(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 September 2012 (27.09.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/129227 A1

(51) International Patent Classification:
A61K 39/395 (2006.01) *A61P 37/04* (2006.01)
A61K 39/04 (2006.01) *C07K 16/46* (2006.01)
A61K 31/06 (2006.01) *C12N 5/0784* (2010.01)

(21) International Application Number:
PCT/US2012/029802

(22) International Filing Date:
20 March 2012 (20.03.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/466,292 22 March 2011 (22.03.2011) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *with sequence listing part of description (Rule 5.2(a))*

WO 2012/129227 A1

(54) Title: DENDRITIC CELLS (DCS) TARGETING FOR TUBERCULOSIS (TB) VACCINE

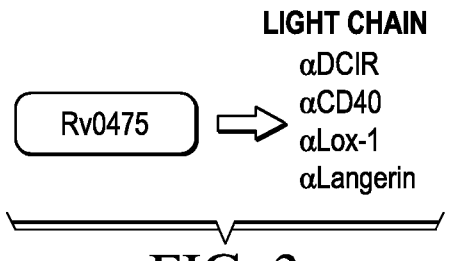

FIG. 3

(57) Abstract: Compositions and methods comprising high affinity monoclonal antibody conjugates against several DC receptors are described herein. The inventors prepared fusion proteins with antigens for DC-targeting vaccine generation by conjugating several M. *tuberculosis* protein antigens with high affinity monoclonal antibodies against several DC receptors with a view to developing novel human vaccines based on *in vivo* DC-targeting. The findings of studies described herein indicate that vaccines bearing TB antigens can recall a potent memory antigen-specific T cell response *in vitro* resulting in IFN*γ* secretion.

DENDRITIC CELLS (DCs) TARGETING FOR TUBERCULOSIS (TB) VACCINE

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates in general to tuberculosis (TB) treatment and control, and more particularly, to a composition and a method of developing a TB vaccine by targeting antigens to human dendritic cells and their subtypes.

REFERENCE TO A SEQUENCE LISTING

[0002] The present application includes a Sequence Listing which has been submitted in ASCII format via EFS-Web and is hereby incorporated by reference in its entirety. Said ASCII copy, created on March 12, 2012, is named BHCS2476.txt and is 882,499 bytes in size.

BACKGROUND OF THE INVENTION

[0003] Without limiting the scope of the invention, its background is described in connection with design of fusion proteins and targeting antigens to dendritic cells (DCs) for the purpose of vaccination and to evoke potent humoral and cellular immune responses.

[0004] U.S. Patent Application No. 20040146948 (Britton et al. 2003) provides single-chain Fv (scFv) fragment-based compositions and methods for targeting antigens (including Mycobacterial antigens) to antigen-presenting cells (APCs) such as, for example, dendritic cells (DC). The Britton invention further discloses compositions and methods useful in the treatment of diseases including infectious diseases and cancer.

[0005] U.S. Patent No. 7,560,534 issued to Deo et al. (2009) describes molecular conjugates comprising an antigen linked to a human monoclonal antibody that specifically binds to dendritic cells. The '534 patent further discloses pharmaceutical compositions comprising the molecular conjugates and therapeutic methods for using the conjugates.

[0006] U.S. Patent No. 7,261,897 issued to Skeiky et al. (2007) relates to compositions and fusion proteins containing at least two Mycobacterium sp. antigens, and nucleic acids encoding such compositions and fusion proteins. The compositions of the Skeiky invention increase serological sensitivity of sera from individuals infected with tuberculosis, and methods for their use in the diagnosis, treatment, and prevention of tuberculosis infection.

SUMMARY OF THE INVENTION

[0007] The present invention describes a tuberculosis (TB) vaccine comprising selected TB proteins domains fused to heavy and light chain of antibodies that is used to target and activate dendritic cells (DCs). The vaccine composition described herein delivers antigen specifically to DCs for the purpose of vaccination to evoke potent humoral and cellular immune responses. The vaccine composition of the present invention promotes efficient recall memory induced in blood from TB patients. Targeting DCs with TB-antigen fused to anti-DC antibodies enables recognition of both human and monkey proteins.

[0008] A method for increasing the effectiveness of antigen presentation by an antigen presenting cell (APC) is disclosed in one embodiment of the present invention. The method of the present invention comprises the steps of: isolating and purifying a dendritic cell (DC)-specific antibody or fragment

thereof to which one or more antigens or recombinant antigens are attached or conjugated to form an antibody-antigen complex, and contacting the APC with the antibody-antigen complex under conditions wherein the antibody-antigen complex is processed and presented for T cell recognition.

[0009] In one aspect of the method described hereinabove the APC comprises an isolated dendritic cell (DC), a peripheral blood mononuclear cell (PBMC), a monocyte, a B cell, a myeloid dendritic cell and combinations thereof that have been cultured in vitro with GM-CSF and IL-4, interferon alpha, antigen and combinations thereof. In one aspect, the one or more antigens or recombinant antigens comprise M. tuberculosis antigens comprises at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211. In another aspect, the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR. In another aspect, the method of claim 1, wherein a nucleotide sequence for the DC-specific antibody or the antigen is selected from SEQ ID NOS: 6 to 70, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, or 220.

[0010] Another embodiment described herein relates to an immunostimulatory composition for generating an immune response, for prophylaxis, for therapy or any combination thereof against tuberculosis in a human or animal subject comprising: (i) an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more *M. tuberculosis* antigens or antigenic peptides and (ii) a pharmaceutically acceptable carrier, wherein the conjugate is comprised in an amount effective to generate the immune response against tuberculosis. In one aspect of the composition the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, and any combinations thereof. In another aspect the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR. In yet another aspect the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40. In a related aspect the DC-specific antibody is humanized. In another aspect the composition is administered to the human or

animal subject by an oral route, a nasal route, topically or as an injection, wherein the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal.

[0011] In yet another embodiment the instant invention discloses a vaccine composition comprising: an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis and an optional pharmaceutically acceptable carrier or an adjuvant. The vaccine composition of the present invention further comprises a flexible linker between the DC-specific antibody or fragment thereof and the one or more antigens, wherein the one or more antigens or antigenic peptides are conjugated to a heavy-chain, a light-chain or both of the anti-dendritic cell (DC)-specific antibody.

[0012] In one aspect of the vaccine composition the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof. In another aspect the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR. In a specific aspect the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40. In a related aspect the DC-specific antibody is humanized and the composition is administered to the human or animal subject by an oral route, a nasal route, topically or as an injection. In one aspect the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

[0013] A tuberculosis vaccine composition is disclosed in one embodiment of the instant invention. The composition comprises a dendritic cell (DC)-specific antibody or fragment thereof comprising αDCIR, αLangerin, αLOX-1 or αCD40 fused to one or more antigens or antigenic peptides selected from at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, wherein the antigens or the antigenic peptides are conjugated to a heavy chain of the DC-specific antibody via one or more flexible linkers and an optional pharmaceutically acceptable carrier or an adjuvant.

[0014] Another embodiment of the instant invention describes a tuberculosis vaccine comprising: a dendritic cell (DC)-specific antibody or fragment thereof comprising αDCIR, αLangerin, αLOX-1 or αCD40 fused to one or more antigens selected from at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, wherein the antigens or the antigenic peptides are conjugated to a heavy chain of the DC-specific

antibody via one or more flexible linkers and an optional pharmaceutically acceptable carrier or an adjuvant. A tuberculosis vaccine comprising a dendritic cell (DC)-specific antibody or fragment thereof comprising αDCIR, αLangerin, αLOX-1 or αCD40 fused to one or more antigens or antigenic peptide comprising SEQ ID NO: 3, wherein the antigen or the antigenic peptide is conjugated to a light chain of the DC-specific antibody via one or more flexible linkers and an optional pharmaceutically acceptable carrier or an adjuvant is also disclosed herein.

[0015] In yet another embodiment the instant invention provides a method for increasing effectiveness of one or more dendritic cells (DCs) comprising the steps of: a) isolating the DCs from a patient, b) exposing the DCs to activating amounts of a vaccine comprising a dendritic cell (DC)-specific antibody or fragment thereof loaded, fused or conjugated to one or more antigens selected from at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, and any combinations thereof wherein the antigens or the antigenic peptides are conjugated to a heavy chain, a light chain or both of the DC-specific antibody via one or more flexible linkers; and an optional pharmaceutically acceptable carrier or an adjuvant, and c) reintroducing the antigen-loaded and activated DCs into the patient. In one aspect of the method the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

[0016] A method of providing immunostimulation by activation of one or more dendritic cells (DCs) to a human subject for a prophylaxis, a therapy or a combination thereof against one or more viral, bacterial, fungal, parasitic, protozoal, and parasitic diseases, and allergic disorders is disclosed in one embodiment of the present invention. The immunostimulation method comprises the steps of: (i) identifying the human subject in need of immunostimulation for the prophylaxis, the therapy or a combination thereof against the one or more diseases or disorders; (ii) isolating one or more DCs from the human subject; (iii) activating the isolated DCs with an amount of a composition effective to form activated DCs comprising a dendritic cell (DC)-specific antibody or fragment thereof loaded, fused or conjugated to one or more antigens or antigenic peptides, wherein the antigens or the antigenic peptides are conjugated to a heavy chain, a light chain or both of the DC-specific antibody via one or more flexible linkers; and an optional pharmaceutically acceptable carrier or an adjuvant; and (iv) reintroducing the activated DCs into the human subject. In a specific aspect the bacterial disease is tuberculosis. In one aspect of the method the antigens selected from at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, and any combinations thereof. In another aspect of the method the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2,

IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR. In yet another aspect the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

[0017] In another embodiment the instant invention describes a method for a treatment, a prophylaxis or a combination thereof against tuberculosis in a human subject comprising the steps of: identifying the human subject in need of the treatment, the prophylaxis or a combination thereof against tuberculosis; and administering a vaccine composition comprising an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis and an optional pharmaceutically acceptable carrier or an adjuvant.

[0018] The method as described hereinabove further comprises a flexible linker between the DC-specific antibody or fragment thereof and the one or more antigens. In one aspect the one or more antigens or antigenic peptides are conjugated to a heavy-chain, a light-chain or both of the anti-dendritic cell (DC)-specific antibody. In another aspect the one or more *M. tuberculosis* antigens are selected from at lteast one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, and any combinations thereof. In yet another aspect the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR. In a related aspect the humanized DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40. In another aspect the composition is administered to the human or animal subject by an oral route, a nasal route, topically or as an injection. In another aspect the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

[0019] An immunostimulatory composition for generating an immune response is disclosed in one embodiment of the present invention. The composition provides a prophylaxis, a therapy or any combination thereof against tuberculosis in a human or animal subject and comprises: a) an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more *M. tuberculosis* antigens or antigenic peptides, b) at least one Toll-Like Receptor (TLR) agonist which is selected from the group consisting of TLR1, TLR2, TLR3, TLR4, TLR5, TLR6, TLR7, and TLR8 agonists and c) a pharmaceutically acceptable carrier, wherein the conjugate is comprised in an amount effective to generate the immune response against tuberculosis. In one aspect the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof. In another aspect the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

[0020] The present invention also discloses A tuberculosis vaccine comprising: an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis, at least one Toll-Like Receptor (TLR) agonist which is selected from the group consisting of TLR1, TLR2, TLR3, TLR4, TLR5, TLR6, TLR7, and TLR8 agonists, and one or more optional pharmaceutically acceptable carriers and adjuvants. In one aspect the one or more *M. tuberculosis* antigens are selected from at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, and any combinations thereof. In another aspect the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR. In yet another aspect the DC-specific antibody is humanized. In another aspect the composition is administered to the human or animal subject by an oral route, a nasal route, topically or as an injection, wherein the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

[0021] In one embodiment the present invention discloses a method for a treatment, a prophylaxis or a combination thereof against tuberculosis in a human subject comprising the steps of: (i) identifying the human subject in need of the treatment, the prophylaxis or a combination thereof against tuberculosis, and (ii) administering a vaccine composition comprising: a) an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis; b) at least one Toll-Like Receptor (TLR) agonist which is selected from the group consisting of TLR1, TLR2, TLR3, TLR4, TLR5, TLR6, TLR7, and TLR8 agonists; and c) one or more optional pharmaceutically acceptable carriers and adjuvants.

[0022] In one aspect the vaccine described hereinabove further comprises a flexible linker between the DC-specific antibody or fragment thereof and the one or more antigens. In another aspect the one or more antigens or antigenic peptides are conjugated to a heavy-chain, a light-chain or both of the anti-dendritic cell (DC)-specific antibody. In yet another aspect the one or more *M. tuberculosis* antigens are selected from at least one of SEQ ID NOS: 1, 2, 3, 4, 5, 71 to 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, or 211, and any combinations thereof. In another aspect the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR,

MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.. In related aspects the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40 and further the DC-specific antibody is humanized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] For a more complete understanding of the features and advantages of the present invention, reference is now made to the detailed description of the invention along with the accompanying figures and in which:

[0024] FIG. 1 shows the results of IFNγ measurement from the peripheral blood mononuclear cells (PBMCs) of tuberculosis (TB) patients, active and latent, that were incubated for 48h with recombinant antigens;

[0025] FIG. 2 is a schematic showing TB antigens expressed as fusion proteins with the heavy chain of each antibody;

[0026] FIG. 3 is a schematic showing the fusion of Rv0475 to the light chain of each antibody;

[0027] FIG. 4 is a schematic representation of the chimeric recombinant antibody used as vaccine according to an embodiment of the present invention; and

[0028] FIGS. 5A-5F demonstrate the ability of recombinant anti-DCIR and anti-CD40 antibodies fused to individual TB antigen to elicit expansion of antigen-specific CD4+ T cells from TB patients: Delivering ESAT6 to DCs through CD40 and DCIR induces IFNγ-TNFα-producing ESAT6-specific CD4+ T cells. Monocytes-derived DCs (GM-CSF & IFNγ) were loaded ON with 10 (FIGS. 5A-5C) or 100 pM (FIGS. 5D-5F) of each targeting antibody. T cells were then added (1:40 ratio) and cultivated for 8 days with addition of 100 U of IL-2 at day 2 and day 5. At day 9, DCs were thawed and loaded ON with 1 nM of targeting mAbs (IgG4, αCD40 and αDCIR). On day 9.5 50,000 loaded-DCs (IgG4, αCD40 and αDCIR) or unloaded were then added. After 6h, frequency of peptide-specific CD4+ and CD8+ T cells with intracellular IFNγ+ TNFα+ was assessed by FACS analysis.

[0029] FIGS. 6A (non-reduced) and 6B (reduced) are gels that show the expression of the constructs listed as follows: In Figure 6A - Lane 1. hIgG4-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 2. manti-CD40_12E12.3F3-hIgG4HC-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 3. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 4. hIgG4-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 5. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 6. hIgG4-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 7. manti-CD40_12E12.3F3-hIgG4HC-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 8. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 9. hIgG4-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 10. manti-CD40_12E12-hIgG4-C-Flex-v1-

m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980. In Figure 6B - Lane 1. hIgG4-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 2. manti-CD40_12E12.3F3-hIgG4HC-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 3. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 4. hIgG4-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 5. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 6. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 7. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbCFP10-f2-m.tbESAT6; Lane 8. hIgG4-Flex-v1-m.tbCFP10-f2-m.tbESAT6; Lane 9. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbCFP10-f2-m.tbESAT6; Lane 10. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbHspX. The sequences for each of these constructs is detailed hereinbelow.

DETAILED DESCRIPTION OF THE INVENTION

[0030] While the making and using of various embodiments of the present invention are discussed in detail below, it should be appreciated that the present invention provides many applicable inventive concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed herein are merely illustrative of specific ways to make and use the invention and do not delimit the scope of the invention.

[0031] To facilitate the understanding of this invention, a number of terms are defined below. Terms defined herein have meanings as commonly understood by a person of ordinary skill in the areas relevant to the present invention. Terms such as "a", "an," and "the" are not intended to refer to only a singular entity, but include the general class of which a specific example may be used for illustration. The terminology herein is used to describe specific embodiments of the invention, but their usage does not delimit the invention, except as outlined in the claims.

[0032] As used herein, the term "Antigen Presenting Cells" (APC) refers to cells that are capable of activating T cells, and include, but are not limited to, certain macrophages, B cells and dendritic cells. "Dendritic cells" (DCs) refers to any member of a diverse population of morphologically similar cell types found in lymphoid or non-lymphoid tissues. These cells are characterized by their distinctive morphology, high levels of surface MHC-class II expression (Steinman, et al., Ann. Rev. Immunol. 9:271. (1991); incorporated herein by reference for its description of such cells). These cells can be isolated from a number of tissue sources, and conveniently, from peripheral blood, as described herein. Dendritic cell binding proteins refers to any protein for which receptors are expressed on a dendritic cell. Examples include GM-CSF, IL-1, TNF, IL-4, CD40L, CTLA4, CD28, and FLT-3 ligand.

[0033] For the purpose of the present invention, the term "vaccine composition" is intended to mean a composition which can be administered to humans or to animals in order to induce an immune system response; this immune system response can result in a production of antibodies or simply in the activation of certain cells, in particular antigen-presenting cells, T lymphocytes and B lymphocytes. The vaccine composition can be a composition for prophylactic purposes or for therapeutic purposes, or both. As used herein, the term "antigen" refers to any antigen which can be used in a vaccine, whether it

involves a whole microorganism or a subunit, and whatever its nature: peptide, protein, glycoprotein, polysaccharide, glycolipid, lipopeptide, etc. They may be viral antigens, bacterial antigens, or the like; the term "antigen" also comprises the polynucleotides, the sequences of which are chosen so as to encode the antigens whose expression by the individuals to which the polynucleotides are administered is desired, in the case of the immunization technique referred to as DNA immunization. They may also be a set of antigens, in particular in the case of a multivalent vaccine composition which comprises antigens capable of protecting against several diseases, and which is then generally referred to as a vaccine combination, or in the case of a composition which comprises several different antigens in order to protect against a single disease, as is the case for certain vaccines against whooping cough or the flu, for example. The term "antibodies" refers to immunoglobulins, whether natural or partially or wholly produced artificially, e.g. recombinant. An antibody may be monoclonal or polyclonal. The antibody may, in some cases, be a member of one, or a combination immunoglobulin classes, including: IgG, IgM, IgA, IgD, and IgE.

[0034] The term "adjuvant" refers to a substance that enhances, augments or potentiates the host's immune response to a vaccine antigen.

[0035] The term "gene" is used to refer to a functional protein, polypeptide or peptide-encoding unit. As will be understood by those in the art, this functional term includes both genomic sequences, cDNA sequences, or fragments or combinations thereof, as well as gene products, including those that may have been altered by the hand of man. Purified genes, nucleic acids, protein and the like are used to refer to these entities when identified and separated from at least one contaminating nucleic acid or protein with which it is ordinarily associated.

[0036] As used herein, the term "nucleic acid" or "nucleic acid molecule" refers to polynucleotides, such as deoxyribonucleic acid (DNA) or ribonucleic acid (RNA), oligonucleotides, fragments generated by the polymerase chain reaction (PCR), and fragments generated by any of ligation, scission, endonuclease action, and exonuclease action. Nucleic acid molecules can be composed of monomers that are naturally-occurring nucleotides (such as DNA and RNA), or analogs of naturally-occurring nucleotides (e.g., α-enantiomeric forms of naturally-occurring nucleotides), or a combination of both. Modified nucleotides can have alterations in sugar moieties and/or in pyrimidine or purine base moieties. Sugar modifications include, for example, replacement of one or more hydroxyl groups with halogens, alkyl groups, amines, and azido groups, or sugars can be functionalized as ethers or esters. Moreover, the entire sugar moiety can be replaced with sterically and electronically similar structures, such as aza-sugars and carbocyclic sugar analogs. Examples of modifications in a base moiety include alkylated purines and pyrimidines, acylated purines or pyrimidines, or other well-known heterocyclic substitutes. Nucleic acid monomers can be linked by phosphodiester bonds or analogs of such linkages. Analogs of phosphodiester linkages include phosphorothioate, phosphorodithioate, phosphoroselenoate, phosphorodiselenoate, phosphoroanilothioate, phosphoranilidate, phosphoramidate, and the like. The term "nucleic acid molecule" also includes so-called "peptide nucleic acids," which comprise naturally-

occurring or modified nucleic acid bases attached to a polyamide backbone. Nucleic acids can be either single stranded or double stranded.

[0037] As used in this application, the term "amino acid" means one of the naturally occurring amino carboxylic acids of which proteins are comprised. The term "polypeptide" as described herein refers to a polymer of amino acid residues joined by peptide bonds, whether produced naturally or synthetically. Polypeptides of less than about 10 amino acid residues are commonly referred to as "peptides." A "protein" is a macromolecule comprising one or more polypeptide chains. A protein may also comprise non-peptidic components, such as carbohydrate groups. Carbohydrates and other non-peptidic substituents may be added to a protein by the cell in which the protein is produced, and will vary with the type of cell. Proteins are defined herein in terms of their amino acid backbone structures; substituents such as carbohydrate groups are generally not specified, but may be present nonetheless.

[0038] As used herein, the term "in vivo" refers to being inside the body. The term "in vitro" used as used in the present application is to be understood as indicating an operation carried out in a non-living system.

[0039] As used herein, the term "treatment " or "treating" means any administration of a compound of the present invention and includes (1) inhibiting the disease in an animal that is experiencing or displaying the pathology or symptomatology of the diseased (i.e., arresting further development of the pathology and/or symptomatology), or (2) ameliorating the disease in an animal that is experiencing or displaying the pathology or symptomatology of the diseased (i.e., reversing the pathology and/or symptomatology).

[0040] The present invention describes a novel tuberculosis (TB) human vaccine based on *in vivo* dendritic cell (DC)-targeting. The vaccine comprises a conjugate of one or more high affinity monoclonal antibodies against several DC receptors with several *M. tuberculosis* protein antigens. The vaccine composition described herein delivers antigen specifically to DCs for the purpose of vaccination to evoke potent humoral and cellular immune responses. The vaccine composition of the present invention promotes efficient recall memory induced in blood from TB patients.

[0041] TB is a leading cause of death: in 2006, there were 9.2 million new cases of active TB and an estimated 1.5 million deaths in the world, according to the World Health Organization. It is estimated that one-third of the world's population harbors *Mycobacterium tuberculosis* (*M. tuberculosis*) in the form of non-replicating bacilli (latent tuberculosis) (1). In addition, an increasing proportion of TB cases results from infection with *M. tuberculosis* resistant to first line chemotherapy (multi-drug resistant TB or MDR-TB) (2). *M. bovis* BCG, the only vaccine against TB currently available, prevents 80% of childhood military disease and meningitis, but its efficacy in preventing pulmonary disease in adulthood is rather low (3). Therefore, efficient therapeutic vaccines are urgently needed to cure active and latent TB patients. Furthermore, according to the World Health Organization, *M. tuberculosis* is also the major opportunistic pathogen associated with HIV disease, contributing significantly to HIV-associated mortality (almost 25% of HIV-related deaths are from TB).

[0042] Dendritic cells (DCs) are leukocytes specialized in the uptake, processing and presentation of antigens and play fundamental roles in regulating both innate and adaptive immunity functions and in maintaining immunological tolerance. They are mainly localized at the interface between body surfaces and the environment, continuously scrutinizing incoming antigen for the potential threat it may represent for the body. To control immune responses against a large variety of microorganisms including viruses and bacteria they exhibit at their surface a large number of receptors, which have been shown to be crucial in DC biological functions *in vivo* by sensing pathogen-associated molecular patterns (PAMPs). These specialized pathogen recognition receptors (PRRs) whose engagement modulates the functional activity of DCs, include C-type lectin receptors (CLRs) and Toll-like receptors (TLRs) (4). Following pathogen contact, PRRs are endocytosed by immature DCs, which induce the DC to enter a developmental program called maturation, which transforms DCs from sentinels into efficient APCs and T cell stimulators (5). With the induction of maturation, DCs undergo massive morphological and functional changes. Antigen internalization is down modulated due to repression of most antigen-receptors and to an overall reduction in phagocytosis and macropinocytosis. In addition, MHC molecules are redistributed from intracellular endocytic compartments to the cell surface (6,7). Peptide loading as well as the half-life of MHC molecules is increased (6,7). Finally, the surface expression of T cell costimulatory molecules also rises. Concomitant with the modifications of their antigen presentation abilities, maturation induces migration of DCs out of peripheral tissues (8). Modifications in the expression of chemokine receptors and adhesion molecules, as well as profound changes of the cytoskeleton organization, contribute to the migration of DCs, through the lymph, towards secondary lymphoid organs (9). By linking antigen uptake, peptide loading, and cell migration to the encounter of a pathogen, DCs restrict antigen presentation to those antigens internalized during maturation, thus favoring the stimulation of T cells specific for potentially pathogenic antigens.

[0043] All these biological events result in the activation of specific signaling pathways that lead to the induction of specific immune responses against these pathogens, in part through expression of effector cytokines. The resulting T cell responses following these interactions between PRRs and PAMPs have been extensively studied. However, little is known about the way the PPRs are internalized and how from inside the cell, they are able to dictate and orientate immune responses. The present inventors have previously produced high affinity monoclonal antibodies against several DC receptors, and prepared fusion proteins with antigens for DC-targeting vaccine generation. Targeting antigens to DCs using these fusion proteins recognizing different CLRs resulted in different biological responses. The inventors hypothesize is that subsets of human DCs express distinct receptors that need to be mobilized in order to mount a durable immune response adapted to each microbial invasion, depending on the pathogen to be eliminated. To test this hypothesis, the inventors have prepared high affinity monoclonal antibodies against several DC receptors to which antibodies have been conjugated to several *M. tuberculosis* protein antigens to develop novel human vaccines based on *in vivo* DC-targeting.

[0044] Construction of TB vaccine, Antigen selection: *M. tuberculosis* genome encodes for more than 4000 genes. Antigens selected were tested with PBMCs from active or latent TB patients. IFNγ secretion was measured to identify antigens recognized (FIG. 1). The data showed that several antigens are broadly recognized and therefore constitute potential antigens that will be fused to recombinant mAb. These include: ESAT6, CFP10, Rv1980 and combination of antigens: CFP10-f2-ESAT6 and Rv0287-f2-Rv0288. One antigen, Rv0475, is recognized mainly by latent TB patient as already reported in the literature (10-12). Because ESAT6 and CFP10 are used as a diagnostic tool to identify TB patients from environmental mycobacteria-infected person, clinical trials have focused on using Rv0288 instead of ESAT6. The inventors also chose Ag85B as a potential antigen even though its immunogenicity was not detected in the study described above. The inventors chose 5 antigens: ESAT6, Rv0288, Rv0475, Rv1980 and Ag85B. The sequences of the selected antigens are presented herein below. The underlined amino acids within parentheses are sequences that have been removed from the protein for better expression.

[0045] ESAT6 (95 amino acids):
MTEQQWNFAGIEAAASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGSGSEAYQGVQQKWDATA TELNNALQNLARTISEAGQAMASTEGNVTGMFA (SEQ ID NO: 1)

[0046] Rv0288 (96 amino acids):
MSQIMYNYPAMLGHAGDMAGYAGTLQSLGAEIAVEQAALQSAWQGDTGITYQAWQAQWNQ AMEDLVRAYHAMSSTHEANTMAMMARDTAEAAKWGG (SEQ ID NO: 2)

[0047] Rv0475 (199 amino acids) :
MAENSNIDDIKAPLLAALGAADLALATVNELITNLRERAEETRTDTRSRVEESRARLTKLQEDL PEQLTELREKFTAEELRKAAEGYLEAATSRYNELVERGEAALERLRSQQSFEEVSARAEGYVD QAVELTQEALGTVASQTRAVGERAAKLVGIELPKKAAPAKKAAPAKKAAPAKKAAAKKAPA KKAAAKKVTQK (SEQ ID NO: 3)

[0048] Rv1980Δ24 (228 amino acids):
(MRIKIFMLVTAVVLLCCSGVATAA)PKTYCEELKGTDTGQACQIQMSDPAYNINISLPSYYPDQ KSLENYIAQTRDKFLSAATSSTPREAPYELNITSATYQSAIPPRGTQAVVLKVYQNAGGTHPTTT YKAFDWDQAYRKPITYDTLWQADTDPLPVVFPIVQGELSKQTGQQVSIAPNAGLDPVNYQNFA VTNDGVIFFFNPGELLPEAAGPTQVLVPRSAIDSMLA (SEQ ID NO: 4)

[0049] Ag85BΔ41 (228 amino acids):
(MTDVSRKIRAWGRRLMIGTAAAVVLPGLVGLAGGAATAGAF)SRPGLPVEYLQVPSPSMGRDI KVQFQSGGNNSPAVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYS PACGKAGCQTYKWETFLTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAG SLSALLDPSQGMGPSLIGLAMGDAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANNTRLWV YCGNGTPNELGGANIPAEFLENFVRSSNLKFQDAYNAAGGHNAVFNFPPNGTHSWEYWGAQL NAMKGDLQSSLGAG (SEQ ID NO: 5)

[0050] Vaccine description: Vaccines are recombinant monoclonal antibodies recognizing specific receptors expressed at the surface of DCs. These recombinant mAb are then conjugated to selected antigens (fusion to the C terminus of the heavy chain or the light chain). The inventors selected four recombinant antibodies: αCD40, αDCIR, αLox-1 and αLangerin. These antibodies have been conjugated

to the selected antigens Ag85BΔ41, ESAT6, Rv0288 and Rv1980Δ24 from *M. tuberculosis* (FIG. 2). To cover as many potential epitopes from different antigens as possible, the inventors fused three selected antigens to the heavy chain of different recombinant mAbs, resulting in 2 contructs (FIG. 2). One antigen, Rv0475, was also fused to the light chain of each antibody (FIG. 3). The vaccine harbors three antigens fused to the heavy chain (Ag85B, Rv1980 and ESAT6 or Rv0288) and one to the light chain (Rv0475) as depicted in FIG. 4.

[0051] Vaccine evaluation: Vaccine candidates were tested in targeting studies by incubating vaccines with peripheral blood mononuclear cells (PBMCs) from TB patients (latent or active) or by loading monocyte-derived DCs with the recombinant mAb follow by addition of T-lymphocytes. After 11 days of culture, the efficiency of each vaccine in eliciting an immune recall response was assessed by cytokines secretion (in the culture supernatant or following intracellular staining) as seen in FIGS. 5A-5F and Table 1.

[0052] FIGS. 5A-5F demonstrate the ability of recombinant anti-DCIR and anti-CD40 antibodies fused to individual TB antigen to elicit expansion of antigen-specific CD4+ T cells from TB patients: Delivering ESAT6 to DCs through CD40 and DCIR induces IFNγ-TNFα-producing ESAT6-specific CD4+ T cells. Monocytes-derived DCs (GM-CSF and IFNγ) were loaded ON with 10 (FIGS. 5A-5C) or 100 pM (FIGS. 5D-5F) of each targeting antibody. T cells were then added (1:40 ratio) and cultivated for 8 days with addition of 100 U of IL-2 at day 2 and day 5. At day 9, DCs were thawed and loaded ON with 1 nM of targeting mAbs (IgG4, αCD40 and αDCIR). On day 9.5 50,000 loaded-DCs (IgG4, αCD40 and αDCIR) or unloaded were then added. After 6h, frequency of peptide-specific CD4+ and CD8+ T cells with intracellular IFNγ+ TNFα+ was assessed by FACS analysis. Thus, the data shows that αCD40 and αDCIR vaccines bearing a TB antigen can recall a potent memory antigen-specific anti-CD4+ T cell response *in vitro*. In this *in vitro* culture system αCD40 and αDCIR are equally potent vaccines (DCs used in this assay express both receptors).

[0053] Table 1: Demonstration of the ability of TB antigen vaccines to induce IFNα secretion at low doses.

mAb	aTB#5	aTB#7	aTB#8	DCTB#02
IgG4-ESAT6	0.1 nM (~600) 0.01 nM (~60)	0.1 nM (~30) 0.01 nM (~10)	1 nM (~300) 0.1 nM (~60)	1 nM (~300) 0.1 nM (~60)
αCD40-ESAT6	0.1 nM (~600) 0.01 nM (~1000)	0.1 nM (~140) 0.01 nM (~500)	1 nM (~3500) 0.1 nM (~2500)	1 nM (~3500) 0.1 nM (~2500)
αDCIR-ESAT6	0.1 nM (~600) 0.01 nM (~1000)	0.1 nM (~300) 0.01 nM (~175)	1 nM (~2500) 0.1 nM (~600)	1 nM (~2500) 0.1 nM (~600)
IgG4-CFP10	0.01 nM (~470) 0.001 nM (~60)	0.1 nM (~20) 0.01 nM (~10)	0.1 nM (~700) 0.01 nM (~60)	0.01 nM (~2300) 0.001 nM (~60
αCD40-CFP10	0.01 nM (~4800) 0.001 nM (~2900)	0.1 nM (~350) 0.01 nM (~250)	0.1 nM (~3200) 0.01 nM (~6000)	0.01 nM (~3000) 0.001 nM (~3500)
αDCIR-CFP10	0.01 nM (~1600) 0.001 nM (~7300)	0.1 nM (~350) 0.01 nM (~250)	0.1 nM (~2000) 0.01 nM (~3000)	0.01 nM (~3000) 0.001 nM (~3500)
IgG4-Ag85B	0.01 nM (~190) 0.001 nM (~40)	ND	ND	ND
αCD40-Ag85B	0.01 nM (~6000) 0.001 nM (~10000)	ND	ND	ND
αDCIR-Ag85B	0.1 nM (~14000) 0.01 nM (~6000)	ND	ND	ND

mAb	aTB#5	aTB#7	aTB#8	DCTB#02
IgG4-Rv1980	0.1 nM (~500) 0.01 nM (~60) 0.001 nM (~15)	ND	ND	ND
αCD40-Rv1980	0.01 nM (~2000) 0.001 nM (~11000)	ND	ND	ND
αDCIR-Rv1980	0.1 nM (~3000) 0.01 nM (~19000)	ND	ND	ND

[0054] ESAT6 and CFP-10 were fused to IgG4, αCD40 and αDCIR and incubated with PBMCs from TB patients at different concentration (from 10 nM to 1 pM). Cells were cultivated for 8 days with addition of 100 U of IL-2 at day 2 and day 5. At day 8, cells were washed in DPBS and rested for 36h. At day 9.5, cluster of peptides (10 μM each peptide) were used to stimulate cells for another 36h. Supernatants were recovered and IFNγ secretion measured. IFNγ secretion is indicated in pg/ml.

[0055] The data presented hereinabove shows that both αCD40 and αDCIR vaccines bearing TB antigens can recall a potent memory antigen-specific T cell response *in vitro* resulting in IFNγ secretion. Specific immune responses were observed with low doses of vaccines, i.e., between 1 and 100 pM. Both constructs induced similar levels of IFNγ secretion in different patients.

[0056] Non-limiting examples different DC-specific antibodies or fragments (both nucleotide and protein sequences) that may be used in the preparation of the TB vaccine of the present invention are shown herein below:

[0057] Anti_CLEC_6_9B9.2G12_Hv-V-hIgG4H-C (SEQ ID NO: 6):

ATGGGCAGGCTTACTTCTTCATTCTTGCTACTGATTGTCCCTGCATATGTCCTGTCCCAGGTT
ACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGACCTGTTC
TTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGAGTGTAGGCTGGATTCGTCAGCCTTCAG
GGAAGGGTCTGGAGTGGCTGGCTCACATTTGGTGGAATGATGATAAGTACTATAATCCAGT
CCTGAAAAGCCGGCTCACAATCTCCAAGGAGACCTCCAACAACCAGGTATTCCTCAAGATC
GCCAGTGTGGTCTCTGCAGATACTGCCACATACTACTGTGCTCGATTCTATGGTAACTGTCT
TGACTACTGGGGCCAAGGCACCACTCTCACAGTCTCCTCGGCCAAAACAaagggcccATCCGTC
TTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGG
TCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGG
CGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGA
CCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAG
CAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCA
GCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTC
TCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCC
CGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCC
GCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAG
GACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCC
ATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTG
CCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGC
TTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTAC
AAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGT
GGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTG
CACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGATTAATTA
A

[0058] Anti_CLEC_6_9B9.2G12_Hv-V-hIgG4H-C (SEQ ID NO: 71):

MGRLTSSFLLLIVPAYVLSQVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMSVGWIRQPSGKGL
EWLAHIWWNDDKYYNPVLKSRLTISKETSNNQVFLKIASVVSADTATYYCARFYGNCLDYWG
QGTTLTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPA
VLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSV
FLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVV
SVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTC
LVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHE
ALHNHYTQKSLSLSLGKAS

[0059] Anti_CLEC_6_9B9.2G12_Kv-V-hIgGK-C (SEQ ID NO: 7):

ATGATGTCCTCTGCTCAGTTCCTTGGTCTCCTGTTGCTCTGTTTTCAAGGTACCAGATGTGAT
ATCCAGATGACACAGACTACATCCTCCCTGTCTGCCTCTCTGGGAGACAGAGTCACCATCA
GTTGCAGGGCAAGTCAGGACATTAGCAATTATTTAAACTGGTATCAGCAGAAACCAGATGG
AACTGTTAAACTCCTGATCTACTACACATCAATATTACAATTAGGAGTCCCATCAAGATTCA
GTGGCAGTGGGTCTGAAACAGATTATTCTCTCACCATTAGCAACCTGGAGCAAGAAGATAT
TGCCACTTACTTTTGCCAACAGGGTGATTCGCTTCCATTCACGTTCGGCTCGGGGACAAAGC
TCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAG
TTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCAA
AGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAGA
GCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAGA
CTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGTC
ACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0060] Anti_CLEC_6_9B9.2G12_Kv-V-hIgGK-C (SEQ ID NO: 72):

MMSSAQFLGLLLLCFQGTRCDIQMTQTTSSLSASLGDRVTISCRASQDISNYLNWYQQKPDGTV
KLLIYYTSILQLGVPSRFSGSGSETDYSLTISNLEQEDIATYFCQQGDSLPFTFGSGTKLEIKRTVA
APSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSL
SSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0061] Anti-ASGPR_49C11_7H-LV-hIgG4H-C (SEQ ID NO: 8):

ATGAGAGCGCTGATTCTTTTGTGCCTGTTCACAGCCTTTCCTGGTATCCTGTCTGATGTGCA
GCTTCAGGAGTCAGGACCTGACCTGGTGAAACCTTCTCAGTCACTTTCACTCACCTGCACTG
TCACTGGCTACTCCATCACCAGTGGTTATAGCTGGCACTGGATCCGGCAGTTTCCAGGAAA
CAAACTGGAATGGATGGGCTACATACTCTTCAGTGGTAGCACTAACTACAACCCATCTCTG
AAAAGTCGAATCTCTATCACTCGAGACACATCCAAGAACCAGTTCTTCCTGCAGTTGAATT
CTGTGACTACTGAGGACACAGCCACATATTTCTGTGCAAGATCTAACTATGGTTCCTTTGCT
TCCTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACAACGGGCCCATCCGTCT
TCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGT
CAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGC
GTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGAC
CGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGC
AACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAG
CACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCT
CATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCC
GAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCG
CGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGG
ACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCAT
CGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCC
CCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTC
TACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAG
ACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGA
CAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCAC
AACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGATTAATTAA

[0062] Anti-ASGPR_49C11_7H-LV-hIgG4H-C (SEQ ID NO: 73):

MRALILLCLFTAFPGILSDVQLQESGPDLVKPSQSLSLTCTVTGYSITSGYSWHWIRQFPGNKLE
WMGYILFSGSTNYNPSLKSRISITRDTSKNQFFLQLNSVTTEDTATYFCARSNYGSFASWGQGTL
VTVSAAKTTGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQS
SGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFP
PKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLT
VLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVK
GFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALH
NHYTQKSLSLSLGKAS

[0063] Anti-ASGPR_49C11_7K-LV-hIgGK-C (SEQ ID NO: 9):

ATGGATTTTCAAGTGCAGATTTTCAGCTTCCTGCTAATCAGTGCCTCAGTCATAATATCCAG
AGGACAAATTGTTCTCACCCAGTCTCCAGCAATCATGTCTGCATCTCCAGGGGAGAAGGTC
ACCATGACCTGCAGTGCCAGCTCAAGTGTAAGTCACATGCACTGGTACCAGCAGAAGTCAG
GCACTTCCCCCAAAAGATGGATTTATGACACATCCAGACTGGCTTCTGGAGTCCCTGCTCG
CTTCAGTGGCAGTGGGTCTGGGACCTCTTACTCTCTCACAATCAGCAGCATGGAGGCTGAA
GATGCTGCCACTTATTACTGCCAGCAGTGGAGTAGTCACCCATGGTCGTTCGGTGGAGGCA
CCAAACTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGAT
GAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAG
AGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTG
TCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCA
AAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCT
CGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0064] Anti-ASGPR_49C11_7K-LV-hIgGK-C (SEQ ID NO: 74):

MDFQVQIFSFLLISASVIISRGQIVLTQSPAIMSASPGEKVTMTCSASSSVSHMHWYQQKSGTSPK
RWIYDTSRLASGVPARFSGSGSGTSYSLTISSMEAEDAATYYCQQWSSHPWSFGGGTKLEIKRT
VAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDST
YSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0065] Anti-ASGPR_4G2.2_Hv-V-hIgG4H-C (SEQ ID NO: 10):

ATGGCTTGGGTGTGGACCTTGCTATTCCTGATGGCAGCTGCCCAAAGTGCCCAAGCACAGA
TCCAGTTGGTGCAGTCTGGACCTGAGCTGAAGAAGCCTGGAGAGACAGTCAAGATCTCCTG
CAAGGCTTCTGGGTATACCTTCACAAACTATGGAATGAACTGGGTGAAGCAGGTTCCAGGA
AAAGGTTTAAGGTGGATGGGCTGGATGGACACCTTCACTGGAGAGCCAACATATGCTGATG
ACTTCAAGGGACGGTTTGCCTTCTCTTTGGAAACCTCTGCCAGCACTGCCTATTTGCAGATC
AACAGCCTCAAAAATGAGGACACGGCTACTTATTTCTGTGCAAGAGGGGGGATTTTACGAC
TCAACTACTTTGACTACTGGGGCCAAGGCACCACTCTCACAGTCTCCTCAGCCAAAACGAA
GGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCC
CTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCG
CCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTC
AGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAG
ATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCAT
GCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAA
ACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTG
AGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAAT
GCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTC
ACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAA
GGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCA
CAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCT
GCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGC
CGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTA
CAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGT
GATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAA
GCTAGCTGATTAATTAA

[0066] Anti-ASGPR_4G2.2_Hv-V-hIgG4H-C (SEQ ID NO: 75):

MAWVWTLLFLMAAAQSAQAQIQLVQSGPELKKPGETVKISCKASGYTFTNYGMNWVKQVPG
KGLRWMGWMDTFTGEPTYADDFKGRFAFSLETSASTAYLQINSLKNEDTATYFCARGGILRLN
YFDYWGQGTTLTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSG
VHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEF
EGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTK
NQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVF
SCSVMHEALHNHYTQKSLSLSLGKAS

[0067] Anti-ASGPR_4G2.2_Kv-V-hIgGK-C (SEQ ID NO: 11):

ATGAAGTTTCCTTCTCAACTTCTGCTCTTACTGCTGTTTGGAATCCCAGGCATGATATGTGA
CATCCAGATGACACAATCTTCATCCTCCTTTTCTGTATCTCTAGGAGACAGAGTCACCATTA
CTTGCAAGGCAAGTGAGGACATATATAATCGGTTAGGCTGGTATCAGCAGAAACCAGGAA
ATGCTCCTAGGCTCTTAATATCTGGTGCAACCAGTTTGGAAACTGGGGTTCCTTCAAGATTC
AGTGGCAGTGGATCTGGAAAGGATTACGCTCTCAGCATTACCAGTCTTCAGACTGAAGATC
TTGCTACTTATTACTGTCAACAGTGTTGGACTTCTCCGTACACGTTCGGAGGGGGGACCAA
GCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGC
AGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCC
AAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACA
GAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCA
GACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCG
TCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0068] Anti-ASGPR_4G2.2_Kv-V-hIgGK-C (SEQ ID NO: 76):

MKFPSQLLLLLLFGIPGMICDIQMTQSSSSFSVSLGDRVTITCKASEDIYNRLGWYQQKPGNAPR
LLISGATSLETGVPSRFSGSGSGKDYALSITSLQTEDLATYYCQQCWTSPYTFGGGTKLEIKRTV
AAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0069] Anti-ASGPR_5F10H-LV-hIgG4H-C (SEQ ID NO: 12):

ATGGGATGGAGCTGGATCTTTCTCTTTCTCTTGTCAGGAACTGGAGGTGTCCTCTCTGAGGT
CCAGCTGCAACAGTCTGGACCTGAGCTGGTGAAGCCTGGGGCTTCAGTGAAGATGTCCTGC
AAGGCTTCTGGATACACCTTCACTGACTACTACATGAAGTGGGTGAAGCAGAGCCATGGAA
AGAGCCTTGAGTGGATTGGAGATATTAATCCTAACTATGGTGATACTTTCTACAACCAGAA
GTTCGAGGGCAAGGCCACATTGACTGTAGACAAATCCTCCAGGACAGCCTACATGCAGCTC
AACAGCCTGACATCTGAGGACTCTGCAGTCTATTATTGTGGAAGAGGGGACTATGGATACT
TCGATGTCTGGGGCGCAGGGACCACGGTCACCGTCTCCTCAGCCAAAACAAAGGGCCCATC
CGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGC
CTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCA
GCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTG
GTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGC
CCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTG
CCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGAC
ACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAG
ACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAA
AGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCA
CCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTC
CTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACAC
CCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAA
GGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAAC
TACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAAC
CGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCT
CTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0070] Anti-ASGPR_5F10H-LV-hIgG4H-C (SEQ ID NO: 77):

