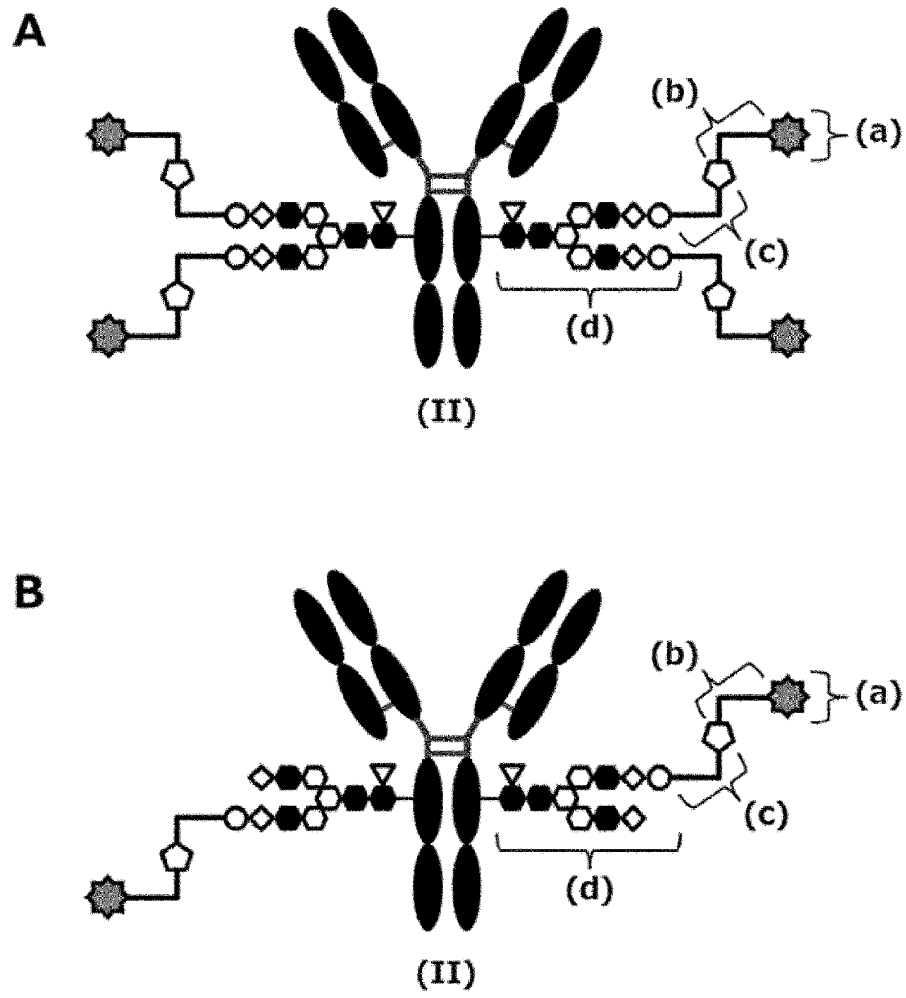
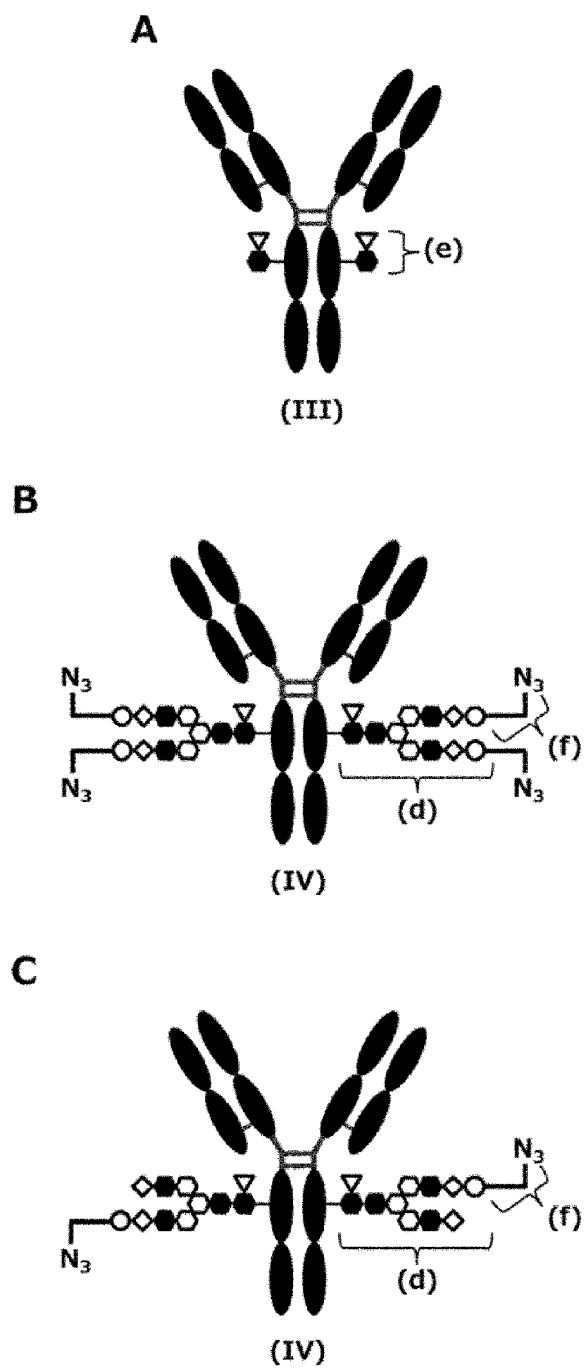


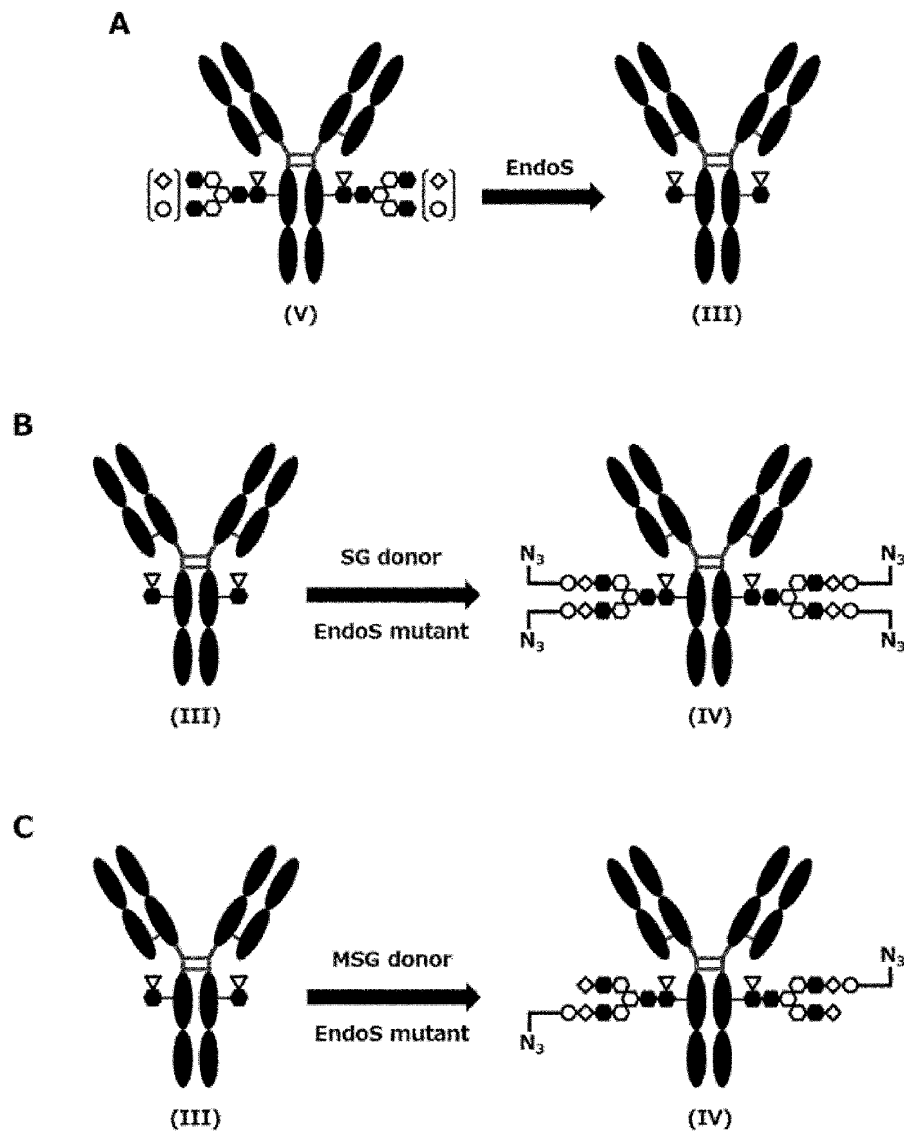
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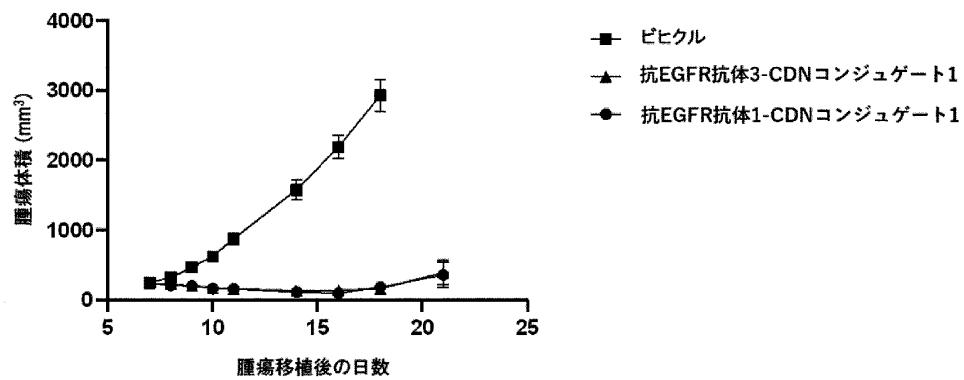
[図2]



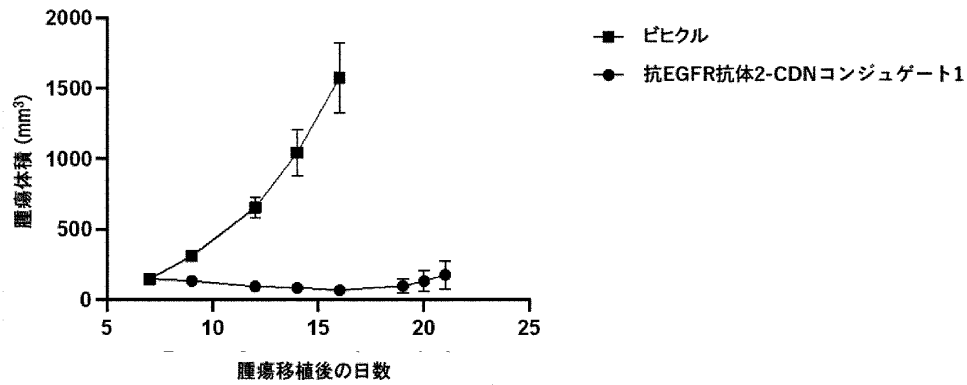
[図3]



