CH), 116.9 (C), 112.8 (CH), 110.5 (C), 109.4 (CH).
12	1H NMR (600 MHz, $CDCl_3$): δ 7.77-7.75 (m, 2H), 7.58 (d, J = 9.0 Hz, 1H), 7.53-7.52 (m, 3H), 7.50-7.47 (m, 3H), 7.50-7.42 (m, 3H), 7.33-7.32 (m, 3H), 7.29-7.27 (m, 2H), 6.31 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 185.5, 159.4, 156.6, 156.3, 150.7, 148.2, 136.6, 135.7, 132.9, 130.7, 129.8, 129.7, 128.9, 128.8, 128.3, 128.1, 127.8, 126.7, 116.6, 114.5, 114.2, 113.6, 108.9. HRMS (M^+): Calcd. for $C_{30}H_{18}O_4$ 442.1205, found 442.1206.
14	1H NMR (300 MHz, $CDCl_3$): δ 7.77-7.72 (m, 3H), 7.53-7.41 (m, 4H), 7.31-7.31 (m, 5H), 6.20 (s, 1H), 2.76 (t, J = 7.6 Hz, 2H), 1.76-1.71 (m, 2H), 1.05 (t, J = 7.6 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$): δ 185.3, 159.5, 156.1, 150.0, 147.9, 136.4, 132.7, 130.5, 129.5, 128.6, 127.9, 127.6, 123.9, 116.3, 114.5, 112.2, 108.7, 34.4, 21.3, 13.7.
16	1H NMR (600 MHz, $CDCl_3$): δ 7.83~7.81 (m, 2H), 7.49-7.45 (m, 4H), 7.33-7.30 (m, 5H), 6.22 (s, 1H), 6.11-6.05 (m, 1H), 5.24-5.20 (m, 2H), 3.76-3.75 (m, 2H), 2.47 (s, 3H). ^{13}C NMR (150 MHz, $CDCl_3$): δ 185.1 (C), 159.7 (C), 154.9 (C), 152.8 (C), 148.6 (C), 148.0 (C), 136.7 (C), 134.8 (CH), 132.9 (CH), 130.6 (CH x2), 129.8 (CH x2), 129.7 (C), 129.0 (C), 128.7 (CH), 128.0 (CH x2), 127.7 (CH x2), 123.3 (CH), 121.4 (C), 117.4 (CH ₂), 116.1 (C), 115.4 (C), 113.5 (CH), 33.5 (CH ₂), 19.6 (CH ₃). EIMS m/z (relative intensity): 420 (M^+ , 100), 391 (10), 334 (53), 320 (70), 305 (11). HRMS Calcd. for $C_{28}H_{20}O_4$ 420.1362, found 420.1356. IR (neat): 2980, 2918, 1730, 1650, 1552, 1585, 1494, 1474, 1446, 1348, 1226, 1227, 1179, 1126 cm^{-1} .
17	1H NMR (400 MHz, $CDCl_3$): δ 7.81-7.80 (m, 2H), 7.49-7.43 (m, 4H), 7.35-7.28 (m, 5H), 6.21 (s, 1H), 2.97 (t, J = 7.6 Hz, 2H), 2.47 (s, 3H), 1.84 (tq, J = 7.2, 7.6 Hz, 2H), 1.03 (t, J = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 185.3 (C), 159.7 (C), 155.2 (C), 152.8 (C), 148.3 (C), 147.9 (C), 136.8 (C), 132.8 (CH), 130.6 (CH x2), 129.8 (C), 129.7 (CH x2), 128.9 (C), 128.7 (CH), 128.1 (CH x2), 127.7 (CH x2), 123.8 (C), 123.2 (CH), 116.0 (C), 115.3 (C), 113.5 (CH), 31.5 (CH ₂), 23.0 (CH ₂), 19.6 (CH ₃), 13.9 (CH ₃). EIMS m/z (relative intensity): 422 (M^+ , 5), 336 (26), 322 (100), 307 (40), 293 (95), 245 (41), 215 (93), 187 (68), 132 (15), 105 (63), 91 (42), 77 (54). HRMS Calcd. for $C_{28}H_{22}O_4$ 422.1518, found 422.1499. IR (neat): 2957, 2927, 2868, 1731, 1651, 1584, 1553, 1490, 1446, 1420, 1373, 1348, 1265, 1230, 1179, 1082 cm^{-1} .
18	1H NMR (600 MHz, $CDCl_3$): δ 7.78-7.76 (m, 2H), 7.60 (s, 1H), 7.47-7.39 (m, 3H), 7.32-7.24 (m, 5H), 6.22 (q, J = 1.0 Hz, 1H), 3.40 (dd, J = 4.5, 14.7 Hz, 1H), 3.37-3.35 (m, 1H), 3.11 (dd, J = 6.1, 14.7 Hz, 1H), 2.86 (dd, J = 3.3, 7.8 Hz, 1H), 2.64 (dd, J = 2.5, 4.8 Hz, 1H), 2.48 (d, J = 1.0 Hz, 3H). ^{13}C NMR (150 MHz, $CDCl_3$): δ 185.4 (C), 159.6 (C), 155.1 (C), 152.8 (C), 148.9 (C), 148.0 (C), 136.6 (C), 132.9 (CH), 130.6 (CH x2), 129.7 (CH x2), 129.5 (C), 129.0 (C), 128.8 (CH), 128.0 (CH x2), 127.8 (CH x2), 124.3 (CH), 118.5 (C), 116.1 (C), 115.5 (C), 113.6 (CH), 51.1 (CH), 47.1 (CH ₂), 32.4

	(CH ₂), 19.6 (CH ₃). EIMS <i>m/z</i> (relative intensity): 436 (M ⁺ , 39), 395 (100), 380 (72), 208 (30), 204 (42), 191 (54), 172 (67), 144 (57), 105 (40), 77 (23). HRMS Calcd. for C ₂₈ H ₂₀ O ₅ 436.1311, found 436.1294. IR (neat): 2985, 2952, 2918, 1731, 1651, 1553, 1492, 1474, 1446, 1367, 1349, 1267, 1227, 1181, 1124 cm ⁻¹ .
19	LCMS [M + 1] ⁺ : 471.1
20	¹H NMR (600 MHz, CDCl ₃): δ 7.76~7.75 (m, 2H), 7.56-7.53 (m, 2H), 7.47-7.38 (m, 3H), 7.31-7.26 (m, 5H), 3.14 (t, <i>J</i> = 7.1 Hz, 2H), 2.89 (t, <i>J</i> = 7.5 Hz, 2H), 2.22-2.19 (tt, <i>J</i> = 7.1, 7.5 Hz, 2H). ¹³C NMR (150 MHz, CDCl ₃): δ 185.6 (C), 158.8 (C), 156.3 (C), 156.1 (C), 150.2 (C), 148.0 (C), 142.2 (C), 136.7 (C), 132.8 (CH), 130.7 (CH x2), 129.7 (CH x2), 128.7 (CH), 128.2 (C), 128.1 (CH x2), 127.8 (CH x2), 126.2 (C), 124.5 (CH), 116.4 (C), 114.3 (C), 108.9 (CH), 32.7 (CH ₂), 30.7 (CH ₂), 22.4 (CH ₂). EIMS <i>m/z</i> (relative intensity) 406 (M ⁺ , 100), 377 (16). HRMS Calcd. for C ₂₇ H ₁₈ O ₄ 406.1205, found 406.1202. IR (neat): 2957, 2851, 1727, 1650, 1600, 1549, 1490, 1479, 1447, 1369, 1283, 1237, 1071 cm ⁻¹ .
21	¹H NMR (600 MHz, CDCl ₃): δ 7.76 (dd, <i>J</i> = 8.4, 1.2 Hz, 2H), 7.69 (d, <i>J</i> = 8.9 Hz, 1H), 7.53 (d, <i>J</i> = 8.9 Hz, 1H), 7.46-7.41 (m, 3H), 7.30-7.26 (m, 5H), 2.85-2.83 (m, 2H), 2.54-2.52 (m, 2H), 1.88-1.86 (m, 2H), 1.79-1.78 (m, 2H). ¹³C NMR (150 MHz, CDCl ₃): δ 185.6, 160.4, 155.7, 147.9, 147.3, 136.7, 132.8, 130.1, 129.9, 129.8, 129.7, 128.8, 128.7, 128.0, 127.7, 123.1, 122.4, 116.2, 115.5, 108.6, 25.9, 24.0, 21.5. HRMS (M ⁺): Calcd. for C ₂₈ H ₂₀ O ₄ 420.1263, found 420.1265.
22	¹H NMR (600 MHz, CDCl ₃): δ 8.33 (d, <i>J</i> = 7.8 Hz, 1H), 8.18 (d, <i>J</i> = 8.8 Hz, 1H), 8.1 (d, <i>J</i> = 8.2 Hz, 1H), 7.84-7.81 (m, 1H), 7.78 (dd, <i>J</i> = 7.1, 1.3 Hz, 2H), 7.61 (dd, <i>J</i> = 8.7, 0.7 Hz, 1H), 7.54 (t, <i>J</i> = 7.5 Hz, 1H), 7.50-7.48 (m, 2H), 7.43 (t, <i>J</i> = 7.3 Hz, 1H), 7.33-7.27 (m, 5H). ¹³C NMR (150 MHz, CDCl ₃): δ 185.6 (C), 159.9 (C), 155.8 (C), 148.1 (C), 147.0 (C), 136.7 (C), 135.0 (CH), 134.2 (C), 132.8 (CH), 132.5 (C), 130.7 (CH x2), 130.6 (CH), 129.9 (C), 129.7 (CH), 128.7 (CH), 128.5 (CH), 128.1 (CH x2), 127.7 (CH x2), 122.7 (CH), 121.7 (CH), 120.4 (C), 117.0 (C), 113.1 (C), 109.2 (CH). EIMS <i>m/z</i> (relative intensity) 415 (M ⁺ , 4), 316 (75), 315 (100), 239 (28), 105 (23), 77 (13). HRMS Calcd. for C ₂₈ H ₁₆ O ₄ 416.1049, found 416.1033. IR (neat): 2924, 2851, 1737, 1650, 1599, 1552, 1488, 1446, 1353, 1310, 1237, 1096 cm ⁻¹ .
26	¹H NMR (600 MHz, CDCl ₃): δ 7.78 (d, <i>J</i> = 8.6 Hz, 1H), 7.65 (d, <i>J</i> = 8.6 Hz, 1H), 7.58 (dd, <i>J</i> = 1.0, 7.2 Hz, 2H), 7.34-7.29 (m, 3H), 7.19-7.16 (m, 5H), 6.21 (q, <i>J</i> = 0.8 Hz, 1H), 2.47 (d, <i>J</i> = 0.8 Hz, 3H). ¹³C NMR (150 MHz, CDCl ₃): δ 191.4 (C), 159.0 (C), 152.6 (C), 151.1 (C), 144.1 (C), 140.4 (C), 139.3 (C), 137.0 (C), 134.2 (C), 132.7 (CH), 130.6 (CH x2), 129.5 (CH x2), 128.3 (CH), 127.9 (CH x2), 127.4 (CH x2), 126.7 (C), 112.4 (CH), 118.5 (CH), 116.1 (C), 114.2 (CH), 19.5 (CH ₃). EIMS <i>m/z</i> (relative intensity): 396 (M ⁺ , 8), 367 (4), 302 (4), 287 (6), 252 (5), 125 (7), 84 (100). HRMS Calcd. for C ₂₅ H ₁₆ O ₃ S 396.082, found 396.0815. IR (neat): 2924, 2854, 1737, 1653, 1590, 1508, 1450, 1378, 1330, 1264, 1175, 1108 cm ⁻¹ .
30	¹H NMR (300 MHz, CDCl ₃): δ 7.70 (d, <i>J</i> = 9.0 Hz, 1H), 7.55 (d, <i>J</i> = 8.7 Hz, 1H), 7.37 (dd, <i>J</i> = 7.2, 1.8 Hz, 1H), 7.33-7.29 (m, 2H), 7.26-7.17 (m, 4H), 6.86 (td, <i>J</i> = 7.4, 0.7 Hz, 1H), 6.52 (d, <i>J</i> = 8.4 Hz, 1H), 6.21 (d, <i>J</i> = 1.2 Hz, 1H), 3.57 (s, 3H), 2.48 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 185.5, 159.5, 157.3, 156.4, 152.9, 150.1, 149.1, 132.8, 130.3, 123.0, 129.3, 128.5, 128.4, 127.9, 127.1, 124.2, 120.2, 116.6, 115.1, 113.3, 110.5, 109.0, 55.2, 19.5.
31	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, <i>J</i> = 8.7 Hz, 1H), 7.57 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.47 (m, 2H), 7.40-7.28 (m, 5H), 7.20 (t, <i>J</i> = 8.4 Hz, 1H), 7.01-6.97 (m, 1H), 6.24 (d, <i>J</i> = 1.2 Hz, 1H), 3.76 (s, 3H), 2.49 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃):

	δ 185.2, 159.5, 159.2, 156.4, 152.8, 149.9, 148.1, 137.8, 130.6, 129.7, 129.1, 128.8, 127.7, 124.2, 122.5, 119.7, 116.3, 115.3, 113.7, 113.5, 108.9, 55.3, 19.5.
32	¹H NMR (300 MHz, CDCl ₃): δ 7.82 (dd, J = 10.2, 2.4 Hz, 2H), 7.70 (dd, J = 9.0, 1.5 Hz, 1H), 7.56-7.47 (m, 3H), 7.37-7.32 (m, 3H), 6.79 (dd, J = 8.7, 2.7 Hz, 2H), 6.30 (d, J = 1.5, 0.9 Hz, 1H), 3.81 (s, 3H), 2.48 (d, J = 0.9 Hz, 3H).
33	¹H NMR (400 MHz, CDCl ₃): δ 7.77 (d, J = 8.4 Hz, 1H), 7.58 (dd, J = 8.4, 0.4 Hz, 1H), 7.48-7.46 (m, 2H), 7.34 (t, J = 2.4 Hz, 4H), 7.24-7.23 (m, 1H), 7.16 (t, J = 8.0 Hz, 1H), 6.94 (ddd, J = 8.0, 2.4, 0.8 Hz, 1H), 6.26 (s, 1H), 2.51 (s, 3H). LCMS [M + 1] ⁺ : 397.1.
34	¹H NMR (300 MHz, CDCl ₃): δ 7.71-7.58 (m, 3H), 7.51 (d, J = 8.7 Hz, 1H), 7.44-7.41 (m, 2H), 7.28-7.25 (m, 3H), 6.69-6.66 (m, 2H), 6.15 (d, J = 1.2 Hz, 1H), 2.43 (d, J = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 182.6, 161.7, 158.6, 155.2, 152.6, 148.5, 147.6, 131.5, 129.7, 129.2, 127.4, 126.7, 125.7, 123.1, 115.0, 114.3, 112.1, 108.0, 18.6.
35	¹H NMR (300 MHz, CDCl ₃): δ 7.77-7.21 (m, 11H), 6.23 (d, J = 0.9 Hz, 1H), 2.49 (d, J = 0.9 Hz, 3H).
36	¹H NMR (300 MHz, CDCl ₃): δ 7.95-7.29 (m, 11H), 6.26 (d, J = 1.2 Hz, 1H), 2.51 (d, J = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.2, 159.3, 156.6, 152.8, 150.1, 147.5, 137.2, 132.5, 130.8, 130.7, 130.4, 129.8, 129.2, 129.14, 129.06, 128.8, 127.9, 126.45, 126.40, 124.8, 116.3, 115.5, 113.7, 109.0, 19.5.
37	¹H NMR (300 MHz, CDCl ₃): δ 7.84-7.30 (m, 11H), 6.25 (s, 1H), 2.49 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.3, 159.3, 156.5, 152.8, 150.1, 147.6, 139.6, 134.0, 133.5, 130.6, 129.9, 129.7, 129.3, 129.1, 127.8, 125.2, 125.01, 124.95, 124.9, 124.8, 116.3, 115.5, 113.7, 108.9, 19.5.
38	¹H NMR (300 MHz, CDCl ₃): δ 7.80-7.08 (m, 11H), 6.26 (d, J = 0.9 Hz, 1H), 2.50 (d, J = 0.6 Hz, 3H).
39	¹H NMR (300 MHz, CDCl ₃): δ 7.75-6.93 (m, 11H), 6.24 (d, J = 1.2 Hz, 1H), 2.42 (s, 3H), 2.18 (s, 3H).
40	¹H NMR (300 MHz, CDCl ₃): δ 7.75-7.18 (m, 11H), 6.26 (s, 1H), 2.51 (d, J = 0.6 Hz, 3H), 2.25 (s, 3H).
41	¹H NMR (300 MHz, CDCl ₃): δ 7.73-7.69 (m, 3H), 7.55 (d, J = 8.7 Hz, 1H), 7.51-7.47 (m, 2H), 7.36-7.32 (m, 3H), 7.11 (d, J = 8.1 Hz, 2H), 6.24 (d, J = 0.9 Hz, 1H), 2.49 (d, J = 0.6 Hz, 3H), 2.35 (s, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 185.1, 159.5, 156.3, 152.8, 149.9, 148.3, 143.9, 133.9, 130.6, 129.9, 129.7, 128.8, 128.7, 128.6, 128.2, 127.7, 124.0, 116.3, 115.3, 113.5, 108.9, 21.6, 19.5.
42	¹H NMR (300 MHz, CDCl ₃): δ 7.98-7.95 (m, 2H), 7.78 (d, J = 8.7 Hz, 1H), 7.70-7.67 (m, 1H), 7.60 (d, J = 9.0 Hz, 1H), 7.46-7.40 (m, 3H), 7.36-7.32 (m, 3H), 6.26 (d, J = 1.2 Hz, 1H), 2.51 (d, J = 0.9 Hz, 3H).
43	¹H NMR (300 MHz, CDCl ₃): δ 7.79-7.74 (m, 3H), 7.58-7.53 (m, 3H), 7.42-7.39 (m, 2H), 7.37-7.29 (m, 3H), 6.25 (d, J = 1.2 Hz, 1H), 2.49 (s, 3H).
44	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, J = 9.0 Hz, 1H), 7.56 (d, J = 9.0 Hz, 1H), 7.51-6.78 (m, 9H), 6.24 (d, J = 1.2 Hz, 1H), 2.49 (d, J = 1.2 Hz, 3H).
45	¹H NMR (300 MHz, CDCl ₃): δ 7.77 (d, J = 8.7 Hz, 1H), 7.57 (d, J = 8.7 Hz, 1H), 7.57-7.11 (m, 9H), 6.26 (d, J = 1.2 Hz, 1H), 2.51 (d, J = 1.2 Hz, 3H). LCMS [M + 1] ⁺ : 415.0.
46	¹H NMR (300 MHz, CDCl ₃): δ 7.84-7.79 (m, 2H), 7.74 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 8.7 Hz, 1H), 7.48-7.45 (m, 2H), 7.36-7.32 (m, 3H), 6.96-6.94 (m, 2H), 6.26 (d, J = 0.9