MGWSWIFLFLLSGTGGVLSEVQLQQSGPELVKPGASVKMSCKASGYTFTDYYMKWVKQSHG
KSLEWIGDINPNYGDTFYNQKFEGKATLTVDKSSRTAYMQLNSLTSEDSAVYYCGRGDYGYFD
VWGAGTTVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVH
TFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEG
GPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNST
YRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQ
VSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCS
VMHEALHNHYTQKSLLSLGKAS

[0071] Anti-ASGPR_5F10K-LV-hIgGK-C (SEQ ID NO: 13):

ATGGAGACACATTCTCAGGTCTTTGTATACATGTTGCTGTGGTTGTCTGGTGTTGAAGGAGA
CATTGTGATGACCCAGTCTCACAAATTCATGTCCACATCAGTAGGAGACAGGGTCAGCATC
ACCTGCAAGGCCAGTCAGGATGTGGGTACTGCTGTAGCCTGGTATCAACAGAAACCAGGG
CAATCTCCTAAACTACTGATTTACTGGGCATCCACCCGGCACACTGGAGTCCCTGATCGCTT
CACAGGCAGTGGATCTGGGACAGATTTCACTCTCACCATTAACAATGTGCAGTCTGAAGAC
TTGGCAGATTATTTCTGTCAGCAATATAGCAGCAATCCGTACATGTTCGGAGGGGGGACCA
AGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAG
CAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGC
CAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCAC
AGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGC
AGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCC
GTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0072] Anti-ASGPR_5F10K-LV-hIgGK-C (SEQ ID NO: 78):

METHSQVFVYMLLWLSGVEGDIVMTQSHKFMSTSVGDRVSITCKASQDVGTAVAWYQQKPG
QSPKLLIYWASTRHTGVPDRFTGSGSGTDFTLTINNVQSEDLADYFCQQYSSNPYMFGGGTKLE
IKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0073] Anti-ASGPR1H11_H-V-hIgG4H-C (SEQ ID NO: 14):

ATGGGATGGAGCTGGATCTTTCTCTTTCTCCTGTCAGGAACTGCAGGTGTCCTCTCTGAGGT
CCAGCTGCAACAGTCTGGACCTGAGTTGGTGAAGCCTGGGGCTTCAGTGAAGATATCCTGC

AAGACTTCTGGATACACATTCACTGAATACACCATGCACTGGGTGAGGCAGAGCCATGGAA
AGAGCCTTGAGTGGATTGGAGGTATTAATCCTATCAATGGTGGTCCTACCTACAACCAGAA
GTTCAAGGGCAAGGCCACATTGACTGTTGACAAGTCCTCCAGCACAGCCTACATGGAGCTC
CGCAGCCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGATGGGACTATGGTAGTC
GAGATGTTATGGACTACTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAACGAA
GGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCC
CTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTACCGGTGACGGTGTCGTGGAACT
CAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTA
CTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGC
AACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGT
CCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCC
CCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTG
GACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTG
CATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGC
GTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCA
ACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAG
AGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCC
TGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGG
GCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTC
CTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCT
CCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGG
TAAAGCTAGCTGA

[0074] Anti-ASGPR1H11_H-V-hIgG4H-C (SEQ ID NO: 79):

MGWSWIFLFLLSGTAGVLSEVQLQQSGPELVKPGASVKISCKTSGYTFTEYTMHWVRSHGKSL
EWIGGINPINGGPTYNQKFKGKATLTVDKSSSTAYMELRSLTSEDSAVYYCARWDYGSRDVM
DYWGQGTSVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVPVTVSWNSGALTSG
VHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEF
EGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTK
NQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVF
SCSVMHEALHNHYTQKSLSLSLGKAS

[0075] Anti-ASGPR1H11K-LV-var2-hIgGK-C (SEQ ID NO: 15):

ATGGAATCACAGACTCTGGTCTTCATATCCATACTGCTCTGGTTATATGGTGCTGATGGGAA
CATTGTAATGACTCAATCTCCCAAATCCATGTCCATGTCAGTAGGGGAGAGGGTCACCTTG
AGCTGCAAGGCCAGTGAGAATGTGGGAACTTATGTATCCTGGTATCAACAGAGACCAGAA
CAGTCTCCAAAACTGCTGATATACGGGGCATCCAACCGGTACACTGGGGTCCCCGATCGCT
TCACAGGCAGTGGATCTGCAACAGATTTCACTCTGACCATCAGCAGTGTGCAGGCTGAGGA
CCTTGCAGATTATCACTGTGGACAGACTTACAGCTATATATTCACGTTCGGCTCGGGGACA
AAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGA
GCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAG
GCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTC
ACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAA
GCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCG
CCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0076] Anti-ASGPR1H11K-LV-var2-hIgGK-C (SEQ ID NO: 80):

METHSQVFVYMLLWLSGVEGNIVMTQSPKSMSMSVGERVTLSCKASENVGTYVSWYQQRPE
QSPKLLIYGASNRYTGVPDRFTGSGSATDFTLTISSVQAEDLADYHCGQTYSYIFTFGSGTKLEIK
RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKD
STYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0077] Anti-CD1d_2B5.3G10_H-V-hIgG4H-C (SEQ ID NO: 16):

ATGGGATGGAGCCGGATCTTTCTCTTCCTCCTGTCAATAACTGCAGGTGTCCATTGCCAGGT
CCAGGTGCAGCAGTCGGGACCTGAGTTGGTGAAGCCTGGGGCCTCAGTGAAGATTTCCTGC
AAAGCCTCTGGCGACGCATTCAGTAGTTCTTGGATGAACTGGGTGAAGCAGAGGCCTGGAC

AGGGTCTTGAGTGGATTGGACGGATTTATCTTGGAGATGGAGATATTAATTACAATGGGAA
GTTCAAGGGCAGGGCCACACTGACTGCAGACAAATCCTCCAGCACAGCCTACATGCAGCTC
AGCAGCCTGACCTCTGTGGACTCTGCGGTCTATTTCTGCGCGAGGCAGCTCGGGCTATGGT
ATGTTATGGACTACTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAACAAAGGG
CCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTG
GGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCC
TGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGC
AGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATC
ACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCC
CACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACC
CAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGC
CAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCC
AAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACC
GTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGC
CTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAG
GTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCC
TGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGG
AGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAG
CAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGAT
GCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCT
AGCTGA

[0078] Anti-CD1d_2B5.3G10_H-V-hIgG4H-C (SEQ ID NO: 81):

MGWSRIFLFLLSITAGVHCQVQVQQSGPELVKPGASVKISCKASGDAFSSSWMNWVKQRPGQG
LEWIGRIYLGDGDINYNGKFKGRATLTADKSSSTAYMQLSSLTSVDSAVYFCARQLGLWYVM
DYWGQGTSVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGV
HTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFE
GGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKN
QVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSC
SVMHEALHNHYTQKSLSLSLGKAS

[0079] Anti-CD1d_2B5.3G10_K-V-hIgGK-C (SEQ ID NO: 17):

ATGAGTGTGCCCACTCAGGTCCTGGGGTTGCTGCTGCTGTGGCTTACAGGTGCCAGATGTG
ACATCCAGATGGCTCAGTCTCCAGCCTCCCTATCTGCATCTGTGGGAGAAACTGTCACCATC
ACATGTCGAGCAAGTGAGAATATTTACAGTTATTTAGCATGGTATCAGCAGAAACAGGGAA
AATCTCCTCAGCTCCTGGTCTATAATGCAAAAACCTTAGCAGAAGGTGTGCCATCAAGGTT
CAGTGGCAGTGGATCAGGCACACAGTTTTCTCTGAAGATCAACAGCCTGCAGCCTGAAGAT
TTTGGGAGTTATTACTGTCAACATCATTATGGTTTTCCGTGGACGTTCGGTGGAGGCACCAA
GCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGC
AGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCC
AAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACA
GAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCA
GACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCG
TCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0080] Anti-CD1d_2B5.3G10_K-V-hIgGK-C (SEQ ID NO: 82):

MSVPTQVLGLLLLWLTGARCDIQMAQSPASLSASVGETVTITCRASENIYSYLAWYQQKQGKS
PQLLVYNAKTLAEGVPSRFSGSGSGTQFSLKINSLQPEDFGSYYCQHHYGFPWTFGGGTKLEIK
RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKD
STYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0081] Anti-CD1d_2H11.2G5_H-V-hIgG4H-C (SEQ ID NO: 18):

ATGAACTTCGGGCTCAGCTTGATTTTCCTTGTCCTCATTTTAAAAGGTGTCCAGTGTGAGGT
GCAGCTGGTGGAGTCTGGGGGAGACTTAGTGAAGCCTGGAGGGTCCCTGAAACTCTCCTGT
GCAGCCTCTGGATTCACTTTCAGTAGCTATGGCATGTCTTGGGTTCGCCAGACTCCAGACAA
GAGGCTGGAGTGGGTCGCAGTCATTAGTAGTGGTGGAAGTTCCACCTTCTATCCAGACAGT

GTGAAGGGGCGATTCACCATCTCCAGAGACAATGCCAAGAACACCCTGTACCTGCAAATG
AGCAGTCTGAAGTCTGAGGACACAGCCGTGTATTACTGTTCAAGAGGAGGTTACTACTTTG
ACTACTGGGGCCAAGGCACCACTCTCACAGTCTCCGCAGCCAAAACAAAGGGCCCATCCGT
CTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTG
GTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCG
GCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTG
ACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCA
GCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCC
AGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACT
CTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACC
CCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGC
CGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCA
GGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTC
CATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCT
GCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGG
CTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTA
CAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACC
GTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTC
TGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0082] Anti-CD1d_2H11.2G5_H-V-hIgG4H-C (SEQ ID NO: 83):

MNFGLSLIFLVLILKGVQCEVQLVESGGDLVKPGGSLKLSCAASGFTFSSYGMSWVRQTPDKRL
EWVAVISSGGSSTFYPDSVKGRFTISRDNAKNTLYLQMSSLKSEDTAVYYCSRGGYYFDYWGQ
GTTLTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAV
LQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVF
LFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVS
VLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCL
VKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEA
LHNHYTQKSLSLSLGKAS

[0083] Anti-CD1d_2H11.2G5_K-V-hIgGK-C (SEQ ID NO: 19):

ATGAGGTTCCAGGTTCAGGTTCTGGGGCTCCTTCTGCTCTGGATATCAGGTGCCCAGTGTGA
TGTCCAGATAACCCAGTCTCCATCTTATCTTGCTGCATCTCCTGGAGAAACCATTACTATTA
ATTGCAGGGCAAGCAAGACCATTAGCAAATATTTAGCCTGGTATCAAGAGAAACCTGAGA
AAACTGATAAGCTTCTTATCTACTCTGGATCCACTTTGCAATCTGGAATTCCATCAAGGTTC
AGTGGCAGTGGATCTGGTACAGATTTCACTCTCACCATCAGTGGCCTGGAGCCTGAAGATT
TTGCAATGTATTACTGTCAACAGCATAATGAATACCCGTGGACGTTCGGTGGAGGCACCAA
GCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGC
AGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCC
AAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACA
GAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCA
GACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCG
TCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0084] Anti-CD1d_2H11.2G5_K-V-hIgGK-C (SEQ ID NO: 84):

MRFQVQVLGLLLLWISGAQCDVQITQSPSYLAASPGETITINCRASKTISKYLAWYQEKPEKTD
KLLIYSGSTLQSGIPSRFSGSGSGTDFTLTISGLEPEDFAMYYCQQHNEYPWTFGGGTKLEIKRTV
AAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0085] Anti-CD40_11B6.1C3_H-LV-hIgG4H-C (SEQ ID NO: 20):

ATGGGATGGAGCTGGATCTTTCTCTTTCTCCTGTCAGGAACTGCAGGTGTCCTCTCTGAGGT
CCAGCTGCAACAGTCTGGACCTGAGCTGGTGAAGCCTGGGGCTTCAGTGAAGATATCCTGC
AAGGCTTCTGGTTACTCATTCACTGGCTACTACATGCACTGGGTGAAGCAAAGCCATGTAA
AGAGCCTTGAGTGGATTGGACGTATTAATCCTTACAATGGTGCTACTAGCTACAACCAGAA
TTTCAAGGACAAGGCCAGCTTGACTGTAGATAAGTCCTCCAGCACAGCCTACATGGAGCTC
CACAGCCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGAGAGGACTACGTCTACT

GGGGCCAAGGCACCACTCTCACAGTCTCCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCC
CCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAG
GACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGC
ACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTG
CCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGCAAC
ACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAGCAC
CTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCAT
GATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGA
GGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCG
GGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGAC
TGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCG
AGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCCCC
CATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTA
CCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGAC
CACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACA
AGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAA
CCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0086] Anti-CD40_11B6.1C3_H-LV-hIgG4H-C (SEQ ID NO: 85):

MGWSWIFLFLLSGTAGVLSEVQLQQSGPELVKPGASVKISCKASGYSFTGYYMHWVKQSHVK
SLEWIGRINPYNGATSYNQNFKDKASLTVDKSSSTAYMELHSLTSEDSAVYYCAREDYVYWG
QGTTLTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPA
VLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSV
FLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVV
SVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTC
LVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHE
ALHNHYTQKSLSLSLGKAS

[0087] Anti-CD40_11B6.1C3_K-LV-hIgGK-C (SEQ ID NO: 21):

ATGAAGTTGCCTGTTAGGCTGTTGGTGCTGATGTTCTGGATTCCTGCTTCCAGCAGTGATGT
TGTGATGACCCAAACTCCACTCTCCCTGCCTGTCAGTCTTGGAGATCAAGCCTCCATCTCTT
GCAGATCTAGTCAGAGCCTTGTACACAGTAATGGAAACACCTATTTACATTGGTACCTGCA
GAAGCCAGGCCAGTCTCCAAAGCTCCTGATCTACAAAGTTTCCAACCGATTTTCTGGGGTC
CCAGACAGGTTCAGTGGCAGTGGATCAGGGACAGATTTCGCACTCAAGATCAGTAGAGTG
GAGGCTGAGGATCTGGGAGTTTATTTCTGCTCTCAAAGTACACATGTTCCGTGGACGTTCG
GTGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0088] Anti-CD40_11B6.1C3_K-LV-hIgGK-C (SEQ ID NO: 86):

MKLPVRLLVLMFWIPASSSDVVMTQTPLSLPVSLGDQASISCRSSQSLVHSNGNTYLHWYLQKP
GQSPKLLIYKVSNRFSGVPDRFSGSGSGTDFALKISRVEAEDLGVYFCSQSTHVPWTFGGGTKL
EIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDS
KDSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0089] Anti-CD40_12B4.2C10_H-LV-hIgG4H-C (SEQ ID NO: 22):

ATGGAATGGAGTTGGATATTTCTCTTTCTTCTGTCAGGAACTGCAGGTGTCCACTCTGAGGT
CCAGCTGCAGCAGTCTGGACCTGAGCTGGTAAAGCCTGGGGCTTCAGTGAAGATGTCCTGC
AAGGCTTCTGGATACACATTCACTGACTATGTTTTGCACTGGGTGAAACAGAAGCCTGGGC
AGGGCCTTGAGTGGATTGGATATATTAATCCTTACAATGATGGTACTAAGTACAATGAGAA
GTTCAAAGGCAAGGCCACACTGACTTCAGACAAATCCTCCAGCACAGCCTACATGGAGCTC
AGCAGCCTGACCTCTGAGGACTCTGCGGTCTATTACTGTGCAAGGGGCTATCCGGCCTACT
CTGGGTATGCTATGGACTACTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAAC
GAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCC

GCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAG
GCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCC
CTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACG
TAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCC
CATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCC
AAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGAC
GTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCAT
AATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTC
CTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAAC
AAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAG
CCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTG
ACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGC
AGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCT
CTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTC
CGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGT
AAAGCTAGCTGA

[0090] Anti-CD40_12B4.2C10_H-LV-hIgG4H-C (SEQ ID NO: 87):

MEWSWIFLFLLSGTAGVHSEVQLQQSGPELVKPGASVKMSCKASGYTFTDYVLHWVKQKPGQ
GLEWIGYINPYNDGTKYNEKFKGKATLTSDKSSSTAYMELSSLTSEDSAVYYCARGYPAYSGY
AMDYWGQGTSVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTS
GVHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAP
EFEGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQ
FNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMT
KNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNV
FSCSVMHEALHNHYTQKSLSLSLGKAS

[0091] Anti-CD40_12B4.2C10_K-LV-v2-hIgGK-C (SEQ ID NO: 23):

ATGATGTCCTCTGCTCAGTTCCTTGGTCTCCTGTTGCTCTGTTTTCAAGGTACCAGATGTGAT
ATCCAGATGACACAGACTACATCCTCCCTGTCTGCCTCTCTGGGAGACAGAGTCACCATCA
GTTGCAGGGCAAGTCAGGACATTAGCAATTATTTAAACTGGTATCAGCAGAAACCAGATGG
AACTGTTAAACTCCTGATCTACTACACATCAAGATTACACTCAGGAGTCCCATCAAGGTTC
AGTGGCAGTGGGTCTGGAACAGATTATTCTCTCACCATTAGCAACCTGGAGCAAGAAGATA
TTGCCACTTACTTTTGCCATCATGGTAATACGCTTCCGTGGACGTTCGGTGGAGGCACCAAG
CTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCA
GTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCA
AAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAG
AGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAG
ACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGT
CACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0092] Anti-CD40_12B4.2C10_K-LV-v2-hIgGK-C (SEQ ID NO: 88):

MMSSAQFLGLLLLCFQGTRCDIQMTQTTSSLSASLGDRVTISCRASQDISNYLNWYQQKPDGTV
KLLIYYTSRLHSGVPSRFSGSGSGTDYSLTISNLEQEDIATYFCHHGNTLPWTFGGGTKLEIKRTV
AAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0093] Anti-CD40_12E12.3F3_H-V-hIgG4H-C (SEQ ID NO: 24):

ATGAACTTGGGGCTCAGCTTGATTTTCCTTGTCCTTGTTTTAAAAGGTGTCCAGTGTGAAGT
GAAGCTGGTGGAGTCTGGGGGAGGCTTAGTGCAGCCTGGAGGGTCCCTGAAACTCTCCTGT
GCAACCTCTGGATTCACTTTCAGTGACTATTACATGTATTGGGTTCGCCAGACTCCAGAGAA
GAGGCTGGAGTGGGTCGCATACATTAATTCTGGTGGTGGTAGCACCTATTATCCAGACACT
GTAAAGGGCCGATTCACCATCTCCAGAGACAATGCCAAGAACACCCTGTACCTGCAAATGA
GCCGGCTGAAGTCTGAGGACACAGCCATGTATTACTGTGCAAGACGGGGGTTACCGTTCCA
TGCTATGGACTATTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAACGAAGGGC
CCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGG
GCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCT

GACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGC
AGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATC
ACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCC
CACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACC
CAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGC
CAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCC
AAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACC
GTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGC
CTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAG
GTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCC
TGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGG
AGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAG
CAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGAT
GCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCT
AGCTGA

[0094] Anti-CD40_12E12.3F3_H-V-hIgG4H-C (SEQ ID NO: 89):

MNLGLSLIFLVLVLKGVQCEVKLVESGGGLVQPGGSLKLSCATSGFTFSDYYMYWVRQTPEKR
LEWVAYINSGGGSTYYPDTVKGRFTISRDNAKNTLYLQMSRLKSEDTAMYYCARRGLPFHAM
DYWGQGTSVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGV
HTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFE
GGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKN
QVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSC
SVMHEALHNHYTQKSLSLSLGKAS

[0095] Anti-CD40_12E12.3F3_K-LV-hIgGK-C (SEQ ID NO: 25):

ATGATGTCCTCTGCTCAGTTCCTTGGTCTCCTGTTGCTCTGTTTTCAAGGTACCAGATGTGAT
ATCCAGATGACACAGACTACATCCTCCCTGTCTGCCTCTCTAGGAGACAGAGTCACCATCA
GTTGCAGTGCAAGTCAGGGCATTAGCAATTATTTAAACTGGTATCAGCAGAAACCAGATGG
AACTGTTAAACTCCTGATCTATTACACATCAATTTTACACTCAGGAGTCCCATCAAGGTTCA
GTGGCAGTGGGTCTGGGACAGATTATTCTCTCACCATCGGCAACCTGGAACCTGAAGATAT
TGCCACTTACTATTGTCAGCAGTTTAATAAGCTTCCTCCGACGTTCGGTGGAGGCACCAAAC
TCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAG
TTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCAA
AGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAGA
GCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAGA
CTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGTC
ACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0096] Anti-CD40_12E12.3F3_K-LV-hIgGK-C (SEQ ID NO: 90):

MMSSAQFLGLLLLCFQGTRCDIQMTQTTSSLSASLGDRVTISCSASQGISNYLNWYQQKPDGTV
KLLIYYTSILHSGVPSRFSGSGSGTDYSLTIGNLEPEDIATYYCQQFNKLPPTFGGGTKLEIKRTV
AAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0097] Anti-DCIR_24A5.4A5_H-V-hIgG4H-C (SEQ ID NO: 26):

ATGGATTGGCTGTGGAACTTGCTATTCCTGATGGCAGCTGCCCAAAGTGCCCAAGCACAGA
TCCAGTTGGTGCAGTCTGGACCTGAGCTGAAGAAGCCTGGAGAGACAGTCAAGATCTCCTG
CAAGGCTTCTGGGTATTCCTTCACAAACTATGGAATGAACTGGGTGAAACAGGCTCCAGGA
AAGGGTTTAAAGTGGATGGGCTGGATAAACACCTACACTGGAGAGTCAACATATGCTGAT
GACTTCAAGGGACGGTTTGCCTTCTCTTTGGAAACCTCTGCCAGCACTGCCTATTTGCAGAT
CAGTAACCTCAAAAATGAGGACATGGCTACATATTTCTGTGCTAGAGGGGACTTTAGGTAC
TACTATTTTGACTACTGGGGCCAAGGCACCACTCTCACAGGCTCCTCAGCCAAAACGAAGG
GCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCT
GGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCC
CTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAG

CAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGAT
CACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGC
CCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAAC
CCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAG
CCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGC
CAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCAC
CGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGG
CCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACA
GGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGC
CTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCG
GAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACA
GCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGA
TGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGC
TAGCTGAT

[0100] Anti-DCIR_24A5.4A5_H-V-hIgG4H-C (SEQ ID NO: 91):

MDWLWNLLFLMAAAQSAQAQIQLVQSGPELKKPGETVKISCKASGYSFTNYGMNWVKQAPG
KGLKWMGWINTYTGESTYADDFKGRFAFSLETSASTAYLQISNLKNEDMATYFCARGDFRYY
YFDYWGQGTTLTGSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSG
VHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEF
EGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTK
NQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVF
SCSVMHEALHNHYTQKSLSLSLGKAS

[0101] Anti-DCIR_24A5.4A5_K-V-hIgGK-C (SEQ ID NO: 27):

ATGAGTGTGCTCACTCAGGTCCTGGCGTTGCTGCTGCTGTGGCTTACAGGTGCCAGATGTG
ACATCCAGATGACTCAGTCTCCAGCCTCCCTATCTGCATCTGTGGGAGAAACTGTCACCATC
ACGTGTCGAGCAAGTGGGAATATTCACAATTATTTAGCATGGTATCAGCAGAAACAGGGA
AAATCTCCTCAGCTCCTGGTCTATAATGCAAAAACCTTGGCAGATGGTGTGCCATCAAGGT
TCAGTGGCAGTGGATCAGGAACACAATATTCTCTCAAGATCAACACCCTGCAGCCTGAAGA
TTTTGGGAGTTATTACTGTCAACATTTTTGGGATTCTTGGACGTTCGGTGGAGGCACCAAGC
TCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAG
TTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCAA
AGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAGA
GCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAGA
CTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGTC
ACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0102] Anti-DCIR_24A5.4A5_K-V-hIgGK-C (SEQ ID NO: 92):

MSVLTQVLALLLLWLTGARCDIQMTQSPASLSASVGETVTITCRASGNIHNYLAWYQQKQGKS
PQLLVYNAKTLADGVPSRFSGSGSGTQYSLKINTLQPEDFGSYYCQHFWDSWTFGGGTKLEIKR
TVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDST
YSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0103] Anti-DCIR_24E7.3H9_H-V-hIgG4H-C (SEQ ID NO: 28):

ATGGAATGGACCTGGGTCTTTCTCTTCCTCCTGTCAGTAACTGCAGGTGTCCACTCCCAGGT
TCAGCTGCAGCAGTCTGGAGCTGAGCTGATGAAGCCTGGGGCCTCAGTGAAGATATCCTGC
AAGGCTACTGGCTACACATTCAGTAGCTACTGGATAGAGTGGGTAAAGCAGAGGCCTGGA
CATGGCCTTGAGTGGATTGGAGAGATTTTACCTGGAAGTGGTAGGACTAACGACAATGAGA
AGTTCAAGGGCAAGGCCACATTCACTGCAGATACATCCTCCAAGAAAGCCTACATGCAACT
CAGCAGCCTGACATCTGAGGACTCTGCCGTCTATTATTGTGCAAGAAGGGGTGGTTACTCC
TTTGCTTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACAAAGGGCCCAT
CCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTG
CCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACC
AGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGT
GGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAG

CCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCT
GCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGA
CACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAA
GACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACA
AAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGC
ACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGT
CCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACA
CCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAA
AGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAA
CTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAA
CCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGG
CTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0104] Anti-DCIR_24E7.3H9_H-V-hIgG4H-C (SEQ ID NO: 93):

MEWTWVFLFLLSVTAGVHSQVQLQQSGAELMKPGASVKISCKATGYTFSSYWIEWVKQRPGH
GLEWIGEILPGSGRTNDNEKFKGKATFTADTSSKKAYMQLSSLTSEDSAVYYCARRGGYSFAY
WGQGTLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHT
FPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGG
PSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTY
RVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQV
SLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSV
MHEALHNHYTQKSLSLSLGKAS

[0105] Anti-DCIR_24E7.3H9_K-V-hIgGK-C (SEQ ID NO: 29):

ATGACCATGTTCTCACTAGCTCTTCTCCTCAGTCTTCTTCTCCTCTGTGTCTCTGATTCTAGG
GCAGAAACAACTGTGACCCAGTCTATGACCATGTTCTCACTAGCTCTTCTCCTCAGTCTTCT
TCTCCTCTGTGTCTCTGATTCTAGGGCAGAAACAACTGTGACCCAGTCTCCAGCATCCCTGT
CCATGGCTATAGGGGAAAAAGTCACCATCAGATGCGTAACCAGCACTGATATTGATGATGA
TGTGAACTGGTACCAGCAGAAGCCAGGGGAACCTCCTAAACTCCTTATTTCAGAAGGCAAT
ACTCTTCGTCCTGGAGTCCCATCCCGATTCTCCAGCAGTGGCTATGGTACAGATTTTGTTTT
TACAATTGAGAACATGCTCTCAGAAGATGTTGCAGATTACTACTGTTTGCAAAGTGGTAAC
TTGCCGTACACGTTCGGAGGGGGGACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCAT
CTGTCTTCATCTTCCCGCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGC
CTGCTGAATAACTTCTATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCC
AATCGGGTAACTCCCAGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCC
TCAGCAGCACCCTGACGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCG
AAGTCACCCATCAGGGCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTT
AGCCAGCATCCCTGTCCATGGCTATAGGGGAAAAAGTCACCATCAGATGCGTAACCAGCAC
TGATATTGATGATGATGTGAACTGGTACCAGCAGAAGCCAGGGGAACCTCCTAAACTCCTT
ATTTCAGAAGGCAATACTCTTCGTCCTGGAGTCCCATCCCGATTCTCCAGCAGTGGCTATGG
TACAGATTTTGTTTTTACAATTGAGAACATGCTCTCAGAAGATGTTGCAGATTACTACTGTT
TGCAAAGTGGTAACTTGCCGTACACGTTCGGAGGGGGGACCAAGCTCGAGATCAAACGAA
CTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAGTTGAAATCTGGAACT
GCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCAAAGTACAGTGGAAGG
TGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAGAGCAGGACAGCAAGG
ACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAGACTACGAGAAACACA
AAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGTCACAAAGAGCTTCAA
CAGGGGAGAGTGTTAG

[0106] Anti-DCIR_24E7.3H9_K-V-hIgGK-C (SEQ ID NO: 94):

MTMFSLALLLSLLLLCVSDSRAETTVTQSPASLSMAIGEKVTIRCVTSTDIDDDVNWYQQKPGE
PPKLLISEGNTLRPGVPSRFSSSGYGTDFVFTIENMLSEDVADYYCLQSGNLPYTFGGGTKLEIK
RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKD
STYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0107] Anti-DCIR_29E9.2E2_H-VhIgG4H-C (SEQ ID NO: 30):

ATGGCTTGGGTGTGGACCTTGCTATTCCTGATGGCAGCTGCCCAAAGTGCCCAAGCACAGA
TCCAGTTGGTGCAGTCTGGACCTGAGCTGAAGAAGCCTGGAGAGACAGTCAAGATCTCCTG
CAAGGCTTCTGGGTATACCTTCACAAACTATGGAATGAACTGGGTGAAGCAGGCTCCAGGA
AAGGGTTTAAAGTGGGTGGGCTGGATAAACACCTTCACTGGAGAGCCAACATATGTTGATG
ACTTCAAGGGACGGTTTGCCTTCTCTTTGGAAACCTCTGCCAGCACTGCCTATTTGCAGATC
AACAACCTCAAAAATGAGGACACGGCTACATATTTCTGTGCAAGAGGGAATTTTAGGTACT
ACTACTTTGACTACTGGGGCCAAGGCACCACTCTCACAGTCTCCTCAGCCAAAACAAAGGG
CCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTG
GGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCC
TGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGC
AGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATC
ACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCC
CACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACC
CAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGC
CAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCC
AAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACC
GTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGC
CTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAG
GTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCC
TGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGG
AGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAG
CAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGAT
GCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCT
AGCTGA

[0108] Anti-DCIR_29E9.2E2_H-VhIgG4H-C (SEQ ID NO: 95):

MAWVWTLLFLMAAAQSAQAQIQLVQSGPELKKPGETVKISCKASGYTFTNYGMNWVKQAPG
KGLKWVGWINTFTGEPTYVDDFKGRFAFSLETSASTAYLQINNLKNEDTATYFCARGNFRYYY
FDYWGQGTTLTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGV
HTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFE
GGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKN
QVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSC
SVMHEALHNHYTQKSLSLSLGKAS

[0109] Anti-DCIR_29E9.2E2_K-V-hIgGK-C (SEQ ID NO: 31):

ATGAGTGTGCTCACTCAGGTCCTGGCGTTGCTGCTGCTGTGGCTTACAGGTGCCAGATGTG
ACATCCAGATGACTCAGTCCCCAGCCTCCCTATCTGCATCTGTGGGAGAAACTGTCACCAT
CACATGTCGAACAAGTGGGAATATTCGCAATTATTTAGCATGGTATCAGCAGAAACAGGGA
AAATCTCCTCAACTCCTGGTCTATAATGCAAAAACCTTAGCAGATGGTGTGCCATCAAGGT
TCGGTGGCAGTGGATCAGGAACACAATATTCTCTCAAGATCAACAGCCTGCAGCCTGAAGA
TTTTGGGAATTATTACTGTCAACATTTTTGGAGTAGTCCGTACACGTTCGGAGGGGGGACC
AAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGA
GCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAG
GCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTC
ACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAA
GCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCG
CCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0110] Anti-DCIR_29E9.2E2_K-V-hIgGK-C (SEQ ID NO: 96):

MSVLTQVLALLLLWLTGARCDIQMTQSPASLSASVGETVTITCRTSGNIRNYLAWYQQKQGKS
PQLLVYNAKTLADGVPSRFGGSGSGTQYSLKINSLQPEDFGNYYCQHFWSSPYTFGGGTKLEIK
RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKD
STYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0111] Anti-DCIR_29G10.3D9_H-V-hIgG4H-C (SEQ ID NO: 32):

ATGATGGGATGGAGCTATATCATCCTCTTTTTGGTAGCAACAGCTACAGATGTCCACTCCCA
GGTCCAACTGCAGCAGCCTGGGGCTGAACTGGTGAAGCCTGGGGCTTCAGTGAAGCTGTCC
TGCAAGGCTTCTGGCTACACCTTCACCAGCTACTGGATGCACTGGGTGAAGCAGAGGCCTG
GAGAAGGCCTTGAGTGGATTGGAGAGATTAATCCTAGCTACGGTCGTACTGACTACAATGA
GAAGTTCAAGAACAAGGCCACACTGACTGTAGCCAAATCCTCCAGCACAGCCTACATGCA
ACTCAGCAGCCTGACATCTGAGGACTCTGCGGTCTATTACTGTGCAAGAGGAGATTACTAC
GGTAGTAGCTCGTTTGCTTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAA
CAAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGC
CGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCA
GGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACT
CCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAA
CGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCC
CCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCC
CAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGA
CGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCA
TAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGT
CCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAAC
AAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAG
CCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTG
ACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGC
AGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCT
CTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTC
CGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGT
AAAGCTAGCGGATGGAGCTATATCATCCTCTTTTTGGTAGCAACAGCTACAGATGTCCACT
CCCAGGTCCAACTGCAGCAGCCTGGGGCTGAACTGGTGAAGCCTGGGGCTTCAGTGAAGCT
GTCCTGCAAGGCTTCTGGCTACACCTTCACCAGCTACTGGATGCACTGGGTGAAGCAGAGG
CCTGGAGAAGGCCTTGAGTGGATTGGAGAGATTAATCCTAGCTACGGTCGTACTGACTACA
ATGGGAAGTTCAAGAACAAGGCCACACTGACTGTAGCCAAATCCTCCAGCACAGCCTACAT
GCAACTCAGCAGCCTGACATCTGAGGACTCTGCGGTCTATTACTGTGCAAGAGGAGATTAC
TACGGTAGTAGCTCGTTTGCTTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCA
AAACAAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCAC
AGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAAC
TCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCT
ACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTG
CAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGG
TCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCC
CCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGT
GGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGT
GCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAG
CGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCC
AACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGA
GAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGC
CTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATG
GGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTT
CCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATG
CTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTG
GGTAAAGCTAGCTGA

[0112] Anti-DCIR_29G10.3D9_H-V-hIgG4H-C (SEQ ID NO: 97):

MMGWSYIILFLVATATDVHSQVQLQQPGAELVKPGASVKLSCKASGYTFTSYWMHWVKQRP
GEGLEWIGEINPSYGRTDYNEKFKNKATLTVAKSSSTAYMQLSSLTSEDSAVYYCARGDYYGS
SSFAYWGQGTLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTS
GVHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAP
EFEGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQ
FNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMT

KNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNV
FSCSVMHEALHNHYTQKSLSLSLGKAS

[0113] Anti-DCIR_29G10.3D9_K-Var1-V-hIgGK-C (SEQ ID NO: 33):

ATGGATTTTCAAGTGCAGATTTTCAGCTTCCTGCTAATGAGTGCCTCAGTCATAATGTCCAG
GGGACAAATTGTTCTCACCCAGTCTCCAGCACTCATGTCTGCATCTCCAGGGGAGAAGGTC
ACCATGACCTGCAGTGCCAGCTCAAATATAAGTTACATGTACTGGTACCAGCAGAAGCCAA
GATCCTCCCCCAAACCCTGGATTTATCTCACATCCAACCTGGCTTCTGGAGTCCCTGCTCGC
TTCAGTGGCAGTGGGTCTGGGACCTCTTACTCTCTCACAACCAGCAGCATGGAGGCTGAAG
ATGCTGCCACTTATTGCTGCCAGCAGTGGAGTAGTAACCCACCCACGTTCGGTGCTGGGAC
CAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATG
AGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGA
GGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGT
CACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAA
AGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTC
GCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0114] Anti-DCIR_29G10.3D9_K-Var1-V-hIgGK-C (SEQ ID NO: 98):

MDFQVQIFSFLLMSASVIMSRGQIVLTQSPALMSASPGEKVTMTCSASSNISYMYWYQQKPRSS
PKPWIYLTSNLASGVPARFSGSGSGTSYSLTTSSMEAEDAATYCCQQWSSNPPTFGAGTKLEIK
RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKD
STYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0115] Anti-DCIR_29G10.3D9_K-Var2-V-hIgGK-C (SEQ ID NO: 34):

ATGGATTTTCGAGTGCAGATTTTCAGCTTCCTGCTAATGAGTGCCTCAGTCATAATGTCCAG
GGGACAAATTGTTCTCACCCAGTCTCCAGCACTCATGTCTGCATCTCCAGGGGAGAAGGTC
ACCATGACCTGCAGTGCCAGCTCAAATATAAGTTACATGTACTGGTACCAGCAGAAGCCAA
GATCCTCCCCCAAACCCTGGATTTATCTCACATCCAACCTGGCTTCTGGAGTCCCTGCTCGC
TTCAGTGGCAGTGGGTCTGGGACCTCTTACTCTCTCACAATCAGCAGCATGGAGGCTGAAG
ATGCTGCCACTTATTACTGCCAGCAGTGGAGTAGTAACCCACCCACGTTCGGTGCTGGGAC
CAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATG
AGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGA
GGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGT
CACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAA
AGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTC
GCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0116] Anti-DCIR_29G10.3D9_K-Var2-V-hIgGK-C (SEQ ID NO: 99):

MDFRVQIFSFLLMSASVIMSRGQIVLTQSPALMSASPGEKVTMTCSASSNISYMYWYQQKPRSS
PKPWIYLTSNLASGVPARFSGSGSGTSYSLTISSMEAEDAATYYCQQWSSNPPTFGAGTKLEIKR
TVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDST
YSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0117] Anti-DCIR_2C9K-V-hIgGK-C (SEQ ID NO: 35):

ATGGAGACAGACACACTCCTGCTATGGGTGCTGCTGCTCTGGGTTCCAGGTTCCACAGGTG
ACATTGTGCTGATCCAATCTCCAGCTTCTTTGGCTGTGTCTCTAGGGCAGAGGGCCACCATA
TCCTGCAGAGCCAGTGAAAGTGTTGATAGTTATGTCAATAGTTTTATGCACTGGTACCAGC
AGAAACCAGGACAGCCACCCAAACTCCTCATCTATCGTGTATCCAACCTAGAATCTGGGAT
CCCTGCCAGGTTCAGTGGCAGTGGGTCTAGGACAGACTTCACCCTCACCATTAATCCTGTG
GAGGCTGATGATGTTGCAACCTATTACTGTCAGCAAAGTAATGAGGATCCATTCACGTTCG
GCTCGGGGACAAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0118] Anti-DCIR_2C9K-V-hIgGK-C (SEQ ID NO: 100):

METDTLLLWVLLLWVPGSTGDIVLIQSPASLAVSLGQRATISCRASESVDSYVNSFMHWYQQK
PGQPPKLLIYRVSNLESGIPARFSGSGSRTDFTLTINPVEADDVATYYCQQSNEDPFTFGSGTKLE
IKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC.

[0119] Anti-DCIR_31A6.1F5_H-var2-V-hIgG4H-C (SEQ ID NO: 36):

ATGGAATGTAACTGGATACTTCCTTTTATTCTGTCGGTAATTTCAGGGGTCTACTCAGAGGT
TCAGCTCCAGCAGTCTGGGACTGTGCTGGCAAGGCCTGGGGCTTCCGTGAATATGTCCTGT
AAGGCTGCTGGCTACAGCTTTACCAGTTACTGGGTGTACTGGGTCAAACAGAGGCCTGGAC
AGGGTCTGGAATGGATTGGTGCTATTTACCCTAAAAATAGTAGAACTAGCTACAACCAGAA
GTTCCAGGACAAGGCCACACTGACTGCAGTCACATCCGCCAGCACTGCCTACATGGAGCTC
AGCAGCCTGACAAATGAGGACTCTGCGGTCTATTACTGTACAAGACCTCACTATGATTCGT
TTGGTTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACAaagggcccATCCGT
CTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTG
GTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCG
GCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTG
ACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCA
GCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCC
AGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACT
CTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACC
CCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGC
CGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCA
GGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTC
CATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCT
GCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGG
CTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTA
CAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACC
GTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTC
TGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0120] Anti-DCIR_31A6.1F5_H-var2-V-hIgG4H-C (SEQ ID NO: 101):

MECNWILPFILSVISGVYSEVQLQQSGTVLARPGASVNMSCKAAGYSFTSYWVYWVKQRPGQ
GLEWIGAIYPKNSRTSYNQKFQDKATLTAVTSASTAYMELSSLTNEDSAVYYCTRPHYDSFGY
WGQGTLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHT
FPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGG
PSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTY
RVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQV
SLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSV
MHEALHNHYTQKSLSLSLGKAS

[0121] Anti-DCIR_31A6.1F5_K-var2-V-hIgGK-C (SEQ ID NO: 37):

ATGGAGACAGACACACTCCTGCTATGGGTGCTGCTGCTCTGGGTTCCAGGTTCCACAGGTG
ACATTGTGCTGACCCAATCTCCAGCTTCTTTGGCTGTGTCTCTAGGGCAGAGGGCCACCATA
TCCTGCAGAGCCAGTGAAAGTGTAGATAGTTATGGCATTAGTTTTATGCACTGGTACCAGC
AGAAACCAGGACAGCCACCCAAACTCCTCATCTATCGTGCATCCAACCAAGAATCTGGGAT
CCCTGCCAGGTTCAGTGGCAGTGGGTCTAGGACAGACTTCACCCTCACCATTAATCCTGTG
GAGGCTGATGATGTTGCAACCTATTACTGTCAGCAAAGTAATGAGGATCCGCTCACGTTCG
GTGCTGGGACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0122] Anti-DCIR_31A6.1F5_K-var2-V-hIgGK-C (SEQ ID NO: 102):

METDTLLLWVLLLWVPGSTGDIVLTQSPASLAVSLGQRATISCRASESVDSYGISFMHWYQQKP
GQPPKLLIYRASNQESGIPARFSGSGSRTDFTLTINPVEADDVATYYCQQSNEDPLTFGAGTKLEI

KRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0123] Anti-DCIR_3C2.2D9_H-LV-hIgG4H-C (SEQ ID NO: 38):

ATGAACAGGCTTACTTCCTCATTGCTGCTGCTGATTGTCCCTGCATATGTCCTGTCCCAGGT
TACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGACTTGTT
CTTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGGGTGTGAGCTGGATTCGTCAGCCTTCA
GGAAAGGGTCTGGAGTGGCTGGCACACATTTACTGGGATGATGACAAGCGCTATAATCCAT
CCCTGAAGAGCCGGCTCACAATCTTTAAGGATCCCTCCAGCAACCAGGTATTCCTCAGGAT
CACCAGTGTGGACACTGCAGATACTGCCACATACTACTGTGCTCGAAACTCCCATTACTAC
GGTAGTACTTACGGGGGATACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTCTCCT
CAGCCAAAACAAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGA
GAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCG
TGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAG
GACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTA
CACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAA
ATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTC
CTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCG
TGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCG
TGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTG
TGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAA
GGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAG
CCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAG
GTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGA
GCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCT
CCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTT
CTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTG
TCTCTGGGTAAAGCTAGCTGA

[0124] Anti-DCIR_3C2.2D9_H-LV-hIgG4H-C (SEQ ID NO: 103):

NRLTSSLLLLIVPAYVLSQQVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQPSGKGL
EWLAHIYWDDDKRYNPSLKSRLTIFKDPSSNQVFLRITSVDTADTATYYCARNSHYYGSTYGG
YFDVWGAGTTVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSG
VHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEF
EGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTK
NQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVF
SCSVMHEALHNHYTQKSLSLSLGKAS.