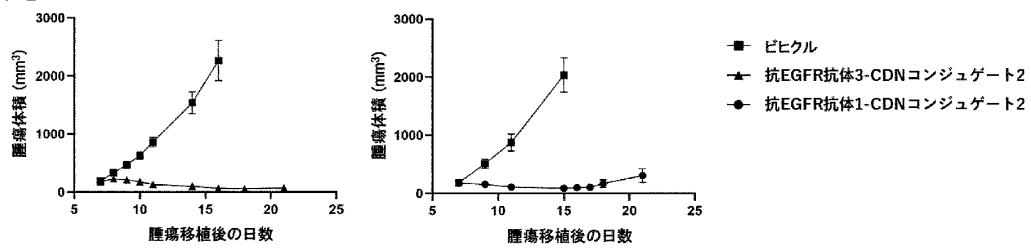
[図4]



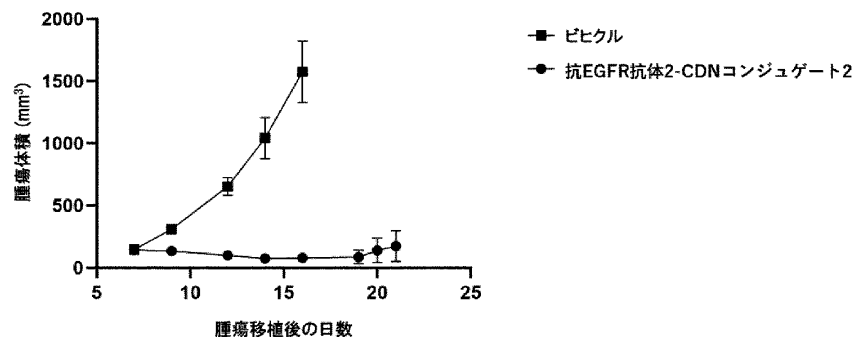
[図5]



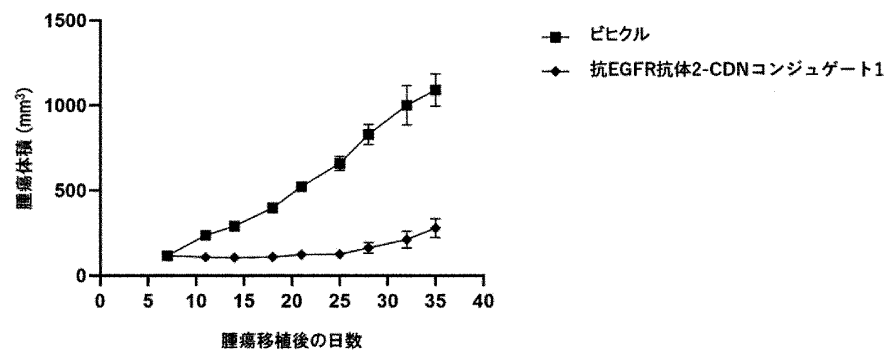
[図6]



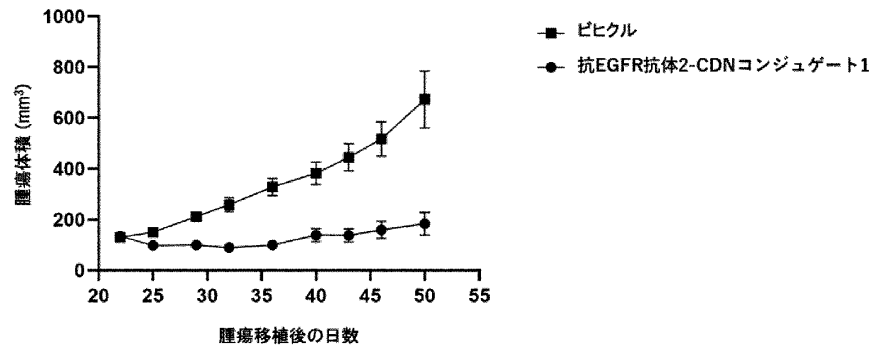
[図7]



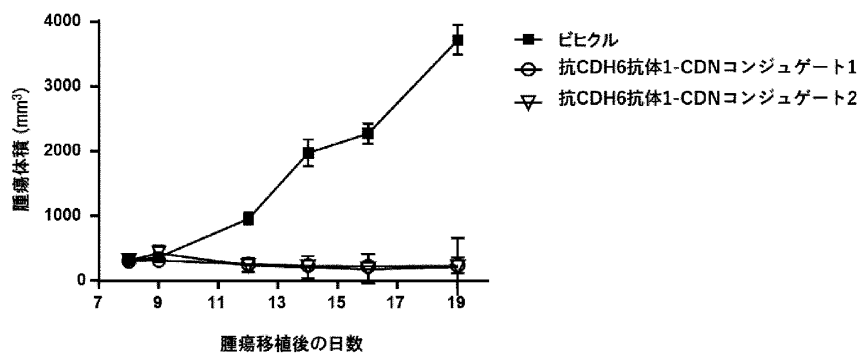
[図8]



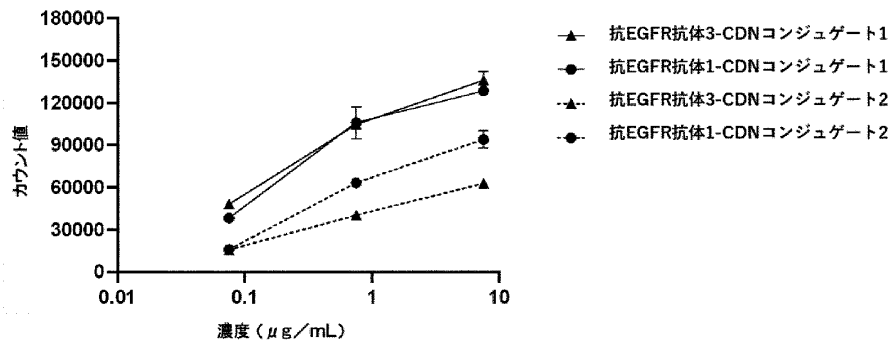
[図9]



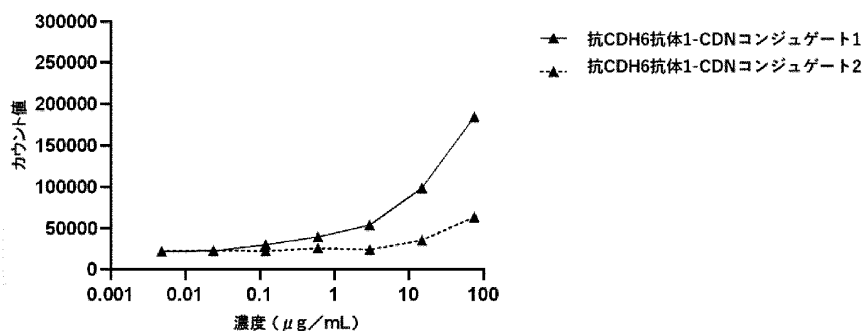
[図10]



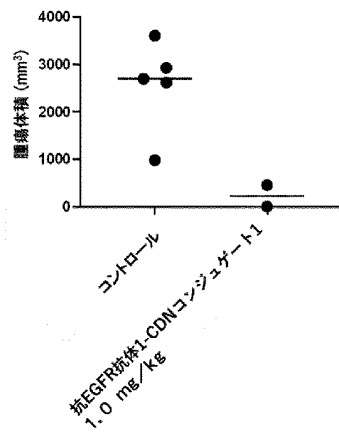
[図11]



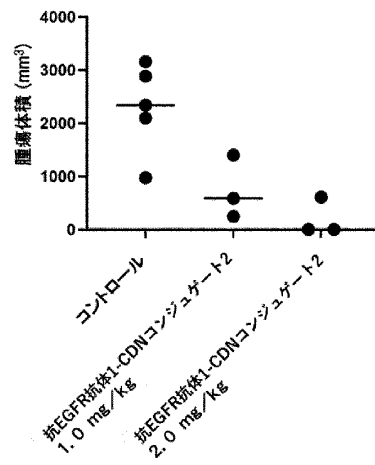
[図12]



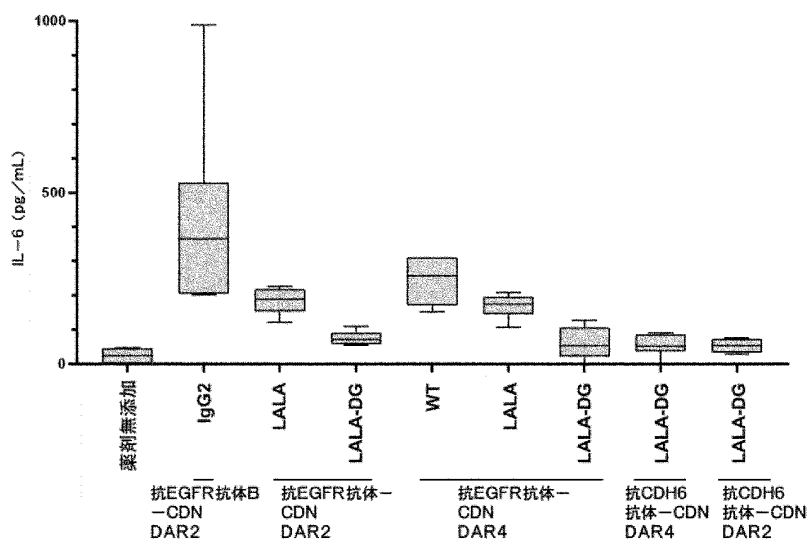
[図13]