	Hz, 1H), 2.50 (d, $J = 0.6$ Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3): δ 183.9, 166.7, 164.2, 159.4, 156.5, 152.8, 150.0, 147.9, 132.9, 132.8, 132.4, 132.3, 130.6, 129.5, 128.9, 128.8, 127.8, 124.3, 116.3, 115.41, 115.39, 115.2, 113.6, 108.9, 19.6.
47	^1H NMR (600MHz, CDCl_3): δ 7.71 (d, $J = 8.8$ Hz, 1H), 7.53 (dd, $J = 1.8, 8.8$ Hz, 1H), 7.36-7.24 (m, 2H), 7.27-7.07 (m, 7H), 6.20 (s, 1H), 2.45 (s, 3H). ^{13}C NMR (150 MHz, CDCl_3): δ 184.5 (C), 159.3 (C), 156.6 (C), 152.8 (C), 150.2 (C), 147.9 (C), 137.4 (C), 131.7 (CH), 130.3 (C), 130.2 (CH x2), 129.72 (CH), 129.65 (CH), 128.9 (C), 128.7 (CH), 127.4 (CH x2), 126.4 (CH), 125.0 (CH), 116.7 (C), 115.3 (C), 113.5 (CH), 109.0 (CH), 29.6 (C), 19.5 (CH_3). EIMS m/z (relative intensity) 416 (14), 414 (M^+ , 34), 84 (100). HRMS Calcd. for $\text{C}_{25}\text{H}_{15}\text{ClO}_4$ 414.0659, found 414.0666. IR (neat): 2923, 2853, 1734, 1657, 1628, 1603, 1555, 1493, 1471, 1434, 1378, 1357, 1272, 1180, 1152, 1080 cm^{-1} .
48	^1H NMR (300 MHz, CDCl_3): δ 7.64-7.37 (m, 11H), 6.23 (d, $J = 1.2$ Hz, 1H), 2.50 (d, $J = 1.2$ Hz, 3H). ^{13}C NMR (75 MHz, CDCl_3): δ 184.0, 159.3, 156.5, 152.8, 150.0, 147.6, 138.1, 134.2, 132.7, 130.5, 129.6, 129.5, 129.4, 129.0, 127.8, 127.6, 124.6, 116.3, 115.4, 113.6, 109.0, 19.5.
49	^1H NMR (300 MHz, CDCl_3): δ 7.76-7.71 (m, 3H), 7.57 (d, $J = 8.7$ Hz, 1H), 7.48-7.44 (m, 2H), 7.38-7.32 (m, 3H), 7.29-7.24 (m, 2H), 6.25 (d, $J = 1.2$ Hz, 1H), 2.50 (d, $J = 1.2$ Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3): δ 184.1, 159.4, 156.4, 152.8, 150.0, 147.8, 139.2, 134.9, 131.0, 130.6, 129.4, 129.1, 128.9, 128.4, 127.9, 124.4, 116.3, 115.4, 113.6, 108.9, 19.5.
50	^1H NMR (300 MHz, CDCl_3): δ 7.75-7.34 (m, 11H), 6.25 (d, $J = 0.6$ Hz, 1H), 2.50 (d, $J = 0.6$ Hz, 3H). ^{13}C NMR (75 MHz, CDCl_3): δ 184.2, 159.4, 156.4, 152.8, 150.0, 147.8, 135.3, 131.4, 131.1, 130.6, 129.4, 129.2, 128.9, 128.0, 127.9, 124.5, 116.3, 115.4, 113.6, 108.9, 19.5.
51	^1H NMR (300 MHz, CDCl_3): δ 8.14-8.09 (m, 2H), 7.89-7.85 (m, 2H), 7.79 (d, $J = 9.0$ Hz, 1H), 7.59 (d, $J = 8.7$ Hz, 1H), 7.46-7.43 (m, 2H), 7.36-7.30 (m, 3H), 6.27 (d, $J = 0.9$ Hz, 1H), 2.52 (d, $J = 1.2$ Hz, 3H).
52	^1H NMR (300 MHz, CDCl_3): δ 7.87-7.83 (m, 2H), 7.73 (d, $J = 8.7$ Hz, 1H), 7.59-7.30 (m, 13H), 6.25 (d, $J = 1.2$ Hz, 1H), 2.49 (d, $J = 1.2$ Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3): δ 185.5, 159.5, 157.3, 156.4, 152.7, 150.1, 149.1, 132.8, 130.3, 130.0, 129.3, 128.5, 128.4, 127.9, 127.1, 124.2, 120.2, 116.6, 115.1, 113.3, 110.5, 109.0, 55.2, 19.5.
53	^1H NMR (300 MHz, CDCl_3): δ 8.23 (dd, $J = 7.8, 1.8$ Hz, 1H), 7.81-7.73 (m, 3H), 7.61-7.48 (m, 4H), 7.23-6.98 (m, 7H), 6.23 (d, $J = 0.9$ Hz, 1H), 2.50 (d, $J = 0.9$ Hz, 3H).
54	^1H NMR (300 MHz, CDCl_3): δ 8.31 (d, $J = 0.6$ Hz, 1H), 7.88-7.25 (m, 13H), 6.25 (d, $J = 0.6$ Hz, 1H), 2.49 (d, $J = 1.2$ Hz, 3H). ^{13}C NMR (75 MHz, CDCl_3): δ 185.3, 159.5, 156.5, 152.8, 149.9, 148.4, 135.3, 133.7, 132.1, 132.0, 130.6, 129.7, 129.4, 128.6, 128.5, 128.0, 127.8, 127.6, 126.6, 124.9, 124.1, 116.4, 115.3, 113.5, 109.0, 19.5.
55	^1H NMR (300 MHz, CDCl_3): δ 7.81-7.44 (m, 4H), 7.72-7.47 (m, 5H), 7.32-7.29 (m, 3H), 6.25 (d, $J = 1.2$ Hz, 1H), 2.51 (d, $J = 1.2$ Hz, 3H), 2.14 (s, 3H). ^{13}C NMR (75 MHz, CDCl_3): δ 184.0, 168.7, 159.7, 156.4, 153.2, 149.8, 148.3, 142.6, 131.8, 131.3, 130.5, 129.7, 128.7, 128.1, 127.8, 124.1, 118.3, 116.3, 115.4, 113.4, 109.0, 24.7, 19.6.
56	^1H NMR (300 MHz, CDCl_3): δ 7.67 (d, $J = 9.0$ Hz, 1H), 7.52 (d, $J = 8.7$ Hz, 1H), 7.40 (d, $J = 8.4$ Hz, 1H), 7.37-7.33 (m, 2H), 7.26-7.21 (m, 3H), 6.38 (dd, $J = 2.1, 8.4$ Hz, 1H), 6.20 (d, $J = 1.2$ Hz, 1H), 6.03 (d, $J = 2.4$ Hz, 1H), 3.76 (s, 3H), 3.52 (s, 3H), 2.46

	(s, 3H).
57	¹H NMR (300 MHz, CDCl ₃): δ 7.76 (d, <i>J</i> = 9.0 Hz, 1H), 7.56 (d, <i>J</i> = 9.0 Hz, 1H), 7.37-7.08 (m, 8H), 6.23 (d, <i>J</i> = 1.2 Hz, 1H), 2.49 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 159.3, 156.7, 152.7, 137.3, 135.9, 132.8, 130.6, 130.2, 129.7, 128.9, 128.8, 127.6, 126.8, 125.1, 115.4, 113.7, 109.0, 19.5.
58	¹H NMR (600 MHz, CDCl ₃): δ 7.73 (d, <i>J</i> = 8.9 Hz, 1H), 7.59-7.54 (m, 2H), 7.44-7.43 (m, 3H), 7.35-7.33 (m, 4H), 6.23 (q, <i>J</i> = 1.0 Hz, 1H), 2.48 (d, <i>J</i> = 1.0 Hz, 3H). ¹³C NMR (150 MHz, CDCl ₃): δ 182.9 (C), 159.3 (C), 156.5 (C), 152.7 (C), 150.0 (C), 147.4 (C), 137.3 (C), 136.1 (C), 132.6 (C), 131.6 (CH), 130.5 (CH x2), 130.2 (CH), 129.8 (C), 129.3 (C), 129.1 (CH), 128.5 (CH), 127.9 (CH x2), 124.8 (CH), 116.3 (C), 115.5 (C), 113.7 (CH), 108.9 (CH), 19.5 (CH ₃). EIMS <i>m/z</i> (relative intensity) 448 (M ⁺ , 100), 450 (59), 452 (12), 419 (31), 269 (56), 195 (80), 189 (51), 175 (47), 145 (67), 75 (62). HRMS Calcd. for C ₂₅ H ₁₄ Cl ₂ O ₄ 448.0269, found 448.0269. IR (neat): 1736, 1649, 1627, 1602, 1553, 1490, 1467, 1443, 1381, 1354, 1267, 1238, 1176, 1152, 1130, 1079, 1030, 1001 cm ⁻¹ .
59	¹H NMR (300 MHz, CDCl ₃): δ 7.72 (d, <i>J</i> = 8.7 Hz, 1H), 7.54 (d, <i>J</i> = 8.7 Hz, 1H), 7.49 (dd, <i>J</i> = 8.7, 1.8 Hz, 1H), 7.41-7.38 (m, 2H), 7.31-7.27 (m, 3H), 6.79 (td, <i>J</i> = 8.4, 2.4 Hz, 1H), 6.56-6.49 (m, 1H), 6.22 (s, 1H), 2.47 (s, 3H).
60	¹H NMR (600 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 8.9 Hz, 1H), 7.65-7.62 (m, 1H), 7.57-7.54 (m, 2H), 7.46-7.44 (m, 2H), 7.36-7.33 (m, 3H), 7.06 (dd, <i>J</i> = 8.4, 17.2 Hz, 1H), 6.24 (q, <i>J</i> = 1.0 Hz, 1H), 2.49 (d, <i>J</i> = 1.0 Hz, 3H). ¹³C NMR (150 MHz, CDCl ₃): δ 182.6 (C), 159.3 (C), 156.5 (C), 153.3 (dd, <i>J</i> = 256.2, 12.8 Hz, C), 152.7 (C), 150.0 (C), 149.9 (dd, <i>J</i> = 249.5, 13.1 Hz, C), 147.4 (C), 133.5 (C), 130.5 (CH x2), 129.5 (C), 129.4 (C), 129.1 (CH), 127.9 (CH x2), 126.8 (d, <i>J</i> = 4.1 Hz, CH), 124.69 (CH), 119.0 (d, <i>J</i> = 18.3 Hz, CH), 117.1 (d, <i>J</i> = 17.7 Hz, CH), 116.3 (C), 115.5 (C), 113.7 (CH), 108.9 (CH), 19.5 (CH ₃). EIMS <i>m/z</i> (relative intensity) 416 (M ⁺ , 100), 387 (33), 141 (70), 113 (60), 84 (52), 77 (17). HRMS Calcd. for C ₂₅ H ₁₄ F ₂ O ₄ 416.086, found 416.0857. IR (neat): 1737, 1656, 1650, 1604, 1555, 1514, 1493, 1473, 1430, 1379, 1355, 1289, 1236, 1203, 1161, 1111, 1079 cm ⁻¹ .
61	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 8.7 Hz, 1H), 7.56 (d, <i>J</i> = 8.7 Hz, 1H), 7.44-7.41 (m, 2H), 7.32-7.28 (m, 3H), 7.19-7.13 (m, 1H), 7.04-6.96 (m, 1H), 6.78 (td, <i>J</i> = 8.9, 4.4 Hz, 1H), 6.24 (d, <i>J</i> = 1.2 Hz, 1H), 2.490 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 180.9, 159.42, 159.38, 159.3, 157.11, 157.08, 156.97, 156.92, 156.6, 154.62, 154.59, 152.7, 150.2, 147.8, 130.5, 130.4, 129.0, 128.8, 127.55, 127.46, 127.37, 127.30, 125.1, 120.24, 120.15, 120.0, 119.9, 117.4, 117.3, 117.2, 117.1, 116.72, 116.68, 116.53, 116.47, 116.43, 115.4, 113.6, 109.0, 19.5.
62	¹H NMR (300 MHz, CDCl ₃): δ 7.71 (d, <i>J</i> = 9.0 Hz, 1H), 7.53 (d, <i>J</i> = 8.7 Hz, 1H), 7.40-7.36 (m, 2H), 7.28-7.20 (m, 3H), 7.19 (d, <i>J</i> = 7.5 Hz, 1H), 6.92 (s, 1H), 6.77 (d, <i>J</i> = 8.1 Hz, 1H), 6.23 (d, <i>J</i> = 1.2 Hz, 1H), 2.48 (d, <i>J</i> = 0.6 Hz, 3H), 2.38 (s, 3H), 2.25 (s, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 187.4, 159.5, 156.4, 152.8, 150.0, 148.8, 141.6, 137.7, 134.1, 131.7, 130.3, 129.9, 129.5, 128.7, 128.4, 127.5, 125.7, 124.3, 116.5, 115.2, 113.5, 109.0, 21.3, 19.9, 19.5.
63	¹H NMR (400 MHz, CDCl ₃): δ 7.77 (d, <i>J</i> = 6.6 Hz, 1H), 7.85-7.21 (m, 8H), 6.74 (d, <i>J</i> = 6.3 Hz, 1H), 6.29 (d, <i>J</i> = 0.9 Hz, 1H), 6.02 (s, 2H), 2.50 (d, <i>J</i> = 0.9 Hz, 3H).
64	¹H NMR (300 MHz, CDCl ₃): δ 7.85-7.32 (m, 8H), 7.76 (d, <i>J</i> = 8.7 Hz, 1H), 6.79 (d, <i>J</i> = 8.7 Hz, 1H), 6.29 (d, <i>J</i> = 1.2 Hz, 1H), 4.30-4.28 (m, 2H), 4.25-4.22 (m, 2H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H).

65	¹H NMR (300 MHz, CDCl ₃): δ 7.89 (br, NH), 7.73 (d, <i>J</i> = 8.7 Hz, 1H), 7.57 (d, <i>J</i> = 8.7 Hz, 1H), 7.52-7.45 (m, 3H), 7.36-7.34 (m, 3H), 7.24 (d, <i>J</i> = 1.8 Hz, 1H), 6.87 (d, <i>J</i> = 8.4 Hz, 1H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 4.65 (s, 2H), 2.51 (d, <i>J</i> = 0.9 Hz, 3H).
66	¹H NMR (300 MHz, CDCl ₃): δ 8.50 (t, <i>J</i> = 2.0 Hz, 1H), 8.25 (dd, <i>J</i> = 8.1, 1.2 Hz, 1H), 8.08 (d, <i>J</i> = 7.8 Hz, 1H), 7.79 (d, <i>J</i> = 8.7 Hz, 1H), 7.62 (d, <i>J</i> = 9.0 Hz, 1H), 7.51 (t, <i>J</i> = 8.0 Hz, 1H), 7.465-7.42 (m, 2H), 7.31-7.26 (m, 3H), 6.27 (s, 1H), 2.52 (d, <i>J</i> = 0.6 Hz, 3H).
67	LCMS [M + 1] ⁺ : 396.1.
68	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, <i>J</i> = 8.7 Hz, 1H), 7.78 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.46 (m, 2H), 7.37-7.27 (m, 5H), 7.18 (dd, <i>J</i> = 8.4, 8.4 Hz, 1H), 7.00-6.96 (m, 1H), 6.25 (d, <i>J</i> = 0.9 Hz, 1H), 3.98 (q, <i>J</i> = 6.9 Hz, 2H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H), 1.40 (t, <i>J</i> = 6.9 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.3, 159.5, 158.6, 156.4, 152.9, 149.9, 148.1, 137.7, 130.6, 129.7, 129.1, 128.8, 128.7, 127.7, 124.2, 122.4, 120.1, 116.3, 115.3, 114.3, 113.5, 109.0, 63.6, 19.6, 14.7.
69	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, <i>J</i> = 8.7 Hz, 1H), 7.77 (d, <i>J</i> = 8.7 Hz, 1H), 7.50-7.46 (m, 2H), 7.37-7.26 (m, 5H), 7.21-7.15 (m, 1H), 7.00-6.96 (m, 1H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 3.86 (d, <i>J</i> = 6.6 Hz, 2H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H), 1.81-1.72 (m, 2H), 1.02 (t, <i>J</i> = 7.5 Hz, 1H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.4, 159.5, 158.8, 156.4, 152.9, 149.9, 148.1, 137.7, 132.3, 130.6, 130.1, 129.7, 129.2, 129.1, 128.7, 128.6, 128.2, 127.9, 127.7, 124.2, 122.3, 120.1, 120.0, 116.3, 115.3, 114.5, 114.4, 113.502, 109.0, 69.6, 22.4, 19.6, 10.5.
70	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, <i>J</i> = 9.0 Hz, 1H), 7.58 (d, <i>J</i> = 8.7 Hz, 1H), 7.49-7.46 (m, 2H), 7.37-7.26 (m, 5H), 7.18 (dd, <i>J</i> = 7.8, 7.8 Hz, 1H), 7.00-6.96 (m, 1H), 6.25 (d, <i>J</i> = 1.2 Hz, 1H), 3.90 (t, <i>J</i> = 6.9 Hz, 2H), 2.60 (d, <i>J</i> = 1.2 Hz, 3H), 1.78-1.70 (m, 2H), 1.51-1.43 (m, 2H), 0.97 (t, <i>J</i> = 7.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.4, 159.5, 158.8, 156.4, 152.9, 149.9, 148.1, 137.7, 130.6, 129.7, 129.1, 128.7, 128.6, 127.7, 124.2, 122.3, 120.1, 116.3, 115.3, 114.4, 113.5, 109.0, 67.8, 31.1, 19.6, 19.2, 13.8.
71	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, <i>J</i> = 9.0 Hz, 1H), 7.77 (d, <i>J</i> = 9.0 Hz, 1H), 7.49-7.46 (m, 2H), 7.37-7.26 (m, 5H), 7.18 (dd, <i>J</i> = 7.8, 7.8 Hz, 1H), 7.00-6.96 (m, 1H), 6.25 (d, <i>J</i> = 0.9 Hz, 1H), 3.89 (t, <i>J</i> = 6.6 Hz, 2H), 2.50 (s, 3H), 1.78-1.73 (m, 2H), 1.44-1.36 (m, 4H), 0.93 (d, <i>J</i> = 6.9 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.4, 159.5, 158.8, 156.4, 152.9, 149.9, 148.1, 137.7, 130.6, 129.6, 129.0, 128.7, 128.6, 127.7, 124.2, 122.3, 120.1, 116.3, 115.3, 114.3, 113.5, 109.0, 68.1, 28.8, 28.1, 22.4, 19.6, 14.0.
72	¹H NMR (300 MHz, CDCl ₃): δ 7.69 (d, <i>J</i> = 9.0 Hz, 1H), 7.52 (d, <i>J</i> = 9.0 Hz, 1H), 7.49-7.46 (m, 2H), 7.37-7.26 (m, 5H), 7.19-7.14 (m, 1H), 6.99-6.95 (m, 1H), 6.21 (d, <i>J</i> = 0.9 Hz, 1H), 3.88 (t, <i>J</i> = 6.6 Hz, 2H), 2.45 (d, <i>J</i> = 0.9 Hz, 1H), 1.77-1.72 (m, 2H), 1.44-1.25 (m, 6H), 0.90 (d, <i>J</i> = 6.6 Hz, 1H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.1, 159.3, 158.7, 156.3, 152.8, 149.7, 148.0, 137.6, 130.5, 129.6, 129.0, 128.6, 128.4, 127.6, 124.1, 122.1, 119.9, 116.1, 115.2, 114.3, 113.3, 108.8, 68.0, 31.4, 28.9, 25.5, 22.4, 19.4, 13.9.
73	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 9.0 Hz, 1H), 7.59 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.45 (m, 2H), 7.42 (dt, <i>J</i> = 7.8, 1.2 Hz, 1H), 7.36-7.27 (m, 5H), 7.21 (t, <i>J</i> = 8.1 Hz, 1H), 7.02 (ddd, <i>J</i> = 8.1, 2.4, 0.9 Hz, 1H), 6.27 (d, <i>J</i> = 1.2 Hz, 1H), 4.18 (t, <i>J</i> = 6.0 Hz, 2H), 3.79 (t, <i>J</i> = 6.0 Hz, 2H), 2.51 (d, <i>J</i> = 1.2 Hz, 3H).
74	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 9.0 Hz, 1H), 7.59 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.46 (m, 2H), 7.39 (d, <i>J</i> = 7.5 Hz, 1H), 7.34~7.32 (m, 3H), 7.28-7.26 (m, 1H), 7.20 (t, <i>J</i>