[0125] Anti-DCIR_3C2.2D9_K-LV-hIgGK-C (SEQ ID NO: 39):

ATGGAGACAGACACACTCCTGCTATGGGTGCTGCTGCTCGGGGTTCCAGGTTCCACAGGTA
ACATTGTGCTGACCCAGTCTCCAACTTCTTTCACTGTGTCTCTTGGGCAGAGGGCCACCATA
TCCTGCAGAGCCAGTGAAAGTGTTCATAGTTATGGCAATAGTTTTATGCACTGGTACCAGC
AGAAACCAGGGCAGCCACCCAAACTCCTCATCTATCTTGCATCCAACGTAGAATCTGGGGT
CCCTGCCAGGTTCAGTGGTAGTGGGTCCAGGACAGACTTCACCCTCACCATTGATCCTGTG
GAGGCTGATGATGCTGCAACCTATTACTGTCAGCAAAATAGTGAGGATCCGTGGACGTTCG
GTGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0126] Anti-DCIR_3C2.2D9_K-LV-hIgGK-C (SEQ ID NO: 104):

METDTLLLWVLLLGVPGSTGNIVLTQSPTSFTVSLGQRATISCRASESVHSYGNSFMHWYQQKP
GQPPKLLIYLASNVESGVPARFSGSGSRTDFTLTIDPVEADDAATYYCQQNSEDPWTFGGGTKL

EIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDS
KDSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0127] Anti-DCIR_6C8.1G9_H-V-hIgG4H-C (SEQ ID NO: 40):

ATGGAATGGACCTGGGTCTTTCTCTTCCTCCTGTCAGTAACTGCAGGTGTCCACTCCCAGGT
TCAGCTGCAGCAGTCTGGAACTGAGCTGATGAAGCCTGGGGCCTCAGTGAAGATATCCTGC
AAGGCTACTGGCTACACATTCAGTACCTACTGGATAGAGTGGGTAAAGCAGAGGCCTGGA
CATGGCCTTGAGTGGATTGGAGAGATTTTACCTGGAAGTGGTAGGACTAACGACAATGAGA
AGTTCAAGGGCAAGGCCACAATCACTGCAGATACATCCTCCAAGAAAGCCTACATGCAACT
CAGCAGCCTGACATCTGAGGACTCTGCCGTCTATTACTGTGCAAGAAGGGGTGGTTACTCC
TTTGCTTTCTGGGGCCAAGGGACTCTGGTCTCTGTCTCTGCAGCCAAAACAAAGGGCCCAT
CCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTG
CCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACC
AGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGT
GGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAG
CCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCT
GCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGA
CACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAA
GACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACA
AAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGC
ACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGT
CCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACA
CCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAA
AGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAA
CTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAA
CCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGG
CTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0128] Anti-DCIR_6C8.1G9_H-V-hIgG4H-C (SEQ ID NO: 105):

MEWTWVFLFLLSVTAGVHSQVQLQQSGTELMKPGASVKISCKATGYTFSTYWIEWVKQRPGH
GLEWIGEILPGSGRTNDNEKFKGKATITADTSSKKAYMQLSSLTSEDSAVYYCARRGGYSFAF
WGQGTLVSVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTF
PAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGP
SVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYR
VVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVS
LTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSV
MHEALHNHYTQKSLSLSLGKAS

[0129] Anti-DCIR_6C8.1G9_K-V-hIgGK-C (SEQ ID NO: 41):

ATGACCATGTTCTCACTAGCTCTTCTCCTCAGTCTTCTTCTCCTCTGTGTCTCTGATTCTAGG
GCAGAAACAACTGTGACCCAGTCTCCAGCATCCCTGTCCATGGCTATAGGAGAAAAAGTCA
CCATCAGATGCGTAACCAGCACTGATATTGATGATGATGTGAACTGGTACCAGCAGAAGCC
AGGGGAACCTCCTAAGCTCCTTATTTCAGAAGGCAATACTCTTCGTGCTGGAGTCCCATCCC
GATTCTCCAGCAGTGGCTATGGTACAGATTTTGTTTTTACAATTGAGAACATGCTCTCAGAA
GATGTTGCAGATTACTACTGTTTGCAAAGTGGTAACTTGCCGTACACGTTCGGAGGGGGGA
CCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGAT
GAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAG
AGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTG
TCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCA
AAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCT
CGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0130] Anti-DCIR_6C8.1G9_K-V-hIgGK-C (SEQ ID NO: 106):

MTMFSLALLLSLLLLCVSDSRAETTVTQSPASLSMAIGEKVTIRCVTSTDIDDDVNWYQQKPGE
PPKLLISEGNTLRAGVPSRFSSSGYGTDFVFTIENMLSEDVADYYCLQSGNLPYTFGGGTKLEIK

RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKD
STYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0131] Anti-DCIR_9E8.1E3_H-V-hIgG4H-C (SEQ ID NO: 42):

ATGAACAGGCTTACTTCCTCATTGCTGCTGCTGATTGTCCCTGCATATGTCCTGTCCCAGGT
TACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGACTTGTT
CTTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGGGTCTGAGCTGGATTCGTCAGCCTTCA
GGAAAGGGTCTGGAGTGGCTGGCACACATTTACTGGGATGATGACAAGCGCTATAACCCAT
CCCTGAAGAGCCGGCTCACAATCTCCAAGGATACCTCCAGCAACCAGGTTTTCCTCAAGAT
CACCATTGTGGACACTGCAGATGCTGCCACATACTACTGTGCTCGAAGCTCCCATTACTAC
GGTTATGGCTACGGGGGATACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTCTCCT
CAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGA
GAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCG
TGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAG
GACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTA
CACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAA
ATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTC
CTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCG
TGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCG
TGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTG
TGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAA
GGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAG
CCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAG
GTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGA
GCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCT
CCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTT
CTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTG
TCTCTGGGTAAAGCTAGCTGA

[0132] Anti-DCIR_9E8.1E3_H-V-hIgG4H-C (SEQ ID NO: 107):

MNRLTSSLLLLIVPAYVLSQVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGLSWIRQPSGKGL
EWLAHIYWDDDKRYNPSLKSRLTISKDTSSNQVFLKITIVDTADAATYYCARSSHYYGYGYGG
YFDVWGAGTTVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSG
VHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEF
EGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTK
NQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVF
SCSVMHEALHNHYTQKSLSLSLGKAS

[0133] Anti-DCIR_9E8.1E3_K-LV-hIgGK-C (SEQ ID NO: 43):

ATGGAGACAGACACACTCCTGCTATGGGTGCTGCTGCTCTGGGTTCCAGGTTCCACAGGTA
ACATTGTGCTGACCCAATCTCCAGCTTCTTTGGCTGTGTCTCTAGGGCAGAGGGCCACCATA
TCCTGCAGAGCCAGTGAAAGTATTCATAGTTATGGCAATAGTTTTCTGCACTGGTACCAGC
AGAAACCAGGACAGCCACCCAAACTCCTCATCTATCTTGCATCCAACCTAGAATCTGGGGT
CCCTGCCAGGTTCAGCGGCAGTGGGTCTAGGACAGACTTCACCCTCACCATTGATCCTGTG
GAGGCTGATGATGCTGCAACCTATTACTGTCAGCAAAATAATGAGGATCCGTGGACGTTCG
GTGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAGGCGGCCGCACTAG
CGCGGGCCGCATTCGAAGAGCTCGGTACCCGGGGATCCTCTAGAGTCGACCTGCAGGCATG
CAAGCTGGCCGCGACTCTAGATCATAATCAGC

[0134] Anti-DCIR_9E8.1E3_K-LV-hIgGK-C (SEQ ID NO: 108):

METDTLLLWVLLLWVPGSTGNIVLTQSPASLAVSLGQRATISCRASESIHSYGNSFLHWYQQKP
GQPPKLLIYLASNLESGVPARFSGSGSRTDFTLTIDPVEADDAATYYCQQNNEDPWTFGGGTKL
EIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDS
KDSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0135] Anti-DCIR2C9H-LV-hIgG4H-V-hIgG4H-C (SEQ ID NO: 44):

ATGAAATGCAGCTGGGTCATCTTCTTCCTGATGGCAGTGGTTACAGGGGTCAATTCAGAGG
TTCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGGCCAGGGGCCTTAGTCAAGTTGTCCTG
CAAAGCTTCTGGCTTCAACATTAATGACTACTATATCCACTGGGTGAAGCAGCGGCCTGAA
CAGGGCCTGGAGCGGATTGGATGGATTGATCCTGACAATGGTAATACTATATATGACCCGA
AGTTCCAGGGCAAGGCCAGTATAACAGCAGACACATCCCCCAACACAGCCTACCTGCAGCT
CAGCAGCCTGACATCTGAGGACACTGCCGTCTATTACTGTGCTAGAACCCGATCTCCTATG
GTTACGACGGGGTTTGTTTACTGGGGCCAAGGGACTGTGGTCACTGTCTCTGCAGCCAAAA
CGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGC
CGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCA
GGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACT
CCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAA
CGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCC
CCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCC
CAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGA
CGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCA
TAATGCCAAGACRAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGT
CCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAAC
AAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAG
CCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTG
ACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGC
AGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCT
CTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTC
CGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGT
AAATGA

[0136] Anti-DCIR2C9H-LV-hIgG4H-V-hIgG4H-C (SEQ ID NO: 109):

MKCSWVIFFLMAVVTGVNSEVQLQQSGAELVRPGALVKLSCKASGFNINDYYIHWVKQRPEQ
GLERIGWIDPDNGNTIYDPKFQGKASITADTSPNTAYLQLSSLTSEDTAVYYCARTRSPMVTTGF
VYWGQGTVVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGV
HTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFE
GGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKXKPREEQFNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKN
QVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSC
SVMHEALHNHYTQKSLSLSLGK

[0137] Anti-DC-SIGNL16E3H (SEQ ID NO: 45):

ATGGAAAGGCACTGGATCTTTCTCTTCCTGTTTTCAGTAACTGCAGGTGTCCACTCCCAGGT
CCAGCTTCAGCAGTCTGGGGCTGAGCTGGCAAAACCTGGGGCCTCAGTGAAGATGTCCTGC
AAGGCTTCTGGCTACACCTTTACTACCTACTGGATGCACTGGGTAAAACAGAGGCCTGGAC
AGGGTCTGGAATGGATTGGATACATTAATCCTATCACTGGTTATACTGAGTACAATCAGAA
GTTCAAGGACAAGGCCACCTTGACTGCAGACAAATCCTCCAGCACAGCCTACATGCAACTG
AGCAGCCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGAGAGGGTTTAAGTGCTA
TGGACTATTGGGGTCAGGGAACCTCAGTCACCGTCACCTCAGCCAAAACAACAGCCCCATC
GGTCTATCCACTGGCCCCTGTGTGTGGAGATACAACTGGCTCCTCGGTAACTCTAGGATGC
CTGGTCAAGGGTTATTTCCCTGAGCCAGTGACCTTGACCTGGAACTCTGGATCCCTGTCCAG
TGGTGTGCACACCTTCCCAGCTGTCCTGCAGTCTGACCTCTACACCCTCAGCAGCTCAGTGA
CTGTAACCTCGAGCACCTGGCCCAGCCAGACCGTCACCTGCAGCGTTGCTCACCCAGCCAG
CAGCACCACGGTGGACAAAAAACTTGAGCCCAGCGGGCCCATTTCAACAATCAACCCCTGT
CCTCCATGCAAGGAGTGTCACAAATGCCCAGCTCCTAACCTCGAGGGTGGACCATCCGTCT
TCATCTTCCCTCCAAATATCAAGGATGTACTCATGATCTCCCTGACACCCAAGGTCACGTGT
GTGGTGGTGGATGTGAGCGAGGATGACCCAGACGTCCAGATCAGCTGGTTTGTGAACAAC

GTGGAAGTACACACAGCTCAGACACAAACCCATAGAGAGGATTACAACAGTACTATCCGG
GTGGTCAGCACCCTCCCCATCCAGCACCAGGACTGGATGAGTGGCAAGGAGTTCAAATGCA
AGGTCAACAACAAAGACCTCCCATCACCCATCGAGAGAACCATCTCAAAAATTAAAGGGC
TAGTCAGAGCTCCACAAGTATACATCTTGCCGCCACCAGCAGAGCAGTTGTCCAGGAAAGA
TGTCAGTCTCACTTGCCTGGTCGTGGGCTTCAACCCTGGAGACATCAGTGTGGAGTGGACC
AGCAATGGGCATACAGAGGAGAACTACAAGGACACCGCACCAGTCCTGGACTCTGACGGT
TCTTACTTCATATATAGCAAGCTCAATATGAAAACAAGCAAGTGGGAGAAAACAGATTCCT
TCTCATGCAACGTGAGACACGAGGGTCTGAAAAATTACTACCTGAAGAAGACCATCTCCCG
GTCTCCGGGTAAAGCTAGCTGA

[0138] Anti-DC-SIGNL16E3H (SEQ ID NO: 110):

MERHWIFLFLFSVTAGVHSQVQLQQSGAELAKPGASVKMSCKASGYTFTTYWMHWVKQRPG
QGLEWIGYINPITGYTEYNQKFKDKATLTADKSSSTAYMQLSSLTSEDSAVYYCAREGLSAMD
YWGQGTSVTVTSAKTTAPSVYPLAPVCGDTTGSSVTLGCLVKGYFPEPVTLTWNSGSLSSGVH
TFPAVLQSDLYTLSSSVTVTSSTWPSQTVTCSVAHPASSTTVDKKLEPSGPISTINPCPPCKECHK
CPAPNLEGGPSVFIFPPNIKDVLMISLTPKVTCVVVDVSEDDPDVQISWFVNNVEVHTAQTQTH
REDYNSTIRVVSTLPIQHQDWMSGKEFKCKVNNKDLPSPIERTISKIKGLVRAPQVYILPPPAEQL
SRKDVSLTCLVVGFNPGDISVEWTSNGHTEENYKDTAPVLDSDGSYFIYSKLNMKTSKWEKTD
SFSCNVRHEGLKNYYLKKTISRSPGKAS

[0139] Anti-DC-SIGNL16E3K (SEQ ID NO: 46):

ATGGGCATCAAGATGGAGTCACGGATTCAGGCATTTGTATTCGTGTTTCTCTGGTTGTCTGG
TGTTGGCGGAGACATTGTGATGACCCAGTCTCACAAATTCATGTCCACATCAGTAGGAGAC
AGGGTCAGCGTCACCTGCAAGGCCAGTCAGGATGTGACTTCTGCTGTAGCCTGGTATCAAC
AAAAACCAGGGCAATCTCCTAAACTACTGATTTACTGGGCATCCACCCGGCACACTGGAGT
CCCTGATCGCTTCACAGGCAGTGGATCTGGGACAGATTATACTCTCACCATCAGCAGTGGG
CAGGCTGAAGACCTGGCACTTTATTACTGTCACCAATATTATAGCGCTCCTCGGACGTTCGG
TGGAGGCACCAAGCTGGAAGTCAAACGGGCTGATGCTGCACCAACTGTATCCATCTTCCCA
CCATCCAGTGAGCAGTTAACATCTGGAGGTGCCTCAGTCGTGTGCTTCTTGAACAACTTCTA
CCCCAAAGACATCAATGTCAAGTGGAAGATTGATGGCAGTGAACGACAAAATGGCGTCCT
GAACAGTTGGACTGATCAGGACAGCAAAGACAGCACCTACAGCATGAGCAGCACCCTCAC
GTTGACCAAGGACGAGTATGAACGACATAACAGCTATACCTGTGAGGCCACTCACAAGAC
ATCAACTTCACCCATCGTCAAGAGCTTCAATAGGAATGAGTGTTAG

[0140] Anti-DC-SIGNL16E3K (SEQ ID NO: 111):

MESRIQAFVFVFLWLSGVGGDIVMTQSHKFMSTSVGDRVSVTCKASQDVTSAVAWYQQKPGQ
SPKLLIYWASTRHTGVPDRFTGSGSGTDYTLTISSGQAEDLALYYCHQYYSAPRTFGGGTKLEV
KRADAAPTVSIFPPSSEQLTSGGASVVCFLNNFYPKDINVKWKIDGSERQNGVLNSWTDQDSKD
STYSMSSTLTLTKDEYERHNSYTCEATHKTSTSPIVKSFNRNEC

[0141] Anti-DC-SIGNL16E7H-LV-hIgG4H-C (SEQ ID NO: 47):

ATGGAAAGGCACTGGATCTTTCTCTTCCTGTTTTCAGTAACTGCAGGTGTCCACTCCCAGGT
CCAGCTTCAGCAGTCTGGGGCTGAGCTGGCAAAACCTGGGGCCTCAGTGAAGATGTCCTGC
AAGGCTTCTGGCTACACCTTTACTACCTACTGGATGCACTGGGTAAAACAGAGGCCTGGAC
AGGGTCTGGAATGGATTGGATACATTAATCCTATCACTGGTTATACTGAGTACAATCAGAA
GTTCAAGGACAAGGCCACCTTGACTGCAGACAAATCCTCCAGCACAGCCTACATGCAACTG
AGCAGCCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGAGAGGGTTTAAGTGCTA
TGGACTATTGGGGTCAGGGAACCTCAGTCACCGTCACCTCAGCCAAAACAACGGGCCCATC
CGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGC
CTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCA
GCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTG
GTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGC
CCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTG
CCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGAC
ACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAG
ACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAA
AGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCA

CCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTC
CTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACAC
CCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAA
GGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAAC
TACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAAC
CGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCT
CTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0142] Anti-DC-SIGNL16E7H-LV-hIgG4H-C (SEQ ID NO: 112):

MERHWIFLFLFSVTAGVHSQVQLQQSGAELAKPGASVKMSCKASGYTFTTYWMHWVKQRPG
QGLEWIGYINPITGYTEYNQKFKDKATLTADKSSSTAYMQLSSLTSEDSAVYYCAREGLSAMD
YWGQGTSVTVTSAKTTGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHT
FPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGG
PSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTY
RVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQV
SLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSV
MHEALHNHYTQKSLSLSLGKAS.

[0143] Anti-DC-SIGNL16E7K-LV-hIgGK-C (SEQ ID NO: 48):

ATGGGCATCAAGATGGAGTCACAGATTCAGGCATTTGTATTCGTGTTTCTCTGGTTGTCTGG
TGTTGGCGGAGACATTGTGATGACCCAGTCTCACAAATTCATGTCCACATCAGTAGGAGAC
AGGGTCAGCGTCACCTGCAAGGCCAGTCAGGATGTGACTTCTGCTGTAGCCTGGTATCAAC
AAAAACCAGGGCAATCTCCTAAACTACTGATTTACTGGGCATCCACCCGGCACACTGGAGT
CCCTGATCGCTTCACAGGCAGTGGATCTGGGACAGATTATACTCTCACCATCAGCAGTGGG
CAGGCTGAAGACCTGGCACTTTATTACTGTCACCAATATTATAGCGCTCCTCGGACGTTCGG
TGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCG
CCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTA
TCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCA
GGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGAC
GCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGG
CCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0144] Anti-DC-SIGNL16E7K-LV-hIgGK-C (SEQ ID NO: 113):

MESQIQAFVFVFLWLSGVGGDIVMTQSHKFMSTSVGDRVSVTCKASQDVTSAVAWYQQKPGQ
SPKLLIYWASTRHTGVPDRFTGSGSGTDYTLTISSGQAEDLALYYCHQYYSAPRTFGGGTKLEI
KRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0145] Anti-Dectin_1_11B6.4_H-V-hIgG4H-C (SEQ ID NO: 49):

ATGGCTGTCCTGGCACTACTCCTCTGCCTGGTGGCTTTCCCAACTTGTACCCTGTCCCAGGT
GCAACTGAAGGAGTCAGGACCTGGCCTGGTGGCGCCCTCACAGAGCCTGTCCATTACCTGC
TCTGTCTCTGGGTTCTCATTAAGCAACTATGATATAAGCTGGATTCGCCAGCCACCAGGAA
AGGGTCTGGAGTGGCTTGGAGTAATGTGGACTGGTGGAGGCGCAAATTATAATTCAGCTTT
CATGTCCAGACTGAGCATCAACAAGGACAACTCCAAGAGCCAAGTTTTTTTAAAAATGAAC
AATCTGCAAACTGATGACACAGCCATTTATTACTGTGTCAGAGATGCGGTGAGGTACTGGA
ACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTCTCCTCAGCCAAAACGAAGGGCCC
ATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGC
TGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGA
CCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGC
GTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACA
AGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCAC
CCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAA
GGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAG
GAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAG
ACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCC
TGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCC
CGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGT

ACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGT
CAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAA
CAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGG
CTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATG
AGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTG
A

[0146] Anti-Dectin_1_11B6.4_H-V-hIgG4H-C (SEQ ID NO: 114):

MAVLALLLCLVAFPTCTLSQVQLKESGPGLVAPSQSLSITCSVSGFSLSNYDISWIRQPPGKGLE
WLGVMWTGGGANYNSAFMSRLSINKDNSKSQVFLKMNNLQTDDTAIYYCVRDAVRYWNFD
VWGAGTTVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVH
TFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEG
GPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNST
YRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQ
VSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCS
VMHEALHNHYTQKSLSLSLGKAS

[0147] Anti-Dectin_1_11B6.4_K-LV-hIgGK-C (SEQ ID NO: 50):

ATGGATTTTCAAGCGCAGATTTTCAGCTTCCTGCTAATCAGTGCTTCAGTCATAATGTCCAG
AGGACAAATTGTTCTCTCCCAGTCACCAGCAATCCTGTCTGCATCTCCAGGGGAGAAGGTC
ACAATGACTTGCAGGGCCAGCTCAAGTGTAAGTTACATACACTGGTACCAGCAGAAGCCA
GGATCCTCCCCCAAACCCTGGATTTATGCCACATCCCACCTGGCTTCTGGAGTCCCTGCTCG
CTTCAGTGGCAGTGGGTCTGGGACCTCTTACTCTCTCACAATCAGCAGAGTGGAGGCTGAA
GATACTGCCACTTATTACTGCCAGCAGTGGAGTAGTAACCCATTCACGTTCGGCTCGGGGA
CAAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGAT
GAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAG
AGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTG
TCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCA
AAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCT
CGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0148] Anti-Dectin_1_11B6.4_K-LV-hIgGK-C (SEQ ID NO: 115):

MDFQAQIFSFLLISASVIMSRGQIVLSQSPAILSASPGEKVTMTCRASSSVSYIHWYQQKPGSSPK
PWIYATSHLASGVPARFSGSGSGTSYSLTISRVEAEDTATYYCQQWSSNPFTFGSGTKLEIKRTV
AAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0149] Anti-Dectin_1_15E2.5_H-V-hIgG4H-C (SEQ ID NO: 51):

ATGGAAAGGCACTGGATCTTTCTACTCCTGTTGTCAGTAACTGCAGGTGTCCACTCCCAGGT
CCAGCTGCAGCAGTCTGGGGCTGAACTGGCAAGACCTGGGGCCTCAGTGAAGATGTCCTGC
AAGGCTTCTGGCTACACCTTTACTACCTACACTATGCACTGGGTAAAACAGAGGCCTGGAC
AGGGTCTGGAATGGATTGGATACATTAATCCTAGCAGTGGTTATACTAATTACAATCAGAA
GTTCAAGGACAAGGCCACATTGACTGCAGACAAATCCTCCAGCACAGCCTCCATGCAACTG
AGCAGCCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGAGAGAGGGCGGTATTAG
TCCCCTATGCTATGGACTACTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAAC
AAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCC
GCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAG
GCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCC
CTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACG
TAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCC
CATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCC
AAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGAC
GTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCAT
AATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTC
CTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAAC
AAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAG
CCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTG

ACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGC
AGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCT
CTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTC
CGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGT
AAAGCTAGCTGA

[0150] Anti-Dectin_1_15E2.5_H-V-hIgG4H-C (SEQ ID NO: 116):

MERHWIFLLLLSVTAGVHSQVQLQQSGAELARPGASVKMSCKASGYTFTTYTMHWVKQRPG
QGLEWIGYINPSSGYTNYNQKFKDKATLTADKSSSTASMQLSSLTSEDSAVYYCARERAVLVP
YAMDYWGQGTSVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALT
SGVHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPA
PEFEGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREE
QFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEM
TKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGN
VFSCSVMHEALHNHYTQKSLSLSLGKAS

[0151] Anti-Dectin_1_15E2.5_K-V-hIgGK-C (SEQ ID NO: 52):

ATGCATTTTCAAGTGCAGATTTTCAGCTTCCTGCTAATCAGTGCCTCAGTCATAATGTCCAG
AGGACAAATTGTTCTCACCCAGTCTCCAGCAGTCATGTCTGCATCTCCAGGGGAGAAGGTC
ACCATAACCTGCACTGCCAGCTCAAGTTTAAGTTACATGCACTGGTTCCAGCAGAAGCCAG
GCACTTCTCCCAAACTCTGGCTTTATAGCACATCCATCCTGGCTTCTGGAGTCCCTACTCGC
TTCAGTGGCAGTGGATCTGGGACCTCTTACTCTCTCACAATCAGCCGAATGGAGGCTGAAG
ATGCTGCCACTTATTACTGCCAGCAAAGGAGTAGTTCCCCATTCACGTTCGGCTCGGGGAC
AAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATG
AGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGA
GGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGT
CACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAA
AGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTC
GCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0152] Anti-Dectin_1_15E2.5_K-V-hIgGK-C (SEQ ID NO: 117):

MHFQVQIFSFLLISASVIMSRGQIVLTQSPAVMSASPGEKVTITCTASSSLSYMHWFQQKPGTSP
KLWLYSTSILASGVPTRFSGSGSGTSYSLTISRMEAEDAATYYCQQRSSSPFTFGSGTKLEIKRTV
AAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYS
LSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0153] Anti-Dectin_1_2D8.2D4H-V-hIgG4H-C (SEQ ID NO: 53):

ATGGGATGGACCTGGATCTTTATTTTAATCCTGTCAGTTACTACAGGTGTCCACTCTGAGGT
CCAGCTGCAGCAGTCTGGACCTGAGCTGGAGAAGCCTGGCGCTTCAGTGAAGATATCCTGC
AAGGCTTCTGGTTACTCCTTCACTGGCTACAACATGAACTGGGTGAAACAGAGCAATGGAA
AGAGCCTTGAGTGGATTGGAAATATTGATCCTTACTATGGTGATACTAACTACAACCAGAA
GTTCAAGGGCAAGGCCACATTGACTGTAGACAAATCCTCCAGCACAGCCTACATGCACCTC
AAGAGCCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGACCCTACGGTAGTGAGG
CCTACTTTGCTTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACGAAGGG
CCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTG
GGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCC
TGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGC
AGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATC
ACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCC
CACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACC
CAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGC
CAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCC
AAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACC
GTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGC
CTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAG
GTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCC
TGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGG

AGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAG
CAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGAT
GCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCT
AGCTGA

[0154] Anti-Dectin_1_2D8.2D4H-V-hIgG4H-C (SEQ ID NO: 118):

MGWTWIFILILSVTTGVHSEVQLQQSGPELEKPGASVKISCKASGYSFTGYNMNWVKQSNGKS
LEWIGNIDPYYGDTNYNQKFKGKATLTVDKSSSTAYMHLKSLTSEDSAVYYCARPYGSEAYFA
YWGQGTLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVH
TFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEG
GPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNST
YRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQ
VSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCS
VMHEALHNHYTQKSLSLSLGKAS

[0155] Anti-Dectin_1_2D8.2D4K-V-hIgGK-C (SEQ ID NO: 54):

ATGGTGTCCACTTCTCAGCTCCTTGGACTTTTGCTTTTCTGGACTTCAGCCTCCAGATGTGAC
ATTGTGATGACTCAGTCTCCAGCCACCCTGTCTGTGACTCCAGGAGATAGAGTCTCTCTTTC
CTGCAGGGCCAGCCAGAGTATTAGCGACTACTTACACTGGTATCAACAAAAATCACATGAG
TCTCCAAGGCTTCTCATCAAATATGCTGCCCAATCCATCTCTGGGATCCCCTCCAGGTTCAG
TGGCAGTGGATCAGGGTCAGATTTCACTCTCAGTATCAACGGTGTGGAACCTGAAGATGTT
GGAGTGTATTACTGTCAAAATGGTCACAGCTTTCCGTACACGTTCGGAGGGGGGACCAAGC
TCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAG
TTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGCCAA
AGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCACAGA
GCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGCAGA
CTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCCGTC
ACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0156] Anti-Dectin_1_2D8.2D4K-V-hIgGK-C (SEQ ID NO: 119):

DIVMTQSPATLSVTPGDRVSLSCRASQSISDYLHWYQQKSHESPRLLIKYAAQSISGIPSRFSGSG
SGSDFTLSINGVEPEDVGVYYCQNGHSFPYTFGGGTKLEIKRTVAAPSVFIFPPSDEQLKSGTAS
VVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLTLSKADYEKHKVYA
CEVTHQGLSSPVTKSFNRGEC

[0157] Anti-Langerin15B10H-LV-hIgG4H-C (SEQ ID NO: 55):

ATGGAATGGAGGATCTTTCTCTTCATCCTGTCAGGAACTGCAGGTGTCCACTCCCAGGTTCA
GCTGCGGCAGTCTGGACCTGAGCTGGTGAAGCCTGGGGCTTCAGTGAAGATGTCCTGCAAG
GCTTCTGGATACACATTTACTGACTATGTTATAAGTTGGGTGAAGCAGAGAACTGGACAGG
GCCTTGAGTGGATTGGAGATATTTATCCTGGAAGTGGTTATTCTTTCTACAATGAGAACTTC
AAGGGCAAGGCCACACTGACTGCAGACAAATCCTCCACCACAGCCTACATGCAGCTCAGC
AGCCTGACATCTGAGGACTCTGCGGTCTATTTCTGTGCAACCTACTATAACTACCCTTTTGC
TTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACAACGGGCCCATCCGTC
TTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGG
TCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGG
CGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGA
CCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAG
CAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCA
GCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTC
TCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCC
CGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCC
GCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAG
GACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCC
ATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTG
CCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGC
TTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTAC
AAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGT

GGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTG
CACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0158] Anti-Langerin15B10H-LV-hIgG4H-C (SEQ ID NO: 120):

QVQLRQSGPELVKPGASVKMSCKASGYTFTDYVISWVKQRTGQGLEWIGDIYPGSGYSFYNEN
FKGKATLTADKSSTTAYMQLSSLTSEDSAVYFCATYYNYPFAYWGQGTLVTVSAAKTTGPSVF
PLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSVVTVPSS
SLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKDTLMISRTPEV
TCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYK
CKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNG
QPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKSLSLSLGKA
S.

[0159] Anti-Langerin15B10K-LV-hIgGK-C (SEQ ID NO: 56):

ATGAAGTTGCCTGTTAGGCTGTTGGTGCTGATGTTCTGGATTCCTGCTTCCAGCAGTGATGT
TGTGATGACCCAAACTCCACTCTCCCTGCCTGTCCGTCTTGGAGATCAAGCCTCCATCTCTT
GCAGATCTAGTCAGAGCCTTGTACACAGTAATGGAAACACCTATTTACATTGGTACCTGCA
GAAGCCAGGCCAGTCTCCAAAGCTCCTGATCTACAAAGTTTCCAACCGATTTTCTGGGGTC
CCAGACAGGTTCAGTGGCAGTGGATCAGGGACAAATTTCACACTCAAGATCAGCAGAGTG
GAGGCTGAGGATCTGGGACTTTATTTCTGCTCTCAAAGTACACATGTTCCGTACACGTTCGG
AGGGGGGACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCG
CCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTA
TCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCA
GGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGAC
GCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGG
CCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0160] Anti-Langerin15B10K-LV-hIgGK-C (SEQ ID NO: 121):

DVVMTQTPLSLPVRLGDQASISCRSSQSLVHSNGNTYLHWYLQKPGQSPKLLIYKVSNRFSGVP
DRFSGSGSGTNFTLKISRVEAEDLGLYFCSQSTHVPYTFGGGTKLEIKRTVAAPSVFIFPPSDEQL
KSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLTLSKADYEK
HKVYACEVTHQGLSSPVTKSFNRGEC

[0161] Anti-Langerin2G3H-LV-hIgG4H-C (SEQ ID NO: 57):

ATGACATTGAACATGCTGTTGGGGCTGAGGTGGGTTTTCTTTGTTGTTTTTTATCAAGGTGT
GCATTGTGAGGTGCAGCTTGTTGAGTCTGGTGGAGGATTGGTGCAGCCTAAAGGGTCATTG
AAACTCTCATGTGCAGCCTCTGGATTAACCTTCAATATCTACGCCATGAACTGGGTCCGCCA
GGCTCCAGGAAAGGGTTTGGAATGGGTTGCTCGCATAAGAAATAAAAGTAATAATTATGC
AACATATTATGCCGATTCAGTGAAAGACAGGTTCACCATCTCCAGAGATGATTCACAAAGC
TTGCTCTATCTGCAAATGAACAACTTGAAAACTGAGGACACAGCCATGTATTACTGTGTGG
GACGGGACTGGTTTGATTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAAC
GAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCC
GCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAG
GCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCC
CTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACG
TAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCC
CATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCC
AAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGAC
GTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCAT
AATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTC
CTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAAC
AAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAG
CCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTG
ACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGC
AGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCT
CTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTC

CGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGT
AAAGCTAGCTGA

[0162] Anti-Langerin2G3H-LV-hIgG4H-C (SEQ ID NO: 122):

MTLNMLLGLRWVFFVVFYQGVHCEVQLVESGGGLVQPKGSLKLSCAASGLTFNIYAMNWVR
QAPGKGLEWVARIRNKSNNYATYYADSVKDRFTISRDDSQSLLYLQMNNLKTEDTAMYYCVG
RDWFDYWGQGTLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGAL
TSGVHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCP
APEFEGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPRE
EQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEE
MTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEG
NVFSCSVMHEALHNHYTQKSLSLSLGKAS.

[0163] Anti-Langerin2G3L-LV-hIgGK-C (SEQ ID NO: 58):

ATGGCCTGGATTTCACTTATACTCTCTCTCCTGGCTCTCAGCTCAGGGGCCATTTCCCAGGC
TGTTGTGACTCAGGAATCTGCACTCACCACATCACCTGGTGAAACAGTCACACTCACTTGTC
GCTCAAGTACTGGGGCTGTTACAACTAGTAACTATGCCAACTGGGTCCAAGAAAAACCAGA
TCATTTATTCACTGGTCTAATAGGTGGTACCAACAACCGAGTTTCAGGTGTTCCTGCCAGAT
TCTCAGGCTCCCTGATTGGAGACAAGGCTGCCCTCACCATCACAGGGGCACAGACTGAGGA
TGAGGCAATATATTTCTGTGCTCTATGGTACAGCAACCATTGGGTGTTCGGTGGAGGAACC
AAACTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGA
GCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAG
GCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTC
ACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAA
GCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCG
CCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0164] Anti-Langerin2G3L-LV-hIgGK-C (SEQ ID NO: 123):

MAWISLILSLLALSSGAISQAVVTQESALTTSPGETVTLTCRSSTGAVTTSNYANWVQEKPDHLF
TGLIGGTNNRVSGVPARFSGSLIGDKAALTITGAQTEDEAIYFCALWYSNHWVFGGGTKLEIKR
TVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDST
YSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0165] Anti-Lox_1_10F9H-LV-hIgG4H-C (SEQ ID NO: 59):

ATGGAATGGACCTGGGTCTTTCTCTTCCTCCTGTCAGTAACTGCAGGTGTCCACTCCCAGGT
TCAGCTGCAGCAGTCTGGAGCTGAGCTGATGAAGCCTGGGGCCTCAGTGAAGATATCCTGC
AAGGCTACTGGCTACACATTCGGTAGCTACTGGATAGAGTGGGTAAAGCAGAGGCCTGGA
CATGGCCTTGAGTGGATTGGAGAGATTTTACCTGGAAGTGGTAATACTAACTACAATGAGA
ACTTCAAGGGCAAGGCCACATTCACTGCAGATACATCCTCCAACACAGCCTACATGCAACT
CACCAGTCTGACATCTGAGGACTCTGCCGTCTATTACTGTGCTAGGGCGGGGATTTATTGG
GGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCC
TGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGA
CTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCAC
ACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCC
CTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGCAACAC
CAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCT
GAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGA
TCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGT
CCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGA
GGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGG
CTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAG
AAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCA
TCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACC
CCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGACCA
CGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAA
GAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAAC
CACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0166] Anti-Lox_1_10F9H-LV-hIgG4H-C (SEQ ID NO: 124):

MEWTWVFLFLLSVTAGVHSQVQLQQSGAELMKPGASVKISCKATGYTFGSYWIEWVKQRPGH
GLEWIGEILPGSGNTNYNENFKGKATFTADTSSNTAYMQLTSLTSEDSAVYYCARAGIYWGQG
TLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVL
QSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFL
FPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSV
LTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLV
KGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEAL
HNHYTQKSLSLSLGKAS

[0167] Anti-Lox_1_10F9K-LV-hIgGK-C (SEQ ID NO: 60):

ATGGAGAAAGACACACTCCTGCTATGGGTCCTGCTTCTCTGGGTTCCAGGTTCCACAGGTG
ACATTGTGCTGACCCAATCTCCAGCTTTTTTGGCTGTGTCTCTAGGGCAGAGGGCCACCATC
TCCTGCAGAGCCAGCGAAAGTGTTGATAATTATGGCATTAGTTTTATGAACTGGTTCCAAC
AGAAACCAGGACAGCCACCCAAACTCCTCATCTATGTTGCATCCAAGCAAGGATCCGGGGT
CCCTGCCAGGTTTAGTGGCAGTGGGTCTGGGACAGACTTCAGCCTCAACATCCATCCTATG
GAGGAGGATGATACTGCAATGTATTTCTGTCAGCAAAGTAAGGAGGTTCCTCGGACGTTCG
GTGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0168] Anti-Lox_1_10F9K-LV-hIgGK-C (SEQ ID NO: 125):

MEKDTLLLWVLLLWVPGSTGDIVLTQSPAFLAVSLGQRATISCRASESVDNYGISFMNWFQQK
PGQPPKLLIYVASKQGSGVPARFSGSGSGTDFSLNIHPMEEDDTAMYFCQQSKEVPRTFGGGTK
LEIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQD
SKDSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0169] Anti-LOX-111C8H-LV-hIgG4H-C (SEQ ID NO: 61):

ATGGAATGTAACTGGATACTTCCTTTTATTCTGTCGGTAACTTCAGGGGTCTACTCAGAGGT
TCAGCTCCAGCAGTCTGGGACTGTGCTGGCAAGGCCTGGGGCTTCAGTGAAGATGTCCTGC
AAGGCTTCTGGCTACACCTTTACCAGCTACTGGATGCACTGGGTAAAACAGAGGCCTGGAC
AGGGTCTGGAATGGATTGGCGCTATTTATCCTGGAAATAGTGATACTACCTACAACCAGAA
GTTCAAGGGCAAGGCCAAACTGACTGCAGTCACATCCACCAGCACTGCCTACATGGAGCTC
AGCAGCCTGACAAATGAGGACTCTGCGGTCTATTACTGTACACCTACTTACTACTTTGACTA
CTGGGGCCAAGGCACCTCTCTCACAGTCTCCTCAGCCAAAACGAAGGGCCCATCCGTCTTC
CCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCA
AGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGCGT
GCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGACCG
TGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGCAA
CACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAGCA
CCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCA
TGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGA
GGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCG
GGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGAC
TGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCG
AGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCCCC
CATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTA
CCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGAC
CACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACA
AGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAA
CCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCTAGCTGA

[0170] Anti-LOX-111C8H-LV-hIgG4H-C (SEQ ID NO: 126):

MECNWILPFILSVTSGVYSEVQLQQSGTVLARPGASVKMSCKASGYTFTSYWMHWVKQRPGQ
GLEWIGAIYPGNSDTTYNQKFKGKAKLTAVTSTSTAYMELSSLTNEDSAVYYCTPTYYFDYWG
QGTSLTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPA
VLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSV
FLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVV
SVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTC
LVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHE
ALHNHYTQKSLSLSLGKAS

[0171] Anti-LOX-111C8K-LV-hIgGK-C (SEQ ID NO: 62):

ATGAGTCCTGCCCAATTCCTGTTTCTGTTAGTGCTCTGGATTCGGGAAACCAACGGTGATGT
TGTGATGACCCAGACTCCACTCACTTTGTCGGTTACCATTGGACAACCAGCCTCCATCTCTT
GCAAGTCAAGTCAGAGCCTCTTAGATAGTGATGGAAAGACATATTTGAATTGGTTCTTACA
GAGGCCAGGCCAGTCTCCAAAGCGCCTAATCTATCTGGTGTCTAAACTGGACTCTGGAGTC
CCTGACAGGTTCACTGGCAGTGGATCAGGGACAGATTTCACACTGAAAATCAGCAGAGTG
GAGGCTGAGGATTTGGGAGTTTATTATTGCTGGCAAGGTACACATTTTCCGTGGACGTTCG
GTGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0172] Anti-LOX-111C8K-LV-hIgGK-C (SEQ ID NO: 127):

MSPAQFLFLLVLWIRETNGDVVMTQTPLTLSVTIGQPASISCKSSQSLLDSDGKTYLNWFLQRP
GQSPKRLIYLVSKLDSGVPDRFTGSGSGTDFTLKISRVEAEDLGVYYCWQGTHFPWTFGGGTKL
EIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDS
KDSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0173] Anti-LOX-115C4H-LV-hIgG4H-C (SEQ ID NO: 63):

ATGGGAGGGATCTGGATCTTTCTCTTCCTCCTGTCAGGAACTGCAGGTGCCCACTCTGAGAT
CCAGCTGCAGCAGACTGGACCTGAGCTGGTGAAGCCTGGGGCTTCAGTGAAGATATCCTGC
AAGGCTTCTGGTTATCCATTCACTGACTACATCATGGTCTGGGTGAAGCAGAGCCATGGAA
AGAGCCTTGAGTGGATTGGAAATATTAGTCCTTACTATGGTACTACTAACTACAATCTGAA
GTTCAAGGGCAAGGCCACATTGACTGTAGACAAATCTTCCAGCACAGCCTACATGCAGCTC
AACAGTCTGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGATCCCCTAACTGGGACG
GGGCCTGGTTTGCTCACTGGGGCCAAGGGGCTCTGGTCACTGTCTCTGCAGCCAAAACAAA
GGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCC
CTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCG
CCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTC
AGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAG
ATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCAT
GCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAA
ACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTG
AGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAAT
GCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTC
ACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAA
GGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCA
CAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCT
GCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGC
CGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTA
CAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGT
GATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAA
GCTAGCTGATTAATTAA

[0174] Anti-LOX-115C4H-LV-hIgG4H-C (SEQ ID NO: 128):

MGGIWIFLFLLSGTAGAHSEIQLQQTGPELVKPGASVKISCKASGYPFTDYIMVWVKQSHGKSL
EWIGNISPYYGTTNYNLKFKGKATLTVDKSSSTAYMQLNSLTSEDSAVYYCARSPNWDGAWF
AHWGQGALVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGV
HTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFE
GGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKN
QVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSC
SVMHEALHNHYTQKSLSLSLGKAS

[0175] Anti-LOX-115C4K-LV-hIgGK-C (SEQ ID NO: 64):

ATGGAGACAGACACAATCCTGCTATGGGTGCTGCTGCTCTGGGTTCCAGGCTCCACTGGTG
ACATTGTGCTGACCCAATCTCCAGCTTCTTTGGCTGTGTCTCTAGGGCAGAGGGCCACCATC
TCCTGCAAGGCCAGCCAAAGTGTTGATTATGATGGTGATAGTTATATGAACTGGTTCCAAC
AGAAACCAGGACAGCCACCCAAACTCCTCATCTATGCTGCATCCAATCTAGAATCTGGGAT
CCCAGCCAGGTTTAGTGGCAGTGGGTCTGGGACAGACTTCACCCTCAACATCCATCCTGTG
GAGGAGGAGGATGCTGCAACCTATTACTGTCAGCAAAGTAATGAGGATCCATTCACGTTCG
GCTCGGGGACAAAGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCC
GCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCT
ATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCC
AGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGA
CGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGG
GCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0176] Anti-LOX-115C4K-LV-hIgGK-C (SEQ ID NO: 129):

METDTILLWVLLLWVPGSTGDIVLTQSPASLAVSLGQRATISCKASQSVDYDGDSYMNWFQQK
PGQPPKLLIYAASNLESGIPARFSGSGSGTDFTLNIHPVEEEDAATYYCQQSNEDPFTFGSGTKLE
IKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0177] Anti-Marco_10B7.3G4H-LV-hIgG4H-C (SEQ ID NO: 65):

ATGGCTGTCCTGGGGCTGCTTCTCTGCCTGGTGACGTTCCCAAGCTGTGTCCTGTCCCAGGT
GCAGCTGAAGGAGTCAGGACCTGGCCTGGTGGCACCCTCACAGAGCCTGTCCATCACATGC
ACTGTCTCTGGGTTCTCATTATCCAGATATAGTGTATTTTGGGTTCGCCAGCCTCCAGGAAA
GGGTCTGGAGTGGCTGGGATTGATATGGGGTGGTGGAAGCACAGACTATAATTCAGCTCTC
AAATCCAGACTGAGCATCAGCAAGGACAACTCCAAGAGCCAAGTTTTCTTAAAAATGAAC
AGTCTGCAAACTGATGACACAGCCATGTACTACTGTGCCAGAATCTACTTTGATTACGACG
GGGCTATGGACTACTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAACAACGGG
CCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTG
GGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCC
TGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGC
AGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATC
ACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCC
CACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACC
CAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGC
CAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCC
AAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACC
GTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGC
CTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAG
GTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCC
TGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGG
AGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAG
CAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGAT
GCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCT
AGCTG

[0178] Anti-Marco_10B7.3G4H-LV-hIgG4H-C (SEQ ID NO: 130):

MAVLGLLLCLVTFPSCVLSQVQLKESGPGLVAPSQSLSITCTVSGFSLSRYSVFWVRQPPGKGLE
WLGLIWGGGSTDYNSALKSRLSISKDNSKSQVFLKMNSLQTDDTAMYYCARIYFDYDGAMDY
WGQGTSVTVSSAKTTGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTF
PAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGP
SVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYR
VVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVS
LTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSV
MHEALHNHYTQKSLSLSLGKAS

[0179] AntiMarco_10B7.3G4K_H-V-hIgGK-C (SEQ ID NO: 66):

ATGCATCGCACCAGCATGGGCATCAAGATGGAGTCACGGATTCAGGCATTTGTATTCGTGT
TTCTCTGGTTGTCTGGTGTTGGCGGAGACATTGTGATGACCCAGTCTCACAAATTCATGTCC
ACATCAGTAGGAGACAGGGTCAGCGTCACCTGCAAGGCCAGTCAGGATGTGACTTCTGCTG
TAGCCTGGTATCAACAAAAACCAGGGCAATCTCCTAAACTACTGATTTACTGGGCATCCAC
CCGGCACACTGGAGTCCCTGATCGCTTCACAGGCAGTGGATCTGGGACAGATTATACTCTC
ACCATCAGCAGTGGGCAGGCTGAAGACCTGGCACTTTATTACTGTCACCAATATTATAGCG
CTCCTCGGACGTTCGGTGGAGGCACCAAGCTCGAGATCAAACGAACTGTGGCTGCACCATC
TGTCTTCATCTTCCCGCCATCTGATGAGCAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCC
TGCTGAATAACTTCTATCCCAGAGAGGCCAAAGTACAGTGGAAGGTGGATAACGCCCTCCA
ATCGGGTAACTCCCAGGAGAGTGTCACAGAGCAGGACAGCAAGGACAGCACCTACAGCCT
CAGCAGCACCCTGACGCTGAGCAAAGCAGACTACGAGAAACACAAAGTCTATGCCTGCGA
AGTCACCCATCAGGGCCTGAGCTCGCCCGTCACAAAGAGCTTCAACAGGGGAGAGTGTTA
G