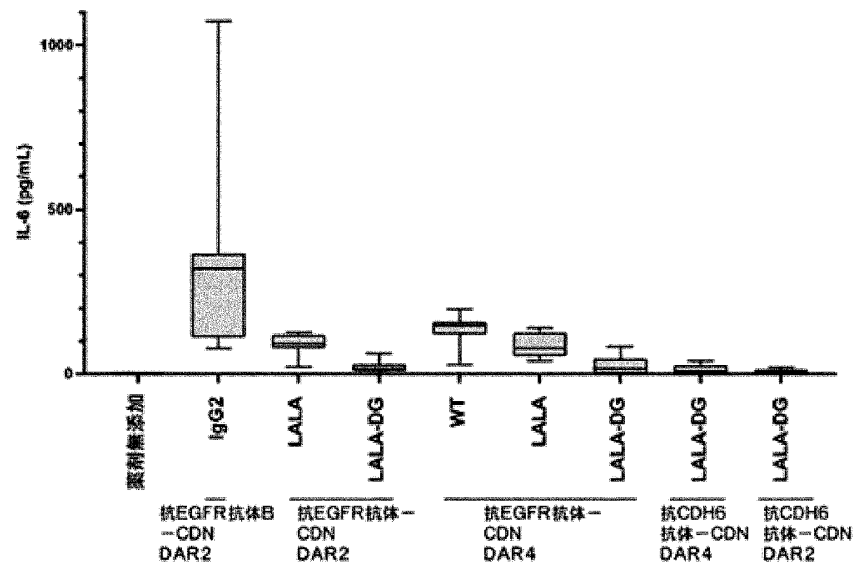
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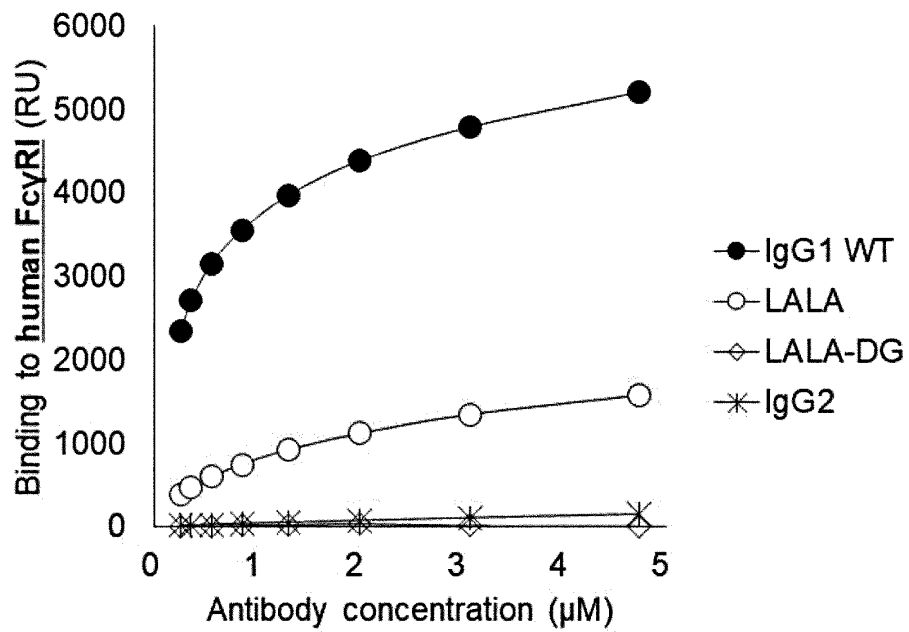
[図15A]



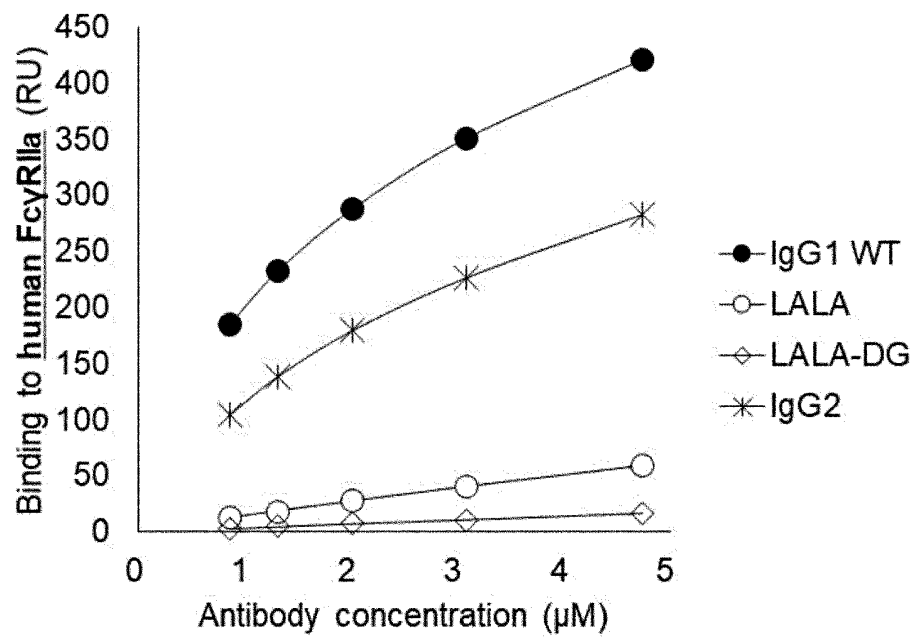
[図15B]



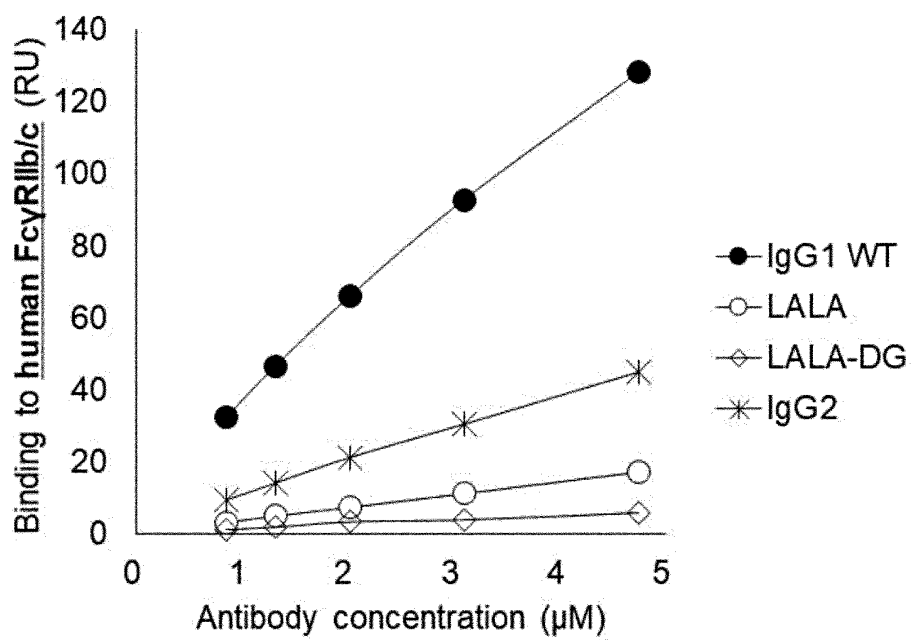
[図16A]



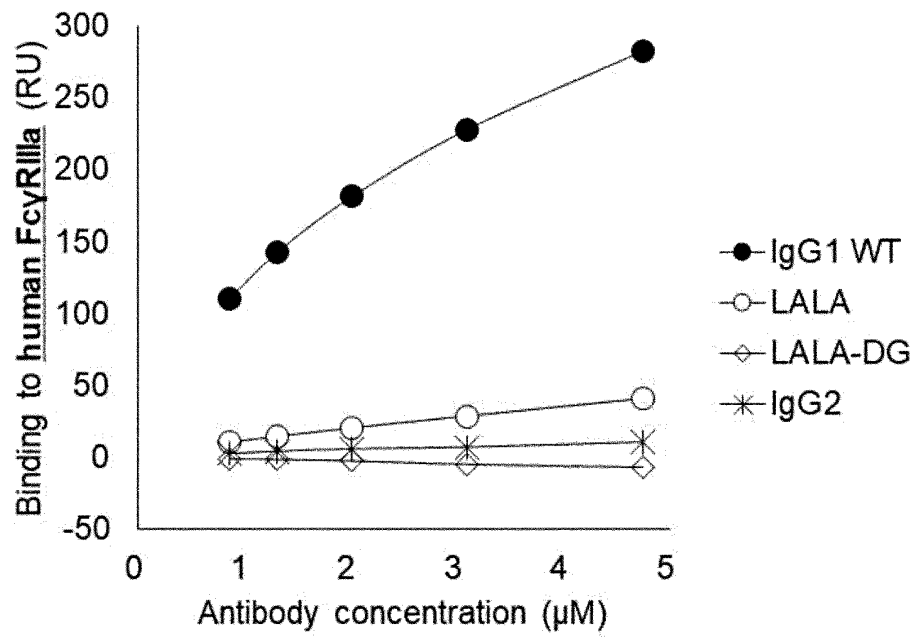
[図16B]



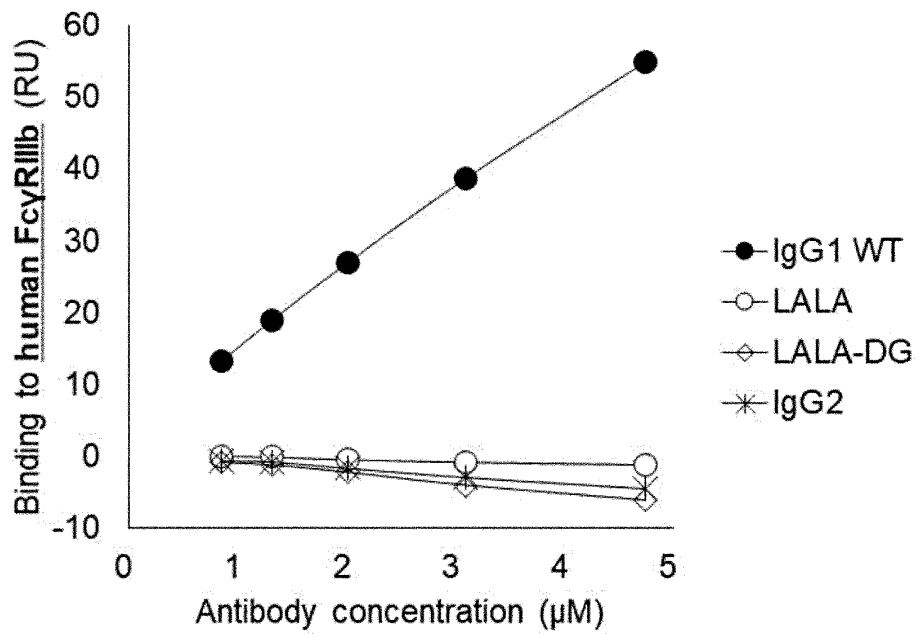
[図16C]