	= 8.1 Hz, 1H), 6.99 (dd, $J = 7.2, 2.1$ Hz, 1H), 6.26 (d, $J = 1.2$ Hz, 1H), 4.06 (t, $J = 6.0$ Hz, 2H), 3.73 (t, $J = 6.0$ Hz, 2H), 2.52 (d, $J = 1.2$ Hz, 3H), 2.21 (quin, $J = 6.0$ Hz, 2H).
75	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, $J = 8.7$ Hz, 1H), 7.59 (d, $J = 8.7$ Hz, 1H), 7.50-7.47 (m, 2H), 7.37 (dt, $J = 7.8, 1.2$ Hz, 1H), 7.35-7.30 (m, 3H), 7.28-7.24 (m, 1H), 7.19 (t, $J = 7.8$ Hz, 1H), 6.98 (dd, $J = 7.2, 2.7$ Hz, 1H), 6.26 (s, 1H), 3.94 (t, $J = 6.0$ Hz, 2H), 3.62 (t, $J = 6.0$ Hz, 2H), 2.15 (d, $J = 1.2$ Hz, 3H), 1.98~1.90 (m, 4H).
76	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 8.7$ Hz, 1H), 7.58 (d, $J = 8.7$ Hz, 1H), 7.50-7.43 (m, 2H), 7.38 (dt, $J = 7.8, 1.2$ Hz, 1H), 7.34-7.30 (m, 4H), 7.22 (t, $J = 8.4$ Hz, 1H), 7.01 (dd, $J = 8.4, 2.7$ Hz, 1H), 6.26 (d, $J = 1.2$ Hz, 1H), 6.02 (dddd, $J = 17.4, 10.5, 5.4, 5.4$ Hz, 1H), 5.39 (ddd, $J = 17.1, 3.0, 1.8$ Hz, 1H), 5.30 (ddd, $J = 10.5, 3.0, 1.5$ Hz, 1H), 4.49 (ddd, $J = 5.7, 1.5, 1.5$ Hz, 2H), 2.51 (s, 3H).
77	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 9.0$ Hz, 1H), 7.58 (d, $J = 9.0$ Hz, 1H), 7.49-7.46 (m, 2H), 7.38-7.27 (m, 5H), 7.18 (t, $J = 7.8$ Hz, 1H), 6.99 (dd, $J = 8.1, 2.7$ Hz, 1H), 6.26 (d, $J = 0.9$ Hz, 1H), 5.93-5.81 (m, 1H), 5.16 (dd, $J = 17.1, 1.5$ Hz, 1H), 5.11 (dd, $J = 10.5, 1.2$ Hz, 1H), 3.95 (t, $J = 6.9$ Hz, 2H), 2.51 (t, $J = 6.9$ Hz, 2H), 2.51 (s, 3H).
78	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, $J = 9.0$ Hz, 1H), 7.57 (d, $J = 9.0$ Hz, 1H), 7.50-7.46 (m, 2H), 7.37-7.26 (m, 5H), 7.18 (t, $J = 8.1$ Hz, 1H), 7.00-6.97 (dd, $J = 8.1, 2.7$ Hz, 1H), 6.25 (s, 1H), 5.91-5.78 (m, 1H), 5.10-4.99 (m, 1H), 3.91 (t, $J = 6.0$ Hz, 2H), 2.50 (s, 3H), 2.22 (q, $J = 6.6$ Hz, 2H), 1.86 (quin, $J = 6.6$ Hz, 2H).
79	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, $J = 9.0$ Hz, 1H), 7.58 (d, $J = 9.0$ Hz, 1H), 7.50-7.45 (m, 2H), 7.37-7.27 (m, 5H), 7.18 (t, $J = 8.1$ Hz, 1H), 6.98 (ddd, $J = 8.1, 1.8, 0.9$ Hz, 1H), 6.25 (s, 1H), 5.90-5.76 (m, 1H), 5.08-4.96 (m, 2H), 4.90 (t, $J = 6.6$ Hz, 2H), 2.50 (s, 3H), 2.12 (q, $J = 7.5$ Hz, 2H), 1.78 (quin, $J = 6.6$ Hz, 2H), 1.60 (quin, $J = 7.5$ Hz, 2H).
80	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 8.7$ Hz, 1H), 7.56 (d, $J = 8.7$ Hz, 1H), 7.50-7.47 (m, 2H), 7.38 (dt, $J = 8.1, 1.2$ Hz, 1H), 7.35-7.29 (m, 4H), 7.20 (t, $J = 8.1$ Hz, 1H), 7.00 (ddd, $J = 8.1, 2.7, 1.2$ Hz, 1H), 6.27 (d, $J = 1.2$ Hz, 1H), 4.06 (t, $J = 5.7$ Hz, 2H), 3.74 (t, $J = 4.8$ Hz, 2H), 2.79 (t, $J = 5.7$ Hz, 2H), 2.57 (t, $J = 4.8$ Hz, 2H), 2.51 (d, $J = 1.2$ Hz, 3H).
81	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 8.7$ Hz, 1H), 7.58 (d, $J = 8.7$ Hz, 1H), 7.50-7.46 (m, 2H), 7.38~7.24 (m, 5H), 7.18 (t, $J = 8.4$ Hz, 1H), 6.89 (dd, $J = 8.4, 1.8$ Hz, 1H), 6.26 (d, $J = 1.2$ Hz, 1H), 3.97 (t, $J = 6.0$ Hz, 2H), 3.72 (t, $J = 4.8$ Hz, 4H), 2.51 (d, $J = 1.2$ Hz, 3H), 2.58~2.40 (m, 6H), 1.97 (quin, $J = 7.8$ Hz, 2H).
82	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 9$ Hz, 1H), 7.58 (d, $J = 9.0$ Hz, 1H), 7.50-7.47 (m, 2H), 7.38-7.32 (m, 4H), 7.28-7.26 (m, 1H), 7.18 (t, $J = 8.1$ Hz, 1H), 6.98 (ddd, $J = 8.1, 2.7, 0.9$ Hz, 1H), 6.26 (d, $J = 1.2$ Hz, 1H), 3.93 (t, $J = 6.0$ Hz, 2H), 3.72 (t, $J = 4.5$ Hz, 4H), 2.51 (d, $J = 1.2$ Hz, 3H), 2.46 (t, $J = 7.5$ Hz, 4H), 2.40 (t, $J = 7.5$ Hz, 2H), 1.82-1.63 (m, 4H).
83	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 9.0$ Hz, 1H), 7.59 (d, $J = 9.0$ Hz, 1H), 7.50-7.46 (m, 2H), 7.38-7.29 (m, 5H), 7.19 (t, $J = 8.1$ Hz, 1H), 7.00 (dt, $J = 8.1, 2.7$ Hz, 1H), 6.26 (d, $J = 1.2$ Hz, 1H), 4.06 (t, $J = 6.3$ Hz, 2H), 3.77 (t, $J = 6.3$ Hz, 2H), 2.51 (d, $J = 1.2$ Hz, 3H).
84	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 8.7$ Hz, 1H), 7.59 (d, $J = 8.7$ Hz, 1H), 7.49-7.46 (m, 2H), 7.37~7.25 (m, 5H), 7.18 (t, $J = 8.4$ Hz, 1H), 6.89 (dd, $J = 8.4, 2.4$ Hz, 1H), 6.26 (s, 1H), 3.95 (t, $J = 6.0$ Hz, 2H), 2.51 (s, 3H), 2.60~2.36 (m, 6H), 1.74-1.40 (m, 6H).

85	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 8.7 Hz, 1H), 7.59 (d, <i>J</i> = 8.7 Hz, 1H), 7.50-7.47 (m, 2H), 7.38-7.32 (m, 5H), 7.19 (t, <i>J</i> = 8.4 Hz, 1H), 6.98 (dd, <i>J</i> = 8.4, 2.7 Hz, 1H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 3.93 (s, 2H), 2.69-2.55 (m, 6H), 2.51 (s, 3H), 1.79-1.50 (m, 12H).
86	¹H NMR (300 MHz, CDCl ₃): δ 7.62 (d, <i>J</i> = 9 Hz, 1H), 7.50~7.21 (m, 9H), 7.11 (dd, <i>J</i> = 8.4, 2.1 Hz, 1H), 6.26 (s, 1H), 4.47 (t, <i>J</i> = 4.2 Hz, 2H), 3.43 (t, <i>J</i> = 4.2 Hz, 2H), 2.91 (s, 6H), 2.51 (s, 3H).
87	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 9.0 Hz, 1H), 7.59 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.45 (m, 2H), 7.37-7.24 (m, 5H), 7.18 (t, <i>J</i> = 8.1 Hz, 1H), 6.99 (ddd, <i>J</i> = 8.4, 2.7, 0.9 Hz, 1H), 6.27 (d, <i>J</i> = 1.2 Hz, 1H), 3.96 (t, <i>J</i> = 6.6 Hz, 2H), 2.52 (d, <i>J</i> = 1.2 Hz, 3H), 2.50 (t, <i>J</i> = 7.8 Hz, 2H), 2.30 (s, 6H), 1.97 (quin, <i>J</i> = 7.8 Hz, 2H).
88	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 8.7 Hz, 1H), 7.59 (d, <i>J</i> = 8.7 Hz, 1H), 7.49-7.47 (m, 2H), 7.38-7.32 (m, 5H), 6.99 (t, <i>J</i> = 8.7 Hz, 1H), 6.26 (s, 1H), 3.93 (t, <i>J</i> = 6.0 Hz, 2H), 2.51 (s, 3H), 2.45 (t, <i>J</i> = 7.2 Hz, 2H), 2.33 (s, 6H), 1.85-1.71 (m, 4H).
89	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 9.0 Hz, 1H), 7.53 (d, <i>J</i> = 9.0 Hz, 1H), 7.49-7.28 (m, 7H), 7.19 (t, <i>J</i> = 7.5 Hz, 1H), 7.00 (dd, <i>J</i> = 7.5, 2.7 Hz, 1H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 4.05 (t, <i>J</i> = 5.7 Hz, 2H), 2.81 (t, <i>J</i> = 5.7 Hz, 2H), 2.66 (bs, 4H), 2.57 (bs, 4H), 2.51 (d, <i>J</i> = 1.2 Hz, 3H), 2.35 (s, 3H).
90	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 8.7 Hz, 1H), 7.59 (d, <i>J</i> = 8.7 Hz, 1H), 7.50~7.47 (m, 2H), 7.38-7.32 (m, 4H), 7.27 (dd, <i>J</i> = 6.9, 2.4 Hz, 1H), 7.18 (t, <i>J</i> = 8.4 Hz, 1H), 6.99 (dd, <i>J</i> = 8.1, 2.4 Hz, 1H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 3.96 (t, <i>J</i> = 6.6 Hz, 2H), 2.51 (s, 3H), 2.53-2.33 (m, 10H), 2.92 (s, 3H), 1.95 (quin, <i>J</i> = 7.5 Hz, 2H).
91	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 8.7 Hz, 1H), 7.58 (d, <i>J</i> = 8.7 Hz, 1H), 7.49-7.45 (m, 2H), 7.37-7.27 (m, 5H), 7.18 (t, <i>J</i> = 8.4 Hz, 1H), 6.27 (ddd, <i>J</i> = 8.4, 2.4, 0.6 Hz, 1H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 3.89 (t, <i>J</i> = 6.6 Hz, 2H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H), 2.60-2.38 (m, 10H), 2.30 (d, <i>J</i> = 1.2 Hz, 3H), 1.75 (quin, <i>J</i> = 6.6 Hz, 4H).
92	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 8.7 Hz, 1H), 7.62-7.56 (m, 4H), 7.50-7.44 (m, 4H), 6.55 (dd, <i>J</i> = 1.8, 1.8 Hz, 1H), 6.25 (d, <i>J</i> = 1.2 Hz, 1H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 171.2, 170.7, 159.4, 156.2, 152.7, 151.0, 149.9, 147.6, 147.1, 130.4, 129.5, 128.8, 127.8, 124.3, 121.2, 116.5, 115.3, 113.6, 112.4, 108.8, 19.6.
94	¹H NMR (400 MHz, CDCl ₃): δ 7.77-7.72 (m, 1H), 7.61-7.58 (m, 2H), 7.56-7.44 (m, 3H), 7.22-7.21 (m, 1H), 6.26-6.21 (m, 3H), 2.51 (s, 3H), 2.40 (s, 3H).
95	¹H NMR (300 MHz, CDCl ₃): δ 8.11-8.10 (m, 1H), 7.76-7.71 (m, 2H), 7.63-7.60 (m, 3H), 7.58-7.26 (m, 3H), 7.16-7.14 (m, 1H), 6.25 (d, <i>J</i> = 1.2 Hz, 1H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 175.2, 161.69, 160.37, 155.09, 149.83, 149.60, 142.78, 135.99, 135.26, 134.98, 134.85, 129.59, 129.17, 128.66, 128.55, 126.48, 126.02, 113.56, 113.46, 113.01, 108.77, 107.84, 25.46.
96	¹H NMR (400 MHz, CDCl ₃): δ 8.30-8.29 (m, 1H), 7.73 (d, <i>J</i> = 8.8 Hz, 1H), 7.63-7.62 (m, 1H), 7.58-7.55 (m, 3H), 7.44-7.42 (m, 3H), 7.27-7.25 (m, 1H), 6.23 (d, <i>J</i> = 1.2 Hz, 1H), 2.48 (s, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 177.3, 159.4, 156.0, 153.0, 152.8, 149.8, 148.2, 140.3, 134.8, 133.3, 130.4, 129.7, 129.2, 128.8, 128.5, 128.2, 127.9, 127.8, 127.2, 126.8, 126.6, 126.5, 126.4, 125.6, 124.2, 116.5, 115.3, 113.5, 113.1, 108.8, 19.5.
97	¹H NMR (300 MHz, CDCl ₃): δ 7.76 (d, <i>J</i> = 8.7 Hz, 1H), 7.59-7.40 (m, 13H), 6.80 (s,

	1H), 6.26 (d, $J = 1.2$ Hz, 1H), 2.50 (d, $J = 1.2$ Hz, 3H).
98	¹H NMR (300 MHz, CDCl ₃): δ 7.89 (d, $J = 3.9$ Hz, 1H), 7.76 (d, $J = 9.0$ Hz, 1H), 7.62-7.48 (m, 7H), 7.13 (d, $J = 3.9$ Hz, 1H), 6.26 (d, $J = 0.8$ Hz, 1H), 2.51 (d, $J = 0.8$ Hz, 1H).
100	¹H NMR (300 MHz, CDCl ₃): δ 7.72 (d, $J = 9.0$ Hz, 1H), 7.62-7.39 (m, 7H), 6.91 (d, $J = 5.1$ Hz, 1H), 6.25 (d, $J = 1.2$ Hz, 1H), 2.49 (s, 3H), 2.50 (s, 3H).
101	¹H NMR (300 MHz, CDCl ₃): δ 9.67 (brs, 1H), 7.98-7.93 (m, 1H), 7.75-7.72 (m, 1H), 7.65-7.42 (m, 6H), 7.10-7.07 (m, 1H), 6.39-6.36 (m, 1H), 6.24 (s, 1H), 2.50 (s, 3H).
102	LCMS [M + 1] ⁺ : 384.1.
105	¹H NMR (400 MHz, CDCl ₃): δ 8.46-7.32 (m, 8H), 6.26 (d, $J = 0.6$ Hz, 1H), 2.52 (d, $J = 0.9$ Hz, 3H).
106	¹H NMR (400 MHz, CDCl ₃): δ 8.36 (s, 1H), 7.75 (d, $J = 8.8$ Hz, 1H), 7.64-7.61 (m, 2H), 7.59-7.42 (m, 9H), 6.26 (d, $J = 1.2$ Hz, 1H), 2.59 (s, 3H), 2.51 (d, $J = 0.8$ Hz, 3H).
107	¹H NMR (400 MHz, CDCl ₃): δ 7.94 (d, $J = 2.1$ Hz, 1H), 7.78-7.42 (m, 8H), 6.26 (d, $J = 0.6$ Hz, 1H), 2.51 (d, $J = 0.6$ Hz, 3H).
109	¹H NMR (300 MHz, CDCl ₃): δ 7.69 (d, $J = 9.0$ Hz, 1H), 7.54-7.46 (m, 6H), 6.21 (d, $J = 0.9$ Hz, 1H), 2.48 (d, $J = 1.2$ Hz, 3H), 2.11 (s, 8H), 1.80 (s, 7H). ¹³C NMR (75 MHz, CDCl ₃): δ 197.2, 159.8, 155.5, 153.0, 150.0, 148.7, 130.6, 130.2, 128.8, 128.0, 124.0, 116.7, 115.4, 113.8, 108.9, 47.3, 37.8, 36.9, 28.3, 19.8.
110	¹H NMR (300 MHz, CDCl ₃): δ 7.84-7.49 (m, 8H), 6.27 (d, $J = 0.6$ Hz, 1H), 4.50 (q, $J = 7.2$ Hz, 2H), 2.51 (d, $J = 0.6$ Hz, 3H), 1.26 (t, $J = 7.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 169.1, 165.9, 159.1, 159.0, 156.7, 156.6, 152.6, 150.2, 145.8, 132.4, 130.3, 129.6, 128.6, 128.0, 125.8, 116.6, 115.7, 114.0, 110.4, 109.0, 62.7, 29.7, 19.5, 14.1.
111	¹H NMR (600 MHz, CDCl ₃): δ 7.80-7.79 (m, 2H), 7.63-7.59 (m, 2H), 7.48-7.43 (m, 8H), 7.33 (s, 1H), 6.25 (s, 1H), 2.49 (s, 3H). ¹³C NMR (150 MHz, CDCl ₃): δ 170.2 (C), 165.4 (C), 162.8 (C), 159.3 (C), 156.6 (C), 152.8 (C), 150.1 (C), 146.3 (C), 131.8 (C), 130.6 (CH), 130.3 (CH x2), 129.5 (CH), 129.1 (CH x2), 128.9 (C), 128.0 (CH x2), 126.9 (CH x2, C), 125.5 (CH), 116.6 (C), 115.6 (C), 113.9 (CH), 109.1 (CH), 108.2 (CH), 19.6 (CH ₃). EIMS m/z (relative intensity): 447 (M ⁺ , 56), 176 (93), 148 (100), 91 (31), 84 (53), 77 (46), 71 (22), 57 (38), 51 (43). HRMS Calcd. for C ₂₈ H ₁₇ NO ₅ 447.1107, found 447.1106. IR (neat): 2917, 2849, 1736, 1657, 1649, 1599, 1572, 1552, 1492, 1468, 1421, 1352, 1288, 1250, 1228, 1204, 1167, 1080, 1052 cm ⁻¹ .
112	¹H NMR (300 MHz, CDCl ₃): δ 7.81 (d, $J = 8.7$ Hz, 1H), 7.75 (d, $J = 8.4$ Hz, 2H), 7.64-7.60 (m, 3H), 7.52-7.45 (m, 5H), 7.31 (s, 1H), 7.27 (s, $J = 0.9$ Hz, 1H), 2.59 (s, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 183.3, 159.2, 156.7, 152.7, 150.2, 147.7, 137.2, 135.8, 132.7, 130.6, 130.6, 130.2, 129.6, 128.82, 128.80, 127.6, 126.8, 125.2, 116.6, 115.4, 113.6, 109.0, 19.5.
113	¹H NMR (400 MHz, CDCl ₃): δ 7.89 (d, $J = 2.0$ Hz, 1H), 7.80 (d, $J = 8.4$ Hz, 1H), 7.66-7.59 (m, 4H), 7.56 (d, $J = 8.4$ Hz, 1H), 7.49-7.46 (m, 3H), 7.27 (s, 1H), 6.26 (s, 1H), 2.50 (s, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 169.8 (C), 165.8 (C), 160.9 (C), 159.1 (C), 156.6 (C), 152.6 (C), 150.2 (C), 146.2 (C), 134.9 (C), 133.5 (C), 132.0 (C), 131.2 (CH), 130.3 (CH x2), 129.6 (CH), 128.8 (C), 128.7 (CH), 128.0 (CH x2), 127.9 (C), 126.0 (CH), 125.6 (CH), 116.5 (C), 115.7 (C), 113.9 (CH), 109.0 (CH), 107.7 (CH), 19.5 (CH ₃). EIMS m/z (relative intensity): 519 (9), 517 (37), 515 (M ⁺ , 52), 269 (34), 195 (52), 176 (54), 148 (62), 86 (61), 84 (100), 75 (53). HRMS Calcd. for