[0180] AntiMarco_10B7.3G4K_H-V-hIgGK-C (SEQ ID NO: 131):

MHRTSMGIKMESRIQAFVFVFLWLSGVGGDIVMTQSHKFMSTSVGDRVSVTCKASQDVTSAV
AWYQQKPGQSPKLLIYWASTRHTGVPDRFTGSGSGTDYTLTISSGQAEDLALYYCHQYYSAPR
TFGGGTKLEIKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQ
ESVTEQDSKDSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0181] Anti-Marco_11A8.3C9_H-V-hIgG4H-C (SEQ ID NO: 67):

ATGGAATGGAACTGGGTCGTTCTCTTCCTCCTGTCATTAACTGCAGGTGTCTATGCCCAGGG
TCAGATGCAGCAGTCTGGAGCTGAGCTGGTGAAGCCTGGGGCTTCAGTGAAGCTGTCCTGC
AAGACTTCTGGCTTCACCTTCAGCAGTAACTATATAAGTTGGTTGAAGCAAAAGCCTGGAC
AGAGTCTTGAGTGGATTGCATGGATTTATGCTGGAACTGGTGGTATTACCTATAATCAGAA
GTTCAGAGGCAGGGCCCAACTGACTGTAGACACATCCTCCAGCACAGCCTACATGCAGTTC
AGCAGCCTGACAACTGATGACTCTGCCATCTATTACTGTGCAAGACACGTGAGGGGTTACC
ATCCTATGGACTACTGGGGTCAAGGAACCTCAGTCACCGTCTCCTCAGCCAAAACGAAGGG
CCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCCCTG
GGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCGCCC
TGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTCAGC
AGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAGATC
ACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCATGCC
CACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAAACC
CAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTGAGC
CAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAATGCC
AAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTCACC
GTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGGC
CTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCACAG
GTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCTGCC
TGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGG
AGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTACAG
CAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGTGAT
GCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAAGCT
AGCTGA

[0182] Anti-Marco_11A8.3C9_H-V-hIgG4H-C (SEQ ID NO: 132):

MEWNWVVLFLLSLTAGVYAQGQMQQSGAELVKPGASVKLSCKTSGFTFSSNYISWLKQKPGQ
SLEWIAWIYAGTGGITYNQKFRGRAQLTVDTSSSTAYMQFSSLTTDDSAIYYCARHVRGYHPM
DYWGQGTSVTVSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGV
HTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFE
GGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNS
TYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKN
QVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSC
SVMHEALHNHYTQKSLSLSLGKAS

[0183] Anti-Marco_11A8.3C9_H-V-hIgGK-C (SEQ ID NO: 68):

ATGGAGTCACAGACTCAGGTCTTTGTATACATGTTGCTGTGGTTGTCTGGTGTTGATGGAGA
CATTGTGATGACCCAGTCTCAAAAATTCATGTCCGCATCAGTAGGGGACAGGGTCAGCGTC
ACCTGCAGGGCCAGTCAGAATGTGGTTACTAATGTAGGCTGGTATCAACAGAAACCAGGG
CAATCTCCTAAAGTACTGATTTACTCGGCATCCTTCCGGTACAGTGGAGTCCCTGATCGCTT
CACAGGCAGTGGATCTGGGACAGATTTCACTCTCACCATCACCAATGTGCAGTCTGAAGAC
TTGGCAGAGTATTTCTGTCAGCAATATAACAACTATCCGTACACGTTCGGAGGGGGGACCA
AGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAG
CAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGC
CAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCAC
AGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGC
AGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCC
GTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0184] Anti-Marco_11A8.3C9_H-V-hIgGK-C (SEQ ID NO: 133):

MESQTQVFVYMLLWLSGVDGDIVMTQSQKFMSASVGDRVSVTCRASQNVVTNVGWYQQKP
GQSPKVLIYSASFRYSGVPDRFTGSGSGTDFTLTITNVQSEDLAEYFCQQYNNYPYTFGGGTKLE
IKRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0185] Anti-Marco_3H10.1F3_H-V-hIgG4H-C (SEQ ID NO: 69):

ATGGGATGGAGCTATATCATCCTCTTTTTGGTAGCAACAGCTACAGATGTCCACTCCCAGGT
CCAACTGCAGCAGCCTGGGGCTGAACTGGTGAAGCCTGGGGCTTCAGTGAAGCTGTCCTGC
AAGGCTTCTGGCTACACCTTCACCAGCTACTGGATGCACTGGGTGAAGCAGAGGCCTGGAG
AAGGCCTTGAGTGGATTGGAGAGATTAATCCTAGCTACGGTCGTACTGACTACAATGGGAA
GTTCAAGAACAAGGCCACACTGACTGTAGCCAAATCCTCCAGCACAGCCTACATGCAACTC
AGCAGCCTGACATCTGAGGACTCTGCGGTCTATTACTGTGCAAGAGGAGATTACTACGGTA
GTAGCTCGTTTGCTTACTGGGGCCAAGGGACTCTGGTCACTGTCTCTGCAGCCAAAACAAA
GGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGAGAGCACAGCCGCC
CTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCGTGGAACTCAGGCG
CCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAGGACTCTACTCCCTC
AGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTACACCTGCAACGTAG
ATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAAATATGGTCCCCCAT
GCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTCCTGTTCCCCCCAAA
ACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCGTGGTGGTGGACGTG
AGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCGTGGAGGTGCATAAT
GCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTGTGGTCAGCGTCCTC
ACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAA
GGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAGCCA
CAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAGGTCAGCCTGACCT
GCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGC
CGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCTCCTTCTTCCTCTA
CAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTTCTCATGCTCCGT
GATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTGTCTCTGGGTAAA
GCTAGCTGA

[0186] Anti-Marco_3H10.1F3_H-V-hIgG4H-C (SEQ ID NO: 134):

MGWSYIILFLVATATDVHSQVQLQQPGAELVKPGASVKLSCKASGYTFTSYWMHWVKQRPGE
GLEWIGEINPSYGRTDYNGKFKNKATLTVAKSSSTAYMQLSSLTSEDSAVYYCARGDYYGSSS
FAYWGQGTLVTVSAAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSG
VHTFPAVLQSSGLYSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEF
EGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTK
NQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVF
SCSVMHEALHNHYTQKSLSLSLGKAS

[0187] Anti-Marco_3H10.1F3_K-V-hIgGK-C (SEQ ID NO: 70):

ATGGAGTCACAGACTCAGGTCTTTGTATACATGTTGCTGTGGTTGTCTGGTGTTGATGGAGA
CATTGTGATGACCCAGTCTCAAAAATTCATGTCCACATCATTAGGAGACAGGGTCAGCGTC
ACCTGCAAGGCCAGTCAGAATGTGGGTACTAATGTAGCCTGGTATCAACAGAAACCAGGG
CACTCTCCTAAAGCACTGATTTACTCGGCATCCTACCGGTACAGTGGAGTCCCTGATCGCTT
CACAGGCAGTGGATCTGGGACAGATTTCACTCTCACCATCAGCAATGTGCAGTCTGAAGAC
TTGGCAGAGTTTTTCTGTCAGCAATATAACAACTATCCGTACACGTTCGGAGGGGGGACCA
CGCTCGAGATCAAACGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAG
CAGTTGAAATCTGGAACTGCCTCTGTTGTGTGCCTGCTGAATAACTTCTATCCCAGAGAGGC
CAAAGTACAGTGGAAGGTGGATAACGCCCTCCAATCGGGTAACTCCCAGGAGAGTGTCAC
AGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCTGACGCTGAGCAAAGC
AGACTACGAGAAACACAAAGTCTATGCCTGCGAAGTCACCCATCAGGGCCTGAGCTCGCCC
GTCACAAAGAGCTTCAACAGGGGAGAGTGTTAG

[0188] Anti-Marco_3H10.1F3_K-V-hIgGK-C (SEQ ID NO: 135):

MESQTQVFVYMLLWLSGVDGDIVMTQSQKFMSTSLGDRVSVTCKASQNVGTNVAWYQQKPG
HSPKALIYSASYRYSGVPDRFTGSGSGTDFTLTISNVQSEDLAEFFCQQYNNYPYTFGGGTTLEI
KRTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSK
DSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

[0189] FIGS. 6A (non-reduced polyacrylamide gel) and 6B (reduced polyacrylamide gel) are PAGE gels that show the expression of the constructs listed as follows: In Figure 6A - Lane 1. hIgG4-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 2. manti-CD40_12E12.3F3-hIgG4HC-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 3. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 4. hIgG4-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 5. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 6. hIgG4-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 7. manti-CD40_12E12.3F3-hIgG4HC-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 8. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 9. hIgG4-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 10. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980. In Figure 6B - Lane 1. hIgG4-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 2. manti-CD40_12E12.3F3-hIgG4HC-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 3. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbRv1980-f4-m.tbRv0288-f2-m.tbAg85BDel41; Lane 4. hIgG4-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 5. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 6. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbAg85BDel41-f2-m.tbESAT6-f4-m.tbRv1980; Lane 7. manti-CD40_12E12-hIgG4-C-Flex-v1-m.tbCFP10-f2-m.tbESAT6; Lane 8. hIgG4-Flex-v1-m.tbCFP10-f2-m.tbESAT6; Lane 9. mAnti-DCIR_9E8-hIgG4-C-

Flex-v1-m.tbCFP10-f2-m.tbESAT6; Lane 10. mAnti-DCIR_9E8-hIgG4-C-Flex-v1-m.tbHspX. The sequences for each of these constructs is detailed hereinbelow.

[0190] C2092: rAB-cetHS-puro [mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbAg85BDel41 (bold) -f2-m.tbESAT6 (underlined) -f4-m.tbRv1980 (italics)] (SEQ ID NO:136)

ATGAACAGGCTTACTTCCTCATTGCTGCTGCTGATTGTCCCTGCATATGTCCTGTCCCAGGT
TACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGACTTGTT
CTTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGGGTCTGAGCTGGATTCGTCAGCCTTCA
GGAAAGGGTCTGGAGTGGCTGGCACACATTTACTGGGATGATGACAAGCGCTATAACCCAT
CCCTGAAGAGCCGGCTCACAATCTCCAAGGATACCTCCAGCAACCAGGTTTTCCTCAAGAT
CACCATTGTGGACACTGCAGATGCTGCCACATACTACTGTGCTCGAAGCTCCCATTACTAC
GGTTATGGCTACGGGGGATACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTCTCCT
CAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTCCGA
GAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCG
TGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCTCAG
GACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGACCTA
CACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTCCAA
ATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTCTTC
CTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTGCG
TGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGGCG
TGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCGTG
TGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGCAA
GGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAG
CCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACCAG
GTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGAGA
GCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGGCT
CCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTCTT
CTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCCTG
TCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCCACCAACAACA
GCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCTCCCGGCCGGGGCTGCC
GGTCGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGGTTCAGTTCCAG
AGCGGTGGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGCCCAAGACGACT
ACAACGGCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCGGGACTGTCGAT
AGTCATGCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCCCGGCCTGCGGT
AAGGCTGGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCTGCCGCAATGGT
TGTCCGCCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTGTCGATGGCCGG
CTCGTCGGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACGCCGGCTCGCTGT
CGGCCCTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCTCGCGATGGGTGA
CGCCGGCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCCGGCATGGGAGCG
CAACGACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCGGCTATGGGTTTAT
TGCGGGAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCCGAGTTCTTGGAG
AACTTCGTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCGCGGGCGGGCACA
ACGCCGTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTGGGGCGCTCAGCT
CAACGCCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCGAATTCCCCACCAGCACC
CCCGCCGACAGCAGCACCATCACCCCCACCGCCACCCCCACCGCCACCCCCACCATCAAGG
GC*ACTAGC*ATGACAGAGCAGCAGTGGAATTTCGCGGGTATCGAGGCCGCGGCAAGCGCAAT
CCAGGGAAATGTCACGTCCATTCATTCCCTCCTTGACGAGGGGAAGCAGTCCCTGACCAAG
CTCGCAGCGGCCTGGGGCGGTAGCGGTTCGGAGGCGTACCAGGGTGTCCAGCAAAAATGG
GACGCCACGGCTACCGAGCTGAACAACGCGCTGCAGAACCTGGCGCGGACGATCAGCGAA
GCCGGTCAGGCAATGGCTTCGACCGAAGGCAACGTCACTGGGATGTTCGCAAAGCTTGGCG
GCGCGCCTACCAACGGCAGCATCACCGTGGCCGCCACCGCCCCCACCGTGACCCCCACCGT
GAACGCCACCCCCAGCGCCGCCTCT*AGC*GCCGCGCCCAAGACCTACTGCGAGGAGTTGAAA
GGCACCGATACCGGCCAGGCGTGCCAGATTCAAATGTCCGACCCGGCCTACAACATCAACA
TCAGCCTGCCCAGTTACTACCCCGACCAGAAGTCGCTGGAAAATTACATCGCCCAGACGCG

CGACAAGTTCCTCAGCGCGGCCACATCGTCCACTCCACGCGAAGCCCCCTACGAATTGAAT
ATCACCTCGGCCACATACCAGTCCGCGATACCGCCGCGTGGTACGCAGGCCGTGGTGCTCA
AGGTCTACCAGAACGCCGGCGGCACGCACCCAACGACCACGTACAAGGCCTTCGATTGGG
ACCAGGCCTATCGCAAGCCAATCACCTATGACACGCTGTGGCAGGCTGACACCGATCCGCT
GCCAGTCGTCTTCCCCATTGTGCAAGGTGAACTGAGCAAGCAGACCGGACAACAGGTATCG
ATAGCGCCGAATGCCGGCTTGGACCCGGTGAATTATCAGAACTTCGCAGTCACGAACGACG
GGGTGATTTTCTTCTTCAACCCGGGGGAGTTGCTGCCCGAAGCAGCCGGCCCAACCCAGGT
ATTGGTCCCACGTTCCGCGATCGACTCGATGCTGGCCGAATTCTAGGCGGCCG

[0191] Protein sequence PAB2008 - rAB-cetHS-puro [mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbAg85BDel41 (bold) -f2-m.tbESAT6 (underlined) -f4-m.tbRv1980 (italics)] (SEQ ID NO:137)

QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGLSWIRQPSGKGLEWLAHIYWDDDKRYNPSL
KSRLTISKDTSSNQVFLKITIVDTADAATYYCARSSHYYGYGYGGYFDVWGAGTTVTVSSAKT
KGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSV
VTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKDTLMI
SRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLN
GKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIAVE
WESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKSLSL
SLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**SRPGLPVEYLQVPSPSMGRDIKVQFQSGG**
NNSPAVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSPACGK
AGCQTYKWETFLTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAGSL
SALLDPSQGMGPSLIGLAMGDAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANNTRL
WVYCGNGTPNELGGANIPAEFLENFVRSSNLKFQDAYNAAGGHNAVFNFPPNGTHSWEY
WGAQLNAMKGDLQSSLGAGEFPTSTPADSSTITPTATPTATPTIKGTS**MTEQQWNFAGIEAA**
ASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGSGSEAYQGVQQKWDATATELNNALQNLA
RTISEAGQAMASTEGNVTGMFAKLGGAPTNGSITVAATAPTVTPTVNATPSAASS***AAPKTYCE***
ELKGTDTGQACQIQMSDPAYNINISLPSYYPDQKSLENYIAQTRDKFLSAATSSTPREAPYELNIT
SATYQSAIPPRGTQAVVLKVYQNAGGTHPTTTYKAFDWDQAYRKPITYDTLWQADTDPLPVVFP
IVQGELSKQTGQQVSIAPNAGLDPVNYQNFAVTNDGVIFFFNPGELLPEAAGPTQVLVPRSAID
SMLAEF

[0192] C2091: rAB-cetHS-puro[mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbRv1980 (M. tb. antigen – bold) -f4-m.tbRv0288 (M. tb. – antigen - underlined) -f2-m.tbAg85BDel41 (M. tb. Antigen - italics] (SEQ ID NO:138)

[0193] ATGAACAGGCTTACTTCCTCATTGCTGCTGCTGATTGTCCCTGCATATGTCCTGTCCC
AGGTTACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGAC
TTGTTCTTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGGGTCTGAGCTGGATTCGTCAGCC
TTCAGGAAAGGGTCTGGAGTGGCTGGCACACATTTACTGGGATGATGACAAGCGCTATAAC
CCATCCCTGAAGAGCCGGCTCACAATCTCCAAGGATACCTCCAGCAACCAGGTTTTCCTCA
AGATCACCATTGTGGACACTGCAGATGCTGCCACATACTACTGTGCTCGAAGCTCCCATTA
CTACGGTTATGGCTACGGGGGATACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTC
TCCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCT
CCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGT
GTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCC
TCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGA
CCTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGT
CCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGT
CTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGT
GCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATG
GCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACC
GTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTG
CAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGG
CAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAAC
CAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGG
AGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACG

GCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGT
CTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCC
CTGTCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCCACCAACA
ACAGCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCGCCGCGCCCAAGA
CCTACTGCGAGGAGTTGAAAGGCACCGATACCGGCCAGGCGTGCCAGATTCAAATGTCCG
ACCCGGCCTACAACATCAACATCAGCCTGCCCAGTTACTACCCCGACCAGAAGTCGCTGGA
AAATTACATCGCCCAGACGCGCGACAAGTTCCTCAGCGCGGCCACATCGTCCACTCCACGC
GAAGCCCCCTACGAATTGAATATCACCTCGGCCACATACCAGTCCGCGATACCGCCGCGTG
GTACGCAGGCCGTGGTGCTCAAGGTCTACCAGAACGCCGGCGGCACGCACCCAACGACCA
CGTACAAGGCCTTCGATTGGGACCAGGCCTATCGCAAGCCAATCACCTATGACACGCTGTG
GCAGGCTGACACCGATCCGCTGCCAGTCGTCTTCCCCATTGTGCAAGGTGAACTGAGCAAG
CAGACCGGACAACAGGTATCGATAGCGCCGAATGCCGGCTTGGACCCGGTGAATTATCAG
AACTTCGCAGTCACGAACGACGGGGTGATTTTCTTCTTCAACCCGGGGGAGTTGCTGCCCG
AAGCAGCCGGCCCAACCCAGGTATTGGTCCCACGTTCCGCGATCGACTCGATGCTGGCCAA
GCTTGGCGGCGCGCCTACCAACGGCAGCATCACCGTGGCCGCCACCGCCCCCACCGTGACC
CCCACCGTGAACGCCACCCCCAGCGCCGCCTCTAGCATGTCGCAAATCATGTACAACTACC
CCGCGATGTTGGGTCACGCCGGGGATATGGCCGGATATGCCGGCACGCTGCAGAGCTTGGG
TGCCGAGATCGCCGTGGAGCAGGCCGCGTTGCAGAGTGCGTGGCAGGGCGATACCGGGAT
CACGTATCAGGCGTGGCAGGCACAGTGGAACCAGGCCATGGAAGATTTGGTGCGGGCCTA
TCATGCGATGTCCAGCACCCATGAAGCCAACACCATGGCGATGATGGCCCGCGACACGGCC
GAAGCCGCCAAATGGGGCGGCGAATTCCCCACCAGCACCCCCGCCGACAGCAGCACCATC
ACCCCCACCGCCACCCCCACCGCCACCCCCACCATCAAGGGC*ACTAGC*TCCCGGCCGGGGC
TGCCGGTCGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGGTTCAGTT
CCAGAGCGGTGGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGCCCAAGAC
GACTACAACGGCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCGGGACTGT
CGATAGTCATGCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCCCGGCCTG
CGGTAAGGCTGGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCTGCCGCAA
TGGTTGTCCGCCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTGTCGATGG
CCGGCTCGTCGGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACGCCGGCTC
GCTGTCGGCCCTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCTCGCGATG
GGTGACGCCGGCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCCGGCATGG
GAGCGCAACGACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCGGCTATGG
GTTTATTGCGGGAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCCGAGTTCT
TGGAGAACTTCGTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCGCGGGCGG
GCACAACGCCGTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTGGGGCGCT
CAGCTCACGCCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCTGAGCGGCCG

[0194] Protein sequence PAB2059 - rAB-cetHS-puro[mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbRv1980 (M. tb. antigen – bold) -f4-m.tbRv0288 (M. tb. – antigen - underlined) -f2-m.tbAg85BDel41 (M. tb. Antigen - italics] (SEQ ID NO:139)

[0195] QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGLSWIRQPSGKGLEWLAHIYWDDDK
RYNPSLKSRLTISKDTSSNQVFLKITIVDTADAATYYCARSSHYYGYGYGGYFDVWGAGTTVT
VSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGL
YSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKP
KDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVL
HQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGF
YPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNH
YTQKSLSLSLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**AAPKTYCEELKGTDTGQACQI**
QMSDPAYNINISLPSYYPDQKSLENYIAQTRDKFLSAATSSTPREAPYELNITSATYQSAIPP
RGTQAVVLKVYQNAGGTHPTTTYKAFDWDQAYRKPITYDTLWQADTDPLPVVFPIVQGE
LSKQTGQQVSIAPNAGLDPVNYQNFAVTNDGVIFFFNPGELLPEAAGPTQVLVPRSAIDSM
LAKLGGAPTNGSITVAATAPTVTPTVNATPSAASSMSQIMYNYPAMLGHAGDMAGYAGTLQS
LGAEIAVEQAALQSAWQGDTGITYQAWQAQWNQAMEDLVRAYHAMSSTHEANTMAMMAR
DTAEAAKWGGEFPTSTPADSSTITPTATPTATPTIKGTS*SRPGLPVEYLQVPSPSMGRDIKVQFQSG*
GNNSPAVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSPACGKAGCQTY

*KWETFLTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAGSLSALLDPSQGMGPSLI GLAMGDAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANNTRLWVYCGNGTPNELGGANIPAEFL ENFVRSSNLKFQDAYNAAGGHNAVFNFPPNGTHSWEYWGAQLNAMKGDLQSSLGA*G

[0196] C2088: rAB-cetHS-puro[hIgG4H-Flex-v1-m.tbAg85BDel41 (M. tb. Antigen – bold) -f2-m.tbESAT6 (M. tb. Antigen – underlined) -f4-m.tbRv1980 (M. tb. Antigen – italics)] (SEQ ID NO:140)

[0197] ATGGACCTCCTGTGCAAGAACATGAAGCACCTGTGGTTCTTCCTCCTGCTGGTGGCG
GCTCCCAGATGGGTCCTGTCCCGGCTGCAGCTGCAGGAGTCGGGCCCAGGCCTGCTGAAGC
CTTCGGTGACCCTGTCCCTCACCTGCACTGTCTCGGGTGACTCCGTCGCCAGTAGTTCTTAT
TACTGGGGCTGGGTCCGTCAGCCCCCAGGGAAGGGACTCGAGTGGATAGGGACTATCAATT
TTAGTGGCAATATGTATTATAGTCCGTCCCTCAGGAGTCGAGTGACCATGTCGGCAGACAT
GTCCGAGAACTCCTTCTATCTGAAATTGGACTCTGTGACCGCAGCAGACACGGCCGTCTAT
TATTGTGCGGCAGGACACCTCGTTATGGGATTTGGGGCCCACTGGGGACAGGGAAAACTGG
TCTCCGTCTCTCCAGCTTCCACCAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGG
AGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGG
TGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCT
ACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGC
ACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGA
GTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGAC
CATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAG
GTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTAC
GTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGC
ACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGT
ACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGC
CAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGAC
CAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTG
GAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGAC
TCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGG
GGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAG
CCTCTCCCTGTCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCC
ACCAACAACAGCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCTCCCGG
CCGGGGCTGCCGGTCGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGG
TTCAGTTCCAGAGCGGTGGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGC
CCAAGACGACTACAACGGCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCG
GGACTGTCGATAGTCATGCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCC
CGGCCTGCGGTAAGGCTGGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCT
GCCGCAATGGTTGTCCGCCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTG
TCGATGGCCGGCTCGTCGGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACG
CCGGCTCGCTGTCGGCCCTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCT
CGCGATGGGTGACGCCGGCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCC
GGCATGGGAGCGCAACGACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCG
GCTATGGGTTTATTGCGGGAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCC
GAGTTCTTGGAGAACTTCGTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCG
CGGGCGGGCACAACGCCGTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTG
GGGCGCTCAGCTCAACGCCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCGAATTC
CCCACCAGCACCCCCGCCGACAGCAGCACCATCACCCCCACCGCCACCCCCACCGCCACCC
CCACCATCAAGGGC*ACTAGC*ATGACAGAGCAGCAGTGGAATTTCGCGGGTATCGAGGCCGC
GGCAAGCGCAATCCAGGGAAATGTCACGTCCATTCATTCCCTCCTTGACGAGGGGAAGCAG
TCCCTGACCAAGCTCGCAGCGGCCTGGGGCGGTAGCGGTTCGGAGGCGTACCAGGGTGTCC
AGCAAAAATGGGACGCCACGGCTACCGAGCTGAACAACGCGCTGCAGAACCTGGCGCGGA
CGATCAGCGAAGCCGGTCAGGCAATGGCTTCGACCGAAGGCAACGTCACTGGGATGTTCG
CAAAGCTTGGCGGCGCGCCTACCAACGGCAGCATCACCGTGGCCGCCACCGCCCCCACCGT
GACCCCCACCGTGAACGCCACCCCCAGCGCCGCCTCT*AGC*GCCGCGCCCAAGACCTACTGC
GAGGAGTTGAAAGGCACCGATACCGGCCAGGCGTGCCAGATTCAAATGTCCGACCCGGCC
TACAACATCAACATCAGCCTGCCCAGTTACTACCCCGACCAGAAGTCGCTGGAAAATTACA

TCGCCCAGACGCGCGACAAGTTCCTCAGCGCGGCCACATCGTCCACTCCACGCGAAGCCCC
CTACGAATTGAATATCACCTCGGCCACATACCAGTCCGCGATACCGCCGCGTGGTACGCAG
GCCGTGGTGCTCAAGGTCTACCAGAACGCCGGCGGCACGCACCCAACGACCACGTACAAG
GCCTTCGATTGGGACCAGGCCTATCGCAAGCCAATCACCTATGACACGCTGTGGCAGGCTG
ACACCGATCCGCTGCCAGTCGTCTTCCCCATTGTGCAAGGTGAACTGAGCAAGCAGACCGG
ACAACAGGTATCGATAGCGCCGAATGCCGGCTTGGACCCGGTGAATTATCAGAACTTCGCA
GTCACGAACGACGGGGTGATTTTCTTCTTCAACCCGGGGGAGTTGCTGCCCGAAGCAGCCG
GCCCAACCCAGGTATTGGTCCCACGTTCCGCGATCGACTCGATGCTGGCCGAATTCTAGGC
GGCCGCG

[0198] Protein sequence PAB 2032- rAB-cetHS-puro[hIgG4H-Flex-v1-m.tbAg85BDel41 (M. tb. Antigen – bold) -f2-m.tbESAT6 (M. tb. Antigen – underlined) -f4-m.tbRv1980 (M. tb. Antigen – italics)] (SEQ ID NO:141)

[0199] RLQLQESGPGLLKPSVTLSLTCTVSGDSVASSSYYWGWVRQPPGKGLEWIGTINFSGN
MYYSPSLRSRVTMSADMSENSFYLKLDSVTAADTAVYYCAAGHLVMGFGAHWGQGKLVSVS
PASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYS
LSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKD
TLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQ
DWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPS
DIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQ
KSLSLSLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**SRPGLPVEYLQVPSPSMGRDIKVQ**
FQSGGNNSPAVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSP
ACGKAGCQTYKWETFLTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIY
AGSLSALLDPSQGMGPSLIGLAMGDAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANN
TRLWVYCGNGTPNELGGANIPAEFLENFVRSSNLKFQDAYNAAGGHNAVFNFPPNGTHS
WEYWGAQLNAMKGDLQSSLGAGEFPTSTPADSSTITPTATPTATPTIKGTSMTEQQWNFAGIE
AAASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGSGSEAYQGVQQKWDATATELNNALQNLAR
TISEAGQAMASTEGNVTGMFAKLGGAPTNGSITVAATAPTVTPTVNATPSAASS*AAPKTYCEEL*
KGTDTGQACQIQMSDPAYNINISLPSYYPDQKSLENYIAQTRDKFLSAATSSTPREAPYELNITSATYQS
AIPPRGTQAVVLKVYQNAGGTHPTTTYKAFDWDQAYRKPITYDTLWQADTDPLPVVFPIVQGELSKQ
*TGQQVSIAPNAGLDPVNYQNFAVTNDGVIFFFNPGELLPEAAGPTQVLVPRSAIDSMLA*EF

[0200] C2087: rAB-cetHS-puro[hIgG4H-Flex-v1-m.tbRv1980 (M. tb. antigen – bold)-f4-m.tbRv0288 (M. tb. antigen – underlined)-f2-m.tbAg85BDel41 (M. tb. antigen – italics)] (SEQ ID NO:142)

[0201] ATGGACCTCCTGTGCAAGAACATGAAGCACCTGTGGTTCTTCCTCCTGCTGGTGGCG
GCTCCCAGATGGGTCCTGTCCCGGCTGCAGCTGCAGGAGTCGGGCCCAGGCCTGCTGAAGC
CTTCGGTGACCCTGTCCCTCACCTGCACTGTCTCGGGTGACTCCGTCGCCAGTAGTTCTTAT
TACTGGGGCTGGGTCCGTCAGCCCCCAGGGAAGGGACTCGAGTGGATAGGGACTATCAATT
TTAGTGGCAATATGTATTATAGTCCGTCCCTCAGGAGTCGAGTGACCATGTCGGCAGACAT
GTCCGAGAACTCCTTCTATCTGAAATTGGACTCTGTGACCGCAGCAGACACGGCCGTCTAT
TATTGTGCGGCAGGACACCTCGTTATGGGATTTGGGGCCCACTGGGGACAGGGAAAACTGG
TCTCCGTCTCTCCAGCTTCCACCAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGG
AGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGG
TGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCT
ACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGC
ACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGA
GTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGAC
CATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAG
GTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTAC
GTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGC
ACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGT
ACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGC
CAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGAC
CAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTG
GAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGAC

TCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGG
GGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAG
CCTCTCCCTGTCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCC
ACCAACAACAGCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCGCCGCG
CCCAAGACCTACTGCGAGGAGTTGAAAGGCACCGATACCGGCCAGGCGTGCCAGATTCAA
ATGTCCGACCCGGCCTACAACATCAACATCAGCCTGCCCAGTTACTACCCCGACCAGAAGT
CGCTGGAAAATTACATCGCCCAGACGCGCGACAAGTTCCTCAGCGCGGCCACATCGTCCAC
TCCACGCGAAGCCCCCTACGAATTGAATATCACCTCGGCCACATACCAGTCCGCGATACCG
CCGCGTGGTACGCAGGCCGTGGTGCTCAAGGTCTACCAGAACGCCGGCGGCACGCACCCA
ACGACCACGTACAAGGCCTTCGATTGGGACCAGGCCTATCGCAAGCCAATCACCTATGACA
CGCTGTGGCAGGCTGACACCGATCCGCTGCCAGTCGTCTTCCCCATTGTGCAAGGTGAACT
GAGCAAGCAGACCGGACAACAGGTATCGATAGCGCCGAATGCCGGCTTGGACCCGGTGAA
TTATCAGAACTTCGCAGTCACGAACGACGGGGTGATTTTCTTCTTCAACCCGGGGGAGTTG
CTGCCCGAAGCAGCCGGCCCAACCCAGGTATTGGTCCCACGTTCCGCGATCGACTCGATGC
TGGCCAAGCTTGGCGGCGCGCCTACCAACGGCAGCATCACCGTGGCCGCCACCGCCCCCAC
CGTGACCCCCACCGTGAACGCCACCCCCAGCGCCGCCTCTAGCATGTCGCAAATCATGTAC
AACTACCCCGCGATGTTGGGTCACGCCGGGGATATGGCCGGATATGCCGGCACGCTGCAGA
GCTTGGGTGCCGAGATCGCCGTGGAGCAGGCCGCGTTGCAGAGTGCGTGGCAGGGCGATA
CCGGGATCACGTATCAGGCGTGGCAGGCACAGTGGAACCAGGCCATGGAAGATTTGGTGC
GGGCCTATCATGCGATGTCCAGCACCCATGAAGCCAACACCATGGCGATGATGGCCCGCGA
CACGGCCGAAGCCGCCAAATGGGGCGGCGAATTCCCCACCAGCACCCCCGCCGACAGCAG
CACCATCACCCCCACCGCCACCCCCACCGCCACCCCCACCATCAAGGGC*ACTAGC*TCCCGG
CCGGGGCTGCCGGTCGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGG
TTCAGTTCCAGAGCGGTGGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGC
CCAAGACGACTACAACGGCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCG
GGACTGTCGATAGTCATGCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCC
CGGCCTGCGGTAAGGCTGGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCT
GCCGCAATGGTTGTCCGCCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTG
TCGATGGCCGGCTCGTCGGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACG
CCGGCTCGCTGTCGGCCCTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCT
CGCGATGGGTGACGCCGGCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCC
GGCATGGGAGCGCAACGACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCG
GCTATGGGTTTATTGCGGGAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCC
GAGTTCTTGGAGAACTTCGTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCG
CGGGCGGGCACAACGCCGTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTG
GGGCGCTCAGCTCAACGCCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCTGAGC
GGCCG

[0202] Protein sequence PAB2007 - rAB-cetHS-puro[hIgG4H-Flex-v1-m.tbRv1980 (M. tb. antigen – bold)-f4-m.tbRv0288 (M. tb. antigen – underlined)-f2-m.tbAg85BDel41 (M. tb. antigen – italics)] (SEQ ID NO:143)

[0203] RLQLQESGPGLLKPSVTLSLTCTVSGDSVASSSYYWGWVRQPPGKGLEWIGTINFSGN
MYYSPSLRSRVTMSADMSENSFYLKLDSVTAADTAVYYCAAGHLVMGFGAHWGQGKLVSVS
PASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYS
LSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKD
TLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQ
DWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPS
DIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQ
KSLSLSLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**AAPKTYCEELKGTDTGQACQIQM**
SDPAYNINISLPSYYPDQKSLENYIAQTRDKFLSAATSSTPREAPYELNITSATYQSAIPPRGT
QAVVLKVYQNAGGTHPTTTYKAFDWDQAYRKPITYDTLWQADTDPLPVVFPIVQGELSK
QTGQQVSIAPNAGLDPVNYQNFAVTNDGVIFFFNPGELLPEAAGPTQVLVPRSAIDSMLAK
LGGAPTNGSITVAATAPTVTPTVNATPSAASSMSQIMYNYPAMLGHAGDMAGYAGTLQSLGA
EIAVEQAALQSAWQGDTGITYQAWQAQWNQAMEDLVRAYHAMSSTHEANTMAMMARDTA
EAAKWGGEFPTSTPADSSTITPTATPTATPTIKGTS*SRPGLPVEYLQVPSPSMGRDIKVQFQSGGNN*

*SPAVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSPACGKAGCQTYKWE TFLTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAGSLSALLDPSQGMGPSLIGLA MGDAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANNTRLWVYCGNGTPNELGGANIPAEFLENF VRSSNLKFQDAYNAAGGHNAVFNFPPNGTHSWEYWGAQLNAMKGDLQSSLGA*G

[0204] C2084: rAB-cetHS-puro[manti-CD40_12E12.3F3_H-V-SLAML-hIgG4H-C-Flex-v1-m.tbAg85BDel41 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)-f4-m.tbRv1980 (M. tb. antigen – italics)] (SEQ ID NO:144)

[0205] ATGGACCCCAAAGGCTCCCTTTCCTGGAGAATACTTCTGTTTCTCTCCCTGGCTTTTG
AGTTGTCGTACGGAGAAGTGAAGCTGGTGGAGTCTGGGGGAGGCTTAGTGCAGCCTGGAG
GGTCCCTGAAACTCTCCTGTGCAACCTCTGGATTCACTTTCAGTGACTATTACATGTATTGG
GTTCGCCAGACTCCAGAGAAGAGGCTGGAGTGGGTCGCATACATTAATTCTGGTGGTGGTA
GCACCTATTATCCAGACACTGTAAAGGGCCGATTCACCATCTCCAGAGACAATGCCAAGAA
CACCCTGTACCTGCAAATGAGCCGGCTGAAGTCTGAGGACACAGCCATGTATTACTGTGCA
AGACGGGGGTTACCGTTCCATGCTATGGACTATTGGGGTCAAGGAACCTCAGTCACCGTCT
CCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTC
CGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTG
TCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCT
CAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGAC
CTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTC
CAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTC
TTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTG
CGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGG
CGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCG
TGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGC
AAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGC
AGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACC
AGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGA
GAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGG
CTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTC
TTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCC
TGTCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCCACCAACAA
CAGCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCTCCCGGCCGGGGCT
GCCGGTCGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGGTTCAGTTC
CAGAGCGGTGGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGCCCAAGACG
ACTACAACGGCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCGGGACTGTC
GATAGTCATGCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCCCGGCCTGC
GGTAAGGCTGGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCTGCCGCAAT
GGTTGTCCGCCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTGTCGATGGC
CGGCTCGTCGGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACGCCGGCTCG
CTGTCGGCCCTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCTCGCGATGG
GTGACGCCGGCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCCGGCATGGG
AGCGCAACGACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCGGCTATGGG
TTTATTGCGGGAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCCGAGTTCTT
GGAGAACTTCGTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCGCGGGCGG
GCACAACGCCGTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTGGGGCGCT
CAGCTCAACGCCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCGAATTCCCCACCA
GCACCCCCGCCGACAGCAGCACCATCACCCCCACCGCCACCCCCACCGCCACCCCCACCAT
CAAGGGC*ACTAGC*ATGACAGAGCAGCAGTGGAATTTCGCGGGTATCGAGGCCGCGGCAAG
CGCAATCCAGGGAAATGTCACGTCCATTCATTCCCTCCTTGACGAGGGGAAGCAGTCCCTG
ACCAAGCTCGCAGCGGCCTGGGGCGGTAGCGGTTCGGAGGCGTACCAGGGTGTCCAGCAA
AAATGGGACGCCACGGCTACCGAGCTGAACAACGCGCTGCAGAACCTGGCGCGGACGATC
AGCGAAGCCGGTCAGGCAATGGCTTCGACCGAAGGCAACGTCACTGGGATGTTCGCAAAG
CTTGGCGGCGCGCCTACCAACGGCAGCATCACCGTGGCCGCCACCGCCCCCACCGTGACCC
CCACCGTGAACGCCACCCCCAGCGCCGCCTCT*AGC*GCCGCGCCCAAGACCTACTGCGAGGA

GTTGAAAGGCACCGATACCGGCCAGGCGTGCCAGATTCAAATGTCCGACCCGGCCTACAAC
ATCAACATCAGCCTGCCCAGTTACTACCCCGACCAGAAGTCGCTGGAAAATTACATCGCCC
AGACGCGCGACAAGTTCCTCAGCGCGGCCACATCGTCCACTCCACGCGAAGCCCCCTACGA
ATTGAATATCACCTCGGCCACATACCAGTCCGCGATACCGCCGCGTGGTACGCAGGCCGTG
GTGCTCAAGGTCTACCAGAACGCCGGCGGCACGCACCCAACGACCACGTACAAGGCCTTC
GATTGGGACCAGGCCTATCGCAAGCCAATCACCTATGACACGCTGTGGCAGGCTGACACCG
ATCCGCTGCCAGTCGTCTTCCCCATTGTGCAAGGTGAACTGAGCAAGCAGACCGGACAACA
GGTATCGATAGCGCCGAATGCCGGCTTGGACCCGGTGAATTATCAGAACTTCGCAGTCACG
AACGACGGGGTGATTTTCTTCTTCAACCCGGGGGAGTTGCTGCCCGAAGCAGCCGGCCCAA
CCCAGGTATTGGTCCCACGTTCCGCGATCGACTCGATGCTGGCCGAATTCTAGGCG

[0206] Protein sequence PAB2058 - rAB-cetHS-puro[manti-CD40_12E12.3F3_H-V-SLAML-hIgG4H-C-Flex-v1-m.tbAg85BDel41 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)-f4-m.tbRv1980 (M. tb. antigen – italics)] (SEQ ID NO:145).

[0207] EVKLVESGGGLVQPGGSLKLSCATSGFTFSDYYMYWVRQTPEKRLEWVAYINSGGGST
YYPDTVKGRFTISRDNAKNTLYLQMSRLKSEDTAMYYCARRGLPFHAMDYWGQGTSVTVSSA
KTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLS
SVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKDTL
MISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDW
LNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIA
VEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKS
LSLSLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**SRPGLPVEYLQVPSPSMGRDIKVQFQ**
SGGNNSPAVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSPAC
GKAGCQTYKWETFLTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAG
SLSALLDPSQGMGPSLIGLAMGDAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANNTR
LWVYCGNGTPNELGGANIPAEFLENFVRSSNLKFQDAYNAAGGHNAVFNFPPNGTHSWE
YWGAQLNAMKGDLQSSLGAGEFPTSTPADSSTITPTATPTATPTIKGTSMTEQQWNFAGIEAA
ASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGSGSEAYQGVQQKWDATATELNNALQNLARTIS
EAGQAMASTEGNVTGMFAKLGGAPTNGSITVAATAPTVTPTVNATPSAASS*AAPKTYCEELKGT*
DTGQACQIQMSDPAYNINISLPSYYPDQKSLENYIAQTRDKFLSAATSSTPREAPYELNITSATYQSAIPP
RGTQAVVLKVYQNAGGTHPTTTYKAFDWDQAYRKPITYDTLWQADTDPLPVVFPIVQGELSKQTGQ
*QVSIAPNAGLDPVNYQNFAVTNDGVIFFFNPGELLPEAAGPTQVLVPRSAIDSMLA*EF

[0208] C2083: rAB-cetHS-puro[manti-CD40_12E12.3F3_H-V-SLAML-hIgG4H-C-Flex-v1-m.tbRv1980 (M. tb. antigen – bold)-f4-m.tbRv0288 (M. tb. antigen – underlined)-f2-m.tbAg85BDel41 (M. tb. antigen – italics)] (SEQ ID NO:146)

[0209] ATGGACCCCAAAGGCTCCCTTTCCTGGAGAATACTTCTGTTTCTCTCCCTGGCTTTTG
AGTTGTCGTACGGAGAAGTGAAGCTGGTGGAGTCTGGGGGAGGCTTAGTGCAGCCTGGAG
GGTCCCTGAAACTCTCCTGTGCAACCTCTGGATTCACTTTCAGTGACTATTACATGTATTGG
GTTCGCCAGACTCCAGAGAAGAGGCTGGAGTGGGTCGCATACATTAATTCTGGTGGTGGTA
GCACCTATTATCCAGACACTGTAAAGGGCCGATTCACCATCTCCAGAGACAATGCCAAGAA
CACCCTGTACCTGCAAATGAGCCGGCTGAAGTCTGAGGACACAGCCATGTATTACTGTGCA
AGACGGGGGTTACCGTTCCATGCTATGGACTATTGGGGTCAAGGAACCTCAGTCACCGTCT
CCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTC
CGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTG
TCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCT
CAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGAC
CTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTC
CAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTC
TTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTG
CGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGG
CGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCG
TGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGC
AAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGC

AGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACC
AGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGA
GAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGG
CTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTC
TTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCC
TGTCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCCACCAACAA
CAGCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCGCCGCGCCCAAGAC
CTACTGCGAGGAGTTGAAAGGCACCGATACCGGCCAGGCGTGCCAGATTCAAATGTCCGA
CCCGGCCTACAACATCAACATCAGCCTGCCCAGTTACTACCCCGACCAGAAGTCGCTGGAA
AATTACATCGCCCAGACGCGCGACAAGTTCCTCAGCGCGGCCACATCGTCCACTCCACGCG
AAGCCCCCTACGAATTGAATATCACCTCGGCCACATACCAGTCCGCGATACCGCCGCGTGG
TACGCAGGCCGTGGTGCTCAAGGTCTACCAGAACGCCGGCGGCACGCACCCAACGACCAC
GTACAAGGCCTTCGATTGGGACCAGGCCTATCGCAAGCCAATCACCTATGACACGCTGTGG
CAGGCTGACACCGATCCGCTGCCAGTCGTCTTCCCCATTGTGCAAGGTGAACTGAGCAAGC
AGACCGGACAACAGGTATCGATAGCGCCGAATGCCGGCTTGGACCCGGTGAATTATCAGA
ACTTCGCAGTCACGAACGACGGGGTGATTTTCTTCTTCAACCCGGGGGAGTTGCTGCCCGA
AGCAGCCGGCCCAACCCAGGTATTGGTCCCACGTTCCGCGATCGACTCGATGCTGGCCAAG
CTTGGCGGCGCGCCTACCAACGGCAGCATCACCGTGGCCGCCACCGCCCCCACCGTGACCC
CCACCGTGAACGCCACCCCCAGCGCCGCCTCTAGCATGTCGCAAATCATGTACAACTACCC
CGCGATGTTGGGTCACGCCGGGGATATGGCCGGATATGCCGGCACGCTGCAGAGCTTGGGT
GCCGAGATCGCCGTGGAGCAGGCCGCGTTGCAGAGTGCGTGGCAGGGCGATACCGGGATC
ACGTATCAGGCGTGGCAGGCACAGTGGAACCAGGCCATGGAAGATTTGGTGCGGGCCTAT
CATGCGATGTCCAGCACCCATGAAGCCAACACCATGGCGATGATGGCCCGCGACACGGCC
GAAGCCGCCAAATGGGGCGGCGAATTCCCCACCAGCACCCCCGCCGACAGCAGCACCATC
ACCCCCACCGCCACCCCCACCGCCACCCCCACCATCAAGGGC*ACTAGC*TCCCGGCCGGGGC
TGCCGGTCGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGGTTCAGTT
CCAGAGCGGTGGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGCCCAAGAC
GACTACAACGGCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCGGGACTGT
CGATAGTCATGCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCCCGGCCTG
CGGTAAGGCTGGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCTGCCGCAA
TGGTTGTCCGCCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTGTCGATGG
CCGGCTCGTCGGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACGCCGGCTC
GCTGTCGGCCCTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCTCGCGATG
GGTGACGCCGGCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCCGGCATGG
GAGCGCAACGACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCGGCTATGG
GTTTATTGCGGGAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCCGAGTTCT
TGGAGAACTTCGTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCGCGGGCGG
GCACAACGCCGTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTGGGGCGCT
CAGCTCAACGCCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCTGAGCGGCC

[0210] Protein sequence PAB2122 - rAB-cetHS-puro[manti-CD40_12E12.3F3_H-V-SLAML-hIgG4H-C-Flex-v1-m.tbRv1980 (M. tb. antigen – bold)-f4-m.tbRv0288 (M. tb. antigen – underlined)-f2-m.tbAg85BDel41 (M. tb. antigen – italics)] (SEQ ID NO:147).