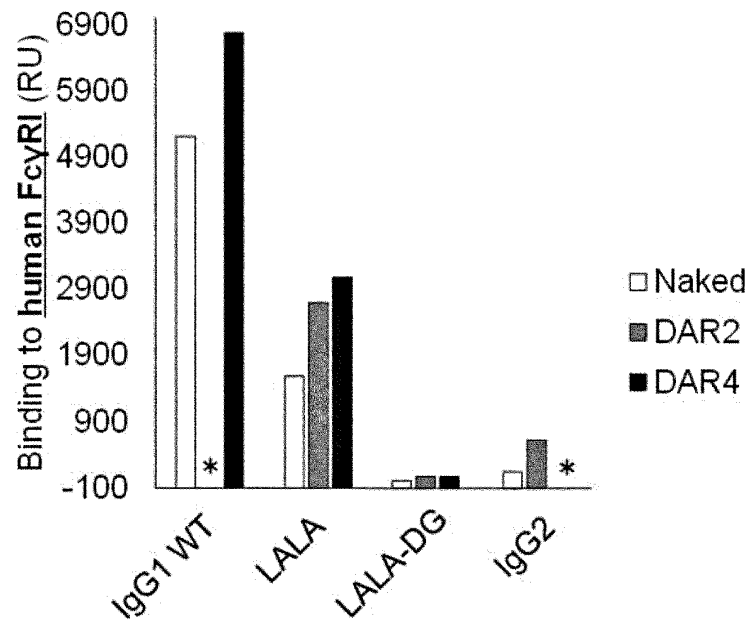
[図16D]



[図16E]

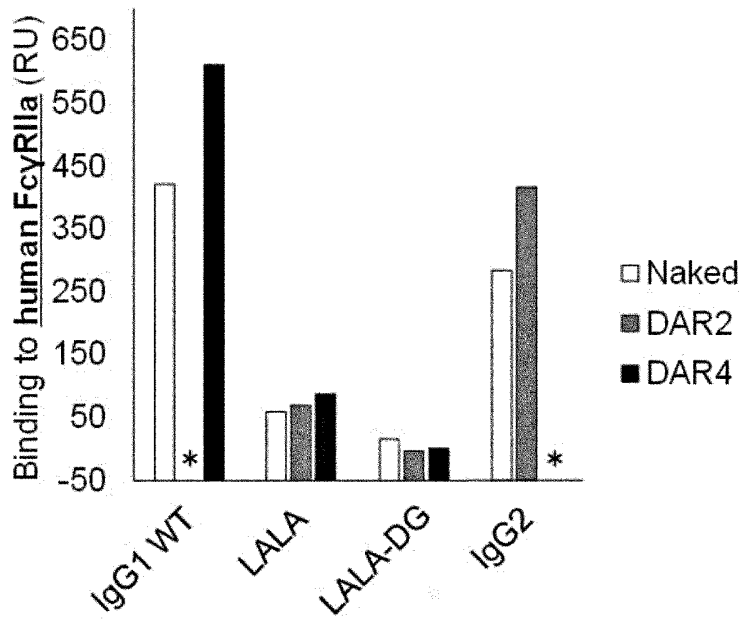


[図17A]



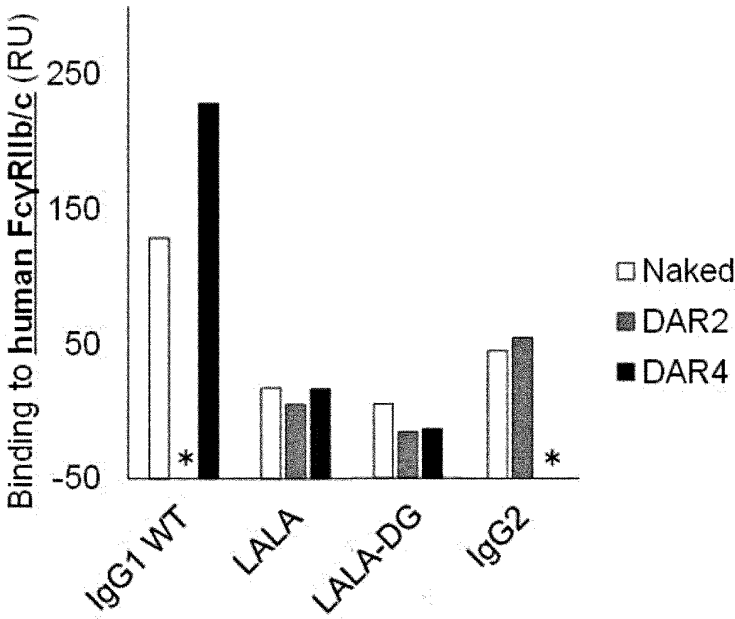
* : Not determined

[図17B]



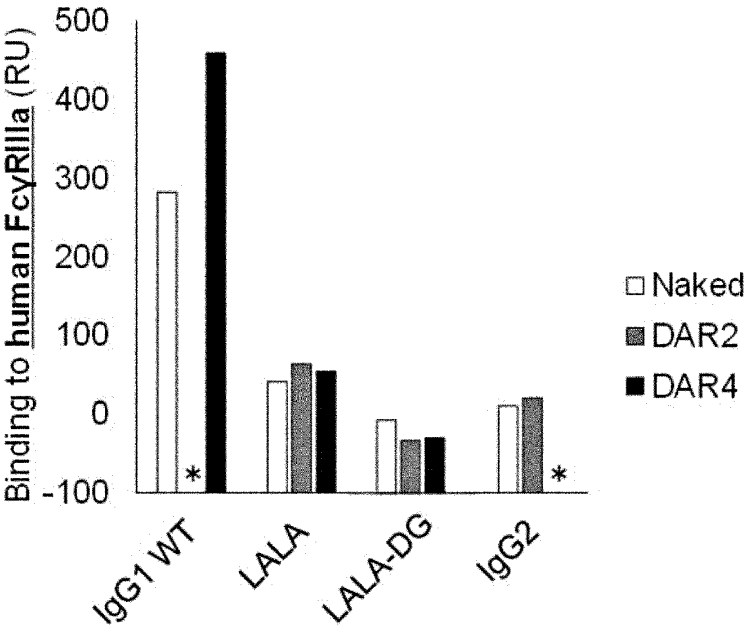
* : Not determined

[図17C]



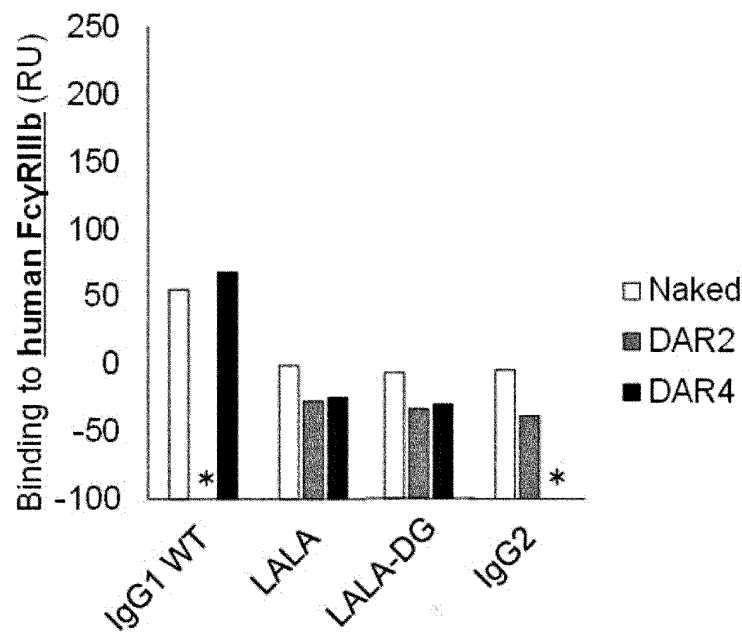
* : Not determined

[図17D]



* : Not determined

[図17E]



* : Not determined

[図18]

	CH2 T_m (°C)	ΔT_m (°C)
IgG1 WT	70.6	—
LALA	71.0	+ 0.4
LALA-DG	75.1	+ 4.5

[図19]

(a) ヒト STING 野生型のアミノ酸配列 (配列番号 1)

MPHSSLHPSIPCPRGHGAQKAALVLLSACLVTWGLGEPPEHTLRYLVHLASLQLGLLNGVCSLAEELRHIHS
RYRGSYWRTVRACLGCP LRRGALLLSIYFYSLPNAVGPFTWMLALLGLSQALNILLGLKGLAPAEISAVCEK
GNFNVAHGLAWSYYIGYLRLILPELQARIRTYNQHYNNLLRGAVSQRLYILLPLDCGVDPNLSMADPNIRFLDKL
PQQTGDRAGIKDRVYSNSIYELLENGQRAGTCVLEYATPLQTLFAMSQYSQAGFSREDRLAQAKLFCRTLEDILA
DAPESQNNCRLIAYQEPADDSSFSLSQEVLRLRQEEKEEVTGSLKTSAVPSTSTMSQEPELLISGMEKPLPLR
TDFS

(b) ヒト STING REF 変異型 (R232H) のアミノ酸配列 (配列番号 3)

MPHSSLHPSIPCPRGHGAQKAALVLLSACLVTWGLGEPPEHTLRYLVHLASLQLGLLNGVCSLAEELRHIHS
RYRGSYWRTVRACLGCP LRRGALLLSIYFYSLPNAVGPFTWMLALLGLSQALNILLGLKGLAPAEISAVCEK
GNFNVAHGLAWSYYIGYLRLILPELQARIRTYNQHYNNLLRGAVSQRLYILLPLDCGVDPNLSMADPNIRFLDKL
PQQTGDHAGIKDRVYSNSIYELLENGQRAGTCVLEYATPLQTLFAMSQYSQAGFSREDRLAQAKLFCRTLEDILA
DAPESQNNCRLIAYQEPADDSSFSLSQEVLRLRQEEKEEVTGSLKTSAVPSTSTMSQEPELLISGMEKPLPLR
TDFS

(下線は、R232H 変異の場所を示す。)

(c) ヒト STING HAQ 変異体 (R71H, G230A, R293Q) のアミノ酸配列 (配列番号 5)

MPHSSLHPSIPCPRGHGAQKAALVLLSACLVTWGLGEPPEHTLRYLVHLASLQLGLLNGVCSLAEELHHIHS
RYRGSYWRTVRACLGCP LRRGALLLSIYFYSLPNAVGPFTWMLALLGLSQALNILLGLKGLAPAEISAVCEK
GNFNVAHGLAWSYYIGYLRLILPELQARIRTYNQHYNNLLRGAVSQRLYILLPLDCGVDPNLSMADPNIRFLDKL
PQQTADRAGIKDRVYSNSIYELLENGQRAGTCVLEYATPLQTLFAMSQYSQAGFSREDRLAQAKLFCQTLEDILA
DAPESQNNCRLIAYQEPADDSSFSLSQEVLRLRQEEKEEVTGSLKTSAVPSTSTMSQEPELLISGMEKPLPLR
TDFS