	$C_{28}H_{15}Cl_2NO_5$ 515.0237, found 515.0329. IR (neat): 1736, 1657, 1602, 1555, 1493, 1468, 1425, 1363, 1287, 1173, 1080, 1031 cm^{-1} .
114	1H NMR (600 MHz, $CDCl_3$): δ 7.79 (d, J = 8.9 Hz, 1H), 7.67 (d, J = 8.4 Hz, 1H), 7.60-7.58 (m, 3H), 7.53-7.52 (m, 2H), 7.48-7.46 (m, 3H), 7.36 (dd, J = 1.8, 3.0 Hz, 1H), 6.25 (s, 1H), 2.49 (s, 3H). ^{13}C NMR (150 MHz, $CDCl_3$): δ 170.1 (C), 165.0 (C), 160.5 (C), 159.1 (C), 156.6 (C), 152.6 (C), 146.2 (C), 150.2 (C), 137.0 (C), 133.6 (C), 132.0 (C), 131.8 (CH), 130.4 (CH), 130.3 (CH x2), 129.5 (CH), 128.8 (C), 128.0 (CH x2), 127.8 (C), 125.8 (C), 125.5 (CH), 116.6 (C), 115.6 (C), 113.9 (CH), 111.1 (CH), 109.0 (CH), 19.6 (CH ₃). EIMS m/z (relative intensity): 515 (73), 195 (91), 117 (78), 85 (48), 71 (70), 57 (100). HRMS Calcd. for $C_{28}H_{15}Cl_2NO_5$ 515.0327, found 515.0328. IR (neat): 2923, 2851, 1736, 1656, 1603, 1569, 1551, 1493, 1437, 1384, 1355, 1288, 1230, 1208, 1171, 1080, 1029 cm^{-1} .
115	1H NMR (300 MHz, $CDCl_3$): δ 8.25-8.24 (m, 1H), 7.80-7.77 (m, 1H), 7.74-7.67 (m, 2H), 7.58 (d, J = 9.0 Hz, 1H), 7.42-7.38 (m, 2H), 7.25-7.20 (m, 4H), 6.24 (d, J = 1.2 Hz, 1H), 2.49 (d, J = 1.2 Hz, 3H).
116	1H NMR (400 MHz, $CDCl_3$): δ 9.00 (s, 1H), 6.65 (d, J = 4.0 Hz, 1H), 8.05-8.02 (m, 1H), 7.77 (d, J = 9.0 Hz, 1H), 7.59 (d, J = 9.0 Hz, 1H), 7.49-7.47 (m, 2H), 7.37-7.34 (m, 3H), 7.27-7.23 (m, 1H), 6.26 (q, J = 1.2 Hz, 1H), 2.50 (d, J = 1.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 183.5 (C), 159.3 (C), 156.6 (C), 152.9 (CH), 152.7 (C), 150.6 (CH), 150.1 (C), 147.5 (C), 136.6 (CH), 132.5 (C), 130.7 (CH x2), 130.0 (C), 129.2 (C), 129.18 (CH), 128.0 (CH x2), 124.9 (CH), 123.0 (CH), 116.4 (C), 115.5 (C), 113.8 (CH), 109.0 (CH), 19.5 (CH ₃). EIMS m/z (relative intensity) 381 (M^+ , 7), 279 (10), 88 (10), 86 (63), 84 (100), 71 (15), 57 (22), 51 (34). HRMS Calcd. for $C_{24}H_{15}ClO_4$ 381.1001, found 381.1006. IR (neat): 2924, 2854, 1731, 1650, 1626, 1602, 1585, 1553, 1492, 1471, 1446, 1416, 1380, 1366, 1263, 1178, 1153, 1080, 1063 cm^{-1} .
117	1H NMR (300 MHz, $CDCl_3$): δ 8.62-8.60 (m, 1H), 7.78 (d, J = 9.3 Hz, 1H), 7.59-7.52 (m, 2H), 7.47-7.44 (m, 1H), 7.37-7.27 (m, 2H), 6.25 (d, J = 1.2 Hz, 1H), 2.50 (d, J = 1.2 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$): δ 184.0, 159.2, 156.5, 152.7, 150.1, 150.0, 147.1, 143.3, 130.6, 130.5, 129.3, 129.0, 127.8, 125.1, 122.3, 116.2, 115.5, 113.7, 108.9, 19.5.
118	1H NMR (300 MHz, $CDCl_3$): δ 7.86-7.83 (m, 2H), 7.61-7.58 (m, 2H), 7.46-7.41 (m, 2H), 7.26-7.08 (m, H), 6.95 (d, J = 8.7 Hz, 1H), 6.12 (s, 1H), 5.12 (s, 2H), 2.39 (s, 3H).
119	1H NMR (300 MHz, $CDCl_3$): δ 7.73-7.51 (m, 7H), 6.21 (s, 1H), 2.48 (s, 3H), 2.34 (d, J = 0.8 Hz, 3H). ^{13}C NMR (75 MHz, $CDCl_3$): δ 188.7, 159.3, 155.9, 152.7, 150.1, 148.2, 130.3, 130.0, 129.2, 128.4, 128.2, 127.9, 124.6, 117.0, 115.2, 113.5, 108.8, 28.5, 19.4.
120	1H NMR (400 MHz, $CDCl_3$): δ 7.78-7.76 (m 2H), 7.54-7.50 (m, 2H), 7.40-7.36 (m, 2H), 7.22-7.19 (m, 1H), 6.11 (d, J = 1.2 Hz, 1H), 3.66 (s, 3H), 2.35 (d, J = 0.8 Hz, 1H).
121	1H NMR (300 MHz, $CDCl_3$): δ 7.70 (d, J = 8.7 Hz, 1H), 7.57-7.52 (m, 3H), 7.51-7.47 (m, 3H), 6.22 (d, J = 1.2 Hz, 1H), 4.30 (q, J = 7.1 Hz, 2H), 2.48 (d, J = 1.2 Hz, 3H), 1.22 (t, J = 7.2 Hz, 3H).
122	1H NMR (300 MHz, $CDCl_3$): δ 7.70 (d, J = 9.0 Hz, 1H), 7.54-7.46 (m, 6H), 6.22 (d, J = 1.2 Hz, 1H), 2.48 (d, J = 1.2 Hz, 3H), 1.40 (s, 9H).
127	1H NMR (300 MHz, $CDCl_3$): δ 7.71 (d, J = 9.0 Hz, 1H), 7.68-7.42 (m, 6H), 6.22 (d, J = 1.2 Hz, 1H), 3.70 (m, 1H), 2.93-1.07 (m, 10H), 2.59 (s, 3H).
128	1H NMR (300 MHz, $CDCl_3$): δ 7.65-7.61 (m, 2H), 7.56-7.42 (m, 5H), 6.23 (d, J = 0.9

	Hz, 1H), 2.48 (d, $J = 0.9$ Hz, 3H).
129	¹H NMR (300 MHz, CDCl ₃): δ 7.62-7.57 (m, 3H), 7.54-7.43 (m, 4H), 2.67 (s, 3H).
130	¹H NMR (300 MHz, CDCl ₃): δ 7.65-7.61 (m, 3H), 7.56-7.45 (m, 6H), 7.39-7.29 (m, 3H), 6.25 (d, $J = 0.9$ Hz, 1H), 2.44 (d, $J = 1.2$ Hz, 3H). LCMS $[M + 1]^+$: 353.1.
131	¹H NMR (300 MHz, CDCl ₃): δ 7.53-7.36 (m, 7H), 6.17 (d, $J = 1.2$ Hz, 1H), 2.77 (t, $J = 7.5$ Hz, 2H), 2.44 (d, $J = 0.9$ Hz, 3H), 1.79 (h, $J = 7.5$ Hz, 2H), 0.96 (t, $J = 7.5$ Hz, 3H).
132	¹H NMR (300 MHz, CDCl ₃): δ 8.05 (d, $J = 7.5$ Hz, 2H), 7.56 (d, $J = 8.7$ Hz, 1H), 7.60-7.39 (m, 6H), 7.06-7.01 (m, 1H), 6.85-6.79 (m, 1H), 6.28 (d, $J = 1.2$ Hz, 1H), 2.51 (d, $J = 1.2$ Hz, 3H).
133	¹H NMR (300 MHz, CDCl ₃): δ 7.81 (d, $J = 7.2$ Hz, 2H), 7.76 (d, $J = 8.7$ Hz, 1H), 7.59 (d, $J = 8.7$ Hz, 1H), 7.50 (dd, $J = 7.5, 7.5$ Hz, 2H), 7.37 (d, $J = 8.1$ Hz, 1H), 7.34-7.26 (m, 2H), 7.18 (d, $J = 9.9$ Hz, 1H), 7.04 (t, $J = 8.7$ Hz, 1H), 6.27 (s, 1H), 2.51 (s, 3H).
134	¹H NMR (300 MHz, CDCl ₃): δ 7.80-7.72 (m, 3H), 7.55 (d, $J = 9.0$ Hz, 1H), 7.52-7.44 (m, 3H), 7.36-7.31 (m, 2H), 7.04-6.99 (m, 2H), 6.25 (d, $J = 1.2$ Hz, 1H), 2.49 (d, $J = 1.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.2, 164.5, 161.2, 159.4, 156.3, 152.9, 149.8, 148.1, 136.4, 133.0, 132.5, 132.4, 129.6, 128.1, 127.6, 125.6, 125.5, 124.3, 115.3, 115.0, 114.7, 113.5, 108.9, 19.5.
135	¹H NMR (400 MHz, CDCl ₃): δ 7.85 (d, $J = 6.8$ Hz, 2H), 7.74 (d, $J = 8.8$ Hz, 1H), 7.59 (d, $J = 8.8$ Hz, 1H), 7.49 (t, $J = 7.6$ Hz, 1H), 7.40 (d, $J = 7.6$ Hz, 1H), 7.38-7.32 (m, 3H), 7.13-7.08 (m, 4H), 6.25 (d, $J = 1.2$ Hz, 1H), 2.45 (d, $J = 1.2$ Hz, 3H).
136	¹H NMR (300 MHz, CDCl ₃): δ 7.83 (d, $J = 7.2$ Hz, 2H), 7.76 (d, $J = 9.0$ Hz, 1H), 7.58 (d, $J = 9.0$ Hz, 1H), 7.56-7.53 (m, 3H), 7.48-7.37 (m, 4H), 6.28 (s, 1H), 2.52 (s, 3H).
137	¹H NMR (300 MHz, CDCl ₃): δ 7.82-7.78 (m, 2H), 7.75 (d, $J = 9.3$ Hz, 1H), 7.57 (d, $J = 8.7$ Hz, 1H), 7.54-7.49 (m, 1H), 7.45-7.42 (m, 2H), 7.38-7.30 (m, 4H), 6.27 (d, $J = 1.2$ Hz, 1H), 2.51 (d, $J = 0.9$ Hz, 3H).
138	¹H NMR (300 MHz, CDCl ₃): δ 7.81-7.74 (m, 3H), 7.59-7.44 (m, 5H), 7.38-7.33 (m, 2H), 7.28-7.22 (m, 1H), 6.27 (d, $J = 1.2$ Hz, 1H), 2.51 (d, $J = 1.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.1, 159.2, 156.3, 152.8, 149.7, 148.3, 136.4, 133.6, 133.1, 131.7, 129.5, 129.23, 129.15, 128.2, 127.1, 124.4, 121.6, 116.0, 115.4, 113.7, 108.9, 19.5.
139	¹H NMR (300 MHz, CDCl ₃): δ 7.81-7.74 (m, 3H), 7.60-7.44 (m, 5H), 7.38-7.33 (m, 2H), 7.28-7.22 (m, 1H), 6.23 (d, $J = 1.2$ Hz, 1H), 2.46 (d, $J = 1.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.1, 159.2, 156.3, 152.8, 149.7, 148.3, 136.4, 133.6, 133.1, 131.7, 129.5, 129.23, 129.15, 128.2, 127.1, 124.4, 121.6, 116.0, 115.4, 113.7, 108.9, 19.5.
140	¹H NMR (300 MHz, CDCl ₃): δ 7.81-7.73 (m, 3H), 7.58-7.45 (m, 4H), 7.39-7.26 (m, 4H), 6.27 (s, 1H), 2.50 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.2, 159.4, 156.3, 152.9, 152.8, 149.8, 148.2, 136.5, 133.6, 133.1, 132.2, 131.7, 131.0, 129.7, 129.5, 129.24, 129.17, 128.6, 128.2, 127.5, 124.4, 124.4, 123.2, 121.6, 116.0, 115.4, 113.7, 113.6, 109.0, 19.6.
141	¹H NMR (300 MHz, CDCl ₃): δ 7.76-7.72 (m, 3H), 7.57 (d, $J = 9.0$ Hz, 1H), 7.46-7.41 (m, 1H), 7.33-7.20 (m, 5H), 7.10 (d, $J = 7.5$ Hz, 1H), 6.25 (d, $J = 0.9$ Hz, 1H), 2.50 (d, $J = 0.9$ Hz, 3H), 2.25 (s, 3H).
142	¹H NMR (300 MHz, CDCl ₃): δ 7.78-7.68 (m, 3H), 7.53-7.45 (m, 2H), 7.42-7.27 (m,