[0211] EVKLVESGGGLVQPGGSLKLSCATSGFTFSDYYMYWVRQTPEKRLEWVAYINSGGGST
YYPDTVKGRFTISRDNAKNTLYLQMSRLKSEDTAMYYCARRGLPFHAMDYWGQGTSVTVSSA
KTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLS
SVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKDTL
MISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDW
LNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIA
VEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKS
LSLSLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**AAPKTYCEELKGTDTGQACQIQMSD**
PAYNINISLPSYYPDQKSLENYIAQTRDKFLSAATSSTPREAPYELNITSATYQSAIPPRGTQ
AVVLKVYQNAGGTHPTTTYKAFDWDQAYRKPITYDTLWQADTDPLPVVFPIVQGELSKQ
TGQQVSIAPNAGLDPVNYQNFAVTNDGVIFFFNPGELLPEAAGPTQVLVPRSAIDSMLAKL
GGAPTNGSITVAATAPTVTPTVNATPSAASSMSQIMYNYPAMLGHAGDMAGYAGTLQSLGAEI

AVEQAALQSAWQGDTGITYQAWQAQWNQAMEDLVRAYHAMSSTHEANTMAMMARDTAEA
AKWGGEFPTSTPADSSTITPTATPTATPTIKGTS*SRPGLPVEYLQVPSPSMGRDIKVQFQSGGNNSP*
AVYLLDGLRAQDDYNGWDINTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSPACGKAGCQTYKWETF
LTSELPQWLSANRAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAGSLSALLDPSQGMGPSLIGLAMG
DAGGYKAADMWGPSSDPAWERNDPTQQIPKLVANNTRLWVYCGNGTPNELGGANIPAEFLENFVRS
*SNLKFQDAYNAAGGHNAVFNFPPNGTHSWEYWGAQLNAMKGDLQSSLGA*G

[0212] C1590: rAB-cetHS-puro[mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbCFP10 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)] (SEQ ID NO:148).

[0213] ATGAACAGGCTTACTTCCTCATTGCTGCTGCTGATTGTCCCTGCATATGTCCTGTCCC
AGGTTACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGAC
TTGTTCTTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGGGTCTGAGCTGGATTCGTCAGCC
TTCAGGAAAGGGTCTGGAGTGGCTGGCACACATTTACTGGGATGATGACAAGCGCTATAAC
CCATCCCTGAAGAGCCGGCTCACAATCTCCAAGGATACCTCCAGCAACCAGGTTTTCCTCA
AGATCACCATTGTGGACACTGCAGATGCTGCCACATACTACTGTGCTCGAAGCTCCCATTA
CTACGGTTATGGCTACGGGGGATACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTC
TCCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCT
CCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGT
GTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCC
TCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGA
CCTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGT
CCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGT
CTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGT
GCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATG
GCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACC
GTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTG
CAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGG
CAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAAC
CAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGG
AGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACG
GCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGT
CTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCC
CTGTCTCTGGGTAAAGCTAGCATGGCAGAGATGAAGACCGATGCCGCTACCCTCGCGCAGG
AGGCAGGTAATTTCGAGCGGATCTCCGGCGACCTGAAAACCCAGATCGACCAGGTGGAGT
CGACGGCAGGTTCGTTGCAGGGCCAGTGGCGCGGCGCGGCGGGGACGGCCGCCCAGGCCG
CGGTGGTGCGCTTCCAAGAAGCAGCCAATAAGCAGAAGCAGGAACTCGACGAGATCTCGA
CGAATATTCGTCAGGCCGGCGTCCAATACTCGAGGGCCGACGAGGAGCAGCAGCAGGCGC
TGTCCTCGCAAATGGGCTTCGAATTCCCCACCAGCACCCCCGCCGACAGCAGCACCATCAC
CCCCACCGCCACCCCCACCGCCACCCCCACCATCAAGGGCACTAGCATGACAGAGCAGCA
GTGGAATTTCGCGGGTATCGAGGCCGCGGCAAGCGCAATCCAGGGAAATGTCACGTCCATT
CATTCCCTCCTTGACGAGGGGAAGCAGTCCCTGACCAAGCTCGCAGCGGCCTGGGGCGGTA
GCGGTTCGGAGGCGTACCAGGGTGTCCAGCAAAAATGGGACGCCACGGCTACCGAGCTGA
ACAACGCGCTGCAGAACCTGGCGCGGACGATCAGCGAAGCCGGTCAGGCAATGGCTTCGA
CCGAAGGCAACGTCACTGGGATGTTCGCATAGGCGGCC

[0214] Protein sequence PAB1686 - rAB-cetHS-puro[mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbCFP10 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)] (SEQ ID NO:149).

[0215] QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGLSWIRQPSGKGLEWLAHIYWDDDK
RYNPSLKSRLTISKDTSSNQVFLKITIVDTADAATYYCARSSHYYGYGYGGYFDVWGAGTTVT
VSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGL
YSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKP
KDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVL
HQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGF
YPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNH
YTQKSLSLSLGKAS**MAEMKTDAATLAQEAGNFERISGDLKTQIDQVESTAGSLQGQWRGA**

AGTAAQAAVVRFQEAANKQKQELDEISTNIRQAGVQYSRADEEQQQALSSQMGFEFPTST
PADSSTITPTATPTATPTIKGTSMTEQQWNFAGIEAAASAIQGNVTSIHSLLDEGKQSLTKLAAA
WGGSGSEAYQGVQQKWDATATELNNALQNLARTISEAGQAMASTEGNVTGMFA

[0216] C1589: rAB-cetHS-puro[hIgG4H-Flex-v1-m.tbCFP10 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)] (SEQ ID NO:150).

[0217] ATGGACCTCCTGTGCAAGAACATGAAGCACCTGTGGTTCTTCCTCCTGCTGGTGGCG
GCTCCCAGATGGGTCCTGTCCCGGCTGCAGCTGCAGGAGTCGGGCCCAGGCCTGCTGAAGC
CTTCGGTGACCCTGTCCCTCACCTGCACTGTCTCGGGTGACTCCGTCGCCAGTAGTTCTTAT
TACTGGGGCTGGGTCCGTCAGCCCCCAGGGAAGGGACTCGAGTGGATAGGGACTATCAATT
TTAGTGGCAATATGTATTATAGTCCGTCCCTCAGGAGTCGAGTGACCATGTCGGCAGACAT
GTCCGAGAACTCCTTCTATCTGAAATTGGACTCTGTGACCGCAGCAGACACGGCCGTCTAT
TATTGTGCGGCAGGACACCTCGTTATGGGATTTGGGGCCCACTGGGGACAGGGAAAACTGG
TCTCCGTCTCTCCAGCTTCCACCAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGG
AGCACCTCCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGG
TGACGGTGTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCT
ACAGTCCTCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGC
ACGAAGACCTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGA
GTTGAGTCCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGAC
CATCAGTCTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAG
GTCACGTGCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTAC
GTGGATGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGC
ACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGT
ACAAGTGCAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGC
CAAAGGGCAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGAC
CAAGAACCAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTG
GAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGAC
TCCGACGGCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGG
GGAATGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAG
CCTCTCCCTGTCTCTGGGTAAAGCTAGCATGGCAGAGATGAAGACCGATGCCGCTACCCTC
GCGCAGGAGGCAGGTAATTTCGAGCGGATCTCCGGCGACCTGAAAACCCAGATCGACCAG
GTGGAGTCGACGGCAGGTTCGTTGCAGGGCCAGTGGCGCGGCGCGGCGGGGACGGCCGCC
CAGGCCGCGGTGGTGCGCTTCCAAGAAGCAGCCAATAAGCAGAAGCAGGAACTCGACGAG
ATCTCGACGAATATTCGTCAGGCCGGCGTCCAATACTCGAGGGCCGACGAGGAGCAGCAG
CAGGCGCTGTCCTCGCAAATGGGCTTCGAATTCCCCACCAGCACCCCCGCCGACAGCAGCA
CCATCACCCCCACCGCCACCCCCACCGCCACCCCCACCATCAAGGGCACTAGCATGACAGA
GCAGCAGTGGAATTTCGCGGGTATCGAGGCCGCGGCAAGCGCAATCCAGGGAAATGTCAC
GTCCATTCATTCCCTCCTTGACGAGGGGAAGCAGTCCCTGACCAAGCTCGCAGCGGCCTGG
GGCGGTAGCGGTTCGGAGGCGTACCAGGGTGTCCAGCAAAAATGGGACGCCACGGCTACC
GAGCTGAACAACGCGCTGCAGAACCTGGCGCGGACGATCAGCGAAGCCGGTCAGGCAATG
GCTTCGACCGAAGGCAACGTCACTGGGATGTTCGCATAGGCGGCC

[0218] Protein sequence PAB1687 - rAB-cetHS-puro[hIgG4H-Flex-v1-m.tbCFP10 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)] (SEQ ID NO:151).

[0219] RLQLQESGPGLLKPSVTLSLTCTVSGDSVASSSYYWGWVRQPPGKGLEWIGTINFSGN
MYYSPSLRSRVTMSADMSENSFYLKLDSVTAADTAVYYCAAGHLVMGFGAHWGQGKLVSVS
PASTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYS
LSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKD
TLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQ
DWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPS
DIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQ
KSLSLSLGKAS**MAEMKTDAATLAQEAGNFERISGDLKTQIDQVESTAGSLQGQWRGAAGT
AAQAAVVRFQEAANKQKQELDEISTNIRQAGVQYSRADEEQQQALSSQMG**FEFPTSTPADS
STITPTATPTATPTIKGTSMTEQQWNFAGIEAAASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGS
GSEAYQGVQQKWDATATELNNALQNLARTISEAGQAMASTEGNVTGMFA

[0220] C1588: rAB-cetHS-puro[manti-CD40_12E12.3F3_H-V-SLAML-hIgG4H-C-Flex-v1-m.tbCFP10 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)] (SEQ ID NO:152).

[0221] ATGGACCCCAAAGGCTCCCTTTCCTGGAGAATACTTCTGTTTCTCTCCCTGGCTTTTG
AGTTGTCGTACGGAGAAGTGAAGCTGGTGGAGTCTGGGGGAGGCTTAGTGCAGCCTGGAG
GGTCCCTGAAACTCTCCTGTGCAACCTCTGGATTCACTTTCAGTGACTATTACATGTATTGG
GTTCGCCAGACTCCAGAGAAGAGGCTGGAGTGGGTCGCATACATTAATTCTGGTGGTGGTA
GCACCTATTATCCAGACACTGTAAAGGGCCGATTCACCATCTCCAGAGACAATGCCAAGAA
CACCCTGTACCTGCAAATGAGCCGGCTGAAGTCTGAGGACACAGCCATGTATTACTGTGCA
AGACGGGGGTTACCGTTCCATGCTATGGACTATTGGGGTCAAGGAACCTCAGTCACCGTCT
CCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCTC
CGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTG
TCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCCT
CAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGAC
CTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGTC
CAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGTC
TTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGTG
CGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATGG
CGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACCG
TGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTGC
AAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGGC
AGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAACC
AGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGGA
GAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACGG
CTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGTC
TTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCCC
TGTCTCTGGGTAAAGCTAGCATGGCAGAGATGAAGACCGATGCCGCTACCCTCGCGCAGGA
GGCAGGTAATTTCGAGCGGATCTCCGGCGACCTGAAAACCCAGATCGACCAGGTGGAGTC
GACGGCAGGTTCGTTGCAGGGCCAGTGGCGCGGCGCGGCGGGGACGGCCGCCCAGGCCGC
GGTGGTGCGCTTCCAAGAAGCAGCCAATAAGCAGAAGCAGGAACTCGACGAGATCTCGAC
GAATATTCGTCAGGCCGGCGTCCAATACTCGAGGGCCGACGAGGAGCAGCAGCAGGCGCT
GTCCTCGCAAATGGGCTTCGAATTCCCCACCAGCACCCCCGCCGACAGCAGCACCATCACC
CCCACCGCCACCCCCACCGCCACCCCCACCATCAAGGGCACTAGCATGACAGAGCAGCAGT
GGAATTTCGCGGGTATCGAGGCCGCGGCAAGCGCAATCCAGGGAAATGTCACGTCCATTCA
TTCCCTCCTTGACGAGGGGAAGCAGTCCCTGACCAAGCTCGCAGCGGCCTGGGGCGGTAGC
GGTTCGGAGGCGTACCAGGGTGTCCAGCAAAAATGGGACGCCACGGCTACCGAGCTGAAC
AACGCGCTGCAGAACCTGGCGCGGACGATCAGCGAAGCCGGTCAGGCAATGGCTTCGACC
GAAGGCAACGTCACTGGGATGTTCGCATAGGCGGCC

[0222] Protein sequence PAB1685 - rAB-cetHS-puro[manti-CD40_12E12.3F3_H-V-SLAML-hIgG4H-C-Flex-v1-m.tbCFP10 (M. tb. antigen – bold)-f2-m.tbESAT6 (M. tb. antigen – underlined)] (SEQ ID NO:153).

[0223] EVKLVESGGGLVQPGGSLKLSCATSGFTFSDYYMYWVRQTPEKRLEWVAYINSGGGST
YYPDTVKGRFTISRDNAKNTLYLQMSRLKSEDTAMYYCARRGLPFHAMDYWGQGTSVTVSSA
KTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLS
SVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKPKDTL
MISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDW
LNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIA
VEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKS
LSLSLGKAS**MAEMKTDAATLAQEAGNFERISGDLKTQIDQVESTAGSLQGQWRGAAGTA**
AQAAVVRFQEAANKQKQELDEISTNIRQAGVQYSRADEEQQQALSSQMGFEFPTSTPADSS
TITPTATPTATPTIKGTSMTEQQWNFAGIEAAASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGSG
SEAYQGVQQKWDATATELNNALQNLARTISEAGQAMASTEGNVTGMFA

[0224] C1261: rAB-pIRES2[mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbHspX (M. tb. antigen – bold)] (SEQ ID NO:154).

[0225] ATGAACAGGCTTACTTCCTCATTGCTGCTGCTGATTGTCCCTGCATATGTCCTGTCCC
AGGTTACTCTGAAAGAGTCTGGCCCTGGGATATTGCAGCCCTCCCAGACCCTCAGTCTGAC
TTGTTCTTTCTCTGGGTTTTCACTGAGCACTTCTGGTATGGGTCTGAGCTGGATTCGTCAGCC
TTCAGGAAAGGGTCTGGAGTGGCTGGCACACATTTACTGGGATGATGACAAGCGCTATAAC
CCATCCCTGAAGAGCCGGCTCACAATCTCCAAGGATACCTCCAGCAACCAGGTTTTCCTCA
AGATCACCATTGTGGACACTGCAGATGCTGCCACATACTACTGTGCTCGAAGCTCCCATTA
CTACGGTTATGGCTACGGGGGATACTTCGATGTCTGGGGCGCAGGGACCACGGTCACCGTC
TCCTCAGCCAAAACGAAGGGCCCATCCGTCTTCCCCCTGGCGCCCTGCTCCAGGAGCACCT
CCGAGAGCACAGCCGCCCTGGGCTGCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGT
GTCGTGGAACTCAGGCGCCCTGACCAGCGGCGTGCACACCTTCCCGGCTGTCCTACAGTCC
TCAGGACTCTACTCCCTCAGCAGCGTGGTGACCGTGCCCTCCAGCAGCTTGGGCACGAAGA
CCTACACCTGCAACGTAGATCACAAGCCCAGCAACACCAAGGTGGACAAGAGAGTTGAGT
CCAAATATGGTCCCCCATGCCCACCCTGCCCAGCACCTGAGTTCGAAGGGGGACCATCAGT
CTTCCTGTTCCCCCCAAAACCCAAGGACACTCTCATGATCTCCCGGACCCCTGAGGTCACGT
GCGTGGTGGTGGACGTGAGCCAGGAAGACCCCGAGGTCCAGTTCAACTGGTACGTGGATG
GCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTTCAACAGCACGTACC
GTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTGAACGGCAAGGAGTACAAGTG
CAAGGTCTCCAACAAAGGCCTCCCGTCCTCCATCGAGAAAACCATCTCCAAAGCCAAAGGG
CAGCCCCGAGAGCCACAGGTGTACACCCTGCCCCCATCCCAGGAGGAGATGACCAAGAAC
CAGGTCAGCCTGACCTGCCTGGTCAAAGGCTTCTACCCCAGCGACATCGCCGTGGAGTGGG
AGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGGACTCCGACG
GCTCCTTCTTCCTCTACAGCAGGCTAACCGTGGACAAGAGCAGGTGGCAGGAGGGGAATGT
CTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACACAGAAGAGCCTCTCC
CTGTCTCTGGGTAAAGCTAGTCAGACCCCCACCAACACCATCAGCGTGACCCCCACCAACA
ACAGCACCCCCACCAACAACAGCAACCCCAAGCCCAACCCCGCTAGCATGGCCACCACCCT
TCCCGTTCAGCGCCACCCGCGGTCCCTCTTCCCCGAGTTTTCTGAGCTGTTCGCGGCCTTCC
CGTCATTCGCCGGACTCCGGCCCACCTTCGACACCCGGTTGATGCGGCTGGAAGACGAGAT
GAAAGAGGGGCGCTACGAGGTACGCGCGGAGCTTCCCGGGGTCGACCCCGACAAGGACGT
CGACATTATGGTCCGCGATGGTCAGCTGACCATCAAGGCCGAGCGCACCGAGCAGAAGGA
CTTCGACGGTCGCTCGGAATTCGCGTACGGTTCCTTCGTTCGCACGGTGTCGCTGCCGGTAG
GTGCTGACGAGGACGACATTAAGGCCACCTACGACAAGGGCATTCTTACTGTGTCGGTGGC
GGTTTCGGAAGGGAAGCCAACCGAAAAGCACATTCAGATCCGGTCCACCAACTGA

[0226] Protein sequence PAB1360 - rAB-pIRES2[mAnti-DCIR_9E8_H-LV-hIgG4H-C-Flex-v1-m.tbHspX (M. tb. antigen – bold)] (SEQ ID NO:155)

[0227] QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGLSWIRQPSGKGLEWLAHIYWDDDK
RYNPSLKSRLTISKDTSSNQVFLKITIVDTADAATYYCARSSHYYGYGYGGYFDVWGAGTTVT
VSSAKTKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGL
YSLSSVVTVPSSSLGTKTYTCNVDHKPSNTKVDKRVESKYGPPCPPCPAPEFEGGPSVFLFPPKP
KDTLMISRTPEVTCVVVDVSQEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVL
HQDWLNGKEYKCKVSNKGLPSSIEKTISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGF
YPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNH
YTQKSLSLSLGKASQTPTNTISVTPTNNSTPTNNSNPKPNPAS**MATTLPVQRHPRSLFPEFSELF**
AAFPSFAGLRPTFDTRLMRLEDEMKEGRYEVRAELPGVDPDKDVDIMVRDGQLTIKAER
TEQKDFDGRSEFAYGSFVR

[0228] Rv1626: C1256: Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbRv1626 (M. tb. Antigen – bold)] (SEQ ID NO:156)

[0229] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC

GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC

AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGACCGGCCCCACCACCGACGC
CGATGCCGCTGTCCCACGTCGGGTCTTGATCGCGGAAGATGAAGCGCTCATCCGCATGGAC
CTGGCCGAGATGTTGCGAGAGGAGGGATATGAAATTGTCGGCGAGGCCGGCGACGGCCAG
GAAGCCGTCGAGCTGGCCGAGCTGCACAAGCCCGACCTGGTGATCATGGACGTGAAGATG
CCGCGCCGGGACGGGATCGACGCCGCATCCGAAATCGCCAGCAAACGTATTGCCCCGATC
GTGGTGCTGACCGCGTTCAGCCAGCGTGATCTGGTCGAACGTGCGCGTGATGCCGGGGCGA
TGGCATACCTGGTAAAGCCTTTCAGCATCAGCGACCTGATTCCAGCGATTGAATTGGCGGT
CAGCCGGTTCAGGGAGATCACCGCGTTGGAAGGCGAGGTGGCGACGCTATCTGAACGGTT
GGAAACCCGCAAGCTGGTGGAACGAGCAAAAGGCCTGCTGCAGACCAAACATGGGATGAC
CGAGCCGGACGCTTTCAAGTGGATTCAACGTGCCGCCATGGATCGGCGCACCACCATGAAG
CGGGTGGCCGAAGTCGTGCTGGAAACCCTCGGAACACCCAAAGACACCTGAGCGGCCGCA
CTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCT
GAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGG
TCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0230] Protein sequence of C1256: Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbRv1626 (M. tb. Antigen – bold)] (SEQ ID NO:157)

[0231] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MTGPTTDADAAVPRRVLIAEDEALIRMDLAEMLREEGYEIVGEAGDGQEAVE
LAELHKPDLVIMDVKMPRRDGIDAASEIASKRIAPIVVLTAFSQRDLVERARDAGAMAYLV**

KPFSISDLIPAIELAVSRFREITALEGEVATLSERLETRKLVERAKGLLQTKHGMTEPDAFK WIQRAAMDRRTTMKRVAEVVLETLGTPKDT

[0232] Rv3044: C1312: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv3044 (M. tb. Antigen in bold)] (SEQ ID NO:158)

[0233] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG

CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGCGATCCACTGTTGCTGTCG
CCGTAGCGGCAGCCGTGATCGCAGCGTCCAGTGGTTGCGGCTCCGATCAACCGGCCC
ATAAGGCGTCACAATCGATGATCACGCCCACCACCCAGATCGCCGGCGCCGGGGTGC
TGGGAAACGACAGAAAGCCGGATGAGTCGTGCGCGCGTGCGGCGGCCGCGGCCGAT
CCGGGGCCACCGACCCGACCAGCGCACAATGCGGCGGGAGTCAGCCCGGAGATGGT
GCAGGTGCCGGCGGAGGCGCAGCGCATCGTGGTGCTCTCCGGTGACCAGCTCGACG
CGCTGTGCGCGCTGGGCCTGCAATCGCGGATCGTCGCCGCCGCGTTGCCGAACAGCT
CCTCAAGTCAACCTTCCTATCTGGGCACGACCGTGCATGATCTGCCCGGTGTCGGTAC
TCGCAGCGCCCCCGACCTGCGCGCCATTGCGGCGGCTCACCCGGATCTGATCCTGGG
TTCGCAGGGTTTGACGCCGCAGTTGTATCCGCAGCTGGCGGCGATCGCCCCGACGGT
GTTTACCGCGGCACCGGGCGCGGACTGGGAAAATAACCTGCGTGGTGTCGGTGCCGC
CACGGCCCGTATCGCCGCGGTGGACGCGCTGATCACCGGGTTCGCCGAACACGCCAC
CCAGGTCGGGACCAAGCATGACGCGACCCACTTCCAAGCGTCGATCGTGCAGCTGAC

CGCCAACACCATGCGGGTATACGGCGCCAACAACTTCCCGGCCAGCGTGCTGAGCGC
GGTCGGCGTCGACCGACCGCCGTCTCAACGGTTCACCGACAAGGCCTACATCGAGAT
CGGCACCACGGCCGCCGACCTGGCGAAATCACCGGACTTCTCGGCGGCCGACGCCGA
TATCGTCTACCTGTCGTGCGCGTCGGAAGCAGCCGCGGAACGCGCGGCCGTCATCCT
GGATAGCGACCCATGGCGCAAGCTGTCCGCCAACCGTGACAACCGGGTCTTCGTCGT
CAACGACCAGGTATGGCAGACCGGCGAGGGTATGGTCGCTGCCCGCGGCATTGTCGA
TGATCTGCGCTGGGTCGACGCGCCGATCAACTAGAAGCTTGCGGCCGCACTCGAGCACC
ACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTG
CTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGG
TTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0234] Protein sequence - C1312: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv3044 (M. tb. Antigen in bold)] (SEQ ID NO:159)

[0235] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MRSTVAVAVAAAVIAASSGCGSDQPAHKASQSMITPTTQIAGAGVLGNDRKP**
DESCARAAAAADPGPPTRPAHNAAGVSPEMVQVPAEAQRIVVLSGDQLDALCALGLQSRI
VAAALPNSSSSQPSYLGTTVHDLPGVGTRSAPDLRAIAAAHPDLILGSQGLTPQLYPQLAAI
APTVFTAAPGADWENNLRGVGAATARIAAVDALITGFAEHATQVGTKHDATHFQASIVQL
TANTMRVYGANNFPASVLSAVGVDRPPSQRFTDKAYIEIGTTAADLAKSPDFSAADADIVY
LSCASEAAAERAAVILDSDPWRKLSANRDNRVFVVNDQVWQTGEGMVAARGIVDDLRW
VDAPIN

[0236] Ag85 A: C1241: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbAg85A (M. tb antigen – bold)] (SEQ ID NO:160)

[0237] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA

CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG

GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAG**ATGCAGCTAGCATGCAGCTTGTTGACAGGGTTC**
GTGGCGCCGTCACGGGTATGTCGCGTCGACTCGTGGTCGGGGCCGTCGGCGCGGCC
CTAGTGTCGGGTCTGGTCGGCGCCGTCGGTGGCACGGCGACCGCGGGGGCATTTTCC
CGGCCGGGCTTGCCGGTGGAGTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGTGAC
ATCAAGGTCCAATTCCAAAGTGGTGGTGCCAACTCGCCCGCCCTGTACCTGCTCGAC
GGCCTGCGCGCGCAGGACGACTTCAGCGGCTGGGACATCAACACCCCGGCGTTCGAG
TGGTACGACCAGTCGGGCCTGTCGGTGGTCATGCCGGTGGGTGGCCAGTCAAGCTTC
TACTCCGACTGGTACCAGCCCGCCTGCGGCAAGGCCGGTTGCCAGACTTACAAGTGG
GAGACCTTCCTGACCAGCGAGCTGCCGGGGTGGCTGCAGGCCAACAGGCACGTCAAG
CCCACCGGAAGCGCCGTCGTCGGTCTTTCGATGGCTGCTTCTTCGGCGCTGACGCTG
GCGATCTATCACCCCCAGCAGTTCGTCTACGCGGGAGCGATGTCGGGCCTGTTGGAC
CCCTCCCAGGCGATGGGTCCCACCCTGATCGGCCTGGCGATGGGTGACGCTGGCGGC
TACAAGGCCTCCGACATGTGGGGCCCGAAGGAGGACCCGGCGTGGCAGCGCAACGA
CCCGCTGTTGAACGTCGGGAAGCTGATCGCCAACAACACCCGCGTCTGGGTGTACTG
CGGCAACGGCAAGCCGTCGGATCTGGGTGGCAACAACCTGCCGGCCAAGTTCCTCGA
GGGCTTCGTGCGGACCAGCAACATCAAGTTCCAAGACGCCTACAACGCCGGTGGCGG
CCACAACGGCGTGTTCGACTTCCCGGACAGCGGTACGCACAGCTGGGAGTACTGGGG
CGCGCAGCTCAACGCTATGAAGCCCGACCTGCAACGGGCACTGGGTGCCACGCCCAA
CACCGGGCCCGCGCCCCAGGGCGCCTAGGCGGCCGCACTCGAGCACCACCACCACCAC
CACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTG
AGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAA
AGGAGGAACTATATCCGGAT

[0238] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbAg85A (M. tb antigen – bold)] (SEQ ID NO:161).

[0239] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MQLVDRVRGAVTGMSRRLVVGAVGAALVSGLVGAVGGTATAGAFSRPGLP**
VEYLQVPSPSMGRDIKVQFQSGGANSPALYLLDGLRAQDDFSGWDINTPAFEWYDQSGLS
VVMPVGGQSSFYSDWYQPACGKAGCQTYKWETFLTSELPGWLQANRHVKPTGSAVVGL
SMAASSALTLAIYHPQQFVYAGAMSGLLDPSQAMGPTLIGLAMGDAGGYKASDMWGPK
EDPAWQRNDPLLNVGKLIANNTRVWVYCGNGKPSDLGGNNLPAKFLEGFVRTSNIKFQD
AYNAGGGHNGVFDFPDSGTHSWEYWGAQLNAMKPDLQRALGATPNTGPAPQGA

[0240] Rv1860: C2342: Ecoli-pET28[6xHis-Cohesin (bold) -m.tbRv1860 (m. tb. Antigen – bold)] (SEQ ID NO:162).

[0241] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT

ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT

GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC*ATGCATCAGGTGGACCCCAACTTG*
*ACACGTCG*CAAGGGACGATTGGCGGCACTGGCTATCGCGGCGATGGCCAGCGCCAGC
CTGGTGACCGTTGCGGTGCCCGCGACCGCCAACGCCGATCCGGAGCCAGCGCCCCCG
GTACCCACAACGGCCGCCTCGCCGCCGTCGACCGCTGCAGCGCCACCCGCACCGGCG
ACACCTGTTGCCCCCCCACCACCGGCCGCCGCCAACACGCCGAATGCCCAGCCGGGC
GATCCCAACGCAGCACCTCCGCCGGCCGACCCGAACGCACCGCCGCCACCTGTCATT
GCCCCAAACGCACCCCAACCTGTCCGGATCGACAACCCGGTTGGAGGATTCAGCTTC
GCGCTGCCTGCTGGCTGGGTGGAGTCTGACGCCGCCCACTTCGACTACGGTTCAGCA
CTCCTCAGCAAAACCACCGGGGACCCGCCATTTCCCGGACAGCCGCCGCCGGTGGCC
AATGACACCCGTATCGTGCTCGGCCGGCTAGACCAAAAGCTTTACGCCAGCGCCGAA
GCCACCGACTCCAAGGCCGCGGCCCGGTTGGGCTCGGACATGGGTGAGTTCTATATG
CCCTACCCGGGCACCCGGATCAACCAGGAAACCGTCTCGCTCGACGCCAACGGGGTG
TCTGGAAGCGCGTCGTATTACGAAGTCAAGTTCAGCGATCCGAGTAAGCCGAACGGC
CAGATCTGGACGGGCGTAATCGGCTCGCCCGCGGCGAACGCACCGGACGCCGGGCC
CCCTCAGCGCTGGTTTGTGGTATGGCTCGGGACCGCCAACAACCCGGTGGACAAGGG
CGCGGCCAAGGCGCTGGCCGAATCGATCCGGCCTTTGGTCGCCCCGCCGCCGGCGCC
GGCACCGGCTCCTGCAGAGCCCGCTCCGGCGCCGGCGCCGGCCGGGGAAGTCGCTC
CTACCCCGACGACACCGACACCGCAGCGGACCTTACCGGCCGAATTCTGAGCGGCCGC
ACTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGC
TGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGG
GTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0242] Protein sequence - C2342: Ecoli-pET28[6xHis-Cohesin (bold) -m.tbRv1860 (m. tb. Antigen – bold)] (SEQ ID NO:163).

[0243] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MHQVDPNLTRRKGRLAALAIAAMASASLVTVAVPATANADPEPAPPVPTTAA**

SPPSTAAAPPAPATPVAPPPPAAANTPNAQPGDPNAAPPPADPNAPPPPVIAPNAPQPVRIDN PVGGFSFALPAGWVESDAAHFDYGSALLSKTTGDPPFPGQPPPVANDTRIVLGRLDQKLY ASAEATDSKAAARLGSDMGEFYMPYPGTRINQETVSLDANGVSGSASYYEVKFSDPSKPN GQIWTGVIGSPAANAPDAGPPQRWFVVWLGTANNPVDKGAAKALAESIRPLVAPPPAPAP APAEPAPAPAPAGEVAPTPTTPTPQRTLPA

[0244] Rv3812: C1255: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv3812 (M. tb. Antigen – bold)] (SEQ ID NO:164).

[0245] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG

GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGTGTGTCGTTCGTGGTCACAGTGCCG
GAGGCCGTGGCGGCTGCGGCGGGGGATTTGGCGGCCATCGGCTCGACGCTTCGGGAAGCG
ACCGCTGCGGCGGCGGGCCCCACGACCGGGCTGGCGGCCGCGGCCGCCGACGACGTGTCG
ATCGCTGTCTCGCAGCTGTTCGGCAGGTACGGCCAGGAATTTCAAACCGTGAGCAACCAAC
TGGCCGCGTTTCATACCGAGTTCGTACGCACGTTGAACCGCGGCGCGGCGGCGTATCTCAA
CACCGAAAGCGCTAACGGCGGGCAGCTGTTCGGTCAGATCGAGGCGGGACAGCGCGCCGT
TTCCGCGGCCGCGGCCGCCGCTCCGGGCGGCGCATACGGCCAACTCGTTGCCAACACGGCC
ACCAACCTGGAATCCCTCTACGGCGCATGGTCGGCCAACCCGTTCCCATTCCTCCGCCAGA
TCATCGCCAACCAGCAGGTTTACTGGCAGCAGATCGCCGCGGCGCTCGCCAACGCCGTCCA
GAACTTCCCCGCCCTGGTGGCGAATTTGCCAGCGGCCATCGACGCGGCCGTCCAGCAATTC

CTGGCCTTCAACGCGGCGTACTACATCCAACAGATTATTAGCTCGCAGATCGGCTTCGCCC
AGCTATTCGCCACGACGGTCGGTCAGGGGGTCACCAGCGTCATTGCCGGGTGGCCCAACCT
TGCGGCGGAGCTTCAGCTAGCGTTTCAACAGCTTCTGGTGGGTGACTACAACGCCGCGGTG
GCGAACCTGGGTAAGGCCATGACAAACCTTCTGGTCACCGGGTTCGACACCAGCGACGTGA
CGATCGGCACAATGGGCACCACCATTAGTGTCACCGCGAAACCCAAGCTGCTGGGCCCGCT
GGGAGATCTGTTCACCATCATGACCATCCCGGCACAAGAGGCGCAGTACTTCACCAACCTG
ATGCCCCCCTCCATCCTGCGAGACATGTCGCAGAACTTCACCAACGTGCTCACGACGCT
CTCCAACCCGAACATCCAGGCGGTCGCTTCGTTCGATATCGCAACCACCGCCGGGAC
TTTGAGCACCTTCTTCGGGGTGCCATTGGTGCTCACTTACGCCACATTGGGTGCGCCG
TTCGCGTCACTGAACGCGATTGCGACGAGCGCGGAAACCATCGAGCAGGCCCTGTTG
GCCGGCAACTACCTAGGGGCGGTGGGTGCGCTTATCGACGCCCCGGCCCACGCGTTA
GACGGCTTCCTCAACAGCGCAACCGTGTTGGATACGCCGATCCTGGTGCCCACGGGG
CTCCCGTCCCCTCTGCCCCCGACGGTCGGGATCACGCTGCACTTGCCTTTCGACGGG
ATTCTCGTGCCGCCGCATCCCGTCACCGCGACGATCAGCTTCCCGGGTGCTCCGGTT
CCTATTCCCGGTTTCCCAACCACCGTAACCGTTTTCGGCACACCCTTCATGGGAATGG
CTCCGCTGCTGATCAACTACATTCCCCAACAGCTCGCCCTGGCAATCAAACCGGCGGC
TTAGCTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGA
AGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAA
CGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0246] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv3812 (M. tb. Antigen – bold)] (SEQ ID NO:165).

[0247] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAA**SVSFVVTVPEAVAAAAGDLAAIGSTLREATAAAAGPTTGLAAAAAADDVSIAVSQ**
LFGRYGQEFQTVSNQLAAFHTEFVRTLNRGAAAYLNTESANGGQLFGQIEAGQRAVSAA
AAAAPGGAYGQLVANTATNLESLYGAWSANPFPFLRQIIANQQVYWQQIAAALANAVQN
FPALVANLPAAIDAAVQQFLAFNAAYYIQQIISSQIGFAQLFATTVGQGVTSVIAGWPNLAA
ELQLAFQQLLVGDYNAAVANLGKAMTNLLVTGFDTSDVTIGTMGTTISVTAKPKLLGPL
GDLFTIMTIPAQEAQYFTNLMPPSILRDMSQNFTNVLTTLSNPNIQAVASFDIATTAGTLST
FFGVPLVLTYATLGAPFASLNAIATSAETIEQALLAGNYLGAVGALIDAPAHALDGFLNSA
TVLDTPILVPTGLPSPLPPTVGITLHLPFDGILVPPHPVTATISFPGAPVPIPGFPTTVTVFGT
PFMGMAPLLINYIPQQLALAIKPAA

[0248] Rv3878: C2343: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv3878 (M. tb. Antigen – bold)] (SEQ ID NO:166).

[0249] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC

AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT

CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC**ATGGCTGAACCGTTGGCCGTCG**
ATCCCACCGGCTTGAGCGCAGCGGCCGCGAAATTGGCCGGCCTCGTTTTTCCGCAGC
CTCCGGCGCCGATCGCGGTCAGCGGAACGGATTCGGTGGTAGCAGCAATCAACGAGA
CCATGCCAAGCATCGAATCGCTGGTCAGTGACGGGCTGCCCGGCGTGAAAGCCGCCC
TGACTCGAACAGCATCCAACATGAACGCGGCGGCGGACGTCTATGCGAAGACCGATC
AGTCACTGGGAACCAGTTTGAGCCAGTATGCATTCGGCTCGTCGGGCGAAGGCCTGG
CTGGCGTCGCCTCGGTCGGTGGTCAGCCAAGTCAGGCTACCCAGCTGCTGAGCACAC
CCGTGTCACAGGTCACGACCCAGCTCGGCGAGACGGCCGCTGAGCTGGCACCCCGTG
TTGTTGCGACGGTGCCGCAACTCGTTCAGCTGGCTCCGCACGCCGTTCAGATGTCGC
AAAACGCATCCCCCATCGCTCAGACGATCAGTCAAACCGCCCAACAGGCCGCCCAGA
GCGCGCAGGGCGGCAGCGGCCCAATGCCCGCACAGCTTGCCAGCGCTGAAAAACCG
GCCACCGAGCAAGCGGAGCCGGTCCACGAAGTGACAAACGACGATCAGGGCGACCA
GGGCGACGTGCAGCCGGCCGAGGTCGTTGCCGCGGCACGTGACGAAGGCGCCGGCG
CATCACCGGGCCAGCAGCCCGGCGGGGGCGTTCCCGCGCAAGCCATGGATACCGGA
GCCGGTGCCCGCCCAGCGGCGAGTCCGCTGGCGGCCCCCGTCGATCCGTCGACTCCG
GCACCCTCAACAACCACAACGTTGGAATTCTAAAAGCTTGCGGCCGCACTCGAGCACCA
CCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCT
GCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTT
TTTTGCTGAAAGGAGGAACTATATCCGGAT

[0250] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv3878 (M. tb. Antigen – bold)] (SEQ ID NO:167).

[0251] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MAEPLAVDPTGLSAAAAKLAGLVFPQPPAPIAVSGTDSVVAAINETMPSIESLV**
SDGLPGVKAALTRTASNMNAAADVYAKTDQSLGTSLSQYAFGSSGEGLAGVASVGGQPS
QATQLLSTPVSQVTTQLGETAAELAPRVVATVPQLVQLAPHAVQMSQNASPIAQTISQTA
QQAAQSAQGGSGPMPAQLASAEKPATEQAEPVHEVTNDDQGDQGDVQPAEVVAAARDE
GAGASPGQQPGGGVPAQAMDTGAGARPAASPLAAPVDPSTPAPSTTTTLEF

[0252] Rv1837: C2341: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv1837 (M. tb. antigen – bold)] (SEQ ID NO:168.)

[0253] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG

GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT

GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGACAGATCGCGTGTCGGTGG
GCAACTTGCGCATCGCTCGGGTGCTCTACGACTTCGTGAACAATGAAGCCCTGCCTG
GCACCGATATCGACCCGGACAGCTTCTGGGCGGGCGTCGACAAGGTCGTCGCCGACC
TGACCCCGCAGAACCAAGCTCTGTTGAACGCCCGCGACGAGCTGCAGGCGCAGATCG
ACAAGTGGCACCGGCGTCGGGTGATCGAGCCCATCGACATGGATGCCTACCGCCAGT
TCCTCACCGAGATCGGCTACCTGCTTCCCGAACCTGATGACTTCACCATCACCACGTC
CGGTGTCGACGCTGAGATCACCACGACCGCCGGCCCCCAGCTGGTGGTGCCGGTGCT
CAACGCGCGGTTTGCTCTGAACGCGGCCAACGCTCGCTGGGGCTCCCTCTACGACGC
CTTGTATGGCACCGATGTCATCCCCGAGACCGACGGCGCCGAAAAAGGCCCCACGTA
CAACAAGGTTCGTGGCGACAAGGTGATCGCGTATGCCCGCAAGTTCCTCGACGACAG
TGTTCCGCTGTCGTCGGGTTCCTTTGGCGACGCCACCGGTTTCACAGTGCAGGATGG
CCAGCTCGTGGTTGCCTTGCCGGATAAGTCCACCGGCCTGGCCAACCCCGGCCAGTT
CGCCGGCTACACCGGCGCAGCCGAGTCGCCGACATCGGTGCTGCTAATCAATCACGG
TTTGCACATCGAGATCCTGATCGATCCGGAGTCGCAGGTCGGCACCACCGACCGGGC
CGGCGTCAAGGACGTGATCCTGGAATCCGCGATCACCACGATCATGGACTTCGAGGA
CTCGGTGGCCGCCGTGGACGCCGCCGACAAGGTGCTGGGTTATCGGAACTGGCTCGG
CCTGAACAAGGGCGACCTGGCAGCAGCGGTAGACAAGGACGGCACCGCTTTCCTGCG
GGTGCTCAATAGGGACCGGAACTACACCGCACCCGGCGGTGGCCAGTTCACGCTGCC
TGGACGCAGCCTCATGTTCGTCCGCAACGTCGGTCACTTGATGACGAATGACGCCAT
CGTCGACACTGACGGCAGCGAGGTGTTCGAAGGCATCATGGATGCCCTATTCACCGG
CCTGATCGCCATCCACGGGCTAAAGGCCAGCGACGTCAACGGGCCGCTGATCAACAG

CCGCACCGGCTCCATCTACATCGTCAAGCCGAAGATGCACGGTCCGGCCGAGGTGGC
GTTTACCTGCGAACTGTTCAGCCGGGTTGAAGATGTGCTGGGGTTGCCGCAAAACAC
CATGAAGATCGGCATCATGGACGAGGAACGCCGGACCACGGTCAACCTCAAGGCGTG
CATCAAAGCTGCCGCGGACCGCGTGGTGTTCATCAACACCGGGTTCCTGGACCGCAC
CGGCGATGAAATCCACACCTCGATGGAGGCCGGCCCGATGGTGCGCAAGGGCACCAT
GAAGAGCCAGCCGTGGATCTTGGCCTACGAGGACCACAACGTCGATGCCGGCCTGGC
CGCCGGGTTCAGCGGCCGAGCCCAGGTCGGCAAGGGCATGTGGACAATGACCGAGC
TGATGGCCGACATGGTCGAGACAAAAATCGCCCAGCCGCGCGCCGGGGCCAGCACCG
CCTGGGTTCCCTCTCCCACTGCGGCCACCCTGCATGCGCTGCACTACCACCAGGTCG
ACGTCGCCGCGGTGCAACAAGGACTGGCGGGGAAGCGTCGCGCCACCATCGAACAAT
TGCTGACCATTCCGCTGGCCAAGGAATTGGCCTGGGCTCCCGACGAGATCCGCGAAG
AGGTCGACAACAACTGTCAATCCATCCTCGGCTACGTGGTTCGCTGGGTTGATCAAG
GTGTCGGCTGCTCGAAGGTGCCCGACATCCACGACGTCGCGCTCATGGAGGACCGGG
CCACGCTGCGAATCTCCAGCCAATTGTTGGCCAACTGGCTGCGCCACGGTGTGATCA
CCAGCGCGGATGTGCGGGCCAGCTTGGAGCGGATGGCGCCGTTGGTCGATCGACAAA
ACGCGGGCGACGTGGCATACCGACCGATGGCACCCAACTTCGACGACAGTATCGCCT
TCCTGGCCGCGCAGGAGCTGATCTTGTCCGGGGCCCAGCAGCCCAACGGCTACACCG
AGCCGATCCTGCACCGACGTCGTCGGGAGTTTAAGGCCCGGGCCGCTGAGAAGCCGG
CCCCATCGGACAGGGCCGGTGACGATGCGGCCCGCGAATTCTAGGCGGCCGCACTCGA
GCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTT
GGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTG
AGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0254] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv1837 (M. tb. antigen – bold)] (SEQ ID NO:169)

[0255] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MTDRVSVGNLRIARVLYDFVNNEALPGTDIDPDSFWAGVDKVVADLTPQNQA
LLNARDELQAQIDKWHRRRVIEPIDMDAYRQFLTEIGYLLPEPDDFTITTSGVDAEITTTA
GPQLVVPVLNARFALNAANARWGSLYDALYGTDVIPETDGAEKGPTYNKVRGDKVIAYA
RKFLDDSVPLSSGSFGDATGFTVQDGQLVVALPDKSTGLANPGQFAGYTGAAESPTSVLLI
NHGLHIEILIDPESQVGTTDRAGVKDVILESAITTIMDFEDSVAAVDAADKVLGYRNWLGL
NKGDLAAAVDKDGTAFLRVLNRDRNYTAPGGGQFTLPGRSLMFVRNVGHLMTNDAIVD
TDGSEVFEGIMDALFTGLIAIHGLKASDVNGPLINSRTGSIYIVKPKMHGPAEVAFTCELFS
RVEDVLGLPQNTMKIGIMDEERRTTVNLKACIKAAADRVVFINTGFLDRTGDEIHTSMEA
GPMVRKGTMKSQPWILAYEDHNVDAGLAAGFSGRAQVGKGMWTMTELMADMVETKIA
QPRAGASTAWVPSPTAATLHALHYHQVDVAAVQQGLAGKRRATIEQLLTIPLAKELAWA
PDEIREEVDNNCQSILGYVVRWVDQGVGCSKVPDIHDVALMEDRATLRISSQLLANWLRH
GVITSADVRASLERMAPLVDRQNAGDVAYRPMAPNFDDSIAFLAAQELILSGAQQPNGYT
EPILHRRRREFKARAAEKPAPSDRAGDDAAR**

[0256] Rv3803: C2357: Ecoli-pET28 [6xHis-CthermoCohesin (underlined) -m.tbRv3803 (M. tb. antigen – bold)] (SEQ ID NO:170).