(3つの下線は、それぞれ、R71H 変異、G230A 変異及び R293Q 変異の場所を示す。)

[図20]

抗EGFR抗体（改変抗EGFR抗体1～3）のCDRL1のアミノ酸配列（配列番号23）

QASQDISNYLN

抗EGFR抗体（改変抗EGFR抗体1～3）のCDRL2のアミノ酸配列（配列番号24）

DASNLET

抗EGFR抗体（改変抗EGFR抗体1～3）のCDRL3のアミノ酸配列（配列番号25）

QHFDHLPLA

抗EGFR抗体（改変抗EGFR抗体1～3）のCDRH1のアミノ酸配列（配列番号26）

SGDYYWT

抗EGFR抗体（改変抗EGFR抗体1～3）のCDRH2のアミノ酸配列（配列番号27）

HIYYSGNTNYP SLKS

抗EGFR抗体（改変抗EGFR抗体1～3）のCDRH3のアミノ酸配列（配列番号28）

DRV TGAFDI

[図21-1]

抗EGFR抗体（改変抗EGFR抗体1～3）の軽鎖可変領域のアミノ酸配列（配列番号29）

DIQMTQSPSSLSASVGDRVTITCQASQDISNYLNWYQQKPGKAPKLLIYDASNLETGVPS
RFSGSGSGTDFTFTISSLPEDIATYFCQHFHDLPLAFGGGTKVEIKR

抗EGFR抗体（改変抗EGFR抗体1～3）の軽鎖のアミノ酸配列（配列番号30）

DIQMTQSPSSLSASVGDRVTITCQASQDISNYLNWYQQKPGKAPKLLIYDASNLETGVPS
RFSGSGSGTDFTFTISSLPEDIATYFCQHFHDLPLAFGGGTKVEIKRTVAAPSVFIFPP
SDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSSTLSSTLT
LSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

抗EGFR抗体（改変抗EGFR抗体1～3）の重鎖可変領域のアミノ酸配列（配列番号31）

QVQLQESGPGLVKPSSETLSLTCTVSGGSVSSGDYYWTWIRQSPGKGLEWIGHIYYSGNTN
YNPSLKSRLTISIDTSKTFSLKLSSVTAADTAIYYCVRDRVTGAFDIWGQGTMTVSS

[図21-2]

抗EGFR抗体LALA-DG変異体（改変抗EGFR抗体1）の
重鎖のアミノ酸配列（配列番号32）

QVQLQESGPGLVKPSSETLSLTCTVSGGSVSSGDYYWTWIRQSPGKGLEWIGHIYYSGNTN
YNPSLKSRLTISIDTSKTQFSLKLSSVTAADTAIYYCVRDRVTGAFDIWGQGTMTVSSA
STKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSG
LYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKRVKPKSCDKTHTCPPCPAPEAAGGP
SVFLFPPKPKDTLMISRTPEVTCVVGVSHPEDPEVKFNWYVDGVEVHNAKTKPREEQYN
TYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSREEM
TKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPPVLDSDGSFFLYSKLTVDKSRWQ
QGNVFSCSVMEALHNHYTQKSLSLSPGK

抗EGFR抗体LALA-DG変異体（改変抗EGFR抗体2）の
重鎖のアミノ酸配列（配列番号33）

QVQLQESGPGLVKPSSETLSLTCTVSGGSVSSGDYYWTWIRQSPGKGLEWIGHIYYSGNTN
YNPSLKSRLTISIDTSKTQFSLKLSSVTAADTAIYYCVRDRVTGAFDIWGQGTMTVSSA
STKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSG
LYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHTCPPCPAPEAAGGP
SVFLFPPKPKDTLMISRTPEVTCVVGVSHPEDPEVKFNWYVDGVEVHNAKTKPREEQYN
TYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSREEM
TKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPPVLDSDGSFFLYSKLTVDKSRWQ
QGNVFSCSVMEALHNHYTQKSLSLSPGK

抗EGFR抗体Aの重鎖のアミノ酸配列（配列番号34）

QVQLQESGPGLVKPSSETLSLTCTVSGGSVSSGDYYWTWIRQSPGKGLEWIGHIYYSGNTN
YNPSLKSRLTISIDTSKTQFSLKLSSVTAADTAIYYCVRDRVTGAFDIWGQGTMTVSS
ASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSS
GLYSLSSVVTVPSSSLGTQTYICNVNHKPSNTKVDKRVKPKSCDKTHTCPPCPAPELLGG
PSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYN
STYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSREE
MTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPPVLDSDGSFFLYSKLTVDKSRW
QGNVFSCSVMEALHNHYTQKSLSLSPGK

[図21-3]

抗EGFR抗体B (Vectibix) の重鎖のアミノ酸配列 (配列番号35)

QVQLQESGPGLVKPSETLSLTCTVSGGSVSSGDYYWTWIRQSPGKGLEWIGHIYYSGNTN
YNPSLKSRLTISIDTSKTQFSLKLSSVTAADTAIYYCVRDRVGTGAFDIWGQGTMTVSSA
STKGPSVFPLAPCSRSTSESTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSG
LYSLSSVTVPSNFGTQTYTCNVDHKPSNTKVDKTVKCCVECPPCPAPPVAGPSVFL
FPPKPKDTLMISRTPEVTCVVVDVSHEDPEVQFNWYVDGVEVHNAKTKPREEQFNSTFRV
VSVLTVVHQDWLNGKEYKCKVSNKGLPAPIEKTISKTKGQPREPQVYTLPPSREEMTKNQ
VSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPMLDSDGSFFLYSKLTVDKSRWQQGNV
FSCSVMEALHNHYTQKSLSLSPGK

抗EGFR抗体LALA変異体 (改変抗EGFR抗体3) の重鎖のアミノ酸配列 (配列番号36)

QVQLQESGPGLVKPSETLSLTCTVSGGSVSSGDYYWTWIRQSPGKGLEWIGHIYYSGNTN
YNPSLKSRLTISIDTSKTQFSLKLSSVTAADTAIYYCVRDRVGTGAFDIWGQGTMTVSSA
STKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSG
LYSLSSVTVPSSSLGTQTYICNVNHKPSNTKVDKRVEPKSCDKTHTCPPCPAPEAAGGP
SVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNS
TYRVSVSLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSREEM
TKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQ
QGNVFSCSVMEALHNHYTQKSLSLSPGK

[図22]

抗CDH6抗体（改変抗CDH6抗体1）のCDRL1のアミノ酸配列（配列番号37）

KASQNIYKNLA

抗CDH6抗体（改変抗CDH6抗体1）のCDRL2のアミノ酸配列（配列番号38）

DANTLQT

抗CDH6抗体（改変抗CDH6抗体1）のCDRL3のアミノ酸配列（配列番号39）

QQYYSGWA

抗CDH6抗体（改変抗CDH6抗体1）のCDRH1のアミノ酸配列（配列番号40）

RNFMH

抗CDH6抗体（改変抗CDH6抗体1）のCDRH2のアミノ酸配列（配列番号41）

WIYPGDGETEYAQKFQG

抗CDH6抗体（改変抗CDH6抗体1）のCDRH3のアミノ酸配列（配列番号42）

GVYGGFAGGYFDF

[図23]

抗CDH6抗体（改変抗CDH6抗体1）の軽鎖可変領域のアミノ酸配列（配列番号43）

DIQMTQSPSSLSASVGDRVTITCKASQNIYKNLAWYQQKPGKAPKLLIYDANTLQTGVPS
RFSGSGSGSDFTLTISSLQPEDFATYFCQQYYSGWAFGQGTKVEIKR

抗CDH6抗体（改変抗CDH6抗体1）の軽鎖のアミノ酸配列（配列番号44）

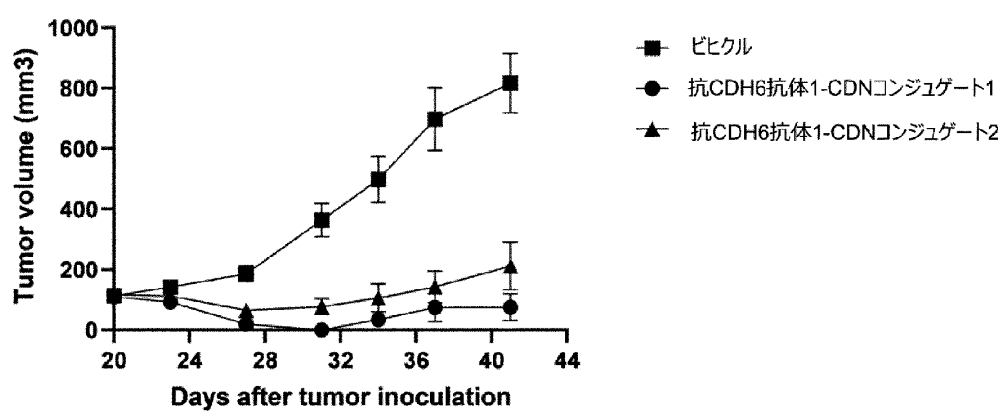
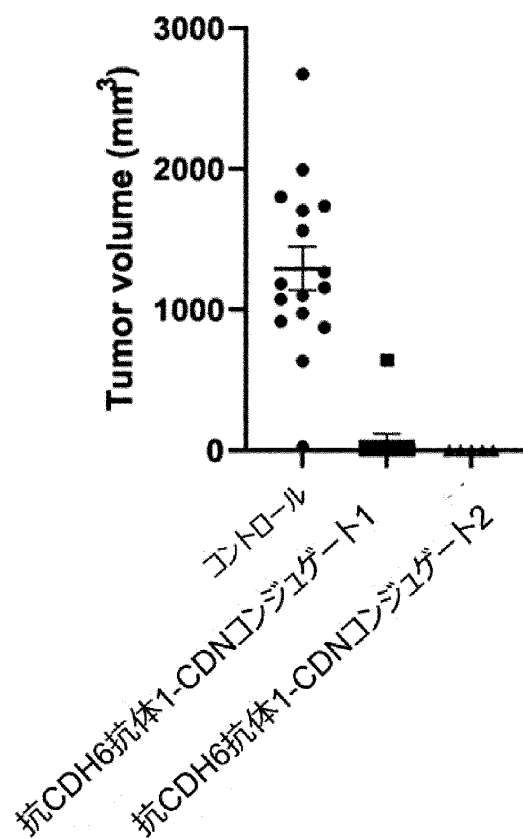
DIQMTQSPSSLSASVGDRVTITCKASQNIYKNLAWYQQKPGKAPKLLIYDANTLQTGVPS
RFSGSGSGSDFTLTISSLQPEDFATYFCQQYYSGWAFGQGTKVEIKRTVAAPSVFIFPPS
DEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSSTYSLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