	4H), 7.13-7.10 (m, 2H), 6.22(s, 1H), 2.46 (s, 3H), 2.32 (s, 3H). ¹³ C NMR (75 MHz, CDCl ₃): δ 185.4, 159.5, 156.3, 152.9, 149.8, 147.9, 138.4, 136.5, 132.7, 130.5, 129.6, 128.7, 128.4, 128.0, 127.8, 126.4, 124.1, 116.2, 115.2, 113.3, 108.8, 21.3, 19.4.
143	¹ H NMR (300 MHz, CDCl ₃): δ 7.88-7.76 (m, 5H), 7.75-7.51 (m, 4H), 7.43-7.38 (m, 2H), 6.27 (d, <i>J</i> = 1.2 Hz, 1H), 2.51 (d, <i>J</i> = 1.2 Hz, 3H). ¹³ C NMR (75 MHz, CDCl ₃): δ 184.6, 159.0, 156.1, 152.7, 149.6, 148.5, 136.3, 134.8, 134.1, 133.3, 132.2, 131.3, 129.7, 128.7, 128.4, 126.3, 124.7, 118.4, 115.9, 115.6, 113.8, 112.1, 109.0, 19.5.
144	¹ H NMR (300 MHz, CDCl ₃): δ 8.25-7.61 (m, 11H), 6.21 (s, 1H), 2.51 (d, <i>J</i> = 1.2 Hz, 3H). LCMS [M + 1] ⁺ : 426.0.
145	¹ H NMR (300 MHz, CDCl ₃): δ 8.27-8.24 (m, 2H), 7.90-7.80 (m, 2H), 7.77-7.70 (m, 3H), 7.70-7.53 (m, 2H), 7.44-7.27 (m, 2H), 6.28 (d, <i>J</i> = 0.9 Hz, 1H), 2.52 (d, <i>J</i> = 0.9 Hz, 3H). ¹³ C NMR (75 MHz, CDCl ₃): δ 184.6, 159.1, 156.2, 152.8, 147.9, 136.9, 136.3, 133.5, 131.5, 130.2, 129.8, 129.5, 128.4, 128.2, 126.4, 124.7, 123.0, 115.7, 113.9, 109.1, 19.5.
146	¹ H NMR (300 MHz, CDCl ₃): δ 7.75-7.30 (m, 11H), 6.21 (s, 1H), 3.82 (s, 2H), 2.33 (s, 3H).
147	¹ H NMR (300 MHz, CDCl ₃): δ 7.89-7.21 (m, 14H), 6.22 (s, 1H), 2.47 (s, 3H).
148	¹ H NMR (400 MHz, CDCl ₃): δ 7.85 (d, <i>J</i> = 7.2 Hz, 2H), 7.74 (d, <i>J</i> = 8.8 Hz, 1H), 7.59 (d, <i>J</i> = 8.7 Hz, 1H), 7.47 (t, <i>J</i> = 7.2 Hz, 1H), 7.40-7.33 (m, 4H), 7.13-7.12 (m, 2H), 6.25 (d, <i>J</i> = 1.2 Hz, 1H), 2.50 (s, 3H).
149	¹ H NMR (300 MHz, CDCl ₃): δ 7.85 (dd, <i>J</i> = 8.7, 1.8 Hz, 2H), 7.58 (d, <i>J</i> = 8.7 Hz, 2H), 7.62 (d, <i>J</i> = 8.7 Hz, 1H), 7.54 (d, <i>J</i> = 7.5 Hz, 1H), 7.43 (d, <i>J</i> = 7.5 Hz, 1H), 7.39 (d, <i>J</i> = 1.8 Hz, 2H), 7.35 (dd, <i>J</i> = 1.8, 1.8 Hz, 1H), 6.28 (d, <i>J</i> = 1.2 Hz, 1H), 2.51 (d, <i>J</i> = 1.2 Hz, 3H).
150	¹ H NMR (300 MHz, CDCl ₃): δ 7.84 (d, <i>J</i> = 6.9 Hz, 2H), 7.76 (d, <i>J</i> = 9.0 Hz, 1H), 7.64 (t, <i>J</i> = 1.8 Hz, 1H), 7.59-7.53 (m, 4H), 7.43 (t, <i>J</i> = 6.0 Hz, 2H), 6.29 (d, <i>J</i> = 1.5 Hz, 1H), 2.52 (d, <i>J</i> = 1.5 Hz, 3H). LCMS [M + 1] ⁺ : 539.9.
151	¹ H NMR (300 MHz, CDCl ₃): δ 9.13 (t, <i>J</i> = 2.1 Hz, 1H), 8.81 (t, <i>J</i> = 2.1 Hz, 2H), 7.92 (dd, <i>J</i> = 8.4, 1.5 Hz, 2H), 7.83 (d, <i>J</i> = 9.0 Hz, 1H), 7.65-7.61 (m, 2H), 7.50 (t, <i>J</i> = 7.2 Hz, 2H), 6.28 (d, <i>J</i> = 0.9 Hz, 1H), 2.51 (d, <i>J</i> = 0.9 Hz, 3H).
153	¹ H NMR (300 MHz, CDCl ₃): δ 8.05-8.01 (m, 2H), 7.83 (s, 1H), 7.83-7.68 (m, 2H), 7.66-7.28 (m, 3H), 6.32 (d, <i>J</i> = 0.9 Hz, 1H), 2.53 (s, 3H). ¹³ C NMR (75 MHz, CDCl ₃): 183.7, 160.1, 157.6, 153.3, 152.6, 149.0, 136.6, 133.3, 129.3, 128.7, 124.5, 117.0, 115.1, 113.6, 113.4, 109.1, 22.6.
154	¹ H NMR (300 MHz, CDCl ₃): δ 8.06-8.03 (m, 2H), 7.67 (d, <i>J</i> = 8.7 Hz, 1H), 7.64-7.60 (m, 1H), 7.56-7.51 (m, 3H), 7.45 (d, <i>J</i> = 8.7 Hz, 1H), 6.29 (d, <i>J</i> = 1.2 Hz, 1H), 2.91 (s, 3H), 2.51 (d, <i>J</i> = 0.9 Hz, 3H).
155	¹ H NMR (300 MHz, CDCl ₃): δ 8.06-7.44 (m, 7H), 6.32 (d, <i>J</i> = 1.2 Hz, 1H), 3.37 (t, <i>J</i> = 5.4 Hz, 2H), 2.52 (d, <i>J</i> = 1.2 Hz, 3H), 2.52 (d, <i>J</i> = 1.2 Hz, 3H), 1.87 (sex, <i>J</i> = 7.2 Hz, 2H), 1.07 (t, <i>J</i> = 7.2 Hz, 3H).
156	¹ H NMR (300 MHz, CDCl ₃): δ 8.07-8.03 (m, 2H), 7.69-7.43 (m, 5H), 6.30 (s, 1H), 2.57 (d, <i>J</i> = 1.2 Hz, 3H), 1.83-1.34 (m, 8H), 0.89 (t, <i>J</i> = 7.2 Hz, 3H). ¹³ C NMR (75 MHz, CDCl ₃): δ 185.4, 159.9, 159.8, 156.2, 153.1, 153.0, 150.2, 148.5, 148.3, 137.6, 132.8, 132.2, 131.8, 129.6, 128.6, 128.3, 128.1, 124.0, 117.43, 117.35, 114.9, 113.2, 108.8,

	39.3, 31.6, 29.9, 28.4, 25.1, 23.3, 22.4, 19.5, 14.0.
157	¹H NMR (300 MHz, CDCl ₃): δ 8.06-7.52 (m, 7H), 6.31 (d, <i>J</i> = 1.2 Hz, 1H), 3.38 (t, <i>J</i> = 7.5 Hz, 2H), 2.52 (d, <i>J</i> = 1.2 Hz, 3H), 1.80 (quin, <i>J</i> = 7.8 Hz, 2H), 1.62-1.26 (m, 6H), 0.87 (t, <i>J</i> = 6.9 Hz, 3H).
158	¹H NMR (300 MHz, CDCl ₃): δ 8.06-7.44 (m, 7H), 6.31 (s, 1H), 3.38 (t, <i>J</i> = 7.5 Hz, 2H), 2.51 (s, 3H), 1.80 (quin, <i>J</i> = 7.5 Hz, 2H), 1.63 (bs, 2H), 1.48 (quin, <i>J</i> = 7.2 Hz, 2H), 1.43 (bs, 10H), 0.86 (t, <i>J</i> = 6.3 Hz, 3H).
159	¹H NMR (300 MHz, CDCl ₃): δ 7.84-7.24 (m, 9H), 6.48-6.46 (m, 1H), 6.28 (s, 1H), 2.49 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.5, 159.6, 156.4, 153.0, 149.3, 148.0, 143.3, 142.8, 136.8, 133.0, 129.2, 128.3, 124.1, 116.9, 115.4, 114.6, 114.4, 113.3, 111.9, 108.9, 19.5.
160	¹H NMR (300 MHz, CDCl ₃): δ 7.83-7.29 (m, 10H), 6.26 (d, <i>J</i> = 0.6 Hz, 1H), 2.48 (d, <i>J</i> = 0.6 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.2, 159.5, 156.2, 152.9, 149.7, 148.5, 136.4, 133.1, 131.3, 129.5, 129.2, 128.3, 128.2, 126.8, 124.3, 120.9, 116.0, 115.4, 113.5, 108.9, 19.5.
161	¹H NMR (300 MHz, CDCl ₃): δ 8.17-7.95 (m, 4H), 7.77-7.30 (m, 10H), 6.37 (s, 1H), 2.55 (s, 3H).
165	¹H NMR (400 MHz, CDCl ₃): δ 7.95-7.93 (m, 2H), 7.67 (d, <i>J</i> = 8.8 Hz, 1H), 7.64-7.60 (m, 1H), 7.53-7.49 (m, 2H), 7.43 (d, <i>J</i> = 8.8 Hz, 1H), 6.30 (q, <i>J</i> = 1.2 Hz, 1H), 3.68 (tt, <i>J</i> = 3.6, 12.4 Hz, 1H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H), 2.34-2.23 (m, 2H), 1.89-1.85 (m, 2H), 1.74-1.71 (m, 3H), 1.65-1.42 (m, 1H), 1.42-1.33 (m, 2H). ¹³C NMR (100 MHz, CDCl ₃): δ 186.5 (C), 159.8 (C), 156.8 (C), 153.1 (C), 149.4 (C), 148.1 (C), 137.9 (C), 135.0 (C), 133.1 (CH), 129.7 (CH x2), 128.4 (CH x2), 123.8 (CH), 117.1 (C), 115.1 (C), 113.0 (CH), 108.9 (CH), 35.1 (CH), 30.6 (CH ₂ x2), 26.7 (CH ₂ x2), 25.5 (CH ₂), 19.7 (CH ₃). EIMS <i>m/z</i> (relative intensity) 386 (M ⁺ , 54), 329 (24), 317 (100), 203 (28), 105 (55), 78 (62), 63 (90), 57 (63). HRMS Calcd. for C ₂₅ H ₁₂ O ₄ 386.1518, found 386.1518. IR (neat): 3058, 2923, 2852, 1738, 1636, 1599, 1538, 1468, 1447 cm ⁻¹ .
166	¹H NMR (600MHz, CDCl ₃): δ 7.75 (d, <i>J</i> = 8.0 Hz, 1H), 7.72 (d, <i>J</i> = 8.8 Hz, 1H), 7.56 (d, <i>J</i> = 8.8 Hz, 1H), 7.46-7.39 (m, 3H), 7.34-7.14 (m, 6H), 6.23 (s, 1H), 2.48 (s, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 220.0 (C), 159.4 (C), 157.4 (C), 154.8 (C), 152.8 (C), 150.4 (C), 145.4 (C), 131.8 (CH), 130.8 (CH x2), 130.3 (C), 129.0 (CH x2), 128.3 (CH), 127.6 (CH x3), 124.7 (C), 124.3 (CH), 117.2 (C), 115.4 (C), 113.4 (CH), 108.8 (CH), 19.5 (CH ₃). EIMS <i>m/z</i> (relative intensity) 396 (M ⁺ , 60), 378 (100), 367 (26), 189 (10), 105 (32), 83 (75), 77 (20). HRMS Calcd. for C ₂₅ H ₁₆ O ₃ S 396.082, found 396.0823. IR (neat): 2918, 2851, 1735, 1647, 1600, 1541, 1488, 1443, 1381, 1356, 1155, 1078 cm ⁻¹ .
170	¹H NMR (300 MHz, CDCl ₃): δ 7.60-7.55 (m, 2H), 7.52-7.44 (m, 6H), 7.43-7.29 (m, 4H), 6.18 (d, <i>J</i> = 1.2 Hz, 1H), 5.97 (s, 1H), 2.76 (s, 1H), 2.44 (d, <i>J</i> = 0.9 Hz, 3H).
171	LCMS [M + 1] ⁺ : 396.1
172	¹H NMR (300 MHz, CDCl ₃): δ 7.58-7.54 (m, 2H), 7.52-7.44 (m, 6H), 7.42-7.28 (m, 4H), 6.18 (d, <i>J</i> = 1.2 Hz, 1H), 5.96 (d, <i>J</i> = 5.4 Hz, 1H), 2.76 (d, <i>J</i> = 5.4 Hz, 1H), 2.44 (d, <i>J</i> = 1.2 Hz, 3H). LCMS [M + 1] ⁺ : 383.0.
173	¹H NMR (300 MHz, CDCl ₃): δ 7.57-7.23 (m, 12H), 6.19 (d, <i>J</i> = 0.9 Hz, 1H), 4.15 (s, 2H), 2.25 (d, <i>J</i> = 0.9 Hz, 3H). LCMS [M + 1] ⁺ : 367.1.
174	LCMS [M + 1] ⁺ : 438.1

175	LCMS $[M + 1]^+$: 486.1
176	LCMS $[M + 1]^+$: 410.1
177	^1H NMR (300 MHz, CD_3OD): δ 7.82 (d, J = 8.7 Hz, 1H), 7.55 (d, J = 8.7 Hz, 1H), 7.41-7.01 (m, 9H), 6.21 (d, J = 1.2 Hz, 1H), 4.06-3.54 (m, 12H), 2.47 (d, J = 0.9 Hz, 3H).
178	^1H NMR (300 MHz, CD_3OD): δ 7.91 (d, J = 8.7 Hz, 1H), 7.63 (d, J = 9.0 Hz, 1H), 7.46-7.03 (m, 9H), 6.27 (d, J = 1.2 Hz, 1H), 4.09-3.58 (m, 16H), 2.52 (d, J = 1.2 Hz, 3H).
179	^1H NMR (400 MHz, CDCl_3): δ 7.74 (d, J = 8.8 Hz, 1H), 7.58 (d, J = 8.8 Hz, 1H), 7.49-7.32 (m, 7H), 7.19 (t, J = 8.0 Hz, 1H), 7.00 (dd, J = 8.0, 2.4 Hz, 1H), 6.26 (d, J = 1.2 Hz, 1H), 3.74 (d, J = 5.8 Hz, 2H), 2.51 (d, J = 1.2 Hz, 3H), 1.25 (bs, 1H), 0.65 (q, J = 5.8 Hz, 2H), 0.34 (q, J = 4.8 Hz, 2H).
180	^1H NMR (300 MHz, CDCl_3): δ 7.75 (d, J = 8.7 Hz, 1H), 7.64 (dt, J = 8.1, 1.2 Hz, 1H), 7.58 (d, J = 8.7 Hz, 1H), 7.56-7.18 (m, 8H), 6.26 (d, J = 1.2 Hz, 1H), 2.51 (d, J = 1.2 Hz, 3H), 2.30 (s, 3H).
181	^1H NMR (300 MHz, CDCl_3): δ 7.75 (d, J = 9.0 Hz, 1H), 7.59 (d, J = 9.0 Hz, 1H), 7.63-7.19 (m, 9H), 6.26 (s, 1H), 2.51 (s, 3H), 1.83-1.79 (m, 1H), 1.19-1.10 (m, 2H), 1.09-1.00 (m, 2H).
182	^1H NMR (300 MHz, CDCl_3): δ 7.75 (d, J = 9.0 Hz, 1H), 7.64 (dt, J = 7.8, 1.5 Hz, 1H), 7.60-7.23 (m, 9H), 6.66 (dd, J = 17.4, 1.5 Hz, 1H), 6.26 (d, J = 1.2 Hz, 1H), 6.04 (dd, J = 10.5, 1.2 Hz, 1H), 2.51 (d, J = 1.2 Hz, 3H).
183	^1H NMR (300 MHz, CDCl_3): δ 7.73 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.45-7.29 (m, 7H), 7.00 (ddd, J = 8.4, 2.4, 0.9 Hz, 1H), 6.25 (d, J = 1.2 Hz, 1H), 4.08 (t, J = 5.4 Hz, 2H), 3.03 (t, J = 5.4 Hz, 2H), 2.50 (d, J = 1.2 Hz, 3H), 2.02-1.25 (m, 14H).
184	^1H NMR (300 MHz, CDCl_3): δ 7.74 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 8.7 Hz, 1H), 7.49-7.00 (m, 9H), 6.26 (s, 1H), 4.04 (t, J = 4.5 Hz, 2H), 3.94 (t, J = 3.9 Hz, 2H), 2.50 (s, 3H).
185	^1H NMR (300 MHz, CDCl_3): δ 7.73 (d, J = 8.7 Hz, 1H), 7.58 (d, J = 8.7 Hz, 1H), 7.49-6.97 (m, 9H), 6.25 (d, J = 1.2 Hz, 1H), 4.06 (t, J = 6.0 Hz, 2H), 3.85 (t, J = 6.0 Hz, 2H), 2.50 (d, J = 1.2 Hz, 3H), 2.06-1.98 (m, 2H).
186	^1H NMR (300 MHz, CDCl_3): δ 7.73 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.50-6.96 (m, 9H), 6.25 (d, J = 0.9 Hz, 1H), 3.93 (t, J = 6.0 Hz, 2H), 3.47 (m, 2H), 2.50 (s, 3H), 2.10-1.64 (m, 4H).
187	^1H NMR (300 MHz, CDCl_3): δ 7.74 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.51-6.96 (m, 9H), 6.26 (d, J = 1.2 Hz, 1H), 3.91 (t, J = 6.3 Hz, 2H), 3.44 (t, J = 6.3 Hz, 2H), 2.51 (d, J = 0.6 Hz, 3H), 1.98-1.56 (m, 6H).
188	^1H NMR (300 MHz, CD_3OD): δ 7.88 (d, J = 9.0 Hz, 1H), 7.60 (d, J = 9.0 Hz, 1H), 7.44-6.98 (m, 9H), 6.25 (d, J = 1.2 Hz, 1H), 3.89 (t, J = 6.3 Hz, 2H), 3.56 (t, J = 6.6 Hz, 2H), 2.50 (d, J = 1.2 Hz, 3H), 1.78-1.42 (m, 8H).
189	^1H NMR (400 MHz, CDCl_3): δ 7.73 (d, J = 6.6 Hz, 1H), 7.57 (d, J = 6.6 Hz, 1H), 7.49-6.99 (m, 9H), 6.25 (d, J = 0.9 Hz, 1H), 3.99-3.93 (m, 4H), 2.50 (d, J = 0.9 Hz, 3H), 0.90 (s, 9H), 0.09 (s, 6H).
190	^1H NMR (300 MHz, CDCl_3): δ 7.74 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.50-6.97 (m, 9H), 6.26 (d, J = 1.2 Hz, 1H), 4.02 (t, J = 6.3 Hz, 2H), 3.78 (t, J = 6.0 Hz, 2H),