[0257] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG

TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG

GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCGCGGAACCCACCGCCAAGGCCGC
CCCATACGAGAACCTGATGGTGCCGTCGCCCTCGATGGGCCGGGACATCCCGGTGGCCTTC
CTAGCCGGTGGGCCGCACGCGGTGTATCTGCTGGACGCCTTCAACGCCGGCCCGGATGTCA
GTAACTGGGTCACCGCGGGTAACGCGATGAACACGTTGGCGGGCAAGGGGATTTCGGTGG
TGGCACCGGCCGGTGGTGCGTACAGCATGTACACCAACTGGGAGCAGGATGGCAGCAAGC
AGTGGGACACCTTCTTGTCCGCTGAGCTGCCCGACTGGCTGGCCGCTAACCGGGGCTTGGC
CCCCGGTGGCCATGCGGCCGTTGGCGCCGCTCAGGGCGGTTACGGGGCGATGGCGCTGGCG
GCCTTCCACCCCGACCGCTTCGGCTTCGCTGGCTCGATGTCGGGCTTTTTGTACCCGTCGAA
CACCACCACCAACGGTGCGATCGCGGCGGGCATGCAGCAATTCGGCGGTGTGGACACCAA
CGGAATGTGGGGAGCACCACAGCTGGGTCGGTGGAAGTGGCACGACCCGTGGGTGCATGC
CAGCCTGCTGGCGCAAAACAACACCCGGGTGTGGGTGTGGAGCCCGACCAACCCGGGAGC
CAGCGATCCCGCCGCCATGATCGGCCAAGCCGCCGAGGCGATGGGTAACAGCCGCATGTTC
TACAACCAGTATCGCAGCGTCGGCGGGCACAACGGACACTTCGACTTCCCAGCCAGCGGTG
ACAACGGCTGGGGCTCGTGGGCGCCCCAGCTGGGCGCTATGTCGGGCGATATCGTCGGTGC
GATCCGCGAATTCTAAGCGGCCGCACTCGAGCACCACCACCACCACCACTGAGATCCGGCT
GCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCA
TAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATAT
CCGGAT

[0258] Protein sequence - Ecoli-pET28 [6xHis-CthermoCohesin (underlined) -m.tbRv3803 (M. tb. antigen – bold)] (SEQ ID NO:171).

[0259] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**AEPTAKAAPYENLMVPSPSMGRDIPVAFLAGGPHAVYLLDAFNAGPDVSNWV
TAGNAMNTLAGKGISVVAPAGGAYSMYTNWEQDGSKQWDTFLSAELPDWLAANAIAAG
MQQFGGVDTNGMWGAPQLGRWKWHDPWVHASLLAQNNTRVWVWSPTNPGASDPAA
MIGQAAEAMGNSRMFYNQYRSVGGHNGHFDFPASGDNGWGSWAPQLGAMSGDIVGAIR
EF**

[0260] HspX: C1253: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbHspX (M. tb. antigen – bold)] (SEQ ID NO:172).

[0261] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT

GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGGCCACCACCCTTCCCGTTCAG
CGCCACCCGCGGTCCCTCTTCCCCGAGTTTTCTGAGCTGTTCGCGGCCTTCCCGTCATTCGC
CGGACTCCGGCCCACCTTCGACACCCGGTTGATGCGGCTGGAAGACGAGATGAAAGAGGG
GCGCTACGAGGTACGCGCGGAGCTTCCCGGGGTCGACCCCGACAAGGACGTCGACATTAT
GGTCCGCGATGGTCAGCTGACCATCAAGGCCGAGCGCACCGAGCAGAAGGACTTCGACGG
TCGCTCGGAATTCGCGTACGGTTCCTTCGTTCGCACGGTGTCGCTGCCGGTAGGTGCTGACG
AGGACGACATTAAGGCCACCTACGACAAGGGCATTCTTACTGTGTCGGTGGCGGTTTCGGA
AGGGAAGCCAACCGAAAAGCACATTCAGATCCGGTCCACCAACTGAGCGGCCGCACTCGA
GCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTT
GGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTG
AGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0262] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbHspX (M. tb. antigen – bold)] (SEQ ID NO:173).

[0263] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MATTLPVQRHPRSLFPEFSELFAAFPSFAGLRPTFDTRLMRLEDEMKEGRYE**
VRAELPGVDPDKDVDIMVRDGQLTIKAERTEQKDFDGRSEFAYGSFVRTVSLPVGADEDD
IKATYDKGILTVSVAVSEGKPTEKHIQIRSTN

[0264] Rv2875: C1310: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv2875 (M. tb. antigen – bold)] (SEQ ID NO:174).

[0265] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA

CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGAAGGTAAAGAACACAATTGC
GGCAACCAGTTTCGCGGCGGCCGGCCTGGCGGCTCTGGCGGTGGCTGTCTCACCGCCGGCG
GCCGCAGGCGATCTGGTGGGCCCGGGCTGCGCGGAATACGCGGCAGCCAATCCCACTGGG
CCGGCCTCGGTGCAGGGAATGTCGCAGGACCCGGTCGCGGTGGCGGCCTCGAACAATCCG
GAGTTGACAACGCTGACGGCTGCACTGTCGGGCCAGCTCAATCCGCAAGTAAACCTGGTGG
ACACCCTCAACAGCGGTCAGTACACGGTGTTCGCACCGACCAACGCGGCATTTAGCAAGCT
GCCGGCATCCACGATCGACGAGCTCAAGACCAATTCGTCACTGCTGACCAGCATCCTGACC
TACCACGTAGTGGCCGGCCAAACCAGCCCGGCCAACGTCGTCGGCACCCGTCAGACCCTCC
AGGGCGCCAGCGTGACGGTGACCGGTCAGGGTAACAGCCTCAAGGTCGGTAACGCCGACG

TCGTCTGTGGTGGGGTGTCTACCGCCAACGCGACGGTGTACATGATTGACAGCGTGCTAAT
GCCTCCGGCGTAAAAGCTTGCGGCCGCACTCGAGCACCACCACCACCACCACTGAGATCCG
GCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTA
GCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTA
TATCCGGAT

[0266] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv2875 (M. tb. antigen – bold)]. (SEQ ID NO:175).

[0267] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MKVKNTIAATSFAAAGLAALAVAVSPPAAAGDLVGPGCAEYAAANPTGPASV
QGMSQDPVAVAASNNPELTTLTAALSGQLNPQVNLVDTLNSGQYTVFAPTNAAFSKLPAS
TIDELKTNSSLLTSILTYHVVAGQTSPANVVGTRQTLQGASVTVTGQGNSLKVGNADVVC
GGVSTANATVYMIDSVLMPPA**

[0268] Rv0125: C1334: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv0125 (M. tb. antigen – bold)] (SEQ ID NO:176).

[0269] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG

AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
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TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA

GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGAGCAATTCGCGCCGCCGCTC
ACTCAGGTGGTCATGGTTGCTGAGCGTGCTGGCTGCCGTCGGGCTGGGCCTGGCCACGGCG
CCGGCCCAGGCGGCCCCGCCGGCCTTGTCGCAGGACCGGTTCGCCGACTTCCCCGCGCTGC
CCCTCGACCCGTCCGCGATGGTCGCCCAAGTGGGGCCACAGGTGGTCAACATCAACACCAA
ACTGGGCTACAACAACGCCGTGGGCGCCGGGACCGGCATCGTCATCGATCCCAACGGTGTC
GTGCTGACCAACAACCACGTGATCGCGGGCGCCACCGACATCAATGCGTTCAGCGTCGGCT
CCGGCCAAACCTACGGCGTCGATGTGGTCGGGTATGACCGCACCCAGGATGTCGCGGTGCT
GCAGCTGCGCGGTGCCGGTGGCCTGCCGTCGGCGGCGATCGGTGGCGGCGTCGCGGTTGGT
GAGCCCGTCGTCGCGATGGGCAACAGCGGTGGGCAGGGCGGAACGCCCCGTGCGGTGCCT
GGCAGGGTGGTCGCGCTCGGCCAAACCGTGCAGGCGTCGGATTCGCTGACCGGTGCCGAA
GAGACATTGAACGGGTTGATCCAGTTCGATGCCGCGATCCAGCCCGGTGATTCGGGCGGGC
CCGTCGTCAACGGCCTAGGACAGGTGGTCGGTATGAACACGGCCGCGTCCGATAACTTCCA
GCTGTCCCAGGGTGGGCAGGGATTCGCCATTCCGATCGGGCAGGCGATGGCGATCGCGGG
CCAGATCCGATCGGGTGGGGGGTCACCCACCGTTCATATCGGGCCTACCGCCTTCCTCGGC
TTGGGTGTTGTCGACAACAACGGCAACGGCGCACGAGTCCAACGCGTGGTCGGGAGCGCT
CCGGCGGCAAGTCTCGGCATCTCCACCGGCGACGTGATCACCGCGGTCGACGGCGCTCCGA
TCAACTCGGCCACCGCGATGGCGGACGCGCTTAACGGGCATCATCCCGGTGACGTCATCTC
GGTGACCTGGCAAACCAAGTCGGGCGGCACGCGTACAGGGAACGTGACATTGGCCGAGGG
ACCCCCGGCCTGAGCGGCCGCACTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCT
AACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAA
CCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCG
GAT

[0270] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv0125 (M. tb. antigen – bold)] (SEQ ID NO:177).

[0271] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MSNSRRRSLRWSWLLSVLAAVGLGLATAPAQAAPPALSQDRFADFPALPLDP
SAMVAQVGPQVVNINTKLGYNNAVGAGTGIVIDPNGVVLTNNHVIAGATDINAFSVGSGQ
TYGVDVVGYDRTQDVAVLQLRGAGGLPSAAIGGGVAVGEPVVAMGNSGGQGGTPRAVP
GRVVALGQTVQASDSLTGAEETLNGLIQFDAAIQPGDSGGPVVNGLGQVVGMNTAASDN
FQLSQGGQGFAIPIGQAMAIAGQIRSGGGSPTVHIGPTAFLGLGVVDNNGNGARVQRVVG
SAPAASLGISTGDVITAVDGAPINSATAMADALNGHHPGDVISVTWQTKSGGTRTGNVTLA
EGPPA**

[0272] Rv0570: C1500: Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv0570 (M. tb. antigen – bold)] (SEQ ID NO:178).

[0273] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC

CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG

ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCGTGGGTGTCAGCTGGCCGGCGAA
AGTCCGGCGCCGGGATGGAACGCTGGTGCCGTTCGACATCGCGCGGATCGAAGCAGCGGT
GACGCGGGCAGCGCGCGAGGTGGCTTGCGACGACCCCGATATGCCGGGCACCGTAGCGAA
AGCCGTCGCCGACGCACTCGGGCGCGGTATCGCTCCCGTTGAGGACATTCAGGACTGCGTG
GAGGCCCGGCTGGGGGAAGCCGGTCTGGATGACGTGGCCCGTGTTTACATCATCTACCGGC
AGCGGCGCGCCGAGCTGCGGACGGCTAAGGCCTTGCTCGGCGTGCGGGACGAGTTAAAGC
TGAGCTTGGCGGCCGTGACGGTACTGCGCGAGCGCTATCTGCTGCACGACGAGCAGGGCCG
GCCGGCCGAGTCGACCGGCGAGCTGATGGACCGATCGGCGCGCTGTGTCGCGGCGGCCGA
GGACCAGTATGAGCCGGGCTCGTCGAGGCGGTGGGCCGAGCGGTTCGCCACGCTATTACGC
AACCTGGAATTCCTGCCGAATTCGCCCACGTTGATGAACTCTGGCACCGACCTGGGACTGC
TCGCCGGCTGTTTTGTTCTGCCGATTGAGGATTCGCTGCAATCGATCTTTGCGACGCTGGGA
CAGGCCGCCGAGCTGCAGCGGGCTGGAGGCGGCACCGGATATGCGTTCAGCCACCTGCGA
CCCGCCGGGGATCGGGTGGCCTCCACGGGCGGCACGGCCAGCGGACCGGTGTCGTTTCTAC
GGCTGTATGACAGTGCCGCGGGTGTGGTCTCCATGGGCGGTCGCCGGCGTGGCGCCTGTAT
GGCTGTGCTTGATGTGTCGCACCCGGATATCTGTGATTTCGTCACCGCCAAGGCCGAATCCC
CCAGCGAGCTCCCGCATTTCAACCTATCGGTTGGTGTGACCGACGCGTTCCTGCGGGCCGT
CGAACGCAACGGCCTACACCGGCTGGTCAATCCGCGAACCGGCAAGATCGTCGCGCGGAT
GCCCGCCGCCGAGCTGTTCGACGCCATCTGCAAAGCCGCGCACGCCGGTGGCGATCCCGGG
CTGGTGTTTCTCGACACGATCAATAGGGCAAACCCGGTGCCGGGGAGAGGCCGCATCGAG
GCGACCAACCCGTGCGGGGAGGTCCCACTGCTGCCTTACGAGTCATGTAATCTCGGCTCGA
TCAACCTCGCCCGGATGCTCGCCGACGGTCGCGTCGACTGGGACCGGCTCGAGGAGGTCGC
CGGTGTGGCGGTGCGGTTCCTTGATGACGTCATCGATGTCAGCCGCTACCCCTTCCCCGAAC
TGGGTGAGGCGGCCCGCGCCACCCGCAAGATCGGGCTGGGAGTCATGGGTTTGGCGGAAC
TGCTTGCCGCACTGGGTATTCCGTACGACAGTGAAGAAGCCGTGCGGTTAGCCACCCGGCT
CATGCGTCGCATACAGCAGGCGGCGCACACGGCATCGCGGAGGCTGGCCGAAGAGCGGGG
CGCATTCCCGGCGTTCACCGATAGCCGGTTCGCGCGGTCGGGCCCGAGGCGCAACGCACAG
GTCACCTCCGTCGCTCCGACGGGCACCATCTCACTGATCGCCGGAACCACCGCGGGCATCG
AGCCGATGTTCGCTATCGCGTTCACCCGCGCCATCGTCGGCCGGCATCTGCTGGAGGTCAA
TCCGTGCTTCGACCGACTGGCCCGCGATCGGGGCTTTTATCGTGACGAGCTGATCGCCGAG
ATCGCTCAGCGTGGCGGAGTCCGTGGCTATCCGCGGCTGCCTGCTGAGGTGCGGGCCGCGT
TCCCGACCGCGGCGGAGATCGCGCCGCAGTGGCATCTGCGCATGCAGGCCGCGGTGCAGC
GCCACGTCGAGGCCGCCGTGTCCAAGACGGTCAACTTGCCCGCCACGGCGACGGTCGATGA

CGTCCGCGCCATCTATGTGGCCGCCTGGAAGGCAAAGGTCAAGGGCATCACGGTGTATCGC
TACGGCAGCCGGGAAGGACAGGTACTGTCCTACGCCGCGCCGAAACCGCTACTGGCGCAG
GCTGACACGGAGTTCAGCGGCGGCTGTGCGGGCCGCTCCTGCGAGTTCTGAGCGGCCGCAC
TCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTG
AGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGT
CTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0274] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbRv0570 (M. tb. antigen – bold)] (SEQ ID NO:179).

[0275] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**VGVSWPAKVRRRDGTLVPFDIARIEAAVTRAAREVACDDPDMPGTVAKAVA**
DALGRGIAPVEDIQDCVEARLGEAGLDDVARVYIIYRQRRAELRTAKALLGVRDELKLSL
AAVTVLRERYLLHDEQGRPAESTGELMDRSARCVAAAEDQYEPGSSRRWAERFATLLRN
LEFLPNSPTLMNSGTDLGLLAGCFVLPIEDSLQSIFATLGQAAELQRAGGGTGYAFSHLRP
AGDRVASTGGTASGPVSFLRLYDSAAGVVSMGGRRRGACMAVLDVSHPDICDFVTAKAE
SPSELPHFNLSVGVTDAFLRAVERNGLHRLVNPRTGKIVARMPAAELFDAICKAAHAGGD
PGLVFLDTINRANPVPGRGRIEATNPCGEVPLLPYESCNLGSINLARMLADGRVDWDRLEE
VAGVAVRFLDDVIDVSRYPFPELGEAARATRKIGLGVMGLAELLAALGIPYDSEEAVRLAT
RLMRRIQQAAHTASRRLAEERGAFPAFTDSRFARSGPRRNAQVTSVAPTGTISLIAGTTAG
IEPMFAIAFTRAIVGRHLLEVNPCFDRLARDRGFYRDELIAEIAQRGGVRGYPRLPAEVRA
AFPTAAEIAPQWHLRMQAAVQRHVEAAVSKTVNLPATATVDDVRAIYVAAWKAKVKGIT
VYRYGSREGQVLSYAAPKPLLAQADTEFSGGCAGRSCEF

[0276] Rv1980: C2197: Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv1980 (M. tb. antigen – bold)] (SEQ ID NO:180).

[0277] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT

CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT

GGGCAGCAGCCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCGCCGCGCCCAAGACCTACTGCGA
GGAGTTGAAAGGCACCGATACCGGCCAGGCGTGCCAGATTCAAATGTCCGACCCGGCCTA
CAACATCAACATCAGCCTGCCCAGTTACTACCCCGACCAGAAGTCGCTGGAAAATTACATC
GCCCAGACGCGCGACAAGTTCCTCAGCGCGGCCACATCGTCCACTCCACGCGAAGCCCCCT
ACGAATTGAATATCACCTCGGCCACATACCAGTCCGCGATACCGCCGCGTGGTACGCAGGC
CGTGGTGCTCAAGGTCTACCAGAACGCCGGCGGCACGCACCCAACGACCACGTACAAGGC
CTTCGATTGGGACCAGGCCTATCGCAAGCCAATCACCTATGACACGCTGTGGCAGGCTGAC
ACCGATCCGCTGCCAGTCGTCTTCCCCATTGTGCAAGGTGAACTGAGCAAGCAGACCGGAC
AACAGGTATCGATAGCGCCGAATGCCGGCTTGGACCCGGTGAATTATCAGAACTTCGCAGT
CACGAACGACGGGGTGATTTTCTTCTTCAACCCGGGGGAGTTGCTGCCCGAAGCAGCCGGC
CCAACCCAGGTATTGGTCCCACGTTCCGCGATCGACTCGATGCTGGCCGAATTCTAGGCGG
CCGCACTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGG
AAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAA
ACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0278] Protein sequence - Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv1980 (M. tb. antigen – bold)] (SEQ ID NO:181).

[0279] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**AAPKTYCEELKGTDTGQACQIQMSDPAYNINISLPSYYPDQKSLENYIAQTRD
KFLSAATSSTPREAPYELNITSATYQSAIPPRGTQAVVLKVYQNAGGTHPTTTYKAFDWDQ
AYRKPITYDTLWQADTDPLPVVFPIVQGELSKQTGQQVSIAPNAGLDPVNYQNFAVTNDG
VIFFFNPGELLPEAAGPTQVLVPRSAIDSMLAEF**

[0280] Rv0475: C2199: Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv0475 (M. tb. antigen – bold)] (SEQ ID NO:182).

[0281] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT

CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT

TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCTGCAGCTGTATGGCTGAAAACTC
GAACATTGATGACATCAAGGCTCCGTTGCTTGCCGCGCTTGGAGCGGCCGACCTGGCCTTG
GCCACTGTCAACGAGTTGATCACGAACCTGCGTGAGCGTGCGGAGGAGACTCGTACGGAC
ACCCGCAGCCGGGTCGAGGAGAGCCGTGCTCGCCTGACCAAGCTGCAGGAAGATCTGCCC
GAGCAGCTCACCGAGCTGCGTGAGAAGTTCACCGCCGAGGAGCTGCGTAAGGCCGCCGAG
GGCTACCTCGAGGCCGCGACTAGCCGGTACAACGAGCTGGTCGAGCGCGGTGAGGCCGCT
CTAGAGCGGCTGCGCAGCCAGCAGAGCTTCGAGGAAGTGTCGGCGCGCGCCGAAGGCTAC
GTGGACCAGGCGGTGGAGTTGACCCAGGAGGCGTTGGGTACGGTCGCATCGCAGACCCGC
GCGGTCGGTGAGCGTGCCGCCAAGCTGGTCGGCATCGAGCTGCCTAAGAAGGCTGCTCCGG
CCAAGAAGGCCGCTCCGGCCAAGAAGGCCGCTCCGGCCAAGAAGGCGGCGGCCAAGAAG
GCGCCCGCGAAGAAGGCGGCGGCCAAGAAGGTCACCCAGAAGTGCAGCTGTTAGGCGGCC
GCACTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAA
GCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAAC
GGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0282] Protein sequence - Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv0475 (M. tb. antigen – bold)] (SEQ ID NO:183).

[0283] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**CSCMAENSNIDDIKAPLLAALGAADLALATVNELITNLRERAEETRTDTRSRV
EESRARLTKLQEDLPEQLTELREKFTAEELRKAAEGYLEAATSRYNELVERGEAALERLR
SQQSFEEVSARAEGYVDQAVELTQEALGTVASQTRAVGERAAKLVGIELPKKAAPAKKA
APAKKAAPAKKAAAKKAPAKKAAAKKVTQKCSC**

[0284] Rv0288: C2202: Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv0288 (M. tb. antigen – bold)] (SEQ ID NO:184).

[0285] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT

ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT

GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGTCGCAAATCATGTACAACTAC
CCCGCGATGTTGGGTCACGCCGGGGATATGGCCGGATATGCCGGCACGCTGCAGAGCTTGG
GTGCCGAGATCGCCGTGGAGCAGGCCGCGTTGCAGAGTGCGTGGCAGGGCGATACCGGGA
TCACGTATCAGGCGTGGCAGGCACAGTGGAACCAGGCCATGGAAGATTTGGTGCGGGCCT
ATCATGCGATGTCCAGCACCCATGAAGCCAACACCATGGCGATGATGGCCCGCGACACGG
CCGAAGCCGCCAAATGGGGCGGCTAGGCGGCCGCACTCGAGCACCACCACCACCACCACT
GAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGC
AATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGG
AGGAACTATATCCGGAT

[0286] Protein sequence- Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv0288 (M. tb. antigen – bold)] (SEQ ID NO:185).

[0287] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**MSQIMYNYPAMLGHAGDMAGYAGTLQSLGAEIAVEQAALQSAWQGDTGIT
YQAWQAQWNQAMEDLVRAYHAMSSTHEANTMAMMARDTAEAAKWGG**

[0288] Ag85BΔ41: C2200: Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbAg85BDel41 (M. tb. antigen)] (SEQ ID NO:186).

[0289] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT

GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT

CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCTCCCGGCCGGGGCTGCCGGTCGA
GTACCTGCAGGTGCCGTCGCCGTCGATGGGCCGCGACATCAAGGTTCAGTTCCAGAGCGGT
GGGAACAACTCACCTGCGGTTTATCTGCTCGACGGCCTGCGCGCCCAAGACGACTACAACG
GCTGGGATATCAACACCCCGGCGTTCGAGTGGTACTACCAGTCGGGACTGTCGATAGTCAT
GCCGGTCGGCGGGCAGTCCAGCTTCTACAGCGACTGGTACAGCCCGGCCTGCGGTAAGGCT
GGCTGCCAGACTTACAAGTGGGAAACCTTCCTGACCAGCGAGCTGCCGCAATGGTTGTCCG
CCAACAGGGCCGTGAAGCCCACCGGCAGCGCTGCAATCGGCTTGTCGATGGCCGGCTCGTC
GGCAATGATCTTGGCCGCCTACCACCCCCAGCAGTTCATCTACGCCGGCTCGCTGTCGGCC
CTGCTGGACCCCTCTCAGGGGATGGGGCCTAGCCTGATCGGCCTCGCGATGGGTGACGCCG
GCGGTTACAAGGCCGCAGACATGTGGGGTCCCTCGAGTGACCCGGCATGGGAGCGCAACG
ACCCTACGCAGCAGATCCCCAAGCTGGTCGCAAACAACACCCGGCTATGGGTTTATTGCGG
GAACGGCACCCCGAACGAGTTGGGCGGTGCCAACATACCCGCCGAGTTCTTGGAGAACTTC
GTTCGTAGCAGCAACCTGAAGTTCCAGGATGCGTACAACGCCGCGGGCGGGCACAACGCC
GTGTTCAACTTCCCGCCCAACGGCACGCACAGCTGGGAGTACTGGGGCGCTCAGCTCAACG
CCATGAAGGGTGACCTGCAGAGTTCGTTAGGCGCCGGCTGAGCGGCCGCACTCGAGCACC
ACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTG
CTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGG
TTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0290] Protein sequence - Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbAg85BDel41 (M. tb. antigen – bold)] (SEQ ID NO:187).

[0291] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI
ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV
FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT
TDDLDAAS**SRPGLPVEYLQVPSPSMGRDIKVQFQSGGNNSPAVYLLDGLRAQDDYNGWDI
NTPAFEWYYQSGLSIVMPVGGQSSFYSDWYSPACGKAGCQTYKWETFLTSELPQWLSAN**

RAVKPTGSAAIGLSMAGSSAMILAAYHPQQFIYAGSLSALLDPSQGMGPSLIGLAMGDAG GYKAADMWGPSSDPAWERNDPTQQIPKLVANNTRLWVYCGNGTPNELGGANIPAEFLEN FVRSSNLKFQDAYNAAGGHNAVFNFPPNGTHSWEYWGAQLNAMKGDLQSSLGAG

[0292] CFP10: C1254: Ecoli-pET28 [6xHis-Cohesin (underlined) -m.tbCFP10 (M. tb. antigen)] (SEQ ID NO:188).

[0293] TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTA
CGCGCAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCT
TCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGG
GTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCAC
GTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTT
AATAGTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGA
TTTATAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAAT
TTAACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAAT
GTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAA
TTAATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATT
ATCAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAG
TTCCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATAC
AACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGAC
GACTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGC
CAGCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTG
CGCCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGA
ATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATAT
TCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATC
AGGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGT
CTGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTC
TGGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA

CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC**ATGGCAGAGATGAAGACCGATG**
CCGCTACCCTCGCGCAGGAGGCAGGTAATTTCGAGCGGATCTCCGGCGACCTGAAAA
CCCAGATCGACCAGGTGGAGTCGACGGCAGGTTCGTTGCAGGGCCAGTGGCGCGGC
GCGGCGGGGACGGCCGCCCAGGCCGCGGTGGTGCGCTTCCAAGAAGCAGCCAATAA
GCAGAAGCAGGAACTCGACGAGATCTCGACGAATATTCGTCAGGCCGGCGTCCAATA
CTCGAGGGCCGACGAGGAGCAGCAGCAGGCGCTGTCCTCGCAAATGGGCTTCTGAGC
GGCCGCACTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGA
AAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCT
CTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT

[0294] Protein sequence - Ecoli-pET28[6xHis-Cohesin (underlined) -m.tbCFP10 (M. tb. antigen – bold)] (SEQ ID NO:189).

[0295] MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGI ANCDFVYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGV FATIVAKVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTT TDDLDAAS**MAEMKTDAATLAQEAGNFERISGDLKTQIDQVESTAGSLQGQWRGAAGTAA QAAVVRFQEAANKQKQELDEISTNIRQAGVQYSRADEEQQQALSSQMGF**

[0296] ESAT6 - C1251 Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbESAT6 (bold)];

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
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TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
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CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
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GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
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GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
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AACACCGACAACAACAGATGATCTAGATGCAGCTAGC**ATGACAGAGCAGCAGTGGAATT**
TCGCGGGTATCGAGGCCGCGGCAAGCGCAATCCAGGGAAATGTCACGTCCATTCATT
CCCTCCTTGACGAGGGGAAGCAGTCCCTGACCAAGCTCGCAGCGGCCTGGGGCGGTA
GCGGTTCGGAGGCGTACCAGGGTGTCCAGCAAAAATGGGACGCCACGGCTACCGAGC
TGAACAACGCGCTGCAGAACCTGGCGCGGACGATCAGCGAAGCCGGTCAGGCAATGG
CTTCGACCGAAGGCAACGTCACTGGGATGTTCGCATAGGCGGCCGCACTCGAGCACCA
CCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCT
GCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTT
TTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 190)

[0297] Protein sequence ESAT6 - C1251 Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbESAT6]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AASMTEQQWNFAGIEAAASAIQGNVTSIHSLLDEGKQSLTKLAAAWGGSGSEAYQGVQQ
KWDATATELNNALQNLARTISEAGQAMASTEGNVTGMFA (SEQ ID NO: 191)

[0298] Rv3478 - C1308 Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbRv3478 (bold)];

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
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GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
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TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
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GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
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GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
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CCGCCGCGAAGATGTGGGACAGCGTGGCGAGTGACCTGTTTTCGGCCGCGTCGGCGT
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GCCCAGCTGACCGCCGCCCAGGTCCGGGTTGCTGCGGCGGCCTACGAGACAGCGTAT
AGGCTGACGGTGCCCCCGCCGGTGATCGCCGAGAACCGTACCGAACTGATGACGCTG

ACCGCGACCAACCTCTTGGGGCAAAACACGCCGGCGATCGAGGCCAATCAGGCCGCA
TACAGCCAGATGTGGGGCCAAGACGCGGAGGCGATGTATGGCTACGCCGCCACGGC
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CGGCGGGCTCCTTGAGCAGGCCGTCGCGGTCGAGGAGGCCATCGACACCGCCGCGG
CGAACCAGTTGATGAACAATGTGCCCCAAGCGCTGCAACAGCTGGCCCAGCCAGCGC
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CGGGTGTGTCGATGACCAACACCTTGCACTCGATGTTGAAGGGCTTAGCTCCGGCGG
CGGCTCAGGCCGTGGAAACCGCGGCGGAAAACGGGGTCTGGGCGATGAGCTCGCTG
GGCAGCCAGCTGGGTTCGTCGCTGGGTTCTTCGGGTCTGGGCGCTGGGGTGGCCGCC
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CGCCGCCCAAACCGCCCCCGGACACATGCTGGGCGGGCTACCGCTGGGGCACTCGGT
CAACGCCGGCAGCGGTATCAACAATGCGCTGCGGGTGCCGGCACGGGCCTACGCGAT
ACCCCGCACACCGGCCGCCGGATAGGCGGCCGCACTCGAGCACCACCACCACCACCACT
GAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGC
AATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGG
AGGAACTATATCCGGAT (SEQ ID NO: 192)

[0299] Protein sequence - Rv3478 - C1308 Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbRv3478 (bold)];

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AASVVDFGALPPEINSARMYAGPGSASLVAAAKMWDSVASDLFSAASAFQSVVWGLTVGS
WIGSSAGLMAAAASPYVAWMSVTAGQAQLTAAQVRVAAAAYETAYRLTVPPPVIAENRT
ELMTLTATNLLGQNTPAIEANQAAYSQMWGQDAEAMYGYAATAATATEALLPFEDAPLI
TNPGGLLEQAVAVEEAIDTAAANQLMNNVPQALQQLAQPAQGVVPSSKLGGLWTAVSPH
LSPLSNVSSIANNHMSMMGTGVSMTNTLHSMLKGLAPAAAQAVETAAENGVWAMSSLGS
QLGSSLGSSGLGAGVAANLGRAASVGSLSVPPAWAAANQAVTPAARALPLTSLTSAAQTA
PGHMLGGLPLGHSVNAGSGINNALRVPARAYAIPRTPAAG (SEQ ID NO: 193)

[0300] Rv0934- C2390 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv0934 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
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GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
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CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
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GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
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GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT

CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
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GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCGTGAAAATTCGTTTGCATACGC
TGTTGGCCGTGTTGACCGCTGCGCCGCTGCTGCTAGCAGCGGCGGGCTGTGGCTCGA
AACCACCGAGCGGTTCGCCTGAAACGGGCGCCGGCGCCGGTACTGTCGCGACTACCC
CCGCGTCGTCGCCGGTGACGTTGGCGGAGACCGGTAGCACGCTGCTCTACCCGCTGT
TCAACCTGTGGGGTCCGGCCTTTCACGAGAGGTATCCGAACGTCACGATCACCGCTC
AGGGCACCGGTTCTGGTGCCGGGATCGCGCAGGCCGCCGCCGGGACGGTCAACATT
GGGGCCTCCGACGCCTATCTGTCGGAAGGTGATATGGCCGCGCACAAGGGGCTGATG
AACATCGCGCTAGCCATCTCCGCTCAGCAGGTCAACTACAACCTGCCCGGAGTGAGC
GAGCACCTCAAGCTGAACGGAAAAGTCCTGGCGGCCATGTACCAGGGCACCATCAAA
ACCTGGGACGACCCCGCAGATCGCTGCGCTCAACCCCGGCGTGAACCTGCCCGGCACC
GCGGTAGTTCCGCTGCACCGCTCCGACGGGTCCGGTGACACCTTCTTGTTCACCCAG
TACCTGTCCAAGCAAGATCCCGAGGGCTGGGGCAAGTCGCCCGGCTTCGGCACCACC
GTCGACTTCCCGGCGGTGCCGGGTGCGCTGGGTGAGAACGGCAACGGCGGCATGGT
GACGGTTGCGCCGAGACACCGGGCTGCGTGGCCTATATCGGCATCAGCTTCCTCGAC
CAGGCCAGTCAACGGGGACTCGGCGAGGCCCAACTAGGCAATAGCTCTGGCAATTTC
TTGTTGCCCGACGCGCAAAGCATTCAGGCCGCGGCGGCTGGCTTCGCATCGAAAACC
CCGGCGAACCAGGCGATTTCGATGATCGACGGGCCCGCCCCGGACGGCTACCCGATC
ATCAACTACGAGTACGCCATCGTCAACAACCGGCAAAAGGACGCCGCCACCGCGCAG
ACCTTGCAGGCATTTCTGCACTGGGCGATCACCGACGGCAACAAGGCCTCGTTCCTC
GACCAGGTTCATTTCCAGCCGCTGCCGCCCGCGGTGGTGAAGTTGTCTGACGCGTTG
ATCGCGACGATTTCCAGCTAG*GCGGCCGCACTCGAG*CACCACCACCACCACCACTGAGAT
CCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAA
CTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAA
CTATATCCGGAT (SEQ ID NO: 194)

[0301] Protein sequence - Rv0934- C2390 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv0934 (bold)];

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AASGCGSKPPSGSPETGAGAGTVATTPASSPVTLAETGSTLLYPLFNLWGPAFHERYPNVT
ITAQGTGSGAGIAQAAAGTVNIGASDAYLSEGDMAAHKGLMNIALAISAQQVNYNLPGVS
EHLKLNGKVLAAMYQGTIKTWDDPQIAALNPGVNLPGTAVVPLHRSDGSGDTFLFTQYL
SKQDPEGWGKSPGFGTTVDFPAVPGALGENGNGGMVTGCAETPGCVAYIGISFLDQASQ

RGLGEAQLGNSSGNFLLPDAQSIQAAAAGFASKTPANQAISMIDGPAPDGYPIINYEYAIVN NRQKDAATAQTLQAFLHWAITDGNKASFLDQVHFQPLPPAVVKLSDALIATISSEF (SEQ ID NO: 195)

[0302] Rv2608 - C1259 Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbRv2608 (bold)]

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
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CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
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CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
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TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
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GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
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GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
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CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
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AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
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GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA

CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
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CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
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TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
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GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
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GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
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GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
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GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
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CGGCCTGGGACGGGTTGGCCGAGGAGTTGCATGCCGCGGCGGGCTCGTTCGCGTCGGTGAC
CACCGGGTTGGCGGGCGACGCGTGGCATGGTCCGGCGTCGCTGGCGATGACCCGCGCG
GCCAGCCCGTATGTGGGGTGGTTGAACACGGCGGCGGGTCAGGCCGCGCAGGCGGC
CGGCCAGGCGCGGCTAGCGGCGAGCGCGTTCGAGGCGACGCTGGCGGCCACCGTGT
CTCCAGCGATGGTCGCGGCCAACCGGACACGGCTGGCGTCGCTGGTGGCAGCCAACT
TGCTGGGCCAGAACGCCCCGGCGATCGCGGCCGCGGAGGCTGAATACGAGCAGATAT
GGGCCCAGGACGTGGCCGCGATGTTCGGCTATCACTCCGCCGCGTCGGCGGTGGCCA
CGCAGCTGGCGCCTATTCAAGAGGGTTTGCAGCAGCAGCTGCAAAACGTGCTGGCCC
AGTTGGCTAGCGGGAACCTGGGCAGCGGAAATGTGGGCGTCGGCAACATCGGCAAC
GACAACATTGGCAACGCAAACATCGGCTTCGGAAATCGAGGCGACGCCAACATCGGC

ATCGGGAATATCGGCGACAGAAACCTCGGCATTGGGAACACCGGCAATTGGAATATC
GGCATCGGCATCACCGGCAACGGACAAATCGGCTTCGGCAAGCCTGCCAACCCCGAC
GTCTTGGTGGTGGGCAACGGCGGCCCGGGAGTAACCGCGTTGGTCATGGGCGGCAC
CGACAGCCTACTGCCGCTGCCCAACATCCCCTTACTCGAGTACGCTGCGCGGTTCATC
ACCCCCGTGCATCCCGGATACACCGCTACGTTCCTGGAAACGCCATCGCAGTTTTTCC
CATTCACCGGGCTGAATAGCCTGACCTATGACGTCTCCGTGGCCCAGGGCGTAACGA
ATCTGCACACCGCGATCATGGCGCAACTCGCGGCGGGAAACGAAGTCGTCGTCTTCG
GCACCTCCCAAAGCGCCACGATAGCCACCTTCGAAATGCGCTATCTGCAATCCCTGCC
AGCACACCTGCGTCCGGGTCTCGACGAATTGTCCTTTACGTTGACCGGCAATCCCAAC
CGGCCCGACGGTGGCATTCTTACGCGTTTTGGCTTCTCCATACCGCAGTTGGGTTTCA
CATTGTCCGGCGCGACGCCCGCCGACGCCTACCCCACCGTCGATTACGCGTTCCAGT
ACGACGGCGTCAACGACTTCCCCAAATACCCGCTGAATGTCTTCGCGACCGCCAACG
CGATCGCGGGCATCCTTTTCCTGCACTCCGGGTTGATTGCGTTGCCGCCCGATCTTGC
CTCGGGCGTGGTTCAACCGGTGTCCTCACCGGACGTCCTGACCACCTACATCCTGCT
GCCCAGCCAAGATCTGCCGCTGCTGGTCCCGCTGCGTGCTATCCCCCTGCTGGGAAA
CCCGCTTGCCGACCTCATCCAGCCGGACTTGCGGGTGCTCGTCGAGTTGGGTTATGA
CCGCACCGCCCACCAGGACGTGCCCAGCCCGTTCGGACTGTTTCCGGACGTCGATTG
GGCCGAGGTGGCCGCGGACCTGCAGCAAGGCGCCGTGCAAGGCGTCAACGACGCCC
TGTCCGGACTGGGGCTGCCGCCGCCGTGGCAGCCGGCGCTACCCCGACTTTTCTAAA
AGCTTGCGGCCGCACTCGAGCACCACCACCACCACCACTGAGATCCGGCTGCTAACAA
AGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTT
GGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT
(SEQ ID NO: 196)

[0303] Protein sequence Rv2608 - C1259 Ecoli-pET28[6xHis-Cohesin (underlined)-m.tbRv2608 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MNFAVLPPEVNSARIFAGAGLGPMLAAASAWDGLAEELHAAAGSFASVTTGLAGDA**
WHGPASLAMTRAASPYVGWLNTAAGQAAQAAGQARLAASAFEATLAATVSPAMVAANR
TRLASLVAANLLGQNAPAIAAAEAEYEQIWAQDVAAMFGYHSAASAVATQLAPIQEGLQQ
QLQNVLAQLASGNLGSGNVGVGNIGNDNIGNANIGFGNRGDANIGIGNIGDRNLGIGNTG
NWNIGIGITGNGQIGFGKPANPDVLVVGNGGPGVTALVMGGTDSLLPLPNIPLLEYAARFI
TPVHPGYTATFLETPSQFFPFTGLNSLTYDVSVAQGVTNLHTAIMAQLAAGNEVVVFGTS
QSATIATFEMRYLQSLPAHLRPGLDELSFTLTGNPNRPDGGILTRFGFSIPQLGFTLSGATP
ADAYPTVDYAFQYDGVNDFPKYPLNVFATANAIAGILFLHSGLIALPPDLASGVVQPVSSPD
VLTTYILLPSQDLPLLVPLRAIPLLGNPLADLIQPDLRVLVELGYDRTAHQDVPSPFGLFPD
VDWAEVAADLQQGAVQGVNDALSGLGLPPPWQPALPRLF (SEQ ID NO: 197)

[0304] Rv3864 - C2363 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv3864 (bold)]; Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
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TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT

CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
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CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
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GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
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GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
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CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
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CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
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TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
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ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
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AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT

GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
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ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
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GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
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TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
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GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
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GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
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GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGCATGGCATCGGGTAGCGGTCTTT
GCAAGACGACGAGTAACTTTATTTGGGGCCAGTTACTCTTGCTTGGAGAGGGAATCC
CCGACCCAGGCGACATTTTCAACACCGGTTCGTCGCTGTTCAAACAAATCAGCGACAA
AATGGGACTCGCCATTCCGGGCACCAACTGGATCGGCCAAGCGGCGGAAGCTTACCT
AAACCAGAACATCGCGCAACAACTTCGCGCACAGGTGATGGGCGATCTCGACAAATT
AACCGGCAACATGATCTCGAATCAGGCCAAATACGTCTCCGATACGCGCGACGTCCT
GCGGGCCATGAAGAAGATGATTGACGGTGTCTACAAGGTTTGTAAGGGCCTCGAAAA
GATTCCGCTGCTCGGCCACTTGTGGTCGTGGGAGCTCGCAATCCCTATGTCCGGCAT
CGCGATGGCCGTTGTCGGCGGCGCATTGCTCTATCTAACGATTATGACGCTGATGAAT
GCGACCAACCTGAGGGGAATTCTCGGCAGGCTGATCGAGATGTTGACGACCTTGCCA
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CCGCCGAAGTTGCCCGACATTCCGATCCCCGGCCTGCCCGACATCCCGGGCCTACCC
GACTTCAAATGGCCGCCCACCCCCGGCAGCCCGTTGTTCCCCGACCTCCCGTCGTTCC
CAGGGTTCCCCGGGTTCCCGGAGTTCCCCGCCATCCCCGGGTTCCCCGCACTGCCCG
GGTTGCCCAGCATTCCCAACTTGTTCCCCGGCTTGCCGGGTCTGGGCGACCTGCTGC
CCGGCGTAGGCGATTTGGGCAAGTTACCCACCTGGACTGAGCTGGCCGCTTTGCCTG
ACTTCTTGGGCGGCTTCGCCGGCCTGCCCAGCTTGGGTTTTGGCAATCTGCTCAGCTT
TGCCAGTTTGCCCACCGTGGGTCAGGTGACCGCCACCATGGGTCAGCTGCAACAGCT
CGTGGCGGCCGGCGGTGGCCCCAGCCAACTGGCCAGCATGGGCAGCCAACAAGCGC
AACTGATCTCGTCGCAGGCCCAGCAAGGAGGCCAGCAGCACGCCACCCTCGTGAGCG
ACAAGAAGGAAGACGAGGAAGGCGTGGCCGAGGCGGAGCGTGCACCCATCGACGCT
GGCACCGCGGCCAGCCAACGGGGGCAGGAGGGGACCGTCCTTTGACTCGAGTAAGCG
GCCGCACTCGAGCACCACCACCACCACCAC*TGA*GATCCGGCTGCTAACAAAGCCCGAAAGG
AAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAA
ACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 198)