抗CDH6抗体（改変抗CDH6抗体1）の重鎖可変領域のアミノ酸配列（配列番号45）

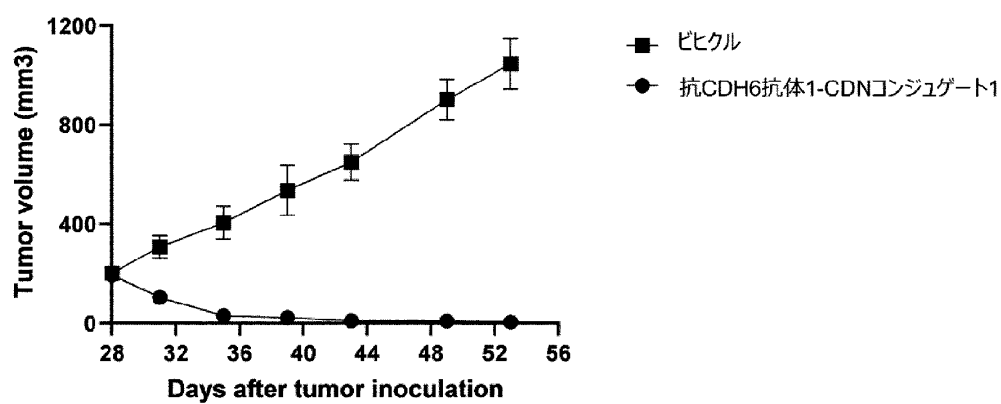
EVQLVQSGAEVKKPGASVKVSCKASGYTFTRNFMHWVRQAPGGGLEWMGWIYPGDGETEY
AQKFQGRVTITADTSTSTAYMELSSLRSEDTAVYYCARGVYGGFAGGYFDWVGQGLVTVSS

抗CDH6抗体LALA-DG変異体（改変抗CDH6抗体1）の重鎖のアミノ酸配列（配列番号46）

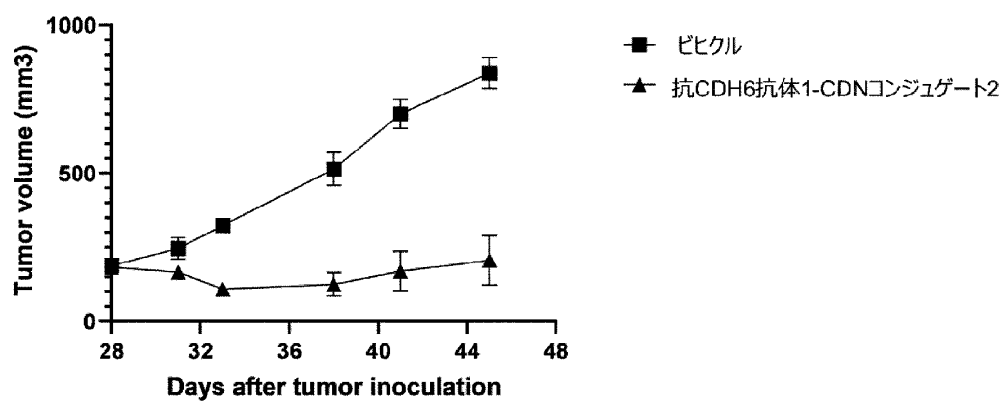
EVQLVQSGAEVKKPGASVKVSCKASGYTFTRNFMHWVRQAPGGGLEWMGWIYPGDGETEY
AQKFQGRVTITADTSTSTAYMELSSLRSEDTAVYYCARGVYGGFAGGYFDWVGQGLVTV
SSASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQ
SSGLYSLSVVTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHTCPPCPAPEAA
GGPSVFLFPPKPKDTLMISRTPEVTCVYVGVSHEDPEVKFNWYVDGVEVHNAKTKPREEQ
YNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSR
EEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK



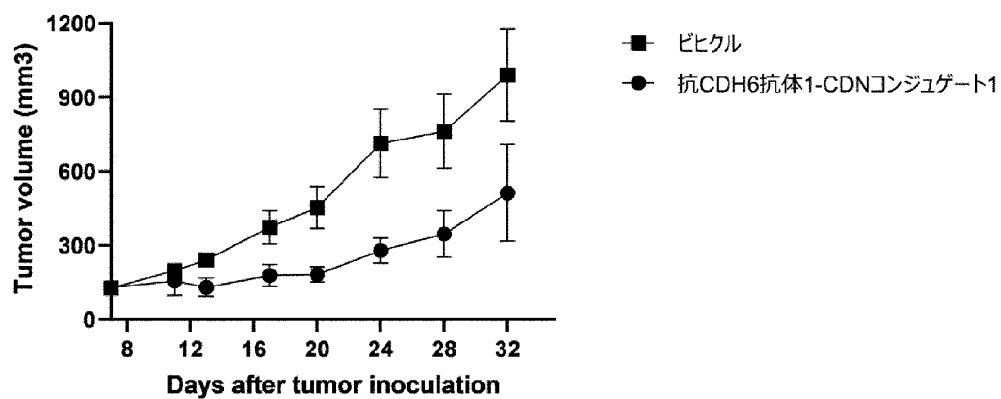
[図26]



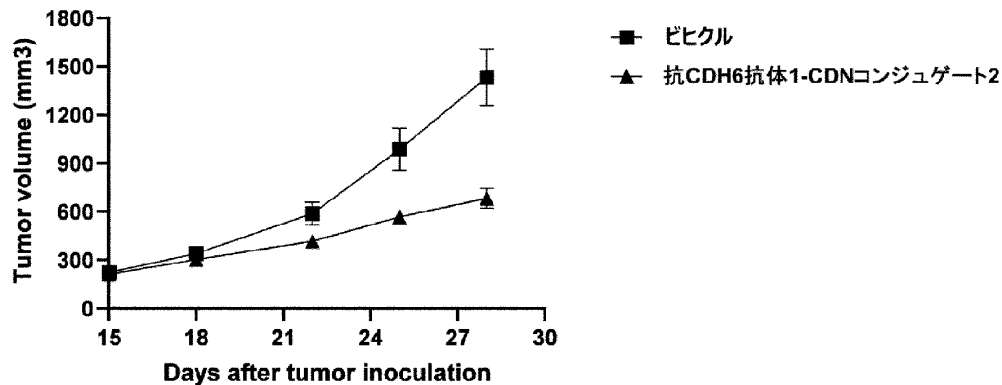
[図27]



[図28]



[図29]



[図30]

配列番号47 野生型Endo-Sのアミノ酸配列 NCBI Accession number: AAK34539.1

```
1   MDKHL LVKRT  LGCVCAATLM  GAALATHHDS  LNTVKAE EKT  VQVQKGLPSI  50
51  DSLHYLS ENS  KKEFK EELSK  AGQESQKVKE  ILAKAQQADK  QAQELAKMKI  100
101 PEKIPMK PLH  GPLYGGYFRT  WHDKTSDPTE  KDKVNSMGEL  PKEVDLAFIF  150
151 HDWTKDY SLF  WKELATKHVP  KLNKQGTRVI  RTIPWRFLAG  GDNSGIAEDT  200
201 SKYPNTPE GN  KALAKAIVDE  YVYKYNLDGL  DV DVEHDSIP  KVDKKEDTAG  250
251 VERSIQVF EE  IGKLIGPKGV  DKSRLFIMDS  TYMADKNPLI  ERGAPYINLL  300
301 LVQVYGSQ GE  KGGWEPVSNR  PEKTMEERWQ  GYSKYIRPEQ  YMIGFSFYEE  350
351 NAQEGNLW YD  INSRKDEDKA  NGINTDITGT  RAERYARWQP  KTGGVKGGIF  400
401 SYAIDRDG VA  HQPKKYAKQK  EFKDATDNIF  HSDYSVSKAL  KTVMLKD KSY  450
451 DLIIDEKD FP  KALREAVMAQ  VGTRKGD LER  FNGTLRLDNP  AIQSLEGLNK  500
501 FKKLAQLD LI  GLSRITKLDR  SVLPANMKPG  KDTLETVLET  YKKDNKEEPA  550
551 TIPPVSLK VS  GLTGLKELDL  SGFDRETLA G  LDAATLTSLE  KVDISGNKLD  600
601 LAPGTENR QI  FDTMLSTISN  HVGSNEQTVK  FDKQKPTGHY  PDTYGKTS LR  650
651 LPVANEKV DL  QSQLLFGTVT  NQGT LINSEA  DYKAYQNHKI  AGRSFVDSNY  700
701 HYNNEKVS YE  NYTVKVTDST  LGTTTDKTLA  TDKEETYKVD  FFSPADKTKA  750
751 VHTAKVIV GD  EKTMMVNLA E  GATVIGGSAD  PVNARKVFDG  QLGSETDNIS  800
801 LGWDSKQS II  FKLKEDGLIK  HWRFFNDSAR  NPETTNKPIQ  EASLQIFNIK  850
851 DYNLDNLL EN  PNKFDDEKYW  ITVD TYSAQG  ERATAFSNTL  NNITSKYWRV  900
901 VFDTKGDR YS  SPVPELQIL  GYPLPNADTI  MKTVTTAKEL  SQQKDKFSQK  950
951 MLDELKIK EM  ALETSLNSKI  FDVTAINANA  GVLKDCIEKR  QLLKK  995
```

[図31]

配列番号48 野生型Endo-S2のアミノ酸配列 NCBI Accession number: ACI61688.1

```

1   MDKHLLVKRT  LGCVCAATLM  GAALATHHDS  LNTVKAEECT  VQTGKTDQQV  50
51  GAKLVQEIRE  GKRGPLYAGY  FRTWHDRAST  GIDGKQOHPE  NTMAEVPKEV  100
101 DILFVFHDHT  ASDSPFWSEL  KDSYVHKLHQ  QGTALVQTIG  VNELNGRTGL  150
151 SKDYPDTPEG  NKALAAAIKV  AFVTDGRGVDG  LDIDIEHEFT  NKRTPEEDAR  200
201 ALNVFKEIAQ  LIGKNGSDKS  KLLIMDTTSL  VENNPIFKGI  AEDLDYLLRQ  250
251 YYGSQGGAE  VDTINSOWNQ  YQNYIDASQF  MIGFSFFEES  ASKGNLWFDV  300
301 NEYDPNNPEK  GKDIEGTRAK  KYAEWQPSTG  GLKAGIFSIA  IDRDRGVAHVP  350
351 STYKNRTSTN  LQRHEVDNIS  HTDYTVSRKL  KTLMTEDKRY  DVIDQKDIPD  400
401 PALREQIIQQ  VGQYKGDLE  YNKTLVLTGD  KIQNLKGLEK  LSKLQKLELR  450
451 QLSNVKEITP  ELLPESMKKD  AELVMVGMTG  LEKLNLSGLN  RQTLDGIDVN  500
501 SITHLTSFDI  SHNSLDLSEK  SEDRKLLMTL  MEQVSNHQKI  TVKNTAFENQ  550
551 KPKGYYPQTY  DTKEGHYDVG  NAEHDILTDF  VFGTVTKRNT  FIGDEEAFAI  600
601 YKEGAVDGRQ  YVSKDYTYEA  FRKDYKGYKV  HLTASNIGET  VTSKVTATTD  650
651 ETVLVDVSDG  EKVVVHHMKLN  IGSGAIMMEN  LAKGAKVIGT  SGDFEQAKKI  700
701 FDGEKSDRFF  TWGQTNWIAF  DLGEINLAKE  WRLFNAETNT  EIKTDSNLV  750
751 AKGRLQILKD  TTIDLEKMDI  KNRKEYLSND  ENWTDVAQMD  DAKAIFNSKL  800
801 SNVLSRYWRF  CVDGGASSYY  PQYTELQILG  QRLSNDVANT  LKD  843

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[図32]

配列番号49 野生型Endo-Siのアミノ酸配列 NCBI Accession number: EKB52062.1

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1   MNKRLLVKRT  FGCVCAAAIL  GVAPLSHPTI  VEAREELKMP  NGLQESIADV  50
51  EAKIDALTYL  SKNSKDEFKH  SMYEIPSNRE  HKPVSPKQAL  QNAKKADAQA  100
101 ERLAKMTIPK  KEELKALEGP  LYGGYFRTWQ  DKTSDPTEIN  KVNSFGELPK  150
151 EVDLAFVFHD  YTKDYSLEWE  ELATKQVPKL  NKQGTRVIRT  IPWRFLSGAD  200
201 HSDISADKEK  FPNTEAGNKA  LAKAIVDEYV  YKYNLDGLDI  DIERDSVPKV  250
251 NDKEDPEALA  RTVEVFKEIG  KLIGANGADK  SRLIMDTTY  TAEENPLIKE  300
301 TAQYLNLLLV  QVYGFSGENG  NYLHHKNILD  ETSSMEGRWQ  GYSKYIRPEQ  350
351 YMVGFSEFYE  KDFNNRWKDI  NEEDPSDPHI  GEKIQTAE  RYAKWQPKTG  400
401 GLKGGLFSYA  IDRDRGVAQPK  QKTEHPELTK  IVKSEYKVS  ALKKLMMTDD  450
451 QYQPIDQSDF  PDKALRESII  KQVGTTRGDL  ERFKGTLRD  NPEIKDLTGL  500
501 NKLKRVAKLE  LINLPKITKI  DKDDLQNLK  PLTDNQKSNL  EIKGTYDDSK  550
551 LYKDIPAFDL  VISGLSGLES  LDISGHQRT  LSGIDASTLP  SLKAINISDN  600
601 HFDLAQGTE  RHILDTILAT  LAKNGASTAS  FDKQKPKGLY  PESYSTAPLH  650
651 LQVGQKINV  IDDLIFGTRT  NQNTLINTEN  DFEAYKEQTI  QGKPFIAPDY  700
701 LYDNFKVSYK  EYSASIVDST  LAETTDKTID  TAKAETYQVT  VSNKDGKTVH  750
751 SVKVIVGDEK  PMMVNLAQDA  KIIGTDNMTQ  SAKVFDGQKD  QFLLSWNKDS  800
801 SVIFELKTPG  TAKHWRFFDD  GKNDSVTLVS  FKGDASNFE  EKDKAENWVE  850
851 ITKDSRKND  KVFSSPLEVD  NAKYLKVTIK  KEAKYIYFNE  LQILGYPGVV  900
901 AKKTADDLRP  TEADKSDDKS  DKNDTEAK  928

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[図33]

配列番号50 野生型Endo-Mの amino 酸配列 NCBI Accession number: BAB43869.1

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1   MPSLQLQPDD KLAPVSFALK SMNELRDWTP DEKIKFNVSS VALQPRVKNA 50
51  LKPQLLLTHD MAGGYKEDKN IQGNNYKDIY NIQYWHLADT FVYFSHERVS 100
101 IPPVNWTNAC HRNGVKCLGT FLVEGNNQMH EMEALLHGPP LLNNTDDPMR 150
151 LWSPYYADQL VAIKHYGFD GWLFNIECEF FPFPTNPKFK AEELAKFLHY 200
201 FKEKLHNEIP GSQLIWYDSM TNEGEIHWQN QLTWKNELFF KNTDGIFLNY 250
251 WWKKEYPEMA RRVAEGIGRS GLEVYFGTDV WGRHTYGGGG FKSYPGVKTA 300
301 YSMTSSALF GMAWTYEHFE KSEFEKMDRL FWC GGKYSYD PPPPKNPDD 350
351 EKEVESDDSE DELMYGHKKG IADTVESIPV PGTDWVFTNF DRGFGNRFYY 400
401 RGKRLLSQPW SHLSHQAILP NKSRYNPEIY PTDQNIKITS SLDCDHGAFL 450
451 GGTSLIIKGQ RFNHRESHDV ETEISIPLYK LSLDASKGCS LRYIYRTLML 500
501 KDVKLTVACH FSLKTNDNVN FFKVWQPDEN FSFEYDDGMR ATVTTENSTE 550
551 SRCFLLRTE EDTGENDWIT KTINVPVPE GSQLYITRLE VSVVLDTAGL 600
601 VGLVNQVIAC LGYISIIPTI NSGIKTSSR IIQDLFWKDQ KYTKIGKESL 650
651 DDIAQEEVHR YYGTLNWENT ANVVNAWEEI DYYNVFYKES DDSATRIFLG 700
701 TAFCNQFRVS GLDIILSKLP KIVIEAVNKE GYISSSGSID LSLN 744

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[図34]

配列番号51 野生型Endo-Rpの amino 酸配列 NCBI Accession number: 未登録*

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1   MPSLELQQA DTRLFESMPL QTMNELGSWE PSNASRANIA TIPLHQRSNL 50
51  DPAEPRLIVT HDMAGGYKED SNIQGNQTYDT IYSCQYWQYV DTFIYFSHR 100
101 VTIPPVNWIN ACHRNKVTL GTFIVEGAAG MFALERFVYG PEPGQRNSWS 150
151 PYYADKLVDI AEFYGF DGWL LNIESDFFPL YRNPSLKAIH LAKLLRYLKN 200
201 AMHARVPGSE IIWYDSMTTN GSVQWQNNIT PKNSIFFEAA DGIFLNYWWN 250
251 ATPVPLALQV AHRLGRQGS VYFGTDVWGR GTFGGGGFDS YLAVGTARAF 300
301 KTSSALFGTA WIYEHFGKGD FELMDRLWL GGDQSEYPAQ EGEQNRTVKV 350
351 TSHLGRHPGI ADVSPVRSAP GKTWFATWFD RGYGTGFYYQ GKLLSQPWS 400
401 HLSHQSIIPP LIARLQREEN HGLSYFLADD DAYIGGTSLL IAAEITQERQ 450
451 LPLYQLEYDV TEGCEVQFIY KSPEPDMQ GK IDIYLNQVT DILPDELA FY 500
501 WQDVTDASSQ ADATTAMRLY LNENTVIYK PSRKQELAEG WLLCSVRVPP 550
551 TYPLGIATIK ELGIHVDGKE TVLFRLLT IIPLGDAPSA LSRTQVQLQ 600
601 RDEDIHSKCP SSSCELWATL SWMMEHNSKE DWDQVDHYMI FFKNVDSKAE 650
651 PIFLGTSFST EYRISGLEIK KHGNSIEIWA VNRLGTVIAR QDIDIQ 696

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[図35]

配列番号52 野生型Endo-CCのアミノ酸配列 NCBI Accession number: EAU82416.1

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1   MPIAGKKFHP RALPEFWRTF REMDEWRATQ TGPQARPAEG ILKYVPRKIR 50
51  PADIAGKGRL LVSHDYKGGY VEDPFSSKSYS FNWWFSTDSE NYFAHHRITI 100
101 PPPEWINAAH RQGVPILGTI IFEGGSDEDI LRMVIGKTPG STSNFHAERN 150
151 AEYTPVPSSY YAELEFADLAV ERGFDGWLLN VEIGLQGGSE QARGLAAWVA 200
201 LLQQEVLKKV GPHGLVIWYD SVTVRGDLWW QDRLNANLNP FFLNSSGIFT 250
251 NYWWYNDAPQ KQIDFLSRVD PNLTGQTAEP HQYNLQKTIQ DIYIGVDVWG 300
301 RGSHTGGGGFG AYKAIEHADP KGLGFSVALF AQGWTWETEE EKPQWNWAQF 350
351 WDYDSKLWVG PPGVVEAPDH TVKPGEYPCV HGPFQPISSF FLTYPPPDPL 400
401 DLPFYTNFCP GIGDAWFVEG KEVFRSETGW TDMDKQTTVG DLVWPRPKIY 450
451 DLPSQNASQA TLNAAFNEND AWNGGNSLQI NLTVPGGATT YGAYWVPIQT 500
501 FTFSSRRQYE ASIVYKPGLS GKTRFDAYE VGIRTITGED QGKIISNTTT 550
551 EVGNGWRKVH ILFEIETPVE GGSIIVPSSI GLVIAVSNVS TTEQFEFPFL 600
601 VGQITIHPL PDRYKEFKPA LLWLLFTPSA GTNSLDGTLT WDVVAAIERP 650
651 PPVEINNPDD AQIPWNLQPT KQEWFPDFLY FNVYVLELLD GGGQGPPQWI 700
701 GTTGYDGEKK RFFIYDESLP PTSGLRRFTF QIEGVLETGE STHWYDAPAA 750
751 PSATAGGEQK RTRRTSLKSV LSPLRRKKSK GDISVAK 787

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[図36]

配列番号53 野生型Endo-Omのアミノ酸配列 NCBI Accession number: BAN20080.1

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1   MAQSQLLGGA VRPVFFDKLE ELRRWHTQSA NLSRESELD LNVATEPFSS 50
51  YERAQTGSGS RSSEPVPGDK EDPPIKLMVC HDFKGGYQDY EDAQPLGYFP 100
101 HPTGSRFLQ YPQLIDQFVY FSHHRVTVPP VNWINFCHRN GIKCFGTVIF 150
151 EGNASKDFEE LDRLVSRDEK GDFVFVDALI KLAHYGFDG YLLNIETTFS 200
201 NTKIAADLEP FAEQLKSLGH CLDSKNELIW YDSYVFPANK VSYTNGVTES 250
251 NYNFFSLSDA FFSNYWWNIK NLQENIKNVG VLGVQKKIYV GYDVWGRGTL 300
301 VGKGGFDSSL ACKMIAKFKS NVALFAPAWT YESLGPKDFN QNDARFWIGL 350
351 FENESSISST VPPHSSAVYK INESSFIFYT NFSSGEGNRF FSKGSEVYRK 400
401 NWVNGSLQFD LPIDLHRKDK NGLQWALDKS DAFHGGACLE IKYSEIKDEN 450
451 GYQIFNNQMV SDFTLFNFTK ECHFTVNVK VTYKLNHKT STFKIKIKYI 500
501 IERRFRSVQT VRTGYLTIPL LSTSGKWFTV EESFQINLQT SHEYIVLESA 550
551 HVTYDEDRSA DSFFRSYIVE DSAITSVIDN EYEKLINSE IYNDEDEDW 600
601 ILVPSDVSIS SSESQSNDSK TQYLGRKLF NKSTPKTRTL EGTAPLLRIG 650
651 EFAIISANNY PSSNFLAVTS VKSIESSRL GDSLVLLNWQ VGEHQKQVC 700
701 YIIYVNGAV VGLSVAPKFI YQDTELASEN SASARSNYKK SGLGSSDRK 750
751 SKVRVDSVDK LGNVFTGSEV WV 772

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[図37]

配列番号 5 4 野生型Endo-Sdのアミノ酸配列 GenBank Accession number: ANI26082

1	MDKRLLVKRT	LGCVC SATLM	GTILGTHHDS	LISVKAEEKI	TQVSQTSTSI	50
51	DDLHYLSSENS	KKEFKKEELSK	EKVPEKVKEI	LSKAQQANKQ	AQE LAEMKVP	100
101	DKIPMKPLNG	PLYGGYFRTW	HDKTSDPLEK	DKVNSMGELP	KEVDLAFVFH	150
151	DWTKDYSLFW	KELATKHVPK	LNKQGTRVIR	T IPWRFLAGG	DNSGIAEDAS	200
201	KYPNTPEGNK	ALAKAIVDEY	VYKYNLDGLD	V DI EHDSIPK	VNGEASDENL	250
251	KRSIDVFEEI	GKLIGPKGAD	KSRLFIM DST	YMADKNPLIE	RGAPYIDLLL	300
301	V QVYGSQGEQ	GEFQNDTKSV	TKTPEERWQG	YSKYIRPEQY	MIGFSFYEE K	350
351	AGSGNLWYDI	NARKDEDTAN	GINDDITGTR	AERYARWQPK	TGGVKGGIFS	400
401	YAIDRDGVAH	QPKQIAEKDK	QSVKNNRPLI	SEITDNIFHS	NYSVSKTLKT	450
451	VMLKDKAYDL	IDEKDFPDKA	LREAVMAQVG	TRKGDLERFN	GTLRLDNPAI	500
501	QSLEGLNKFK	KLAQLDLIGL	SRIIKLDQSV	LPANMKPGKD	PLETVLETYK	550
551	KNGKEEPAII	PPVSLTVSGL	TGLKELDLSG	FDRETLAGID	AATLTSLEKV	600
601	DISDNKDLA	PKTENRQIFD	VMLSTVNNNA	GISEQSIKFD	NQKPAGNYPQ	650
651	TYGATNLQLP	VRQEKIDLQH	QLLFGTITNQ	GTLINSEADY	KTYRNQKIAG	700
701	RNFVDPDPYP	NNFKVSHDNY	TVKVTDSL TG	TTT DKMLATD	KEETYKVDFE	750
751	SPTDKTKAVH	TAKVIVGDEK	TMMVNLAEGA	TVIKSENDEN	AQKVFNGIME	800
801	YNPLSFNNKS	SIIFEIKDPS	LAKYWRLFND	SSKDKKDYIK	EAKLEVFTGQ	850
851	LNAEADV KTI	LEKPDNWVTV	STYSGEEKVF	SHSLDNISAK	YWRVTVDNKK	900
901	DQYGYVSLPE	LQILGYPLPN	ADTIMKTVTV	AKELSQQQDK	FPQQLLDEST	950
951	AKEAVVEASL	NSKLFD TGVI	NTNVEALKNV	VDECLAYEKN	KETA FKATED	1000
1001	YRAAVNGVKA	ESVTVEEM AQ	LKDLIGKAAH	LNSKIDAKLA	DREYDKDLLG	1050
1051	LIGELTNITR	TVKS FVK				1067

[図38]

配列番号 5 5 野生型Endo-Szのアミノ酸配列 GenBank Accession number: KIS14581.1

1	MEKQVLVKKT	LKCVCAAAALM	VAILAAQHDS	LIRVKAEDKL	VQTSPSVSAI	50
51	DALHYLSSENS	KKEFKKEELSK	VEKAQPEK LK	EIVSKAQQAD	KQAKTLAEMK	100
101	VPEKIPMKPL	KGPLYGGYFR	TWHDKTS DPA	EKDKVNSMGE	LPKEVDLAFV	150
151	FHDWTKDYSL	FWQELATKHV	PTLNKQGTRV	IR T IPWRFLA	GGDHSGIAED	200
201	AQKYPNTPEG	NKALAKAIVD	EYVYKYNLDG	LDV DIERDSI	PKVNKEESKE	250
251	GIERSIQVFE	EIGKLIGPKG	ADKSRLFIM D	ST YMADKNPL	IERGAPYIDL	300
301	LLV Q VYGTQG	EKGGF'DNANH	KAVDTMEERW	ESYSKYIRPE	QYMVGF SFYE	350
351	E KANSGLWY	DVNVEDDTNP	NIGSEIKGTR	AERYAKWQPK	TGGVKGGIFS	400
401	YGIDRDGVAH	PKKNGPKTPD	LDKIVKSDYK	VSKALKKVME	NDKSYELIDQ	450
451	KDFPDKALRE	AVIAQVGSRR	GNLERFNGTL	RLDNPDIKSL	EGLNKLKKLA	500
501	KLELIGLSQI	TKLDSSVLPE	NIKPTKDTLV	SVLETYKNDD	RKEEAKAIPQ	550
551	VALTISGLTG	LKELNLAGFD	RDSL AGIDAA	SLTSLEKVDL	SSNKLDLAAG	600
601	TENRQILD TM	LATVTKHGGV	SEKTFVFDHQ	KPTGLYPDTY	GTKSLQLPVA	650
651	NDTIDLQAKL	LFQTVTNQGT	LINSEADYKA	YQE QEIAGHR	FVDSSYDYKA	700
701	FAVTYKDYKI	KVTDSTLGVT	DHKDLSTSKE	ETYKVEFFSP	INSTKPVHEA	750
751	KIVVGEEKTM	MVNLAEGATI	IGGDADPTNA	KKVFDG LLNN	DTTTLSTSNK	800
801	ASII FELKEP	GLVKHWRFFN	DSKISKADYI	KEAKLEAFVG	HLEDSSKVKD	850
851	SLEKSTEWVT	VSDYSGEAQE	FSQPLNNIGA	KYWRITIDNK	KSQYGYVSLP	900
901	ELQIIGHRLP	EAATVMTTMA	AAEELSQQKD	KFSQEQLKEL	EVKVAALKAA	950
951	LDNKM FNADT	INASFADVKA	YIDKLLADAA	GKKT LGKATK	EAQP VATDAK	1000
1001	EKA ESENPKA	D				1011

[図39]

配列番号 5 6 野生型Endo-Seのアミノ酸配列 GenBank Accession number: CAW92602.1

1	MEKQVLVKKT	LKCVCAAALM	VAILAAQHDS	LIRVKAEDKV	VQTSPSVSAI	50
51	DDLHYLSENS	KKEFK EGLSK	AGEVPEKLD	ILSKAQQADK	QAKVLAEMKV	100
101	PEKIAMKPLK	GPLYGGYFRT	WHDKTS DP AE	KDKVNSMGEL	PKEVDLAFVF	150
151	HDWTKDYSFF	WQELATKHVP	TLNKQGTRVI	RT IPWRFLAG	GDHSGIAEDT	200
201	QKYPNTPEGN	KALAKAIVDE	YVYKYNLDGL	DVD IERDSIP	KVNGKESNEN	250
251	IQRSI AVFEE	IGKLIGPKGA	DKSRLFIM DS	TYM ADKNPLI	ERGAQYIDLL	300
301	LV Q VYGTQGE	KGDWDPVARK	PEKTMEERWE	SYSKYIRPEQ	YMGVGSFY EE	350
351	NAGSGNLWYD	INERKDDHNP	LNSEIAGTRA	ERYAKWQPKT	GGVKGGIFSY	400
401	AIDRDGVAHQ	PKKVS DDEKR	TNKAIKDITD	GIVKSDYKVS	KALKKVMEND	450
451	KSYELIDQKD	FPDKALREAV	IAQVGSRRGD	LERFNGTLRL	DNPDIKSLEG	500
501	LNKLKKLAKL	ELIGLSQITK	LDSLVL PAN A	KPTKDTLANV	LEAYDS AKKE	550
551	ETKAIPQVAL	TISGLTGLKE	LNLAGFDRDS	LAGIDAASLT	SLEKVDLSSN	600
601	KDLAAGTEN	RQILD TMLAT	VTKHGGVSEK	TFVFDHQKPT	GLYPDTYGTK	650
651	SLQLPVANDT	IDLQAKLLFG	TVTNQGT LIN	SEADYKAYQE	QEIAGHRFVD	700
701	SSYDYKAF AV	TYKDYKIKVT	DSTLGVT D HK	DLSTSKEETY	KVEFFSPTNS	750
751	TKPVHEAKVV	VGA EKTMMVN	LAEGATVIGG	DADPTNAKKV	FDGLLNNDTT	800
801	ILSTSNKASI	IFELKEPGLV	KYWRFFND SK	ISKADCIKEA	KLEAFVGHLE	850
851	AGSKVKDSLE	KSSKWVTVSD	YSGEDQEFSQ	PLNNIGAKYW	RITVDTKGR	900
901	YNWPSLP ELQ	IIGYQLPAAD	LVMAMLATAE	ELSQQKDKFS	QEQLKELEV K	950
951	IAALKAALDS	KMFNADAINA	STADLKAYVD	KLLADRTDQE	KVAKAAKVEQ	1000
1001	PVATDIKENT	EPENPKTD				1018