	2.51 (d, $J = 1.2$ Hz, 3H), 1.96 (t, $J = 6.0$ Hz, 2H), 0.88 (s, 9H), 0.042 (s, 6H).
191	¹ H NMR (300 MHz, CDCl ₃): δ 7.73 (d, $J = 9.0$ Hz, 1H), 7.57 (d, $J = 9.0$ Hz, 1H), 7.50-6.96 (m, 9H), 6.25 (d, $J = 1.2$ Hz, 1H), 3.93 (t, $J = 6.3$ Hz, 2H), 3.68 (t, $J = 6.3$ Hz, 2H), 2.50 (d, $J = 0.9$ Hz, 3H), 1.85-1.65 (m, 4H), 0.90 (s, 9H), 0.05 (s, 6H).
193	¹ H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 9.0$ Hz, 1H), 7.58 (d, $J = 9.0$ Hz, 1H), 7.50-6.96 (m, 9H), 6.26 (d, $J = 1.2$ Hz, 1H), 3.90 (t, $J = 6.3$ Hz, 2H), 3.62 (t, $J = 6.6$ Hz, 2H), 2.51 (d, $J = 1.2$ Hz, 3H), 1.79-1.39 (m, 8H), 0.89 (s, 9H), 0.05 (s, 6H).
194	LCMS $[M + 1]^+$: 771.2.
195	¹ H NMR (400 MHz, CDCl ₃): δ 7.93 (brs, 2H), 7.64 (brs, 1H), 7.44 (brs, 2H), 7.28 (brs, 5H), 7.05 (brs, 1H), 6.26 (brs, 1H), 4.42-3.45 (m, 11H), 2.53 (brs, 3H).
196	¹ H NMR (300 MHz, CDCl ₃): δ 7.72 (d, $J = 8.7$ Hz, 1H), 7.57-7.54 (m, 1H), 7.48-7.45 (m, 2H), 7.36-7.31 (m, 5H), 7.19-7.13 (m, 1H), 6.99-6.95 (m, 1H), 6.22 (s, 1H), 5.42-5.30 (m, 2H), 5.21-4.94 (m, 3H), 4.47-4.43 (m, 1H), 4.12-3.43 (m, 7H), 2.16 (s, 3H).
197	¹ H NMR (300 MHz, CDCl ₃): δ 7.95 (d, $J = 9.0$ Hz, 1H), 7.67 (d, $J = 9.0$ Hz, 1H), 7.47-7.45 (m, 2H), 7.33-7.19 (m, 6H), 7.05-7.03 (m, 1H), 6.29 (s, 1H), 4.26-4.22 (m, 1H), 4.09-3.46 (m, 16H), 2.55 (s, 3H).
198	¹ H NMR (300 MHz, CDCl ₃): δ 7.86 (d, $J = 15.9$ Hz, 1H), 7.73 (d, $J = 9.0$ Hz, 1H), 7.67-7.30 (m, 15H), 6.61 (d, $J = 15.9$ Hz, 1H), 6.24 (d, $J = 1.2$ Hz, 1H), 2.48 (d, $J = 1.2$ Hz, 3H).
199	¹ H NMR (300 MHz, CDCl ₃): δ 7.76 (d, $J = 9.0$ Hz, 1H), 7.62 (d, $J = 9.0$ Hz, 1H), 7.50-7.21 (m, 8H), 7.11 (dd, $J = 8.4, 2.1$ Hz, 1H), 6.26 (s, 1H), 4.47 (t, $J = 4.2$ Hz, 2H), 3.43 (t, $J = 4.2$ Hz, 2H), 2.91 (s, 6H), 2.51 (s, 3H).
200	¹ H NMR (300 MHz, CDCl ₃): δ 7.73 (d, $J = 9.0$ Hz, 1H), 7.57 (d, $J = 9.0$ Hz, 1H), 7.49-6.96 (m, 14H), 6.25 (d, $J = 1.2$ Hz, 1H), 4.03 (t, $J = 6.0$ Hz, 2H), 2.95 (m, 2H), 2.74 (t, $J = 6.0$ Hz, 2H), 2.54-2.50 (m, 5H), 2.07-1.99 (m, 3H), 1.67-1.63 (m, 2H), 1.40-1.26 (m, 2H).
201	¹ H NMR (300 MHz, CDCl ₃): δ 7.78-7.32 (m, 16H), 6.26 (d, $J = 1.2$ Hz, 1H), 2.39 (d, $J = 1.2$ Hz, 3H).
202	¹ H NMR (300 MHz, CDCl ₃): δ 7.75 (d, $J = 8.7$ Hz, 1H), 7.66-7.19 (m, 10H), 6.26 (d, $J = 1.2$ Hz, 1H), 2.63 (dt, $J = 7.2, 2.7$ Hz, 2H), 2.59 (d, $J = 1.2$ Hz, 3H), 2.05~2.04 (m, 1H), 2.81 (t, $J = 7.2$ Hz, 2H).
203	¹ H NMR (300 MHz, CDCl ₃): δ 7.75 (d, $J = 8.7$ Hz, 1H), 7.70-7.23 (m, 10H), 6.25 (s, 1H), 2.50 (s, 3H), 2.41 (t, $J = 6.9$ Hz, 2H), 1.64 (quin, $J = 7.8$ Hz, 2H), 1.47-1.29 (m, 4H), 0.93 (t, $J = 6.9$ Hz, 3H).
204	¹ H NMR (300 MHz, CDCl ₃): δ 7.80 (dd, $J = 8.7, 1.5$ Hz, 1H), 7.77 (d, $J = 8.7$ Hz, 1H), 7.59 (d, $J = 8.7$ Hz, 1H), 7.56-7.28 (m, 6H), 7.00 (dd, $J = 8.7, 1.2$ Hz, 1H), 6.75 (td, $J = 8.1, 0.9$ Hz, 1H), 6.27 (d, $J = 1.2$ Hz, 1H), 2.52 (d, $J = 1.2$ Hz, 3H). LCMS $[M + 1]^+$: 397.1.
205	¹ H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 9.0$ Hz, 1H), 7.58-7.51 (m, 6H), 6.24 (s, 1H), 2.49 (s, 3H).
206	¹ H NMR (400 MHz, CDCl ₃): δ 7.84-7.73 (m, 3H), 7.65-7.62 (m, 4H), 7.46-7.25 (m, 5H), 7.07-7.03 (m, 2H), 6.11 (d, $J = 0.9$ Hz, 1H), 2.44 (d, $J = 0.6$ Hz, 3H).
207	LCMS $[M + 1]^+$: 425.1.

208	¹H NMR (300 MHz, CDCl ₃): δ 8.34 (s, 1H), 7.88-7.82 (m, 4H), 7.79-7.71 (m, 1H), 7.62-7.49 (m, 3H), 7.40 (s, 4H), 6.25 (d, <i>J</i> = 0.9 Hz, 1H), 2.48 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.9, 159.3, 156.3, 152.9, 149.7, 148.4, 135.4, 133.6, 132.1, 132.0, 131.0, 129.4, 128.74, 128.68, 128.2, 127.8, 127.4, 126.8, 124.8, 124.3, 123.1, 115.9, 115.4, 113.5, 109.0, 19.5.
209	¹H NMR (300 MHz, CDCl ₃): δ 7.91-7.86 (m, 2H), 7.75 (d, <i>J</i> = 8.7 Hz, 1H), 7.58-7.49 (m, 3H), 7.41-7.38 (m, 2H), 7.27-7.03 (m, 2H), 6.27 (s, 1H), 2.51 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.4, 167.4, 164.0, 159.3, 156.2, 152.8, 149.8, 147.9, 132.8, 132.7, 132.5, 132.4, 132.1, 131.0, 128.5, 127.6, 124.5, 123.3, 115.9, 115.7, 115.5, 115.4, 113.7, 108.9, 19.6.
210	¹H NMR (300 MHz, CDCl ₃): δ 7.80-7.74 (m, 3H), 7.57-7.50 (m, 3H), 7.40-7.26 (m, 4H), 6.27(s, 1H), 2.50 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.6, 159.3, 156.2, 152.8, 149.8, 147.8, 139.7, 134.8, 132.1, 131.1, 128.6, 128.4, 127.9, 124.6, 123.4, 115.9, 115.5, 113.7, 108.9, 19.5.
211	¹H NMR (300 MHz, CDCl ₃): δ 7.77-7.69 (m, 4H), 7.58-7.51 (m, 6H), 7.40-7.37 (m, 2H), 6.27 (d, <i>J</i> = 0.9 Hz, 1H), 2.510 (d, <i>J</i> = 0.9 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.8, 159.3, 156.3, 152.8, 149.8, 147.8, 135.3, 132.1, 131.6, 131.2, 131.1, 128.4, 128.0, 124.6, 123.5, 116.0, 115.5, 113.7, 109.0, 19.6.
212	¹H NMR (300 MHz, CDCl ₃): δ 7.74-7.70 (m, 3H), 7.55 (dd, <i>J</i> = 9.0, 0.9 Hz, 1H), 7.48 (dd, <i>J</i> = 6.0, 2.1 Hz, 2H), 7.38 (dd, <i>J</i> = 6.0, 2.1 Hz, 2H), 7.16 (d, <i>J</i> = 8.7 Hz, 2H), 6.26 (d, <i>J</i> = 0.9 Hz, 1H), 2.50 (s, 3H), 2.382 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.8, 159.4, 156.3, 152.9, 149.7, 148.4, 144.3, 138.8, 132.2, 131.0, 129.9, 129.0, 128.7, 127.0, 124.2, 123.1, 116.0, 115.4, 113.6, 109.0, 21.7, 19.6.
213	¹H NMR (300 MHz, CDCl ₃): δ 7.89 (d, <i>J</i> = 8.1 Hz, 2H), 7.78 (d, <i>J</i> = 9.0 Hz, 1H), 7.64-7.55 (m, 3H), 7.50-7.47 (m, 2H), 7.38-7.27 (m, 2H), 2.51 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.9, 159.2, 156.4, 152.8, 149.9, 147.5, 139.6, 134.3, 133.9, 132.1, 131.0, 129.8, 128.8, 128.2, 125.20, 125.15, 125.11, 123.6, 115.9, 115.6, 113.8, 109.0, 19.5.
214	¹H NMR (300 MHz, CDCl ₃): δ 7.85-7.82 (m, 2H), 7.72 (d, <i>J</i> = 8.7 Hz, 1H), 7.57-7.47 (m, 3H), 7.41-7.38 (m, 2H), 6.85-6.83 (m, 2H), 6.25 (s, 1H), 3.85 (s, 3H), 2.50 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.5, 163.8, 159.4, 156.2, 152.9, 149.6, 148.6, 132.3, 132.2, 131.0, 129.0, 128.8, 126.5, 124.0, 123.0, 115.9, 115.4, 113.6, 113.5, 108.9, 55.5, 19.5.
215	¹H NMR (300 MHz, CDCl ₃): δ 7.89-7.86 (m, 2H), 7.74 (d, <i>J</i> = 9.0 Hz, 1H), 7.61-7.55 (m, 5H), 7.50-7.36 (m, 7H), 2.50 (d, <i>J</i> = 0.9 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.6, 159.4, 156.3, 152.9, 149.8, 148.3, 146.0, 139.7, 135.1, 132.2, 131.0, 130.3, 128.9, 128.7, 128.3, 127.5, 127.3, 126.9, 124.4, 123.2, 116.0, 115.4, 113.6, 109.0, 19.6.
216	¹H NMR (300 MHz, CDCl ₃): δ 8.25-8.22 (m, 2H), 8.00-7.97 (m, 2H), 7.80 (d, <i>J</i> = 8.7 Hz, 1H), 7.59-7.51 (m, 3H), 7.42-7.39 (m, 2H), 6.29 (d, <i>J</i> = 1.2 Hz, 1H), 2.52 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.0, 159.1, 156.4, 152.7, 145.0, 149.9, 147.2, 141.6, 132.1, 131.2, 130.5, 129.4, 128.1, 125.3, 123.8, 123.4, 116.0, 115.7, 113.9, 109.0, 19.6.
217	¹H NMR (300 MHz, CDCl ₃): δ 7.78-7.66 (m, 3H), 7.57 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.46 (m, 3H), 7.38-7.27 (m, 3H), 6.27 (d, <i>J</i> = 1.2 Hz, 1H), 2.51 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 183.6, 159.2, 156.4, 152.8, 149.8, 147.6, 138.0, 134.4, 132.8, 132.1, 131.0, 129.64, 129.58, 128.4, 128.3, 127.6, 124.8, 123.441, 115.9, 115.5,

	113.7, 109.0, 19.5.
218	¹H NMR (300 MHz, CDCl ₃): δ 7.90 (d, <i>J</i> = 2.1 Hz, 1H), 7.78 (d, <i>J</i> = 9.0 Hz, 1H), 7.69 (dd, <i>J</i> = 9.0, 2.1 Hz, 1H), 7.60-7.46 (m, 4H), 7.41-7.37 (m, 2H), 6.28 (d, <i>J</i> = 1.2 Hz, 1H), 2.52 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 182.4, 159.2, 156.4, 152.8, 149.9, 147.4, 137.8, 136.0, 132.9, 132.1, 131.6, 131.2, 130.4, 129.5, 128.6, 128.5, 128.3, 125.0, 123.7, 116.0, 115.6, 113.8, 109.0, 19.6.
219	¹H NMR (300 MHz, CDCl ₃): δ 7.71 (d, <i>J</i> = 9.0 Hz, 1H), 7.54 (d, <i>J</i> = 9.0 Hz, 1H), 7.38-7.30 (m, 3H), 7.22-7.19 (m, 2H), 6.93-6.89 (m, 1H), 6.58 (d, <i>J</i> = 9.0 Hz, 1H), 6.23 (d, <i>J</i> = 1.2 Hz, 1H), 3.63 (s, 3H), 2.48 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.2, 159.4, 157.3, 156.3, 152.9, 149.9, 149.2, 133.0, 131.9, 130.3, 130.0, 128.3, 127.7, 127.0, 124.4, 122.9, 120.4, 116.2, 115.2, 113.4, 110.6, 109.0, 55.3, 19.5.
220	¹H NMR (300 MHz, CDCl ₃): δ 7.89-7.38 (m, 11H), 6.89-6.83 (m, 2H), 6.14 (d, <i>J</i> = 1.2 Hz, 1H), 2.38 (d, <i>J</i> = 0.9 Hz, 3H).
221	¹H NMR (300 MHz, CDCl ₃): δ 7.68 (d, <i>J</i> = 9.0 Hz, 1H), 7.47 (d, <i>J</i> = 9.0 Hz, 1H), 7.39-7.32 (m, 2H), 7.19-7.08 (m, 1H), 7.04-6.89 (m, 3H), 6.81-6.72 (m, 1H), 6.17 (d, <i>J</i> = 1.2 Hz, 1H), 2.41 (d, <i>J</i> = 0.9 Hz, 1H).
222	¹H NMR (300 MHz, CDCl ₃): δ 7.70-7.48 (m, 4H), 7.42-7.35 (m, 4H), 6.18 (d, <i>J</i> = 1.2 Hz, 1H), 2.31 (d, <i>J</i> = 1.2 Hz, 3H).
223	¹H NMR (300 MHz, CDCl ₃): δ 7.87-7.82 (m, 2H), 7.73 (d, <i>J</i> = 8.7 Hz, 1H), 7.563 (d, <i>J</i> = 8.7 Hz, 1H), 7.48-7.44 (m, 2H), 7.36-7.32 (m, 2H), 6.87-6.82 (m, 2H), 6.27 (d, <i>J</i> = 1.2 Hz, 1H), 3.85 (s, 3H), 2.51 (d, <i>J</i> = 0.9 Hz, 3H).
224	¹H NMR (300 MHz, CDCl ₃): δ 7.80 (d, <i>J</i> = 7.2 Hz, 2H), 7.75 (d, <i>J</i> = 8.7 Hz, 1H), 7.58 (d, <i>J</i> = 8.7 Hz, 1H), 7.53-7.48 (m, 2H), 7.44-7.30 (m, 4H), 6.27 (s, 1H), 2.51 (s, 3H).
225	¹H NMR (300 MHz, CDCl ₃): δ 7.81-7.77 (m, 2H), 7.46-7.35 (m, 5H), 6.19 (d, <i>J</i> = 0.9 Hz, 1H), 2.42 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 160.7, 156.8, 156.7, 153.5, 129.3, 129.0, 128.8, 124.9, 120.2, 118.5, 114.6, 114.5, 112.6, 107.9, 98.3, 19.2.
226	¹H NMR (300 MHz, CDCl ₃): δ 7.50-7.19 (m, 7H), 6.81 (s, 1H), 6.16 (d, <i>J</i> = 0.9 Hz, 1H), 5.93 (s, 1H), 3.70 (brs, 1H), 2.40 (d, <i>J</i> = 0.9 Hz, 3H).
227	¹H NMR (300 MHz, CDCl ₃): δ 8.16 (dd, <i>J</i> = 8.1, 1.5 Hz, 2H), 7.58 (d, <i>J</i> = 8.7 Hz, 1H), 7.51-6.45 (m, 4H), 2.68 (s, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 156.1, 155.2, 151.9, 151.5, 146.2, 129.7, 129.6, 128.7, 128.6, 127.0, 121.8, 117.2, 115.1, 111.4, 108.8, 90.5, 20.3.
228	¹H NMR (400 MHz, CDCl ₃): δ 7.50-7.48 (m, 1H), 7.42-7.38 (m, 3H), 7.34-7.20 (m, 6H), 7.06 (d, <i>J</i> = 7.2 Hz, 2H), 6.12 (q, <i>J</i> = 1.2 Hz, 1H), 4.19 (s, 2H), 3.56 (s, 3H), 2.46 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 161.0 (C), 153.7 (C), 148.8 (C), 139.3 (C), 138.5 (C), 136.2 (C), 134.3 (C), 130.6 (CH x2), 128.7 (CH x2), 127.82 (CH x2), 127.79 (CH x2), 126.9 (CH), 126.5 (CH), 117.3 (CH), 116.8 (C), 114.5 (C), 111.9 (C), 111.3 (CH), 105.9 (CH), 30.7 (CH ₂), 30.6 (CH ₃), 19.6 (CH ₃). EIMS <i>m/z</i> (relative intensity) 379 (M ⁺ , 100), 351 (6), 302 (13), 274 (8), 150 (5), 84 (11). HRMS Calcd. for C ₂₆ H ₂₁ NO ₂ 379.4504, found 379.1559.
229	¹H NMR (300 MHz, <i>d</i> 6-DMSO): δ 11.78 (br, 1H), 7.46-7.11 (m, 12H), 6.14 (q, <i>J</i> = 1.2 Hz, 1H), 4.07 (s, 2H), 2.45 (d, <i>J</i> = 1.2 Hz, 3H). ¹³C NMR (75 MHz, <i>d</i> 6-DMSO): δ 160.0 (C), 154.8 (C), 148.2 (C), 139.2 (C), 138.4 (C), 135.9 (C), 134.5 (C), 130.5 (CH x2), 128.6 (CH x2), 128.1 (CH x3), 127.7 (CH x2), 126.3 (CH x2), 117.7 (CH), 114.4 (C), 114.1 (C), 111.2 (C), 110.2 (CH), 108.5 (CH), 31.5 (CH ₂), 19.1 (CH ₃). EIMS <i>m/z</i>

	(relative intensity) 365 (88), 288 (23), 260 (13), 249 (14), 221 (15), 217 (26), 213 (19), 158 (27), 131 (30), 111 (100), 91 (68). HRMS Calcd. for C ₂₅ H ₁₉ NO ₂ 365.1416, found 365.1415. IR (neat): 3221(br), 1701, 1560, 1458 cm ⁻¹ .
230	¹H NMR (300 MHz, CDCl ₃): δ 8.13-8.08 (m, 2H), 7.67 (d, <i>J</i> = 9.0 Hz, 1H), 7.46 (d, <i>J</i> = 9.0 Hz, 1H), 7.04-6.99 (m, 2H), 6.30 (d, <i>J</i> = 0.9 Hz, 1H), 3.92 (s, 3H), 2.91 (s, 3H), 2.52 (d, <i>J</i> = 0.9 Hz, 3H).
231	¹H NMR (600 MHz, <i>d</i> 6-DMSO): δ 8.30 (d, <i>J</i> = 8.0 Hz, 1H), 7.75 (d, <i>J</i> = 8.6 Hz, 1H), 7.60 (d, <i>J</i> = 8.0 Hz, 1H), 7.49-7.47 (m, 2H), 7.32-7.30 (m, 1H), 6.28 (q, <i>J</i> = 1.0 Hz, 1H), 2.49 (d, <i>J</i> = 1.0 Hz, 3H). ¹³C NMR (150 MHz, <i>d</i> 6-DMSO): δ 160.2 (C), 155.0 (C), 149.8 (C), 142.5 (C), 139.5 (C), 126.1 (CH), 122.6 (CH), 122.2 (CH), 120.5 (C), 120.2 (C), 111.6 (CH), 111.0 (C), 109.9 (CH), 109.4 (C), 108.2 (CH), 18.9 (CH ₃). EIMS <i>m/z</i> (relative intensity) 249 (M ⁺ , 100), 221 (87), 193 (16), 158 (44), 130 (44), 111 (97), 91 (95). HRMS Calcd. for C ₁₆ H ₁₁ NO ₂ 249.0790, found 249.0790. IR (neat): 3250 (br), 1697, 1630, 1598, 1385, 1336, 1085 cm ⁻¹ .
232	¹H NMR (600 MHz, CDCl ₃): δ 8.64 (dd, <i>J</i> = 0.6, 7.7 Hz, 1H), 8.08-8.07 (m, 2H), 7.68-7.24 (m, 7H), 7.12 (d, <i>J</i> = 8.6 Hz, 1H), 6.22 (q, <i>J</i> = 1.1 Hz, 1H), 5.72 (s, 2H), 2.49 (d, <i>J</i> = 1.1 Hz, 3H). ¹³C NMR (100 MHz, CDCl ₃): δ 192.0 (C), 161.4 (C), 153.8 (C), 143.3 (C), 140.5 (C), 134.5 (C), 134.4 (CH), 129.2 (CH x2), 128.5 (CH), 128.1 (CH x2), 126.4 (C), 124.1 (CH), 122.0 (CH), 121.5 (C), 121.2 (CH), 113.7 (C), 112.3 (C), 111.2 (CH), 108.3 (CH), 107.3 (C), 105.2 (CH), 49.1 (CH ₂), 19.3 (CH ₃). EIMS <i>m/z</i> (relative intensity) 367 (M ⁺ , 70), 270 (54), 262 (100), 249 (53), 221 (40), 191 (20), 105 (86), 77 (23). HRMS Calcd. for C ₂₄ H ₁₇ NO ₃ 367.1208, found 367.1197. IR (neat): 1718, 1701, 1630, 1601, 1448, 1390, 1224 cm ⁻¹ .
233	¹H NMR (300 MHz, CDCl ₃): δ 7.72 (d, <i>J</i> = 9.0 Hz, 1H), 7.58 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-7.06 (m, 9H), 6.27 (d, <i>J</i> = 1.2 Hz, 1H), 4.65 (t, <i>J</i> = 2.7 Hz, 2H), 2.54-2.51 (m, 4H).
234	¹H NMR (300 MHz, CDCl ₃): δ 7.86-7.73 (m, 3H), 7.66-7.55 (m, 2H), 7.47-7.34 (m, 6H), 6.22 (d, <i>J</i> = 1.2 Hz, 1H), 5.89 (s, 1H), 2.60 (brs, 1H), 2.48 (d, <i>J</i> = 1.2 Hz, 3H).
235	¹H NMR (300 MHz, CDCl ₃): δ 7.71-7.64 (m, 3H), 7.57-7.45 (m, 4H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 5.18-5.02 (m, 2H), 3.81-3.71 (m, 1H), 2.95-2.67 (m, 2H), 2.50 (d, <i>J</i> = 1.2 Hz, 3H), 2.39-2.18 (m, 2H).
236	¹H NMR (400 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 6.6 Hz, 1H), 7.59 (d, <i>J</i> = 6.6 Hz, 1H), 7.49-6.96 (m, 9H), 6.26 (d, <i>J</i> = 0.6 Hz, 1H), 3.93 (t, <i>J</i> = 6.0 Hz, 2H), 3.26 (t, <i>J</i> = 5.1 Hz, 2H), 2.51 (s, 3H), 2.05-1.85 (m, 4H).
237	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 9.0 Hz, 1H), 7.58 (d, <i>J</i> = 9.0 Hz, 1H), 7.50-6.96 (m, 9H), 6.26 (d, <i>J</i> = 1.2 Hz, 1H), 4.08 (t, <i>J</i> = 6.6 Hz, 2H), 3.90 (t, <i>J</i> = 6.3 Hz, 2H), 2.51 (d, <i>J</i> = 0.9 Hz, 3H), 2.05 (s, 3H), 1.82-1.38 (m, 8H).
238	¹H NMR (400 MHz, CDCl ₃): δ 7.74 (d, <i>J</i> = 6.6 Hz, 1H), 7.57 (d, <i>J</i> = 6.6 Hz, 1H), 7.50-6.92 (m, 9H), 6.26 (d, <i>J</i> = 0.6 Hz, 1H), 2.51 (d, <i>J</i> = 0.6 Hz, 3H), 0.98 (s, 9H), 0.192 (s, 6H).
239	¹H NMR (300 MHz, <i>d</i> 6-DMSO): δ 7.93 (d, <i>J</i> = 9.3 Hz, 1H), 7.76 (d, <i>J</i> = 9.3 Hz, 1H), 7.72-7.69 (m, 2H), 7.56-7.51 (m, 1H), 7.40-7.35 (m, 2H), 7.28 (d, <i>J</i> = 8.4 Hz, 2H), 6.51 (d, <i>J</i> = 8.4 Hz, 2H), 6.36 (s, 1H), 2.49 (s, 3H). ¹³C NMR (75 MHz, <i>d</i> 6-DMSO): δ 185.1 (C), 158.9 (C), 157.6 (C), 155.9 (C), 154.0 (C), 149.4 (C), 147.1 (C), 136.6 (C), 132.9 (CH), 132.1 (CH x2), 129.3 (CH x2), 128.2 (CH x2), 128.1 (C), 125.3 (CH), 119.8 (C), 115.5 (C), 115.1 (C), 114.4 (CH x2), 112.7 (CH), 108.9 (CH), 19.0 (CH ₃). IR (neat): 3350 (br), 2957, 2925, 2853, 1731, 1708, 1647, 1601, 1552, 1509, 1472, 1447, 1357,

	1269, 1172, 1081 cm^{-1} . EIMS m/z (relative intensity) 396 (M^+ , 16), 105 (5), 79 (25), 78 (100), 63 (82). HRMS Calcd. for $\text{C}_{25}\text{H}_{16}\text{O}_5$ 396.0998, found 396.0998.
240	^1H NMR (400 MHz, CDCl_3): δ 7.74 (d, J = 8.8 Hz, 1H), 7.58 (d, J = 8.8 Hz, 1H), 6.26 (s, 1H), 7.52-7.02 (m, 13H), 4.14 (t, J = 5.6 Hz, 2H), 2.96-2.87 (m, 8H), 2.51 (s, 3H).
241	^1H NMR (300 MHz, CDCl_3): δ 7.73 (d, J = 9.0 Hz, 1H), 7.57 (d, J = 9.0 Hz, 1H), 7.54-7.17 (m, 8H), 7.05 (ddd, J = 8.4, 2.7, 0.9 Hz, 1H), 6.25 (d, J = 1.2 Hz, 1H), 4.13 (t, J = 5.4 Hz, 2H), 4.06 (s, 4H), 3.16 (t, J = 5.7 Hz, 2H), 2.47 (d, J = 1.2 Hz, 3H).
242	^1H NMR (300 MHz, CDCl_3): δ 7.74 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.50-7.27 (m, 7H), 7.18 (t, J = 8.4 Hz, 1H), 6.98 (dd, J = 8.4, 2.4 Hz, 1H), 6.26 (d, J = 1.2 Hz, 1H), 3.90 (t, J = 6.6 Hz, 2H), 2.51 (d, J = 1.2 Hz, 3H), 1.75 (quin, J = 6.3 Hz, 2H), 1.43-1.26 (m, 8H), 0.90 (t, J = 6.9 Hz, 3H).
243	^1H NMR (300 MHz, CDCl_3): δ 7.72 (d, J = 8.7 Hz, 1H), 7.56 (d, J = 8.7 Hz, 1H), 7.50-7.27 (m, 7H), 7.18 (t, J = 8.1 Hz, 1H), 6.98 (ddd, J = 8.1, 2.7, 0.9 Hz, 1H), 6.24 (d, J = 0.9 Hz, 1H), 3.89 (t, J = 6.6 Hz, 2H), 2.49 (d, J = 0.9 Hz, 3H), 1.75 (quin, J = 6.6 Hz, 2H), 1.46-1.29 (10 H, m), 0.87 (t, J = 6.6 Hz, 3H).
244	^1H NMR (300 MHz, CDCl_3): δ 7.74 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.50-7.27 (m, 7H), 7.18 (t, J = 8.4 Hz, 1H), 6.98 (ddd, J = 8.4, 2.4, 0.9 Hz, 1H), 6.26 (d, J = 1.2 Hz, 1H), 3.89 (t, J = 6.6 Hz, 2H), 2.51 (d, J = 1.2 Hz, 3H), 1.75 (quin, J = 7.2 Hz, 1H), 1.50-1.27 (m, 15H), 0.88 (t, J = 6.6 Hz, 3H).
245	^1H NMR (300 MHz, CDCl_3): δ 7.76 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.47-6.79 (m, 8H), 6.28 (d, J = 1.2 Hz, 1H), 3.82 (s, 3H), 2.51 (d, J = 1.2 Hz, 3H).
246	^1H NMR (300 MHz, CDCl_3): δ 7.75 (d, J = 9.0 Hz, 1H), 7.58 (d, J = 9.0 Hz, 1H), 7.44-7.02 (m, 8H), 6.27 (d, J = 1.2 Hz, 1H), 3.80 (s, 3H), 2.51 (d, J = 1.2 Hz, 3H).
247	^1H NMR (300 MHz, CDCl_3): δ 7.70 (d, J = 8.7 Hz, 1H), 7.53 (d, J = 8.7 Hz, 1H), 7.36-7.09 (m, 7H), 6.98-6.94 (m, 1H), 6.22 (d, J = 1.2 Hz, 1H), 3.73 (s, 3H), 2.47 (d, J = 0.9 Hz, 1H), 2.03 (s, 3H). ^{13}C NMR (75 MHz, CDCl_3): δ 185.4, 159.4, 159.1, 156.4, 152.8, 149.9, 147.9, 137.8, 137.1, 131.5, 129.4, 129.3, 129.0, 128.9, 127.6, 124.2, 122.2, 119.5, 116.2, 115.2, 113.43, 113.38, 108.8, 55.2, 21.1, 19.4.
248	^1H NMR (400 MHz, CDCl_3): δ 7.75-7.69 (m, 3H), 7.54 (d, J = 8.8 Hz, 1H), 7.46-7.34 (m, 3H), 7.30-7.26 (m, 2H), 6.84-6.80 (m, 2H), 6.24 (q, J = 1.2 Hz, 1H), 3.78 (s, 3H), 2.48 (d, J = 1.2 Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3): δ 185.6 (C), 160.0 (C), 159.6 (C), 156.5 (C), 152.9 (C), 150.1 (C), 148.0 (C), 136.7 (C), 132.8 (CH), 132.1 (CH x2), 129.7 (CH x2), 128.7 (C), 128.1 (CH x2), 124.1 (CH), 121.6 (C), 116.4 (C), 115.3 (C), 113.5 (CH), 113.3 (CH x2), 109.0 (CH), 55.2 (CH_3), 19.6 (CH_3). IR (neat): 3058 (w), 2927 (w), 2834 (w), 1730 (s), 1652 (m), 1602 (s), cm^{-1} . EIMS m/z (relative intensity) 410 (M^+ , 62), 152 (11), 105 (78), 77 (100), 57 (43), 55 (36). HRMS Calcd. for $\text{C}_{26}\text{H}_{18}\text{O}_5$ 410.1154, found 410.1153
249	^1H NMR (300 MHz, CDCl_3): δ 7.60-7.00 (m, 11H), 6.11 (s, 1H), 2.40 (d, J = 1.2 Hz, 3H).
250	^1H NMR (300 MHz, CDCl_3): δ 7.74 (d, J = 8.7 Hz, 1H), 7.58 (d, J = 8.7 Hz, 1H), 7.50-7.16 (m, 13H), 7.00 (dd, J = 8.4, 2.7 Hz, 1H), 6.53 (d, J = 15.9 Hz, 1H), 6.21~5.30 (m, 2H), 4.05 (t, J = 5.7 Hz, 2H), 3.20-2.96 (m, 2H), 2.81 (t, J = 5.4 Hz, 2H), 2.63-2.47 (m, 7H).
251	^1H NMR (300 MHz, CDCl_3): δ 7.62 (d, J = 9.0 Hz, 1H), 7.360 (d, J = 9.0 Hz, 1H), 7.312-7.308 (m, 2H), 7.29-7.09 (m, 6H), 6.95-6.92 (m, 1H), 6.08 (s, 1H), 3.86 (t, J = 6.3

	Hz, 2H), 3.72-3.58 (m, 3H), 3.43-3.30 (m, 1H), 2.87-2.79 (m, 1H), 2.68-2.57 (m, 3H), 2.32 (d, $J = 0.9$ Hz, 3H), 1.89-1.84 (m, 2H), 1.038 (t, $J = 7.2$ Hz, 1H).
252	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, $J = 9.0$ Hz, 1H), 7.58 (d, $J = 8.7$ Hz, 2H), 7.50-7.46 (m, 2H), 7.42-7.36 (m, 2H), 7.32-7.24 (m, 2H), 7.09-7.05 (m, 1H), 6.27 (d, $J = 1.2$ Hz, 1H), 3.81 (s, 3H), 2.51 (d, $J = 0.9$ Hz, 3H).
253	¹H NMR (300 MHz, CDCl ₃): δ 7.77-7.73 (m, 2H), 7.59-7.56 (m, 2H), 7.55-7.45 (m, 2H), 7.39-7.36 (m, 2H), 7.30-7.26 (m, 2H), 6.27 (d, $J = 1.2$ Hz, 1H), 3.90 (t, $J = 6.6$ Hz, 2H), 2.51 (d, $J = 1.2$ Hz, 3H), 1.84-1.77 (m, 2H), 1.04 (d, $J = 7.5$ Hz, 3H).
254	¹H NMR (300 MHz, CDCl ₃): δ 8.18-8.17 (m, 1H), 7.78-7.75 (m, 2H), 7.63-7.59 (m, 4H), 7.52-7.49 (m, 1H), 7.21-7.20 (m, 1H), 6.28 (s, 1H), 2.51 (d, $J = 0.6$ Hz, 3H).
255	¹H NMR (300 MHz, CDCl ₃): δ 7.74-7.71 (m, 3H), 7.58 (d, $J = 9.0$ Hz, 1H), 7.53-7.39 (m, 4H), 6.26 (d, $J = 1.2$ Hz, 1H), 2.51 (d, $J = 1.2$ Hz, 3H). LCMS $[M + 1]^+$: 277.1.
256	¹H NMR (300 MHz, CDCl ₃): δ 7.75 (d, $J = 8.7$ Hz, 1H), 7.58 (d, $J = 9.0$ Hz, 2H), 7.56-7.44 (m, 2H), 7.39-7.36 (m, 1H), 7.30-7.22 (m, 3H), 7.05-7.02 (m, 1H), 6.27 (d, $J = 1.5$ Hz, 1H), 3.81 (s, 3H), 2.51 (d, $J = 1.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.9, 159.3, 159.2, 156.2, 152.8, 149.7, 148.2, 137.6, 133.5, 131.7, 131.6, 129.2, 129.1, 127.1, 124.5, 122.2, 121.5, 119.7, 115.9, 115.4, 113.6, 113.5, 108.9, 55.3, 19.5.
257	¹H NMR (300 MHz, CDCl ₃): δ 8.05-8.04 (m, 1H), 7.99-7.63 (m, 2H), 7.58-7.39 (m, 3H), 7.27-7.12 (m, 2H), 6.24 (s, 1H), 2.48 (s, 3H).
258	¹H NMR (300 MHz, CDCl ₃): δ 8.19-8.17 (m, 1H), 7.78-7.75 (m, 3H), 7.61-7.55 (m, 4H), 7.37 (dd, $J = 7.5, 7.5$ Hz, 1H), 7.21-7.18 (m, 1H), 6.26 (d, $J = 1.2$ Hz, 1H), 2.51 (d, $J = 1.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 175.0, 159.2, 155.9, 152.6, 149.7, 147.5, 142.6, 135.3, 134.9, 133.3, 131.9, 131.7, 129.3, 129.0, 128.3, 127.2, 124.5, 121.7, 116.4, 115.5, 113.8, 108.8, 19.6.
259	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, $J = 8.7$ Hz, 1H), 7.56-7.48 (m, 2H), 7.48-7.43 (m, 2H), 7.34-7.17 (m, 3H), 7.01-6.98 (m, 1H), 6.27 (d, $J = 0.9$ Hz, 1H), 2.50 (d, $J = 1.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 175.0, 159.2, 155.9, 152.6, 149.7, 147.5, 142.6, 135.3, 134.9, 133.3, 131.9, 131.7, 129.3, 129.0, 128.3, 127.2, 124.5, 121.7, 116.4, 115.5, 113.8, 108.8, 19.6.
260	¹H NMR (300 MHz, CDCl ₃): δ 7.73 (d, $J = 9.0$ Hz, 1H), 7.58-7.54 (m, 2H), 7.48-7.43 (m, 2H), 7.37-7.34 (m, 1H), 7.27-7.20 (m, 3H), 7.03-6.99 (m, 1H), 6.24 (d, $J = 1.2$ Hz, 1H), 4.00 (d, $J = 7.2$ Hz, 2H), 2.48 (d, $J = 1.2$ Hz, 3H), 1.40 (d, $J = 7.2$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 184.9, 159.1, 158.7, 156.2, 152.8, 148.2, 137.6, 133.4, 131.7, 131.6, 129.2, 129.15, 129.09, 127.0, 124.4, 122.1, 121.5, 120.1, 115.8, 115.4, 114.2, 113.5, 108.9, 63.6, 19.5, 14.7.
261	¹³C NMR (75 MHz, CDCl ₃): δ 185.0, 159.2, 158.9, 156.2, 152.8, 149.7, 148.3, 137.6, 133.5, 131.7, 131.6, 129.2, 129.1, 127.0, 124.4, 122.0, 121.5, 120.1, 115.9, 115.4, 114.2, 113.6, 108.9, 69.6, 31.5, 19.5, 14.1.
262	¹H NMR (300 MHz, CDCl ₃): δ 7.74 (d, $J = 8.7$ Hz, 1H), 7.58-7.56 (m, 2H), 7.55-7.44 (m, 2H), 7.44-7.34 (m, 1H), 7.27-7.20 (m, 3H), 7.03-7.00 (m, 1H), 6.25 (d, $J = 1.2$ Hz, 1H), 3.93 (t, $J = 6.6$ Hz, 2H), 2.49 (d, $J = 1.2$ Hz, 3H), 1.78-1.71 (m, 2H), 1.52-1.45 (m, 2H), 0.98 (d, $J = 6.6$ Hz, 3H). ¹³C NMR (75 MHz, CDCl ₃): δ 185.0, 159.2, 158.9, 156.3, 152.8, 148.3, 137.6, 133.5, 131.7, 131.6, 129.2, 129.1, 127.0, 124.4, 122.0, 121.6, 120.2, 115.4, 114.2, 113.6, 108.9, 67.8, 31.1, 19.5, 19.1, 13.8.
263	¹H NMR (300 MHz, CDCl ₃): δ 7.72 (d, $J = 8.7$ Hz, 1H), 7.56-7.48 (m, 2H), 7.46-7.43

	(m, 2H), 7.36-7.34 (m, 1H), 7.27-7.19 (m, 3H), 7.03-6.99 (m, 1H), 6.24 (d, $J = 1.2$ Hz, 1H), 3.91 (t, $J = 6.6$ Hz, 2H), 2.48 (s, 3H), 1.79-1.75 (m, 2H), 1.46-1.34 (m, 4H), 0.93 (d, $J = 6.6$ Hz, 3H). ^{13}C NMR (75 MHz, CDCl_3): δ 185.0, 159.1, 158.9, 156.2, 152.8, 149.6, 148.2, 137.5, 133.5, 131.7, 131.6, 129.15, 129.08, 127.0, 124.4, 122.0, 121.5, 120.1, 115.8, 115.4, 114.2, 113.5, 108.9, 68.1, 28.7, 28.0, 22.3, 19.5, 13.9.
264	^1H NMR (300 MHz, CDCl_3): δ 7.82-7.79 (m, 2H), 7.68 (d, $J = 8.7$ Hz, 1H), 7.57-7.54 (m, 3H), 6.54-6.51 (m, 2H), 6.25 (d, $J = 0.9$ Hz, 1H), 3.04 (s, 6H), 2.50 (d, $J = 1.5$ Hz, 3H).
265	^1H NMR (300 MHz, CDCl_3): δ 7.82 (d, $J = 9.0$ Hz, 2H), 7.72 (d, $J = 8.7$ Hz, 1H), 7.57 (d, $J = 8.7$ Hz, 1H), 7.52-7.33 (m, 5H), 6.80 (d, $J = 9.0$ Hz, 2H), 6.26 (d, $J = 0.9$ Hz, 1H), 4.13 (t, $J = 5.6$ Hz, 2H), 3.74 (m, 4H), 2.80 (t, $J = 5.6$ Hz, 2H), 2.57 (m, 4H), 2.51 (d, $J = 0.9$ Hz, 3H).
266	^1H NMR (300 MHz, CDCl_3): δ 7.81 (d, $J = 8.7$ Hz, 2H), 7.72 (d, $J = 9.0$ Hz, 1H), 7.58 (d, $J = 8.7$ Hz, 1H), 7.51-7.33 (m, 5H), 6.81 (d, $J = 9.3$ Hz, 2H), 6.26 (d, $J = 0.9$ Hz, 1H), 4.08 (t, $J = 5.7$ Hz, 2H), 2.73 (t, $J = 5.6$ Hz, 2H), 2.51 (d, $J = 0.9$ Hz, 3H), 2.34 (s, 6H).
267	^1H NMR (400 MHz, CDCl_3): δ 7.83 (d, $J = 6.6$ Hz, 2H), 7.72 (d, $J = 6.6$ Hz, 1H), 7.58 (d, $J = 6.0$ Hz, 1H), 7.51-7.21 (m, 9H), 6.84 (d, $J = 6.3$ Hz, 2H), 6.26 (s, 1H), 4.20 (t, $J = 4.2$ Hz, 2H), 4.07 (s, 4H), 3.19 (t, $J = 8.7$ Hz, 2H), 2.51 (s, 3H).

Example 3: *In vitro* anticancer assay (Growth Inhibition Assay)

Anticancer activities of the compounds of this invention were evaluated using a growth inhibition assay described in Kuo et al., *Cancer Res.* **2004**, 64(13), 4621-4628.

5 Human cervical carcinoma KB cells were maintained in plastic dishes in DMEM medium supplemented with 10 % fetal bovine serum. For *in vitro* treatment, tumor cells were seeded in 100 mL of culture medium/well in 96-well plates to a final cell density of 6×10^3 cell/mL and incubated in a CO₂ incubator at 37 °C for 24 h. The cells were treated with at least five different
10 concentrations of a test compound, and incubated in a CO₂ incubator at 37 °C for 72 h. The number of viable cells was estimated using MTS assay and absorbance was measured at 490 nm. For each test compound, dose-response curves were measured with at least five different drug concentrations, and the concentration causing 50% cell growth inhibition (IC₅₀) compared with the
15 control was calculated.

Compounds 1-4, 6, 8-12, 16-22, 26, 30-92, 94-98, 100-102, 105-107, 109-122, 127-151, 153-161, 165, 166, 170-191, and 193-266 were tested in this assay. Unexpectedly, Compounds 8, 19, 21, 22, 35, 37, 52, 91, 97, 102, 110, 112, 117, 119, 127, 156, 158, 174, 176, 208, 210-212, 214, 223, 265, and
20 266 showed IC₅₀ values between 1 μM and 10 μM; Compounds 2, 3, 10, 11, 26, 36, 38, 41, 42, 46, 49-51, 58, 60-62, 66, 85, 88-90, 92, 94, 98, 116, 133, 135-138, 153-155, 157, 159, 161, 165, 173, 175, 177, 183, 184, 189, 190, 193-195, 197-199, 204, 206, 209, 217, 219-221, 224, 226, 244, 248, 251, 253, 254, and 264 showed IC₅₀ values between 101 nM and 999 nM; and Compounds 1,
25 4, 6, 9, 14, 20, 30-34, 39, 40, 44, 45, 47, 48, 53-57, 59, 67-84, 86, 87, 95, 96, 100, 107, 115, 132, 134, 139-148, 150, 151, 160, 166, 170-172, 178-182, 185-188, 191, 196, 200-203, 207, 222, 233, 234, 236-243, 246, 247, 249, 250, 252, and 256-263 showed IC₅₀ values between 0.1 nM and 100 nM.

Compound 1 was evaluated against 21 human tumor cell lines derived
30 from nine cancer cell types: nasopharyngeal carcinoma (HONE-1, CPT 30, and HONE-cis6), cervical carcinoma (KB, KB-CPT100, KB7D, KB-1036, KB-S15, and KB-vin10), gastric carcinoma (TSGH), breast carcinoma (MCF-7), colorectal carcinoma (HT29), non-small cell lung carcinoma (H460), lymphoma (BJAB and H9), leukemia (CEM and HL 60), and hepatocellular

carcinoma (Hep 3B, Hep G2, Huh 7, and Hcc36). As indicated in Table 2 below, some of the above cell lines are resistant to certain conventional anticancer drugs ("drug-resistant cells"). Compound 140 was tested against the following 15 cell lines: HONE-1, CPT 30, and HONE-cis6, KB, KB-
 5 CPT100, KB7D, KB-1036, KB-S15, and KB-vin10, TSGH, MCF-7, H460, BJAB, H9, and Hep G2. Compound 32 was tested against the following 8 cell lines: HONE-1, KB, TSGH, MCF-7, H460, BJAB, H9, and Hep G2.

Cells in logarithmic growth phase were cultured at a density of 5000 cells/ml/well in a 24-well plate. Drug-resistant cells were cultured in a
 10 medium free of test compounds for 3 days before use. The cells were exposed to various concentrations of a test compound for 72 h. The methylene blue dye assay was used to evaluate the effect of the test compound on cell growth, as has been described in Finlay et al., *Anal. Biochem.* **1984**, 139, 272–277. The IC₅₀ value resulting from 50% inhibition of cell growth was calculated
 15 graphically as a comparison with control growth. Unexpectedly, Compounds 1 and 140 showed IC₅₀ values less than 10 nM for most of the tested cell lines; and Compound 32 showed IC₅₀ values less than 150 nM for most of the tested cell lines.

Table 2

Cell lines	Compound 1 IC ₅₀	Compound 140 IC ₅₀	Compound 32 IC ₅₀	Notes
HONE1	2 nM	3 nM	55 nM	
CPT30	8.5 nM	10.5 nM	n/a	Drug-resistant cell lines were generated by camptothecin-driven selection.
HONE-cis6	4.5 nM	10 nM	n/a	Drug-resistant cell lines were generated by cisplatin-driven selection.
KB	1.3-1.8 nM	7.7 nM	41 nM	
KB-CPT100	6.25 nM	9 nM	n/a	Drug-resistant cell lines were generated by camptothecin-driven selection.
KB7D	0.8 nM	8 nM	n/a	KB-7D cells were generated by VP-16-driven selection.
KB-1036	4 nM	13 nM	n/a	KB-1036 cells were generated by D-501036

				driven selection.
KB-S15	0.5 nM	10 nM	n/a	Drug-resistant cell lines were generated by paclitaxel-driven selection.
KB-vin10	2.5 nM	10 nM	n/a	KB-VIN10 cells were generated by vincristine-driven selection.
TSGH	17 nM	41 nM	150 nM	
MCF7	4 nM	13 nM	150 nM	
HT29	7 nM	n/a	n/a	
H460	0.5 nM	3 nM	40 nM	
BJAB	110 nM	60 nM	45 nM	
H9	3.5 nM	20 nM	124 nM	
CEM	1 μ M	n/a	n/a	
HL60	1 μ M	n/a	n/a	
Hep 3B	35 μ M	n/a	n/a	
Hep G2	3.5 μ M	2.6 μ M	5.5 μ M	
Huh 7	26.7 μ M	n/a	n/a	
Hcc36	10.8 μ M	n/a	n/a	

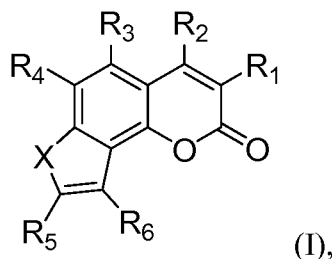
OTHER EMBODIMENTS

All of the features disclosed in this specification may be combined in any combination. Each feature disclosed in this specification may be replaced
5 by an alternative feature serving the same, equivalent, or similar purpose. Thus, unless expressly stated otherwise, each feature disclosed is only an example of a generic series of equivalent or similar features.

From the above description, one skilled in the art can easily ascertain the essential characteristics of the present invention, and without departing
10 from the spirit and scope thereof, can make various changes and modifications of the invention to adapt it to various usages and conditions. Thus, other embodiments are also within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A compound of formula (I):



wherein

each of R_1 , R_2 , R_3 , and R_4 , independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, $C(O)R_a$, $C(O)OR_a$, $C(O)NR_aR_b$, $C(S)R_b$, or $C(NR_b)R_a$, in which each of R_a and R_b , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; or R_1 and R_2 , together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R_2 and R_3 , together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R_3 and R_4 , together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl;

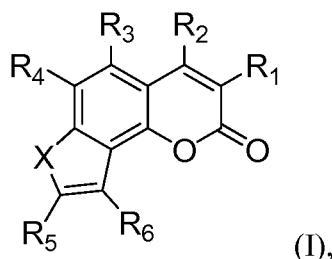
R_5 is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, $C(O)R_c$, $C(O)OR_c$, $C(O)NR_cR_d$, $C(S)R_d$, or $C(NR_d)R_c$, in which each of R_c and R_d , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl;

R_6 is cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, heteroaryl, halo, nitro, cyano, amino, hydroxy, aryloxy, $C(O)R_c$, $C(O)OR_c$, $C(O)NR_cR_d$, $C(S)R_d$, $C(NR_d)R_c$, or aryl substituted with alkyl at the 3-position of the aryl, halo, nitro, cyano, amino, carboxyl, cycloalkyl, aryl, or heteroaryl; and

X is O, S, or N(R_e), in which R_e is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

2. The compound of claim 1, wherein R_5 is alkyl, cycloalkyl, aryl, halo, $C(O)R_c$, $C(O)OR_c$, $C(O)NR_cR_d$, $C(S)R_d$, or $C(NR_d)R_c$.
3. The compound of claim 2, wherein R_5 is $C(O)R_c$, $C(S)R_d$, or $C(NR_d)R_c$, in which R_c is aryl or heteroaryl and R_d is amino or hydroxy.
4. The compound of claim 3, wherein R_6 is cycloalkyl, heteroaryl, or aryl substituted with alkyl at the 3- position of the aryl, halo, nitro, cyano, amino, cycloalkyl, aryl, or heteroaryl.
5. The compound of claim 4, wherein R_6 is phenyl substituted with alkyl at the 3- position of the phenyl, halo, nitro, or amino.
6. The compound of claim 5, wherein X is O.
7. The compound of claim 1, wherein R_6 is cycloalkyl, heteroaryl, or aryl substituted with nitro, cyano, amino, cycloalkyl, or heteroaryl.
8. The compound of claim 1, wherein each of R_1 , R_2 , R_3 , and R_4 , independently, is H, alkyl, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, aryl, hydroxy, alkoxy, halo, cyano, nitro, or $C(O)H$.
9. The compound of claim 1, wherein the compound is one of Compounds 132, 134, 135, 137-141, 143-148, 150, 151, 159, 160, 207, 222, and 234.

10. A compound of formula (I):



wherein

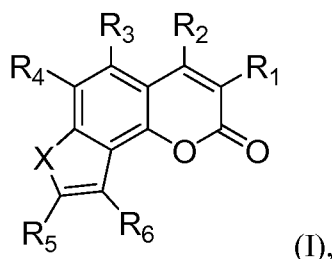
each of R_1 , R_2 , R_3 , and R_4 , independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, $C(O)R_a$, $C(O)OR_a$, $C(O)NR_aR_b$, $C(S)R_b$, or $C(NR_b)R_a$, in which each of R_a and R_b , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; or R_1 and R_2 , together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R_2 and R_3 , together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R_3 and R_4 , together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl;

R_5 is alkyl substituted with aryl or hydroxy, alkenyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, $C(O)R_c$, $C(O)OR_c$, $C(O)NR_dR_e$, $C(S)R_d$, or $C(NR_e)R_d$, in which R_c is cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, heteroaryl, or aryl substituted with alkyl, halo, nitro, cyano, amino, amido, cycloalkyl, aryl, heteroaryl, hydroxy, alkoxy, acyloxy, silyloxy, or phosphate at the 2- or 3-position of the aryl, and each of R_d and R_e , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl;

R_6 is alkyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, or aryloxy; and

X is O, S, or $N(R_f)$, in which R_f is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

11. The compound of claim 10, wherein R_6 is aryl or heteroaryl.
12. The compound of claim 11, wherein R_6 is phenyl.
13. The compound of claim 11, wherein R_5 is $C(O)R_c$, in which R_c is heteroaryl or aryl substituted with alkyl, halo, hydroxy, or alkoxy at the 2- or 3-position of the aryl.
14. The compound of claim 13, wherein R_2 is methyl.
15. The compound of claim 11, wherein R_5 is $C(S)R_d$, or $C(NR_e)R_d$, in which R_d is aryl or heteroaryl and R_e is amino or hydroxy.
16. The compound of claim 10, wherein the compound is one of Compounds 30, 31, 33, 36, 39, 40, 44, 45, 47, 48, 56, 57, 59-61, 67-92, 95, 96, 98, 100, 102, 107, 115, 166, 170-173, 177-203, 233, 236, 236-243, 245-247, 249, 250, 252, and 256-263.
17. A compound of formula (I):



wherein

each of R_1 , R_3 , and R_4 , independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, $C(O)R_a$, $C(O)OR_a$, $C(O)NR_aR_b$, $C(S)R_b$, or $C(NR_b)R_a$, in which each of R_a and R_b , independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; R_2 is H, C_2 - C_{10} alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl,

heterocycloalkyl, heterocycloalkenyl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_a, C(O)OR_a, C(O)NR_aR_b, C(S)R_b, or C(NR_b)R_a; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R₂ and R₃, together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R₃ and R₄, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl;

R₅ is C(O)R_c, C(O)OR_c, C(O)NR_dR_e, C(S)R_d, or C(NR_e)R_d, in which, R_c is aryl or heteroaryl, and each of R_d and R_e, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl;

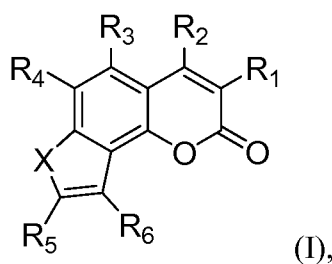
R₆ is aryl or heteroaryl; and

X is O, S, or N(R_f), in which R_f is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

18. The compound of claim 17, wherein the compound is Compound 9, 10, 14, or 20.

19. A compound, wherein the compound is one of Compounds 4, 6, 11, 26, 46, 53-55, 155-157, and 206.

20. A method for treating cancer, comprising administering to a subject in need thereof an effective amount of a compound of formula (I):



wherein

each of R₁, R₂, R₃, and R₄, independently, is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_a, C(O)OR_a, C(O)NR_aR_b, C(S)R_b, or C(NR_b)R_a, in which each of R_a and R_b,

independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; or R₂ and R₃, together with the carbon atoms to which they are bonded, are cycloalkenyl or heterocycloalkenyl; or R₃ and R₄, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl;

R₅ is H, alkyl substituted with aryl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, or C(NR_d)R_c, in which each of R_c and R_d, independently, is H, alkyl, alkenyl, alkynyl, hydroxy, alkoxy, amino, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, or heteroaryl;

R₆ is H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, heterocycloalkyl, heterocycloalkenyl, aryl, heteroaryl, halo, nitro, cyano, amino, hydroxy, alkoxy, aryloxy, C(O)R_c, C(O)OR_c, C(O)NR_cR_d, C(S)R_d, or C(NR_d)R_c; or R₅ and R₆, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl; and

X is O, S, or N(R_e), in which R_e is H, alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl.

21. The method of claim 20, wherein the cancer is nasopharyngeal carcinoma or cervical carcinoma.

22. The method of claim 20, wherein R₅ is alkyl substituted with aryl or hydroxy, cycloalkyl, aryl, halo, C(O)R_c, or C(O)OR_c.

23. The method of claim 22, wherein R₅ is alkyl substituted with aryl or hydroxy, or C(O)R_c, in which R_c is aryl or heteroaryl.

24. The method of claim 23, wherein R₆ is aryl or heteroaryl.

25. The method of claim 24, wherein X is O and R₂ is alkyl or C(O)H.
26. The method of claim 20, wherein R₆ is alkyl, cycloalkyl, aryl, heteroaryl.
27. The method of claim 26, wherein R₆ is aryl or heteroaryl.
28. The method of claim 20, wherein X is O.
29. The method of claim 20, wherein each of R₁, R₂, R₃, and R₄, independently, is H, alkyl, aryl, heteroaryl, nitro, hydroxy, alkoxy, aryloxy, or C(O)R_a; or R₁ and R₂, together with the carbon atoms to which they are bonded, are cycloalkenyl, heterocycloalkenyl, aryl, or heteroaryl.
30. The method of claim 20, wherein R₅ is C(S)R_d, or C(NR_d)R_c.
31. The method of claim 20, wherein the compound is one of Compounds 1, 4, 6, 9, 14, 20, 30-34, 39, 40, 44, 45, 47, 48, 53-57, 59, 67-84, 86, 87, 95, 96, 100, 107, 115, 132, 134, 139-148, 150, 151, 160, 166, 170-172, 178-182, 185-188, 191, 196, 200-203, 207, 222, 233, 234, 236-243, 246, 247, 249, 250, 252, and 256-263.