[0305] Protein sequence - Rv3864 - C2363 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv3864 (bold)];

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AASMASGSGLCKTTSNFIWGQLLLLGEGIPDPGDIFNTGSSLFKQISDKMGLAIPGTNWIG
QAAEAYLNQNIAQQLRAQVMGDLDKLTGNMISNQAKYVSDTRDVLRAMKKMIDGVYKV
CKGLEKIPLLGHLWSWELAIPMSGIAMAVVGGALLYLTIMTLMNATNLRGILGRLIEMLT
TLPKFPGLPGLPSLPDIIDGLWPPKLPDIPIPGLPDIPGLPDFKWPPTPGSPLFPDLPSFPGFP
GFPEFPAIPGFPALPGLPSIPNLFPGLPGLGDLLPGVGDLGKLPTWTELAALPDFLGGFAG
LPSLGFGNLLSFASLPTVGQVTATMGQLQQLVAAGGGPSQLASMGSQQAQLISSQAQQG
GQQHATLVSDKKEDEEGVAEAERAPIDAGTAASQRGQEGTVLLE (SEQ ID NO: 199)

[0306] Rv3881 - C2365 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv3881 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
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CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
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CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
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CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
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GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG

GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
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GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
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ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCA*GCTAGCATGACGCAGTCGCAGACCGTGACG*
GTGGATC**AGCAAGAGATTTTGAACAGGGCCAACGAGGTGGAGGCCCCGATGGCGGAC**
CCACCGACTGATGTCCCCATCACACCGTGCGAACTCACGGCGGCTAAAAACGCCGCC

**CAACAGCTGGTATTGTCCGCCGACAACATGCGGGAATACCTGGCGGCCGGTGCCAAA
GAGCGGCAGCGTCTGGCGACCTCGCTGCGCAACGCGGCCAAGGCGTATGGCGAGGT
TGATGAGGAGGCTGCGACCGCGCTGGACAACGACGGCGAAGGAACTGTGCAGGCAG
AATCGGCCGGGGCCGTCGGAGGGGACAGTTCGGCCGAACTAACCGATACGCCGAGG
GTGGCCACGGCCGGTGAACCCAACTTCATGGATCTCAAAGAAGCGGCAAGGAAGCTC
GAAACGGGCGACCAAGGCGCATCGCTCGCGCACTTTGCGGATGGGTGGAACACTTTC
AACCTGACGCTGCAAGGCGACGTCAAGCGGTTCCGGGGGTTTGACAACTGGGAAGGC
GATGCGGCTACCGCTTGCGAGGCTTCGCTCGATCAACAACGGCAATGGATACTCCAC
ATGGCCAAATTGAGCGCTGCGATGGCCAAGCAGGCTCAATATGTCGCGCAGCTGCAC
GTGTGGGCTAGGCGGGAACATCCGACTTATGAAGACATAGTCGGGCTCGAACGGCTT
TACGCGGAAAACCCTTCGGCCCGCGACCAAATTCTCCCGGTGTACGCGGAGTATCAG
CAGAGGTCGGAGAAGGTGCTGACCGAATACAACAACAAGGCAGCCCTGGAACCGGTA
AACCCGCCGAAGCCTCCCCCCGCCATCAAGATCGACCCGCCCCCGCCTCCGCAAGAG
CAGGGATTGATCCCTGGCTTCCTGATGCCGCCGTCTGACGGCTCCGGTGTGACTCCC
GGTACCGGGATGCCAGCCGCACCGATGGTTCCGCCTACCGGATCGCCGGGTGGTGGC
CTCCCGGCTGACACGGCGGCGCAGCTGACGTCGGCTGGGCGGGAAGCCGCAGCGCT
GTCGGGCGACGTGGCGGTCAAAGCGGCATCGCTCGGTGGCGGTGGAGGCGGCGGGG
TGCCGTCGGCGCCGTTGGGATCCGCGATCGGGGGCGCCGAATCGGTGCGGCCCGCT
GGCGCTGGTGACATTGCCGGCTTAGGCCAGGGAAGGGCCGGCGGCGGCGCCGCGCT
GGGCGGCGGTGGCATGGGAATGCCGATGGGTGCCGCGCATCAGGGACAAGGGGGCG
CCAAGTCCAAGGGTTCTCAGCAGGAAGACGAGGCGCTCTACACCGAGGATCGGGCAT
GGACCGAGGCCGTCATTGGTAAC*CGTCGGCGCCAGGACAGTAAGGAGTCGAAGGAATTCT
GAGCGGCCGCACTCGAG*CACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCG
AAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCC
TCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO:
200)**

[0307] Protein sequence - Rv3881 - C2365 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv3881 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MTQSQTVTVDQQEILNRANEVEAPMADPPTDVPITPCELTAAKNAAQQLVLSADNMR
EYLAAGAKERQRLATSLRNAAKAYGEVDEEAATALDNDGEGTVQAESAGAVGGDSSAEL
TDTPRVATAGEPNFMDLKEAARKLETGDQGASLAHFADGWNTFNLTLQGDVKRFRGFD
NWEGDAATACEASLDQQRQWILHMAKLSAAMAKQAQYVAQLHVWARREHPTYEDIVG
LERLYAENPSARDQILPVYAEYQQRSEKVLTEYNNKAALEPVNPPKPPPAIKIDPPPPPQEQ
GLIPGFLMPPSDGSGVTPGTGMPAAPMVPPTGSPGGGLPADTAAQLTSAGREAAALSGDV
AVKAASLGGGGGGGVPSAPLGSAIGGAESVRPAGAGDIAGLGQGRAGGGAALGGGGMG
MPMGAAHQGQGGAKSKGSQQEDEALYTEDRAWTEAVIGNRRRQDSKESK (SEQ ID NO:
201)**

[0308] Rv2660 - C2366 Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv2660 (bold)]

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
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GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT

AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
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GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
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CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
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CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
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GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
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GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT

TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCA*GCTAGT***GTGATAGCGGGCGTCGACCAGG**
CGCTTGCAGCAACAGGCCAGGCTAGCCAGCGGGCGGCAGGCGCATCTGGTGGGGTC
ACCGTCGGTGTCGGCGTGGGCACGGAACAGAGGAACCTTTCGGTGGTTGCACCGAGT
CAGTTCACATTTAGTTCACGCAGCCCAGATTTTGTGGATGAAACCGCAGGTCAATCGT
GGTGCGCGATACTGGGATTGAACCAGTTTCACGAATTCTAGGCGGCCGCACTCGAGCAC
CACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCT
GCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGG
GTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 202)

[0309] Protein sequence - Rv2660 - C2366 Ecoli-pET28[6xHis-CthermoCohesin (underlined) - m.tbRv2660 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**VIAGVDQALAATGQASQRAAGASGGVTVGVGVGTEQRNLSVVAPSQFTFSSRSPDFV**
DETAGQSWCAILGLNQFHEF (SEQ ID NO: 203)

[0310] Rv2873- C2362 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv2873 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA

GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC

CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC**AAACCCGTGTCGCAAGACACCA**
GCCCGAAACCGGCGACCAGCCCGGCGGCGCCCGTTACCACGGCGGCAATGGCTGAC
CCCGCAGCGGACCTGATTGGTCGTGGGTGCGCGCAATACGCGGCGCAAAATCCCACC
GGTCCCGGATCGGTGGCCGGAATGGCGCAAGACCCGGTCGCTACCGCGGCTTCCAAC
AACCCGATGCTCAGTACCCTGACCTCGGCTCTGTCGGGCAAGCTGAACCCGGATGTG
AATCTGGTCGACACCCTCAACGGCGGCGAGTACACCGTTTTCGCCCCCACCAACGCC
GCATTCGACAAGCTGCCGGCGGCCACTATCGATCAACTCAAGACTGACGCCAAGCTG
CTCAGCAGCATCCTGACCTACCACGTGATAGCCGGCCAGGCGAGTCCGAGCAGGATC
GACGGCACCCATCAGACCCTGCAAGGTGCCGACCTGACGGTGATAGGCGCCCGCGAC
GACCTCATGGTCAACAACGCCGGTTTGGTATGTGGCGGAGTTCACACCGCCAACGCG
ACGGTGTACATGATCGATACGGTGCTGATGCCCCCGGCACAGGAATTCTAAGCGGCCG
CACTCGAGCACCACCACCACCACCAC*TGA*GATCCGGCTGCTAACAAAGCCCGAAAGGAAG
CTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACG
GGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 204)

[0311] Protein sequence - Rv2873- C2362 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv2873 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**KPVSQDTSPKPATSPAAPVTTAAMADPAADLIGRGCAQYAAQNPTGPGSVAGMAQDP**

VATAASNNPMLSTLTSALSGKLNPDVNLVDTLNGGEYTVFAPTNAAFDKLPAATIDQLKT DAKLLSSILTYHVIAGQASPSRIDGTHQTLQGADLTVIGARDDLMVNNAGLVCGGVHTAN ATVYMIDTVLMPPAQEF (SEQ ID NO: 205)

[0312] Rv0831 - C2356 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv0831(bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
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GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG

GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC*ATGCTCCCCGAGACAAATCAGGAT*
***GAGGTCC*AGCCCAACGCACCCGTTGCCCTGGTGACGGTGGAAATCCGTCACCCGACAA**
CGGATTCGCTCACCGAATCAGCGAACCGGGAGCTCAAACACCTGCTTATCAATGATCT
ACCGATCGAACGCCAGGCGCAGGACGTCAGCTGGGGGATGACGGCGCCCGGTGGAG
CCCCCACCCCGGTCGCGGATCGTTTCGTTCGTTATGTCAATCGCGATAACACCACCGC
CGCTTCACTGAAGAACCAGGCGATAGTCGTGGAGACCACCGCCTACCGCAGCTTTGA
GGCCTTTACCGACGTTGTGATGCGGGTCGTGGATGCTCGCGCGCAGGTCTCGTCAAT
CGTTGGGTTGGAGCGTATCGGTCTTCGCTTTGTTCTGGAGATCCGCGTCCCCGCGGG
TGTCGACGGCCGGATCACGTGGAGCAACTGGATCGACGAGCAGCTGCTCGGGCCGCA
GCGTTTCACTCCCGGCGGCCTGGTCCTGACCGAGTGGCAGGGTGCCGCAGTCTACCG

TGAGCTACAACCAGGCAAATCGCTCATCGTGCGCTACGGCCCGGGTATGGGCCAAGC
GCTTGATCCCAATTACCATCTGCGCCGAATAACACCCGCCCAAACCGGACCATTCTTC
CTGCTGGACATCGATAGCTTTTGGACTCCCAGTGGCGGCTCCATTCCCGAGTACAACA
GGGACGCCTTAGTGTCGACATTCCAGGACCTGTACGGTCCGGCCCAGGTCGTGTTTC
AGGAGATGAT*CACCAGTCGCCTGAAAGATGAGCTGCTTCGCCAG* *GAATTCTAAGCGGCCGCA*
*CTCGAG*CACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTG
AGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGT
CTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 206)

[0313] Protein sequence - Rv0831 - C2356 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv0831(bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MLPETNQDEVQPNAPVALVTVEIRHPTTDSLTESANRELKHLLINDLPIERQAQDVSW**
GMTAPGGAPTPVADRFVRYVNRDNTTAASLKNQAIVVETTAYRSFEAFTDVVMRVVDAR
AQVSSIVGLERIGLRFVLEIRVPAGVDGRITWSNWIDEQLLGPQRFTPGGLVLTEWQGAA
VYRELQPGKSLIVRYGPGMGQALDPNYHLRRITPAQTGPFFLLDIDSFWTPSGGSIPEYNR
DALVSTFQDLYGPAQVVFQEMITSRLKDELLRQ (SEQ ID NO: 207)

[0314] Rv0632 - C2355 Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv0632 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC

AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA

GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC**ATGAGCGACCCGGTCAGCTATA**
CCCGCAAGGATTCCATCGCCGTCATCAGTATGGACGACGGCAAGGTCAACGCACTGG
GCCCGGCGATGCAACAAGCCCTCAATGCAGCGATCGACAACGCGGACCGTGATGATG
TTGGGGCGCTGGTGATCACCGGTAATGGCCGGGTATTCAGCGGAGGCTTCGACCTGA
AGATCCTCACCTCCGGTGAAGTGCAGCCCGCGATCGACATGCTCAGGGGCGGCTTCG
AGCTGGCGTATCGCCTCTTGTCCTACCCCAAACCGGTGGTGATGGCGTGCACCGGTC
ACGCCATCGCCATGGGCGCGTTTCTGTTGTCCTGCGGCGATCATCGGGTGGCGGCCC
ACGCATACAACATCCAGGCCAATGAGGTCGCGATCGGCATGACCATTCCGTACGCGG
CGTTAGAGATCATGAAGCTGCGACTGACCCGGTCGGCATACCAGCAGGCAACCGGGC
TGGCCAAGACGTTCTTCGGGGAAACCGCGCTGGCCGCCGGGTTTATCGACGAGATCG
CCCTGCCGGAGGTGGTGGTCAGCCGCGCCGAGGAAGCCGCACGAGAGTTCGCCGGT
CTCAACCAACACGCCCATGCCGCGACCAAGTTGCGCTCCCGCGCCGACGCGCTCACT
GCGATTCGGGCCGGGATCGACGGGATAGCAGCCGAGTTCGGGCTG*GAATTC*TAAGCGG
CCGCACTCGAGCACCACCACCACCACCAC*TGA*GATCCGGCTGCTAACAAAGCCCGAAAGGA
AGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAA
CGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 208)

[0315] Protein sequence- Rv0632 - C2355 Ecoli-pET28[6xHis-CthermoCohesin (underlined) - m.tbRv0632 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MSDPVSYTRKDSIAVISMDDGKVNALGPAMQQALNAAIDNADRDDVGALVITGNGRV**
FSGGFDLKILTSGEVQPAIDMLRGGFELAYRLLSYPKPVVMACTGHAIAMGAFLLSCGDH
RVAAHAYNIQANEVAIGMTIPYAALEIMKLRLTRSAYQQATGLAKTFFGETALAAGFIDEI
ALPEVVVSRAEEAAREFAGLNQHAHAATKLRSRADALTAIRAGIDGIAAEFGLEF (SEQ ID NO: 209)

[0316] Ag85C - C2391 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbAg85C (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG

CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
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AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
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AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG

GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
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AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCA*GCTAGC*TGCAGCTGT***ATGACGTTCTTCGAA***
CAGGTGCGAAGGTTGCGGAGCGCAGCGACAACCCTGCCGCGCCGGCTGGCTATCGCGG
CTATGGGGGCTGTCCTGGTTTACGGTCTGGTCGGTACCTTCGGCGGGCCGGCCACCG
CGGGCGCATTCTCTAGGCCCGGTCTTCCAGTGGAATATCTGCAGGTGCCATCCGCGT
CGATGGGCCGCGACATCAAGGTCCAGTTCCAGGGCGGCGGACCGCACGCGGTCTACC
TGCTCGACGGTCTGCGGGCCCAGGATGACTACAACGGCTGGGACATCAACACCCCGG
CCTTCGAGGAGTACTACCAGTCAGGGTTGTCGGTGATCATGCCCGTGGGCGGCCAAT
CCAGTTTCTACACCGACTGGTATCAGCCCTCGCAGAGCAACGGCCAGAACTACACCTA
CAAGTGGGAGACCTTCCTTACCAGAGAGATGCCCGCCTGGCTACAGGCCAACAAGGG
CGTGTCCCCGACAGGCAACGCGGCGGTGGGTCTTTCGATGTCGGGCGGTTCCGCGCT
GATCCTGGCCGCGTACTACCCGCAGCAGTTCCCGTACGCCGCGTCGTTGTCGGGCTT
CCTCAACCCGTCCGAGGGCTGGTGGCCGACGCTGATCGGCCTGGCGATGAACGACTC
GGGCGGTTACAACGCCAACAGCATGTGGGGTCCGTCCAGCGACCCGGCCTGGAAGCG
CAACGACCCAATGGTTCAGATTCCCCGCCTGGTCGCCAACAACACCCGGATCTGGGT
GTACTGCGGTAACGGCACACCCAGCGACCTCGGCGGCGACAACATACCGGCGAAGTT
CCTGGAAGGCCTCACCCTGCGCACCAACCAGACCTTCCGGGACACCTACGCGGCCGA
CGGTGGACGCAACGGGGTGTTTAACTTCCCGCCCAACGGAACACACTCGTGGCCCTA
CTGGAACGAGCAGCTGGTCGCCATGAAGGCCGATATCCAGCATGTGCTCAACGGCGC
GACACCCCCGGCCGCCCCTGCTGCGCCGGCCGCCTGCAGCTGTTGAGCGGCCGCACTCGAGC
ACCACCACCACCACCACTGAGATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGG
CTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAG
GGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 210)

[0317] Protein sequence- Ag85C - C2391 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbAg85C (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AASCSC**MTFFEQVRRLRSAATTLPRRLAIAAMGAVLVYGLVGTFGGPATAGAFSRPGLPV**
EYLQVPSASMGRDIKVQFQGGGPHAVYLLDGLRAQDDYNGWDINTPAFEEYYQSGLSVI
MPVGGQSSFYTDWYQPSQSNGQNYTYKWETFLTREMPAWLQANKGVSPTGNAAVGLSM

SGGSALILAAYYPQQFPYAASLSGFLNPSEGWWPTLIGLAMNDSGGYNANSMWGPSSDPA WKRNDPMVQIPRLVANNTRIWVYCGNGTPSDLGGDNIPAKFLEGLTLRTNQTFRDTYAA DGGRNGVFNFPPNGTHSWPYWNEQLVAMKADIQHVLNGATPPAAPAAPAACSC (SEQ ID NO: 211)

[0318] Rv2658- C2361 Ecoli-pET28[6xHis-CthermoCohesin (underlined) -m.tbRv2658 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGG*TAAGCGGC*AGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT
GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA

CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC*ATGGCCGATGCGGTTAAGTACGTA*
***GTTATG*TGCAACTGCGACGACGAACCGGGAGCGCTCATCATCGCCTGGATCGACGAC**
GAACGACCCGCCGGCGGGCACATACAGATGCGGTCGAACACCCGCTTCACCGAAACA
CAGTGGGGCCGCCATATCGAGTGGAAACTCGAATGCCGGGCATGCCGAAAGTATGCG
CCGATATCCGAGATGACCGCCGCGGCGATCCTCGACGGTTTCGGGGCGAAGCTTCAC
GAGCTGAGAACGTCGACCATCCCCGACGCTGACGATCCATCAATAGCAGAGGCGCGA
CACGTAATTCCGTTCAGC*GCATTATGCTTGCGCTTGAGCCAGCTAGGCGGGGAATTCTAAG*
*CGGC*CGCACTCGAGCACCACCACCACCACCAC*TGA*GATCCGGCTGCTAACAAAGCCCGAAA

GGAAGCTGAGTTGGCTGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCT
AAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 212)

[0319] Protein sequence - Rv2658- C2361 Ecoli-pET28[6xHis-CthermoCohesin (underlined) - m.tbRv2658 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MADAVKYVVMCNCDDEPGALIIAWIDDERPAGGHIQMRSNTRFTETQWGRHIEWKL
ECRACRKYAPISEMTAAAILDGFGAKLHELRTSTIPDADDPSIAEARHVIPFSALCLRLSQL
GGEF (SEQ ID NO: 213)**

[0320] Rv2659 - C2388 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv2659 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA
CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
GCCATTACGCTCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCG
CCTGAGCGAGACGAAATACGCGATCGCTGTTAAAAGGACAATTACAAACAGGAATCGAAT
GCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTGAATCAGGATATTC
TTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCA
GGAGTACGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTC
TGACCATCTCATCTGTAACATCATTGGCAACGCTACCTTTGCCATGTTTCAGAAACAACTCT
GGCGCATCGGGCTTCCCATACAATCGATAGATTGTCGCACCTGATTGCCCGACATTATCGC
GAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTAGAGCA
AGACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACA
GTTTTATTGTTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCC
CGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTTTCTGCGCGTAATCTGCTGCTTGC
AAACAAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGCCGGATCAAGAGCTACCAACTCT
TTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTCCTTCTAGTGTAG
CCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAAT
CCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCGGGTTGGACTCAAGA
CGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCC
AGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGC
GCCACGCTTCCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACA
GGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTTATAGTCCTGTCGGGT
TTCGCCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGG
AAAAACGCCAGCAACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACAT
GTTCTTTCCTGCGTTATCCCCTGATTCTGTGGATAACCGTATTACCGCCTTTGAGTGAGCTG
ATACCGCTCGCCGCAGCCGAACGACCGAGCGCAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCCTGATGCGGTATTTTCTCCTTACGCATCTGTGCGGTATTTCACACCGCATATATGGT

GCACTCTCAGTACAATCTGCTCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGC
TACGTGACTGGGTCATGGCTGCGCCCCGACACCCGCCAACACCCGCTGACGCGCCCTGACG
GGCTTGTCTGCTCCCGGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTGCATG
TGTCAGAGGTTTTCACCGTCATCACCGAAACGCGCGAGGCAGCTGCGGTAAAGCTCATCAG
CGTGGTCGTGAAGCGATTCACAGATGTCTGCCTGTTCATCCGCGTCCAGCTCGTTGAGTTTC
TCCAGAAGCGTTAATGTCTGGCTTCTGATAAAGCGGGCCATGTTAAGGGCGGTTTTTTCCTG
TTTGGTCACTGATGCCTCCGTGTAAGGGGGATTTCTGTTCATGGGGGTAATGATACCGATG
AAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCGGTTACTGGAA
CGTTGTGAGGGTAAACAACTGGCGGTATGGATGCGGCGGGACCAGAGAAAAATCACTCAG
GGTCAATGCCAGCGCTTCGTTAATACAGATGTAGGTGTTCCACAGGGTAGCCAGCAGCATC
CTGCGATGCAGATCCGGAACATAATGGTGCAGGGCGCTGACTTCCGCGTTTCCAGACTTTA
CGAAACACGGAAACCGAAGACCATTCATGTTGTTGCTCAGGTCGCAGACGTTTTGCAGCAG
CAGTCGCTTCACGTTCGCTCGCGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCG
CCAGCCTAGCCGGGTCCTCAACGACAGGAGCACGATCATGCGCACCCGTGGGGCCGCCAT
GCCGGCGATAATGGCCTGCTTCTCGCCGAAACGTTTGGTGGCGGGACCAGTGACGAAGGCT
TGAGCGAGGGCGTGCAAGATTCCGAATACCGCAAGCGACAGGCCGATCATCGTCGCGCTC
CAGCGAAAGCGGTCCTCGCCGAAAATGACCCAGAGCGCTGCCGGCACCTGTCCTACGAGTT
GCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGA
AGGAGCTGACTGGGTTGAAGGCTCTCAAGGGCATCGGTCGAGATCCCGGTGCCTAATGAGT
GAGCTAACTTACATTAATTGCGTTGCGCTCACTGCCCGCTTTCCAGTCGGGAAACCTGTCGT
GCCAGCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTTGCGTATTGGGCGCC
AGGGTGGTTTTTCTTTTCACCAGTGAGACGGGCAACAGCTGATTGCCCTTCACCGCCTGGCC
CTGAGAGAGTTGCAGCAAGCGGTCCACGCTGGTTTGCCCCAGCAGGCGAAAATCCTGTTTG
ATGGTGGTTAACGGCGGGATATAACATGAGCTGTCTTCGGTATCGTCGTATCCCACTACCG
AGATATCCGCACCAACGCGCAGCCCGGACTCGGTAATGGCGCGCATTGCGCCCAGCGCCAT
CTGATCGTTGGCAACCAGCATCGCAGTGGGAACGATGCCCTCATTCAGCATTTGCATGGTT
TGTTGAAAACCGGACATGGCACTCCAGTCGCCTTCCCGTTCCGCTATCGGCTGAATTTGATT
GCGAGTGAGATATTTATGCCAGCCAGCCAGACGCAGACGCGCCGAGACAGAACTTAATGG
GCCCGCTAACAGCGCGATTTGCTGGTGACCCAATGCGACCAGATGCTCCACGCCCAGTCGC
GTACCGTCTTCATGGGAGAAAATAATACTGTTGATGGGTGTCTGGTCAGAGACATCAAGAA
ATAACGCCGGAACATTAGTGCAGGCAGCTTCCACAGCAATGGCATCCTGGTCATCCAGCGG
ATAGTTAATGATCAGCCCACTGACGCGTTGCGCGAGAAGATTGTGCACCGCCGCTTTACAG
GCTTCGACGCCGCTTCGTTCTACCATCGACACCACCACGCTGGCACCCAGTTGATCGGCGC
GAGATTTAATCGCCGCGACAATTTGCGACGGCGCGTGCAGGGCCAGACTGGAGGTGGCAA
CGCCAATCAGCAACGACTGTTTGCCCGCCAGTTGTTGTGCCACGCGGTTGGGAATGTAATT
CAGCTCCGCCATCGCCGCTTCCACTTTTTCCCGCGTTTTCGCAGAAACGTGGCTGGCCTGGT
TCACCACGCGGGAAACGGTCTGATAAGAGACACCGGCATACTCTGCGACATCGTATAACGT
TACTGGTTTCACATTCACCACCCTGAATTGACTCTCTTCCGGGCGCTATCATGCCATACCGC
GAAAGGTTTTGCGCCATTCGATGGTGTCCGGGATCTCGACGCTCTCCCTTATGCGACTCCTG
CATTAGGAAGCAGCCCAGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGG
TGCATGCAAGGAGATGGCGCCCAACAGTCCCCCGGCCACGGGGCCTGCCACCATACCCAC
GCCGAAACAAGCGCTCATGAGCCCGAAGTGGCGAGCCCGATCTTCCCCATCGGTGATGTCG
GCGATATAGGCGCCAGCAACCGCACCTGTGGCGCCGGTGATGCCGGCCACGATGCGTCCG
GCGTAGAGGATCGAGATCTCGATCCCGCGAAATTAATACGACTCACTATAGGGGAATTGTG
AGCGGATAACAATTCCCCTCTAGAAATAATTTTGTTTAACTTTAAGAAGGAGATATACCAT
GGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATATG
GCTAGTATGGATCTGGATGCAGTAAGGATTAAAGTGGACACAGTAAATGCAAAACCGGGA
GACACAGTAAATATACCTGTAAGATTCAGTGGTATACCATCCAAGGGAATAGCAAACTGTG
ACTTTGTATACAGCTATGACCCGAATGTACTTGAGATAATAGAGATAAAACCGGGAGAATT
GATAGTTGACCCGAATCCTACCAAGAGCTTTGATACTGCAGTATATCCTGACAGAAAGATG
ATAGTATTCCTGTTTGCGGAAGACAGCGGAACAGGAGCGTATGCAATAACTAAAGACGGA
GTATTTGCTACGATAGTAGCGAAAGTAAAAGAAGGAGCACCTAACGGGCTCAGTGTAATC
AAATTTGTAGAAGTAGGCGGATTTGCGAACAATGACCTTGTAGAACAGAAGACACAGTTCT
TTGACGGTGGAGTAAATGTTGGAGATACAACAGAACCTGCAACACCTACAACACCTGTAAC
AACACCGACAACAACAGATGATCTAGATGCAGCTAGC*GTGACGCAAACCGGCAAGCGTCAG*

*AGACGCA*AATTCGGTCGCATCCGACAGTTCAACTCCGGCCGCTGGCAAGCCAGCTACA
CCGGCCCCGACGGCCGCGTGTACATCGCCCCCAAAACCTTCAACGCCAAGATCGACG
CCGAAGCATGGCTCACCGACCGCCGCCGCGAAATCGACCGACAACTATGGTCCCCGG
CATCGGGTCAGGAAGACCGCCCCGGAGCCCCATTCGGTGAGTACGCCGAAGGATGGC
TGAAGCAGCGTGGAATCAAGGACCGCACCCGCGCCCACTATCGCAAACTGCTGGACA
ACCACATCCTGGCCACCTTCGCTGACACCGACCTACGCGACATCACCCCGGCCGCCG
TGCGCCGCTGGTACGCCACCACCGCCGTGGGCACACCGACCATGCGGGCACACTCCT
ACAGCTTGCTGCGCGCAATCATGCAGACCGCCTTGGCCGACGACCTGATCGACTCCA
ACCCCTGCCGCATCTCAGGCGCGTCCACCGCCCGCCGCGTCCACAAGATCAGGCCCG
CCACCCTCGACGAGCTGGAAACCATCACCAAAGCCATGCCCGACCCCTACCAGGCGT
TCGTGCTGATGGCGGCATGGCTGGCCATGCGCTACGGCGAGCTGACCGAATTACGCC
GCAAAGACATCGACCTGCACGGCGAGGTTGCGCGGGTGCGGCGGGCTGTCGTTCGG
GTGGGCGAAGGCTTCAAGGTGACGACACCGAAAAGCGATGCGGGAGTGCGCGACAT
AAGTATCCCGCCACATCTGATACCCGCCATCGAAGACCACCTTCACAAACACGTCAAC
CCCGGCCGGGAGTCCCTGCTGTTCCCATCGGTCAACGACCCCAACCGTCACCTAGCA
CCCTCGGCGCTGTACCGCATGTTCTACAAGGCCCGAAAAGCCGCCGGCCGACCAGAC
TTACGGGTGCACGACCTTCGACACTCCGGCGCCGTGTTGGCTGCATCCACCGGCGCC
ACACTGGCCGAACTGATGCAGCGGCTAGGACACAGCACAGCCGGCGCCGCACTCCGC
TACCAGCACGCCGCCAAGGGCCGGGACCGCGAAATCGCCGCACTGTTAAGCAAACTG
GCCGAGAACCAGGAGATGGAATTCTAAGCGGCCGCACTCGAGCACCACCACCACCACCA
C*TGA*GATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGCTGCTGCCACCGCTGAG
CAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAG
GAGGAACTATATCCGGAT (SEQ ID NO: 214)

[0321] Protein sequence - Rv2659 - C2388 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv2659 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**VTQTGKRQRRKFGRIRQFNSGRWQASYTGPDGRVYIAPKTFNAKIDAEAWLTDRRR
EIDRQLWSPASGQEDRPGAPFGEYAEGWLKQRGIKDRTRAHYRKLLDNHILATFADTDL
RDITPAAVRRWYATTAVGTPTMRAHSYSLLRAIMQTALADDDLIDSNPCRISGASTARRVH
KIRPATLDELETITKAMPDPYQAFVLMAAWLAMRYGELTELRRKDIDLHGEVARVRRAV
VRVGEGFKVTTPKSDAGVRDISIPPHLIPAIEDHLHKHVNPGRESLLFPSVNDPNRHLAPSA
LYRMFYKARKAAGRPDLRVHDLRHSGAVLAASTGATLAELMQRLGHSTAGAALRYQHA
AKGRDREIAALLSKLAENQEM**EF (SEQ ID NO: 215)

[0322] Rv0577- C2411 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv0577 (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
CAGCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCGCTTTCTTCCCTTCCTT
TCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCC
GATTTAGTGCTTTACGGCACCTCGACCCCAAAAAACTTGATTAGGGTGATGGTTCACGTAG
TGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATA
GTGGACTCTTGTTCCAAACTGGAACAACACTCAACCCTATCTCGGTCTATTCTTTTGATTTA
TAAGGGATTTTGCCGATTTCGGCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTA
ACGCGAATTTTAACAAAATATTAACGTTTACAATTTCAGGTGGCACTTTTCGGGGAAATGT
GCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCATGAATT
AATTCTTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTAT
CAATACCATATTTTTGAAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTT
CCATAGGATGGCAAGATCCTGGTATCGGTCTGCGATTCCGACTCGTCCAACATCAATACAA
CCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCATGAGTGACGA

CTGAATCCGGTGAGAATGGCAAAAGTTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCA
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TATCGGGTGCTCAAGGCCGGCGACGCGGAAGTCGGCGGCTGTATGGAACCGCCGATG
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GCGGCCAAAGCCGCCGCAGCGGGCGGCCAGGTCATTGCGGAACCGGCTGACATTCC
GTCGGTGGGCCGGTTCGCCGTGTTGTCCGATCCGCAGGGCGC*GATCTTCAGTGTGTTG*
AAGCCCGCACCGCAGCAATAG*GCGGCCGCACTCGAG*CACCACCACCACCACCACTGAGATC
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TAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGGGGTTTTTTGCTGAAAGGAGGAAC
TATATCCGGAT (SEQ ID NO: 216)

[0323] Protein sequence- Rv0577- C2411 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv0577 (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
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KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MPKRSEYRQGTPNWVDLQTTDQSAAKKFYTSLFGWGYDDNPVPGGGGVYSMATLN**
GEAVAAIAPMPPGAPEGMPPIWNTYIAVDDVDAVVDKVVPGGGQVMMPAFDIGDAGRMS
FITDPTGAAVGLWQANRHIGATLVNETGTLIWNELLTDKPDLALAFYEAVVGLTHSSMEI
AAGQNYRVLKAGDAEVGGCMEPPMPGVPNHWHVYFAVDDADATAAKAAAAGGQVIAE
PADIPSVGRFAVLSDPQGAIFSVLKPAPQQ (SEQ ID NO: 217)

[0324] Mtb72f - C2236 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbMtb72f (bold)] Additional modifications are in italics.

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AACCGTGCAGGCGTCGGATTCGCTGACCGGTGCCGAAGAGACATTGAACGGGTTGAT
CCAGTTCGATGCCGCGATCCAGCCCGGTGATTCGGGCGGGCCCGTCGTCAACGGCCT
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CCACCACCACCACCAC*TGA*GATCCGGCTGCTAACAAAGCCCGAAAGGAAGCTGAGTTGGC
TGCTGCCACCGCTGAGCAATAACTAGCATAACCCCTTGGGGCCTCTAAACGGGTCTTGAGG
GGTTTTTTGCTGAAAGGAGGAACTATATCCGGAT (SEQ ID NO: 218)

[0325] Protein sequence - Mtb72f - C2236 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbMtb72f (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
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KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**TAASDNFQLSQGGQGFAIPIGQAMAIAGQIRSGGGSPTVHIGPTAFLGLGVVDNNGNG**
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TRTGNVTLAEGPPAEFMVDFGALPPEINSARMYAGPGSASLVAAAQMWDSVASDLFSAAS
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GQVVGMNTAAS (SEQ ID NO: 219)

[0326] Rv1411-LPTEG - C2198 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv1411-LPETGsite-6xHis (bold)] Additional modifications are in italics.

TGGCGAATGGGACGCGCCCTGTAGCGGCGCATTAAGCGCGGCGGGTGTGGTGGTTACGCG
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[0327] Protein sequence - Rv1411-LPTEG - C2198 Ecoli-pET28[6xHis-CthermoCohesin (underlined)-m.tbRv1411-LPETGsite-6xHis (bold)]

MGSSHHHHHHSSGLVPRGSHMASMDLDAVRIKVDTVNAKPGDTVNIPVRFSGIPSKGIANCDF
VYSYDPNVLEIIEIKPGELIVDPNPTKSFDTAVYPDRKMIVFLFAEDSGTGAYAITKDGVFATIVA
KVKEGAPNGLSVIKFVEVGGFANNDLVEQKTQFFDGGVNVGDTTEPATPTTPVTTPTTTDDLD
AAS**MRTPRRHCRRIAVLAAVSIAATVVAGCSSGSKPSGGPLPDAKPLVEEATAQTKALKSA**
HMVLTVNGKIPGLSLKTLSGDLTTNPTAATGNVKLTLGGSDIDADFVVFDGILYATLTPNQ
WSDFGPAADIYDPAQVLNPDTGLANVLANFADAKAEGRDTINGQNTIRISGKVSAQAVNQI
APPFNATQPVPATVWIQETGDHQLAQAQLDRGSGNSVQMTLSKWGEKVQVTKPPVSLPE
TGEAHHHHHH (SEQ ID NO: 221)

[0328] It is contemplated that any embodiment discussed in this specification can be implemented with respect to any method, kit, reagent, or composition of the invention, and vice versa. Furthermore, compositions of the invention can be used to achieve methods of the invention.

[0329] It may be understood that particular embodiments described herein are shown by way of illustration and not as limitations of the invention. The principal features of this invention can be employed in various embodiments without departing from the scope of the invention. Those skilled in the art will recognize, or be able to ascertain using no more than routine experimentation, numerous equivalents to the specific procedures described herein. Such equivalents are considered to be within the scope of this invention and are covered by the claims.

[0330] All publications and patent applications mentioned in the specification are indicative of the level of skill of those skilled in the art to which this invention pertains. All publications and patent applications are herein incorporated by reference to the same extent as if each individual publication or patent application was specifically and individually indicated to be incorporated by reference.

[0331] The use of the word "a" or "an" when used in conjunction with the term "comprising" in the claims and/or the specification may mean "one," but it is also consistent with the meaning of "one or more," "at least one," and "one or more than one." The use of the term "or" in the claims is used to mean "and/or" unless explicitly indicated to refer to alternatives only or the alternatives are mutually exclusive, although the disclosure supports a definition that refers to only alternatives and "and/or." Throughout this application, the term "about" is used to indicate that a value includes the inherent variation of error for the device, the method being employed to determine the value, or the variation that exists among the study subjects.

[0332] As used in this specification and claim(s), the words "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including, such as "includes" and "include") or "containing" (and any form of containing, such as "contains" and "contain") are inclusive or open-ended and do not exclude additional, unrecited elements or method steps.

[0333] The term "or combinations thereof" as used herein refers to all permutations and combinations of the listed items preceding the term. For example, "A, B, C, or combinations thereof" is intended to include at least one of: A, B, C, AB, AC, BC, or ABC, and if order is important in a particular context, also BA, CA, CB, CBA, BCA, ACB, BAC, or CAB. Continuing with this example, expressly included are combinations that contain repeats of one or more item or term, such as BB, AAA, MB, BBC,

AAABCCCC, CBBAAA, CABABB, and so forth. The skilled artisan will understand that typically there is no limit on the number of items or terms in any combination, unless otherwise apparent from the context.

[0334] All of the compositions and/or methods disclosed and claimed herein can be made and executed without undue experimentation in light of the present disclosure. While the compositions and methods of this invention have been described in terms of preferred embodiments, it may be apparent to those of skill in the art that variations may be applied to the compositions and/or methods and in the steps or in the sequence of steps of the method described herein without departing from the concept, spirit and scope of the invention. All such similar substitutes and modifications apparent to those skilled in the art are deemed to be within the spirit, scope and concept of the invention as defined by the appended claims.

REFERENCES

[0335] U.S. Patent Application No. 20040146948: *Compositions and Methods for Targeting Antigen-Presenting Cells with Antibody Single-Chain Variable Region Fragments.*

[0336] U.S. Patent No. 7,560,534: *Molecular Conjugates Comprising Human Monoclonal Antibodies to Dendritic Cells.*

[0337] U.S. Patent No. 7,261,897: *Fusion Proteins of Mycobacterium Tuberculosis.*

[0338] 1. Dye, C., Scheele, S., Dolin, P., Pathania, V., and Raviglione, M. C. (1999) Jama 282, 677-686.

[0339] 2. Aziz, M. A., Wright, A., Laszlo, A., De Muynck, A., Portaels, F., Van Deun, A., Wells, C., Nunn, P., Blanc, L., and Raviglione, M. (2006) Lancet 368, 2142-2154.

[0340] 3. Colditz, G. A., Berkey, C. S., Mosteller, F., Brewer, T. F., Wilson, M. E., Burdick, E., and Fineberg, H. V. (1995) Pediatrics 96, 29-35.

[0341] 4. van Vliet, S. J., Garcia-Vallejo, J. J., and van Kooyk, Y. (2008) Immunol Cell Biol 86, 580-587.

[0342] 5. Banchereau, J., Briere, F., Caux, C., Davoust, J., Lebecque, S., Liu, Y. J., Pulendran, B., and Palucka, K. (2000) Annu Rev Immunol 18, 767-811.

[0343] 6. Cella, M., Engering, A., Pinet, V., Pieters, J., and Lanzavecchia, A. (1997) Nature 388, 782-787.

[0344] 7. Rescigno, M., Citterio, S., Thery, C., Rittig, M., Medaglini, D., Pozzi, G., Amigorena, S., and Ricciardi-Castagnoli, P. (1998) Proc Natl Acad Sci U S A 95, 5229-5234.

[0345] 8. Austyn, J. M., Kupiec-Weglinski, J. W., Hankins, D. F., and Morris, P. J. (1988) J Exp Med 167, 646-651.

[0346] 9. Sallusto, F., and Lanzavecchia, A. (2000) Immunol Rev 177, 134-140.

[0347] 10. Locht, C., Rouanet, C., Hougardy, J. M., and Mascart, F. (2007) Expert Opin Biol Ther 7, 1665-1677.

[0348] 11. Hougardy, J. M., Schepers, K., Place, S., Drowart, A., Lechevin, V., Verscheure, V., Debrie, A. S., Doherty, T. M., Van Vooren, J. P., Locht, C., and Mascart, F. (2007) PLoS ONE 2, e926.

[0349] 12. Parida, S. K., and Kaufmann, S. H. (2010) Curr Opin Immunol 22, 374-384.

1. A method for increasing the effectiveness of antigen presentation by an antigen presenting cell (APC) comprising the steps of:

obtaining a previously isolated and purified dendritic cell (DC)-specific antibody or fragment thereof to which one or more antigens or recombinant antigens are attached or conjugated to form an antibody-antigen complex,

obtaining previously isolated APC; and

contacting the APC with the antibody-antigen complex under conditions wherein the antibody-antigen complex is processed and presented for T cell recognition.

2. The method of claim 1, wherein the APC comprises an isolated dendritic cell (DC), a peripheral blood mononuclear cell (PBMC), a monocyte, a B cell, a myeloid dendritic cell and combinations thereof that have been cultured in vitro with GM-CSF and IL-4, interferon alpha, antigen and combinations thereof.

3. The method of claim 1, which the one or more antigens or recombinant antigens comprise *M. tuberculosis* antigens selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof.

4. The method of claim 1, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

5. The method of claim 1, wherein a nucleotide sequence of the DC-specific antibody or the fragment is selected from SEQ ID NOS: 6 to 70.

6. The method of claim 1, wherein an amino acid sequence of the DC-specific antibody or the fragment is selected from SEQ ID NOS: 71 to 135.

7. An immunostimulatory composition for generating an immune response, for use in a treatment by prophylaxis, therapy or any combination thereof of tuberculosis in a human or animal subject comprising:

an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more *M. tuberculosis* antigens or antigenic peptides; and

a pharmaceutically acceptable carrier, wherein the conjugate is comprised in an amount effective to generate the immune response against tuberculosis.

8. The immunostimulatory composition of claim 7, wherein the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID

9. The immunostimulatory composition of claim 7, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

10. The immunostimulatory composition of claim 7, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

11. The immunostimulatory composition of claim 7, wherein the DC-specific antibody is humanized.

12. The immunostimulatory composition of claim 7, wherein the treatment comprises administering the composition to the human or animal subject by an oral route, a nasal route, topically or as an injection.

13. The composition of claim 12, wherein the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

14. A vaccine composition comprising:

an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis; and

an optional pharmaceutically acceptable carrier or an adjuvant.

15. The vaccine composition of claim 14, further comprising a flexible linker between the DC-specific antibody or fragment thereof and the one or more antigens.

16. The vaccine composition of claim 14, wherein the one or more antigens or antigenic peptides are conjugated to a heavy-chain, a light-chain or both of the anti-dendritic cell (DC)-specific antibody.

17. The vaccine composition of claim 14, wherein the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof.

18. The vaccine composition of claim 14, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

19. The vaccine composition of claim 14, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

20. The vaccine composition of claim 14, wherein the DC-specific antibody is humanized.

21. The vaccine composition of claim 14 used for treatment of tuberculosis, wherein the composition is administered to the human or animal subject by an oral route, a nasal route, topically or as an injection.

22. The vaccine composition of claim 21, wherein the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

23. A tuberculosis vaccine comprising:

a dendritic cell (DC)-specific antibody or fragment thereof comprising αDCIR, αLangerin, αLOX-1 or αCD40 fused to one or more antigens or antigenic peptides selected from the group consisting of SEQ. ID NO: 5, SEQ. ID NO: 1, and SEQ. ID NO: 4, wherein the antigens or the antigenic peptides are conjugated to a heavy chain of the DC-specific antibody via one or more flexible linkers; and

an optional pharmaceutically acceptable carrier or an adjuvant.

24. A tuberculosis vaccine comprising:

a dendritic cell (DC)-specific antibody or fragment thereof comprising αDCIR, αLangerin, αLOX-1 or αCD40 fused to one or more antigens or antigenic peptides selected from the group consisting of SEQ. ID NO: 2, SEQ. ID NO: 5, and SEQ. ID NO: 4, wherein the antigens or the antigenic peptides are conjugated to a heavy chain of the DC-specific antibody via one or more flexible linkers; and

an optional pharmaceutically acceptable carrier or an adjuvant.

25. A tuberculosis vaccine comprising:

a dendritic cell (DC)-specific antibody or fragment thereof comprising αDCIR, αLangerin, αLOX-1 or αCD40 fused to one or more antigens or antigenic peptide comprising SEQ. ID NO: 3, wherein the antigen or the antigenic peptide is conjugated to a light chain of the DC-specific antibody via one or more flexible linkers; and

an optional pharmaceutically acceptable carrier or an adjuvant.

26. A method for increasing effectiveness of one or more dendritic cells (DCs) comprising the steps of:

obtaining previously isolated DCs from a patient;

exposing the DCs to activating amounts of a vaccine comprising a dendritic cell (DC)-specific antibody or fragment thereof loaded, fused or conjugated to one or more antigens or antigenic peptides selected from the group consisting of SEQ. ID NO: 1, SEQ. ID NO: 2, SEQ. ID NO: 3, SEQ. ID NO: 4, SEQ. ID NO: 5, and any combinations thereof wherein the antigens or the antigenic peptides are conjugated to a heavy chain, a light chain or both of the DC-specific antibody via one or more flexible linkers; and an optional pharmaceutically acceptable carrier or an adjuvant; and

providing the antigen-loaded and activated DCs to be later reintroduced into the patient.

27. The method of claim 26, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

28. Activated dendritic cells (DCs) for use in a prophylaxis, a therapy, or a combination thereof of one or more viral, bacterial, fungal, parasitic, protozoal, parasitic diseases, or allergic disorders by providing immunostimulation by activation one or more comprising the steps of:

obtaining previously isolated one or more DCs from a human subject in need of immunostimulation for the prophylaxis, the therapy, or the combination thereof against the one or more diseases or disorders;

activating the isolated DCs with an amount of a composition effective to form activated DCs comprising a dendritic cell (DC)-specific antibody or fragment thereof loaded, fused or conjugated to one or more antigens or antigenic peptides, wherein the antigens or the antigenic peptides are conjugated to a heavy chain, a light chain or both of the DC-specific antibody via one or more flexible linkers; and an optional pharmaceutically acceptable carrier or an adjuvant; and

providing the activated DCs to be later reintroduced into the human subject.

29. The activated dendritic cells of claim 28, wherein the bacterial disease is tuberculosis.

30. The activated dendritic cells of claim 28, wherein the antigens or the antigenic peptides are selected from the group consisting of SEQ. ID NO: 1, SEQ. ID NO: 2, SEQ. ID NO: 3, SEQ. ID NO: 4, SEQ. ID NO: 5, and any combinations thereof.

31. The method of claim 28, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

32. The activated dendritic cells of claim 28, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

33. A vaccine for use in a treatment, a prophylaxis or a combination thereof against tuberculosis in a human subject, the vaccine comprising:

an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis and an optional pharmaceutically acceptable carrier or an adjuvant.

34. The vaccine of claim 33, further comprising a flexible linker between the DC-specific antibody or fragment thereof and the one or more antigens.

35. The vaccine of claim 33, wherein the one or more antigens or antigenic peptides are conjugated to a heavy-chain, a light-chain or both of the anti-dendritic cell (DC)-specific antibody.

36. The vaccine of claim 33, wherein the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof.

37. The vaccine of claim 33, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

38. The vaccine of claim 33, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

39. The vaccine of claim 33, wherein the DC-specific antibody is humanized.

40. The vaccine of claim 33, wherein the composition is provided for to be later administered to the human or animal subject by an oral route, a nasal route, topically or as an injection.

41. The vaccine of claim 40, wherein the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

42. An immunostimulatory composition for use in generating an immune response, for a prophylaxis, a therapy or any combination thereof in the treatment of tuberculosis in a human or animal subject comprising:

an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more *M. tuberculosis* antigens or antigenic peptides;

at least one Toll-Like Receptor (TLR) agonist which is selected from the group consisting of TLR1, TLR2, TLR3, TLR4, TLR5, TLR6, TLR7, and TLR8 agonists; and

a pharmaceutically acceptable carrier, wherein the conjugate is comprised in an amount effective to generate the immune response against tuberculosis.

43. The immunostimulatory composition of claim 42, wherein the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof.

44. The immunostimulatory composition of claim 42, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

45. A tuberculosis vaccine comprising:

an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis;

at least one Toll-Like Receptor (TLR) agonist which is selected from the group consisting of TLR1, TLR2, TLR3, TLR4, TLR5, TLR6, TLR7, and TLR8 agonists; and

one or more optional pharmaceutically acceptable carriers and adjuvants.

46. The tuberculosis vaccine of claim 45, wherein the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof.

47. The tuberculosis vaccine of claim 45, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

48. The tuberculosis vaccine of claim 45, wherein the DC-specific antibody is humanized.

49. The tuberculosis vaccine of claim 45, for use in the treatment of tuberculosis by administration to the human or animal subject by an oral route, a nasal route, topically or as an injection.

50. The tuberculosis vaccine of claim 49, wherein the injection is selected from the group consisting of subcutaneous, intravenous, intraperitoneal, intramuscular, and intravenous.

51. A tuberculosis vaccine for use in a treatment, a prophylaxis or a combination thereof against tuberculosis in a human subject comprising the steps of:

identifying the human subject in need of the treatment, the prophylaxis or a combination thereof against tuberculosis; and

administering a vaccine composition comprising:

an anti-dendritic cell (DC)-specific antibody or fragment thereof fused or conjugated to at least a portion of one or more recombinant or natural *M. tuberculosis* antigens or antigenic peptides, wherein the antigenic peptides are representative of one or more epitopes of the one or more antigens implicated in tuberculosis; and

at least one Toll-Like Receptor (TLR) agonist which is selected from the group consisting of TLR1, TLR2, TLR3, TLR4, TLR5, TLR6, TLR7, and TLR8 agonists; and

one or more optional pharmaceutically acceptable carriers and adjuvants.

52. The tuberculosis vaccine of claim 51, further comprising a flexible linker between the DC-specific antibody or fragment thereof and the one or more antigens.

53. The tuberculosis vaccine of claim 51, wherein the one or more antigens or antigenic peptides are conjugated to a heavy-chain, a light-chain or both of the anti-dendritic cell (DC)-specific antibody.

54. The tuberculosis vaccine of claim 51, wherein the one or more *M. tuberculosis* antigens are selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, and any combinations thereof.

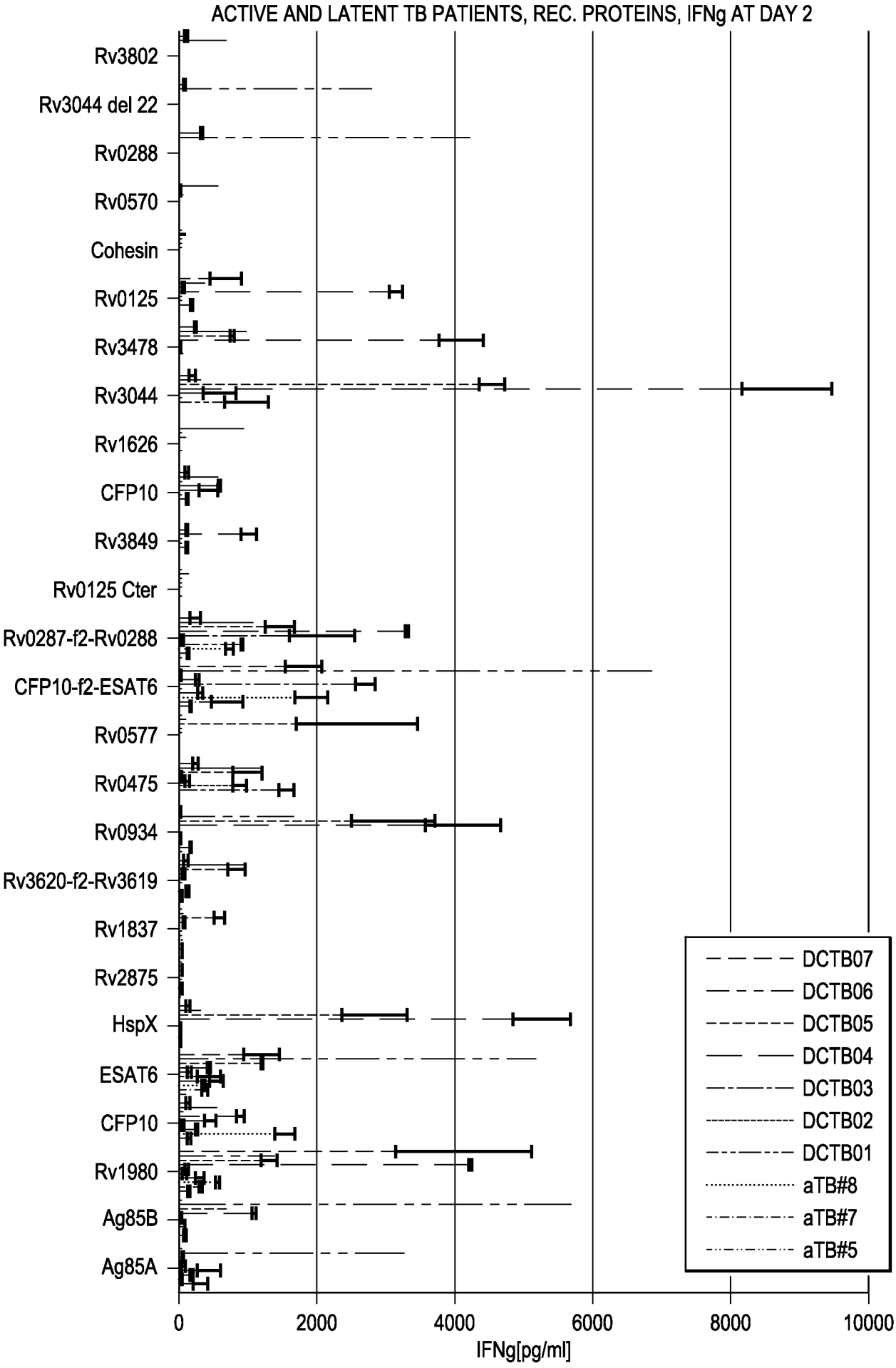
55. The method of claim 51, wherein the DC-specific antibody or fragment is selected from an anti-DCIR, αDCIR, MHC class I, MHC class II, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, αCD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86,

CMRF-44, CMRF-56, DCIR, DC-ASPGR, CLEC-6, CD40, BDCA-2, MARCO, DEC-205, mannose receptor, αLangerin, DECTIN-1, B7-1, B7-2, IFN-γ receptor and IL-2 receptor, ICAM-1, Fcγ receptor, αLOX-1 or ASPGR.

56. The tuberculosis vaccine of claim 51, wherein the DC-specific antibody or fragment comprises αDCIR, αLangerin, αLOX-1 or αCD40.

57. The tuberculosis vaccine of claim 51, wherein the DC-specific antibody is humanized.

FIG. 1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Rv3044 del 22
Rv0288
Rv0570
Cohesin
Rv0125
Rv3478
Rv3044
Rv1626
CFP10
Rv3849
Rv0125 Cter
Rv0287-f2-Rv0288
CFP10-f2-ESAT6
Rv0577
Rv0475
Rv0934
Rv3620-f2-Rv3619
Rv1837
Rv2875
HspX
ESAT6
CFP10
Rv1980
Ag85B
Ag85A
DCTB07
DCTB06
DCTB05
DCTB04
DCTB03
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8000
10000
IFNg[pg/ml]

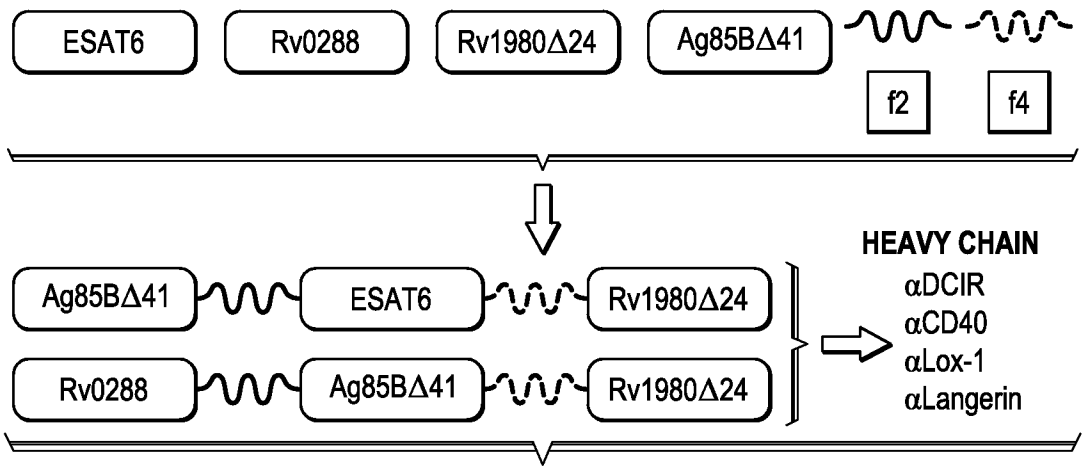

FIG. 2

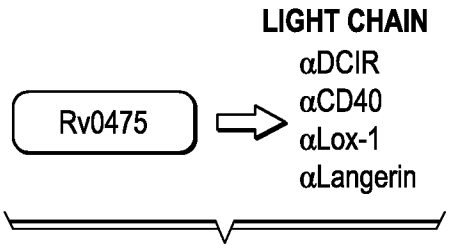

FIG. 3

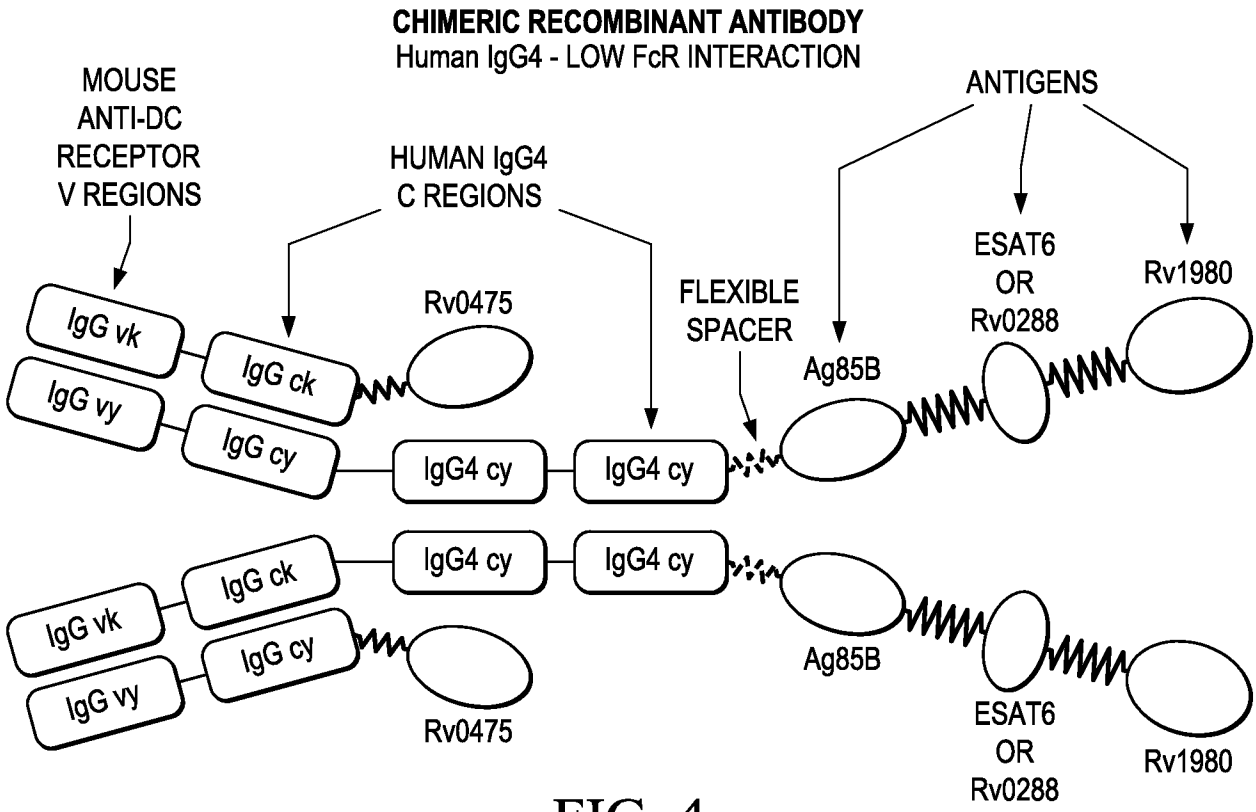

FIG. 4

FIG. 5A

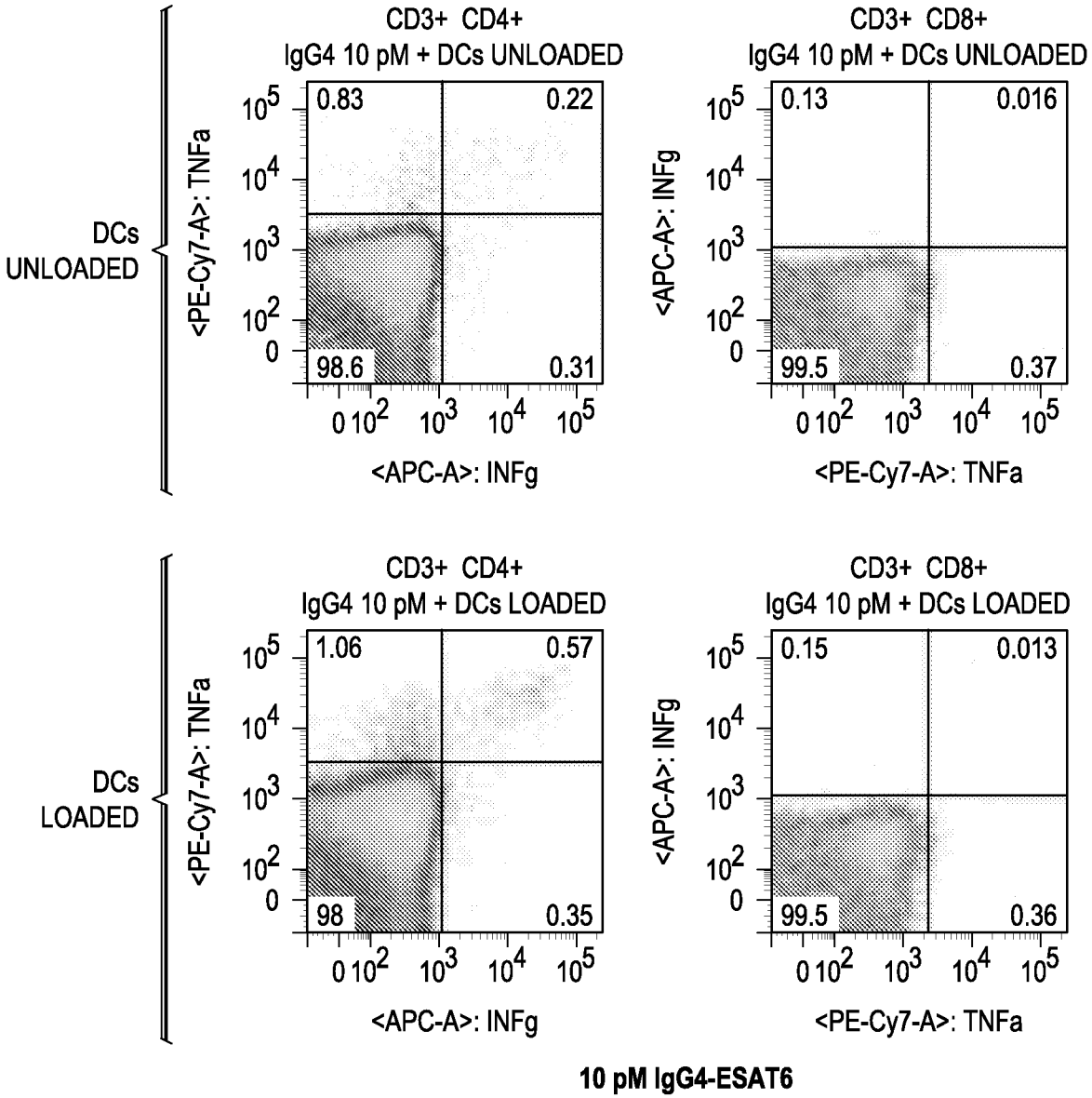
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FIG. 5B

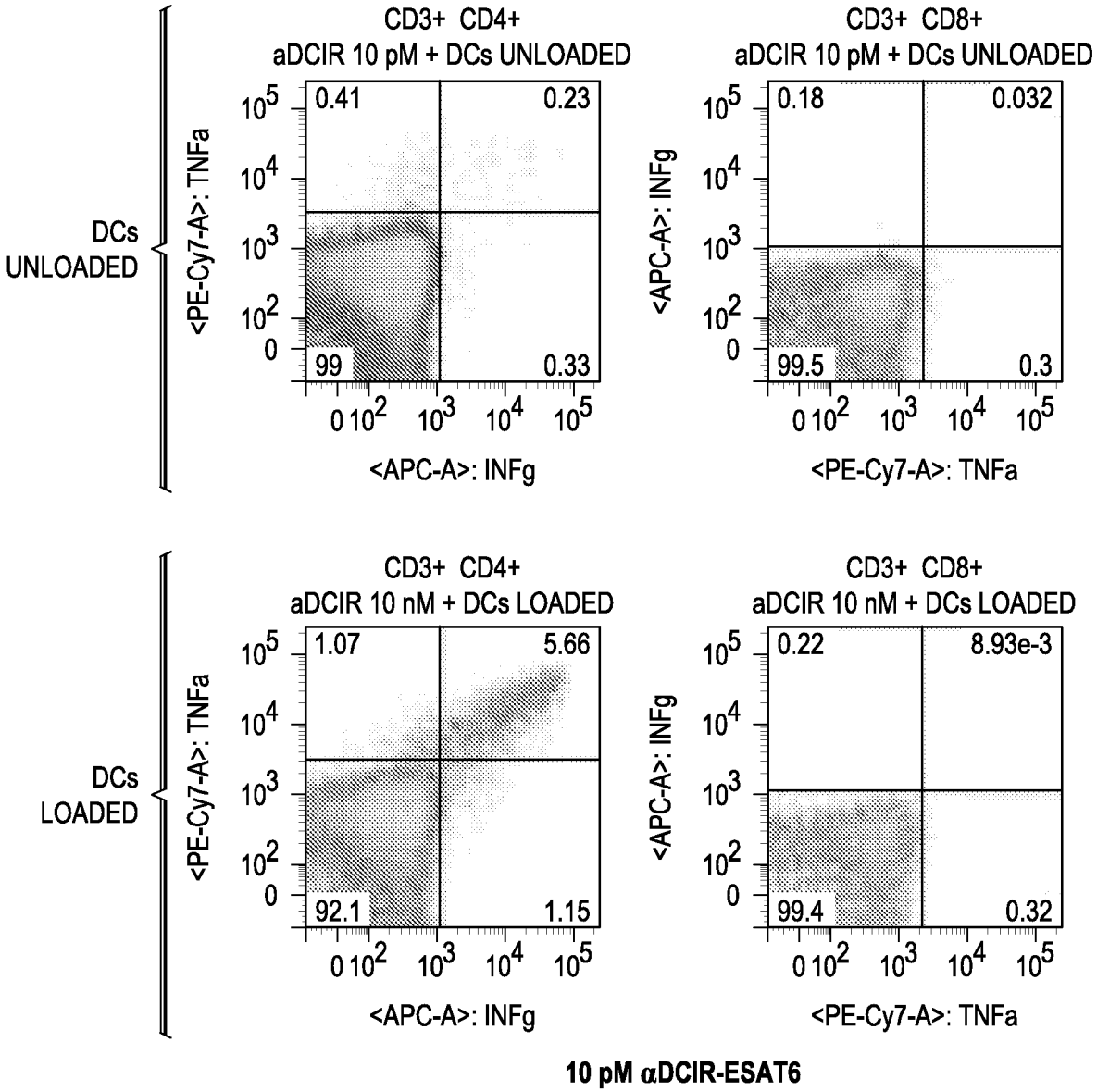
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FIG. 5C

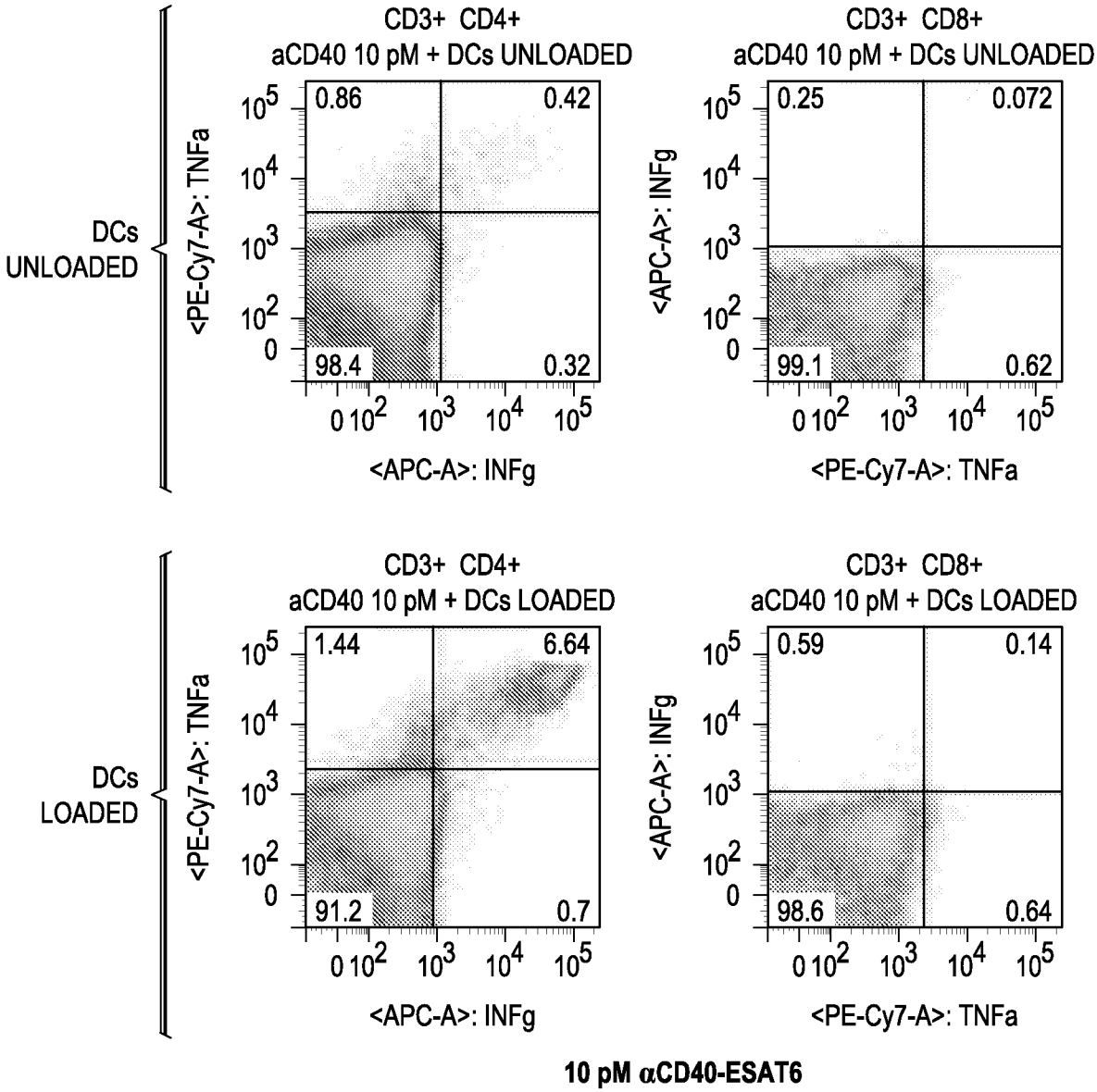
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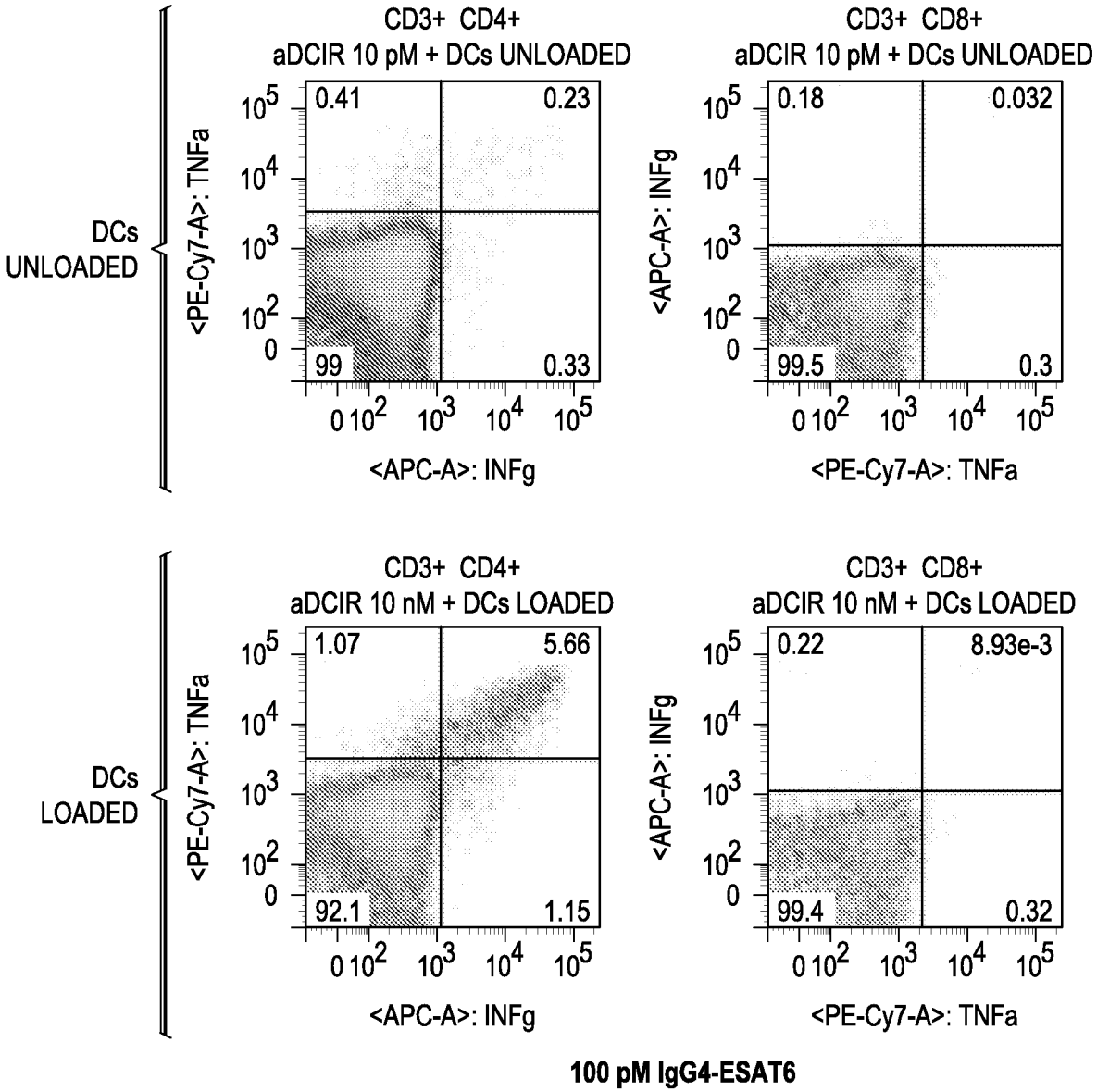
FIG. 5D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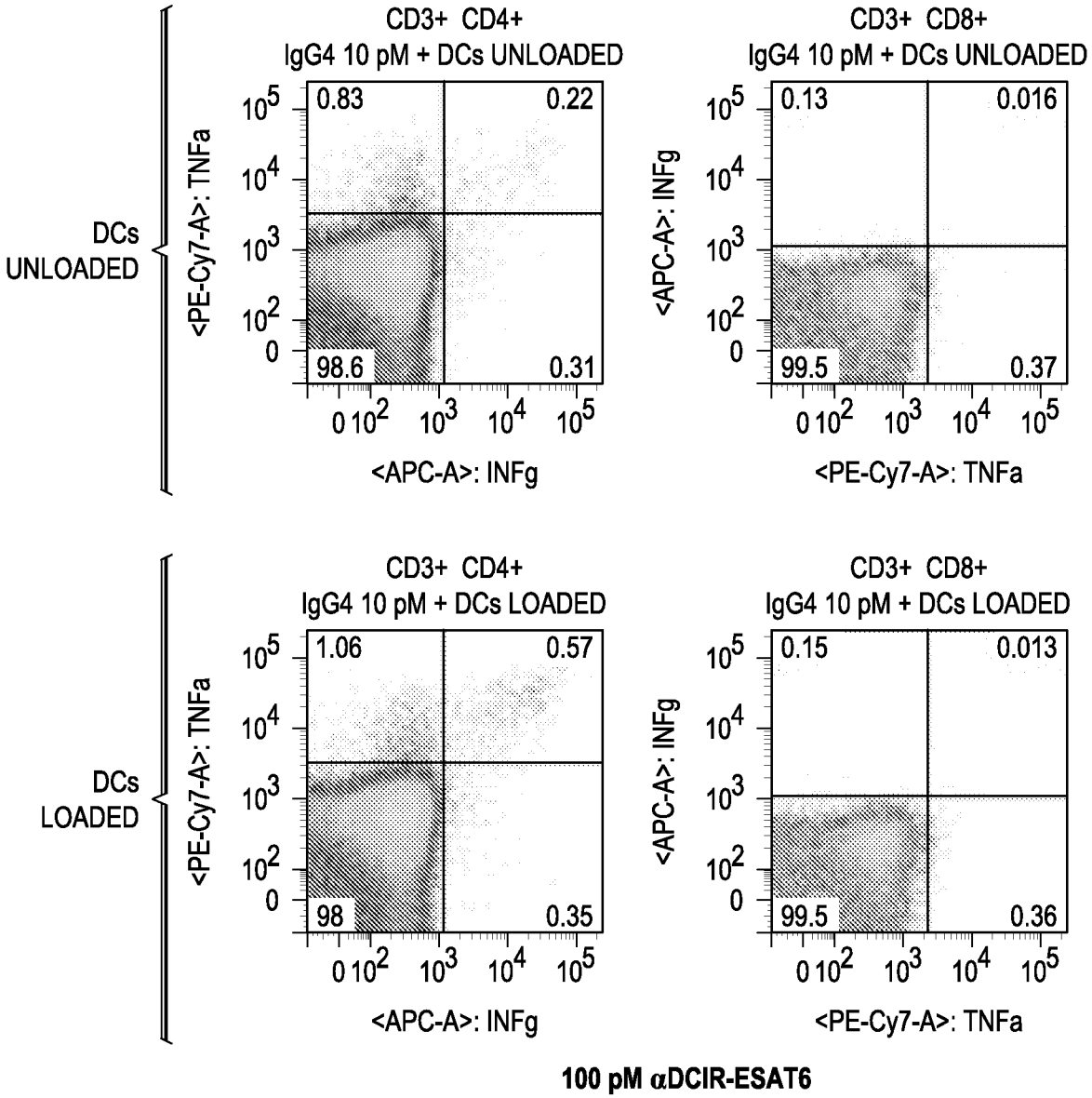
100 pM IgG4-ESAT6

FIG. 5E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0.13
0.016
99.5
0.37
CD3+ CD4+
IgG4 10 pM + DCs LOADED
CD3+ CD8+
IgG4 10 pM + DCs LOADED
DCs LOADED
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0.57
98
0.35
0.15
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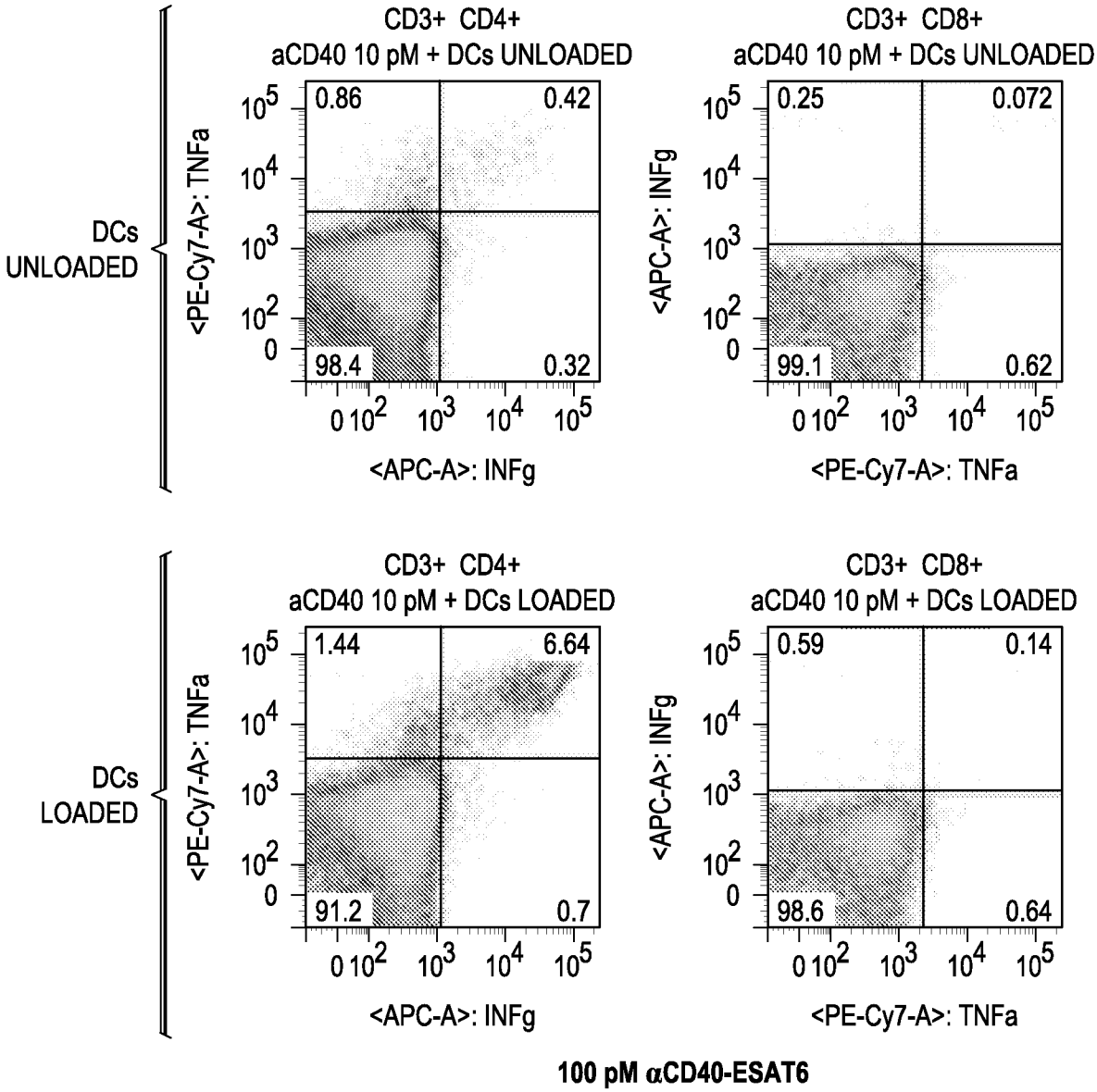
99.5
0.36
100 pM αDCIR-ESAT6

FIG. 5F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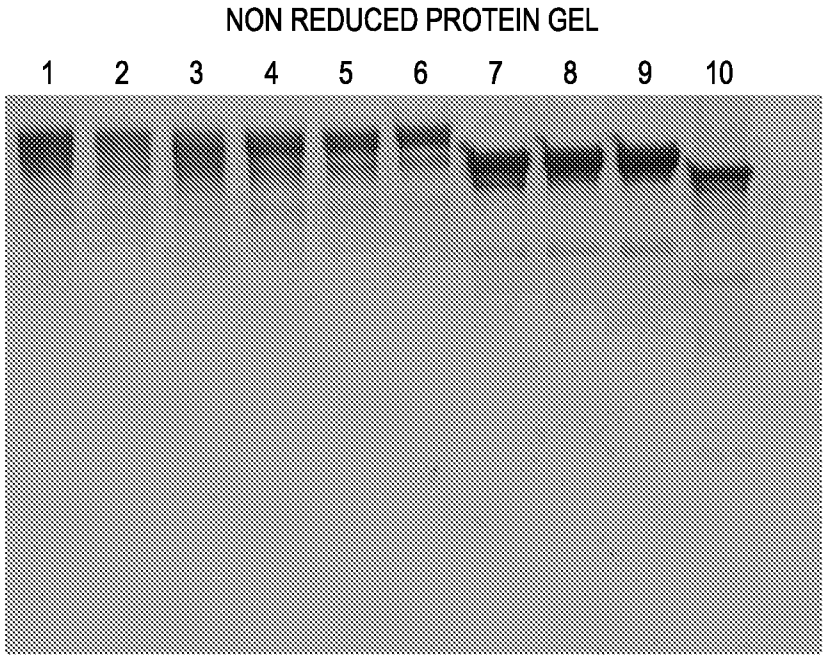
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FIG. 6A

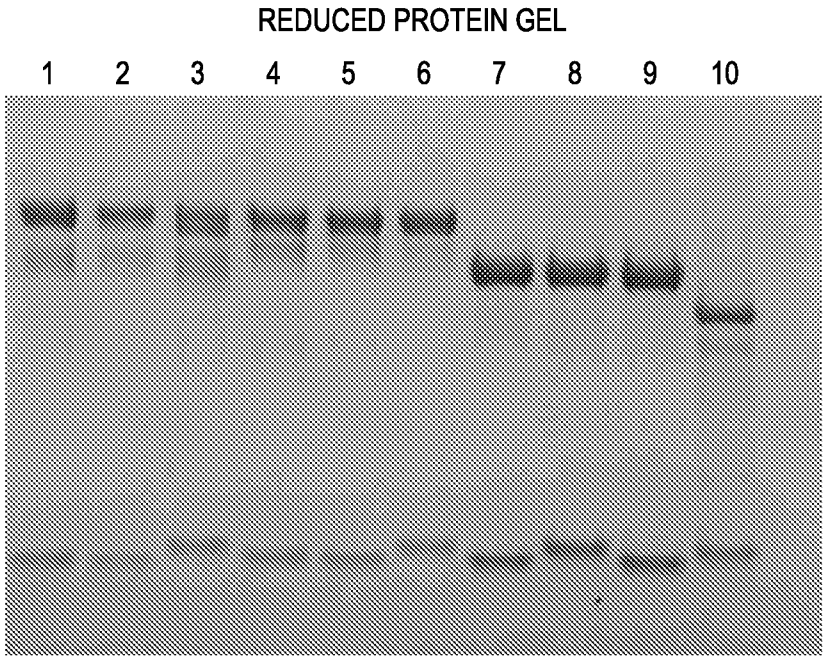
REDUCED PROTEIN GEL
1 2 3 4 5 6 7 8 9 10

FIG. 6B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/029802

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A61K 39/395 (2006.01) ***A61P 31/06*** (2006.01) ***C07K 16/46*** (2006.01)
A61K 39/04 (2006.01) ***A61P 37/04*** (2006.01) ***C12N 5/0784*** (2010.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPI, MEDLINE and EPODOC (EPOQUE): Antibody, antibodies, immunoglobulin, mAb, (dendritic cell), DC, MHC, CD1, CD2, CD3, CD4, CD8, CD11b, CD14, CD15, CD16, CD19, CD20, CD29, CD31, CD40, CD43, CD44, CD45, CD54, CD56, CD57, CD58, CD83, CD86, CMRF-44, CMRF-56, DCIR, other dendritic cell surface proteins disclosed in claims, TUBERCULOSIS, TB, ESAT-6, RV0475, RV0288, RV1980, AG85B. GenomeQuest: Tuberculosis antigen sequences SEQ ID NO: 1-5 (limited to keywords including cell surface proteins above and conjugate, fusion, chimeric, coupled, linker)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	STYLIANOU, E. et al: "Exploring the vaccine potential of Dec-205 targeting in Mycobacterium tuberculosis infection in mice" Vaccine, 25 January 2011 (published online), Vol. 29, pages 2279-2286 (see abstract; page 2281, paragraphs 2.6.2 and 2.7; page 2282, paragraph 3.2)	1-57
X	WO 2004/035619 A1 (CENTENARY INSTITUTE CANCER MEDICINE & CELL BIOLOGY) 29 April 2004 (see abstract; Example 4; page 9, lines 3-6; Example 5; Example 6; page 5, lines 17-19; page 10, line 25 – page 11, lines 1-2)	1-57
X	WO 2011/032161 A2 (BAYLOR RESEARCH INSTITUTE) 17 March 2011 (see examples; SEQ ID NO. 59 and SEQ ID NO. 60 on pages 42-43; SEQ ID NO. 62 on page 44; page 33, lines 33-35; page 32, line 21;page 10, line 25 – page 11, lines 1-2)	1-57

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 May 2012	28 May 2012
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer **SHAWN LYONS** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : +61 2 6283 2081

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 2011/140255 A1 (BAYLOR RESEARCH INSTITUTE) 10 November 2011 (see abstract; page 2, lines 32-37; claims 8-9; page 4, lines 1-3; claim 42; page 9, line 29; claim 51)	1-57
A	GROSSMANN, C. et al. "Enhancement of the priming efficacy of DNA vaccines encoding dendritic cell-targeted antigens by synergistic toll-like receptor ligands" *BMC Immunology*, 2009, Vol. 10, No. 43, published 3 August 2009, (online journal) [retrieved on 4 May 2012]. Retrieved from the internet. <URL: http://www.biomedcentral.com/1471-2172/10/43> (see entire document)	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/029802

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	2004035619	AU	2003271430	US	2004146948		
WO	2011032161	AR	078423	CA	2774140	TW	201116295
		US	2011081343				
WO	2011140255	US	2011274653				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/029802

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing filed or furnished:

   a. (means)

   [X] on paper

   [ ] in electronic form

   b. (time)

   [X] in the international application as filed

   [ ] together with the international application in electronic form

   [ ] subsequently to this Authority for the purposes of search

2. [ ] In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments: