

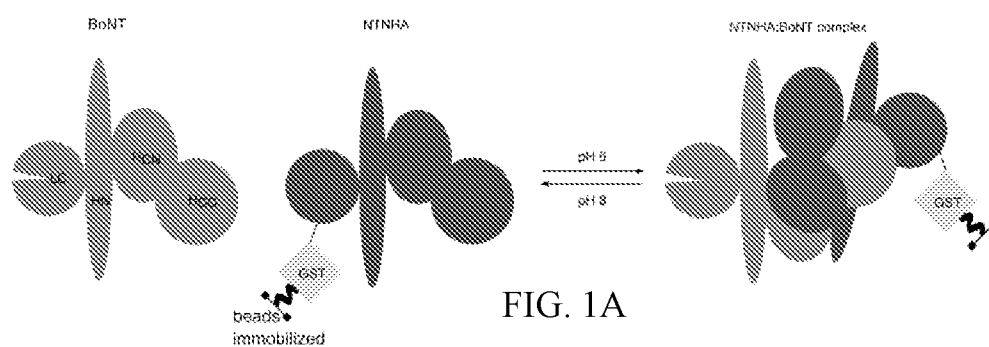


FIG. 1A

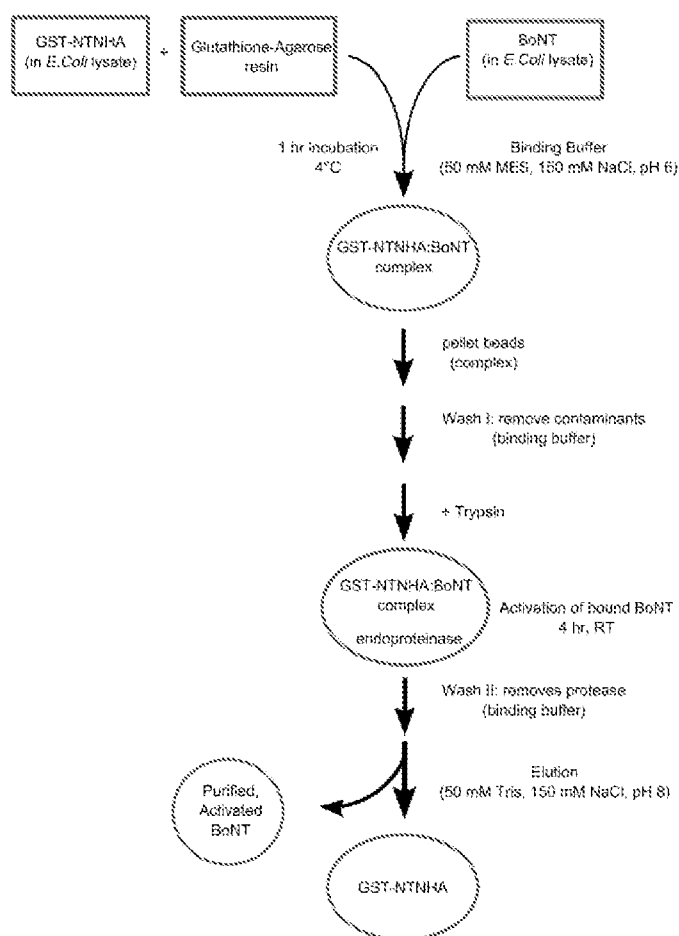


FIG. 1B

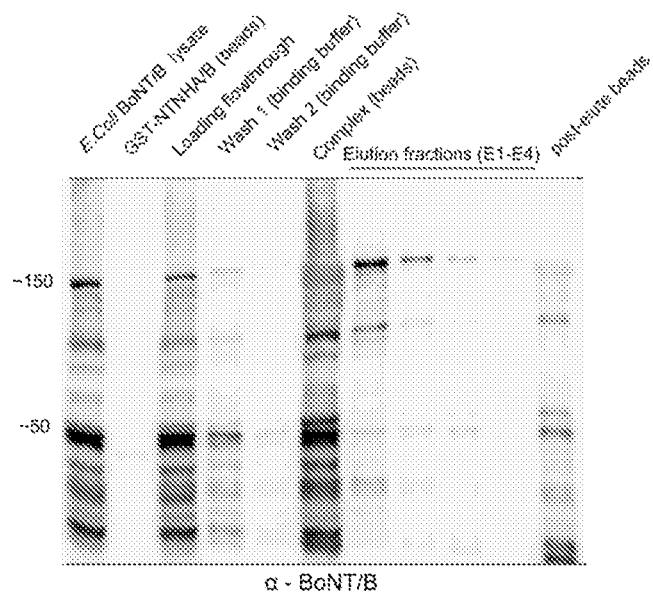


FIG. 2A

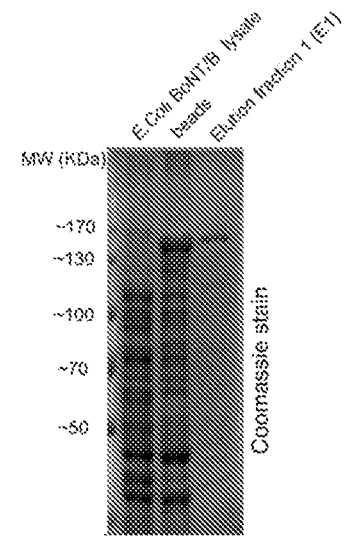


FIG. 2B

FIG. 3B

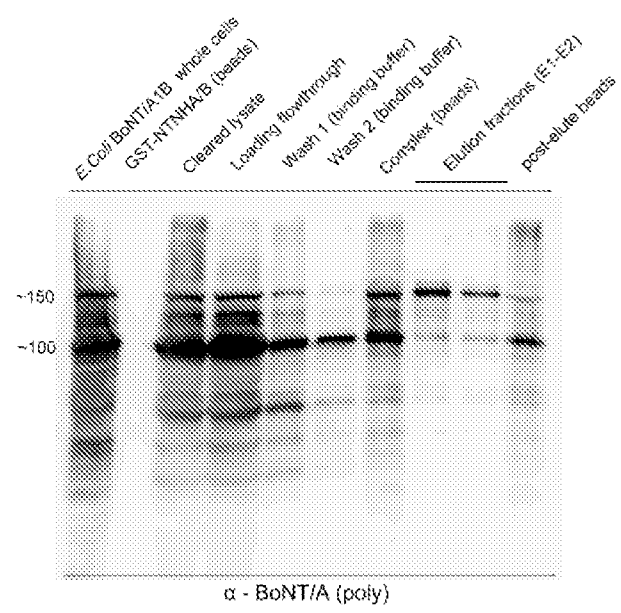


FIG. 4

NTNHA A1: *Clostridium botulinum* A str. ATCC 350. (YP_001253341.1) (SEQ ID NO: 22)

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1 mnindnlsin spvdnknvvv vrarktdtvf kafkvapniw vaperyyges lsideeykvd
61 ggiydsnfls qdsekdkflq aiitllkrin stnageklls listaipfpy gyigggyyap
121 nmitfgsapk snkklnslis stipfpyagy retnylssed nksfyasniv ifgpganive
181 nntvfykked aengmgtmte iwfgpflytyk ydefyidpai elikcliksl yflygikpsd
241 dlvipyrlrs elenieysql nivdllvsgg idpkfintdp ywftdnyfsn akkvfedhrn
301 iyeteiegnn aigndiklrl kqkfrinind iwelnlnyfs kefsimmpdr fnnalkhfyr
361 kqyykidype nysingfvng qinaqlslsd rnqdiinkpe einllngnn vslmrsniyg
421 dglkstvdff ysnykipynr ayeyhfnnsn dssldnvnig vidnipeiid vnpykencdk
481 fspvqkitst reintnipwp inylqaqntn nekfsllsdf vevvsskdkd lvysflsnvm
541 fyldsikdns pidtdkkyyl wlreifrnyf fditatqein tncginkvvt wfgkalniln
601 tsdsfveefq nlgaisslink kenlsmpie syeipndmlg lplndlnekl fniyskntay
661 fkkiyyfnld qwwtqyysqy fdlicmakrs vlaqetlikr iiqkklsyli gnsnissdnl
721 almnltttnt lrdisnesqi amnnvdsfln naaicvfesn iypkfisfme qcinninikt
781 kefiqkctni nedeklqlin qnvfnslde flniqnmskl fssetallik eetwpyelvl
841 yafkepgnnv igdasgknts ieyskdiglv yginsdaly ngsgnsisfs ndffengltn
901 sfsiyfwlrn lgkdtikskl igskedncgw eiylfqtglv fnmidsngne kniylsdvsn
961 nswhyitisv drlkeqllif iddnlvanes ikeilniyss niisllsenn psyiegltil
1021 nkpttsqevl snyfevlnds yirdsneerl eynktyqln yvfssdkpice vkqnnniylt
1081 innntnnlnlq askfkllsin pnkqyvqkld eviisvldnm ekyidisedn rlqlidnknn
1141 akkmiisndi fisncltly ngkyiclsmk denhnwmicn ndmskylw sfk

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FIG. 5A

NTNHA A2: *Clostridium botulinum* A2 str. Kyoto (WP_012704905) (SEQ ID NO: 23)

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1 mkinnnfnid slidnrdvai vrgkrtdtff kvfqvapniw iaperyyges lninedqksd
61 ggiydsnfls tndekdeflq atvkilqrin nnvigaklls listaipfpy eykpgdyrqt
121 nylvskdnqh yytanlvifg pgtnivenna iyykkedsen gmgtmseiwf qpfltykygq
181 fyvdpaleli kclikslyyl ygikpsddls ipyrlrseln sfeyseidmi dflisggtey
241 klltdnpywf tdnfyidapk nfekykndye tkiknnndia nsiklyleqk fktnaqdiwe
301 lnlsyfstef eimmpiefnn alnhyyrkey yvidyfkyn ingfingqik tilplskynk
361 niinkpelvv nlinenntvl mksnvygdgl kgtmdnfya ykipynigde yhinysynn
421 vnveeinnip pindadiypy rknsdpfipv ynitetkein ttpplsvnyl qaqvtnsdi
481 slssdfskvi sskdrslvys fldntidyld sikydepit ddkyylwlke ifrnysfdmt
541 etqevntpcg inkvvpwlgk alnilntgns fieefkslgp islinkkeni tmpkieidei
601 pnsmlnlsfk dlsenlnrf sknnsyfeki yydfldqwwt qyysqyfdli cmakksilaq
661 etlikkiiqk klsyignsn issdnalnm lttntlrldi snesqiamnn vdsflnsaai
721 cvfegniysk fisfmeqcin ninkntrefi qkctnitene klqlinqnif ssldfdflni
781 enlkslfsse tallikeets pyelvyafq epdnnaigda sakntsieys kdidlvygin
841 sdalylngsn qsisfsndff engltnsfsi yfwlrnlgkd tikskligsk edncgweiyf
901 qdtglvfnmi dsngnekniy lsdvsnnsw yitisvdrk eqllifiddn lvanesikei
961 lniyssniis llsennpsyi egtilnkpt tsqevlnnyf kvlnnsyird sneerleynk
1021 tyqlynyvvs dkpicevkqn nniyltinnt nlnlqpskf kllsinsnkq yvqkfdevii
1081 silgnmekyi disednrlql idnkngakkm iisndmfisn cltlscggky iclsmkdenh
1141 nwmicnndms kylwlsfk

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FIG. 5B

NTNHA B: *Clostridium botulinum* B1 str. Okra (WP_003404192.1) (SEQ ID NO: 24)

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1 mnindnlsin spvdnknvvv vrarktdtvf kafkvapniw vaperyyges lsideeykvd

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FIG. 5C

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61 ggiydsnfls qdsekdkflq aiitllkrin stnageklls listaipfpy gyiggggyyap
121 nmitfgsapk snkklnslis stipfpyagy retnylssed nksfyasniv ifgpgganive
181 nntvfykked aengmgtmte iwfpfltyk ydefyidpai elikcliksl yflygikpsd
241 dlvipyrlrs elenieysql nivdllvsgg idpkfintdp ywftdnyfsn akkvfedhrn
301 iyetqieggn aigndiklrl kqkfrinind iwelnlnyfs kefsimmpdr fnnalkhfyr
361 kqyykidype nysingfvng qinvqlslsd rnqdiinkpe eiinllngnn vslmrsniyg
421 dglkstvdff ysnykipynr ayeyhfnnsn dssldnvnig vidnipeiid vnpykencdk
481 fspvqkitst reintnipwp inylqaqntn nekfsllsdf vevvsskdks lvysflsnvm
541 fyldsikdns pidtdkkyyl wlreifrnyf fditatqein tdcginkvvt wfgkalniln
601 tsdsfveefq nlgpislink kenlsmpiie iygipndmlg lplndlnekl fniylknily
661 fkkvyfnfld qwwteyysqy fdlicmakqs ilaqeklikq iiqnklqdlf kadismdkln
721 lmnlatektf idlsnesqia innindflnk saicvfdtni ypkfisfmeq cinsvnsnvt
781 afiqkctnit edeklqlikl ntfmndfef fdiqsikdli tsetdlikee kesdynlflf
841 tlqednnkvi edisgkntlv kysdsislvy gvngdalylk epdesvsfsn kafengltns
901 fsicfwlrnl gediitskli enkadncgwe iyfennglvf sivdcngnee niylsdvisk
961 nwyysisid rlrnqllifi ndklianqsi eqilniyssen tislvnennp iyieglsiln
1021 rsitseevvn nyfsylnnsy irdisgerle ynkyelyny vfpenslyev tennniylsi
1081 kdtnnlniqg akfklinida nkqyvqkwde gvvcllgdee kyvdissenn riqlvnskdt
1141 akriifndi fmpnccltfay nnkylslslr drnynwmicn nndnipkaah lwalkgi

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FIG. 5C Continued

NTNHA C1: *Clostridium botulinum* C1 (YP 398515.1) (SEQ ID NO: 25)

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MDINDDLNIN SPVDNKNVVI VRARKTNTFF KAFKVAPNIW VAPERYYGEP LDIAEYKLD
GGIYDSNFLS QDSERENFLQ AIIILLKRIN NTISGKQLLS LISTAIPFPY GYIGGGYSSP
NIFTFGKTPK SNKKLNSLVT STIPFPFGGY RETNYIESQN NKNFYASNII IFGPGSNIVE
NNVIYYKKND AENGMGTMTE IVFQPLLTYK YNKFYIDPAM ELTKCLIKSL YFLYGIKPSD
NLVVPYRLRT ELDNKQFSQL NIIDLLISGG VDLEFINTNP YWFTNSYFNP SIKMFEKYKN
IYKTEIEGNN AIGNDIKLRL KQKFQINVQD IWNLNLYFC QSFNSIIPDR FSNALKHFYR
KQYYTMDYTD NYNINGFVNG QINTKLPLSN KNTNIISKPE KVVNLVNNEN ISLMKSNIYG
DGLKGTTEDE YSTYKIPYNE EYEFNFDSN NFPLNNISIE EVDSIPEIID INPYKDNDN
LVFTQITSMT EEVTTHALS INYLQAQITN NENFTLSSDF SKVVSSKDKS LVYSFLDNLM
SYLETIKNDG PIDTDKYYL WLKEVFNYS FDINLTQEID SMCGINEVVL WFGKALNILN
TSNSFVEEYQ DSGAISLISK KDNLRPNIE IDDISDSSLG LSFKDLNNKL YEIYSKNIVY
FKKIYFSFLD QWWTEYYSQY FELICMAQS ILAQESLVKQ IVQNKFTDLS KASIPDCLK
LIRETTEKTF IDLSNESQIS MNRVDNFLNK ASICVFVEDI YPKFISYMEK YINNINIKTR
EFIQRCTNIN DNEKSILINS YTFKTIDFKF LDIQSIKNFF NSQVEQVMKE ILSPYQLLLF
ASKGPNSNII EDISGKNTLI QYTESIELVY GVNGESLYLK SPNETIKFSN KFFTNGLTNN
FTICFWLRFT GKNDKTRLI GNKVNNCGWE IYFEDNGLVF EIIDSNGNQE SVYLSNIIND
NWYYSISVD RLKDQLLIFI NDKNVANVSI DQILSIYSTN IISLVNKNNS IYVEELSVLD
NPITSEEVIR NYFSYLDNSY IRDSSKSLE YNKNYQLYNY VFPETSLYEV NDNNKSYLSL
KNTDGINISS VKFKLINIDE SKVYVQKWDE CIICVLDGTE KYLDISPENN RIQLVSSKDN
AKKITVNTDL FRPDCITFSY NDKYFSLSLR DGDYNWMICN DNNKVPKGAH LWILES

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FIG. 5D

NTNHA D: *Clostridium botulinum* D (BAA75083.1) (SEQ ID NO: 26)

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1 mdinddlnin spvdknkvvi vrarktntff kafkvapniw vaperyygep ldiaeeekld
61 ggiydsnfls qdserenflq aiiillkrin ntisgkqls listaipfpy gyigggysp
121 niftfgktpk snkklnslvt stipfpfggy retnyiesqn nknfyasniv ifgpgsnive
181 nnviyykknd aengmgmae ivfqpllyk ynkfyidpam eltkcliksl yflygikpsd
241 nlvvpyslrlt eldnkqfsqf niidllisgg vdlefintnp ywftnsyfpn sikmfekykn
301 iykteieggn aigndiklrl kqkfqinvqd iwnlnlnyfc qsfnsiipdr fsnalkhfyr
361 kqyytmdytd nyningfvng qintklplsn kntniiskpe kvvnlvnenn islmksniyg
421 dglkgstedf ystykipyne eyeyrfndsd nfplnnisie evdsipeiid inpykdnsdn
481 lvftqitsmt eevtthtals inylqaqitn nenftlssdf skvvsskdks lvysfldnlm
541 syletikndg pidtdkkyyl wlkevfknys fdinltqeid smcginenvl wfgkalniln
601 tsnsfveeyq dsqaislisk kdnlnrepnie iddisdslg lsfdlnnkl yeiysknivy
661 fkkiyfsfld qwwteyysqy felicmakqs ilaqeslvkq ivqnkftdls kasippdtlk
721 lirettektf idlsnesqis mnrvdnflnk asicvfvedi ypkfisymek yinniniktr
781 efigrctnin dneksilins ytfktidkfk ldiqsiknff nsqveqvme ilspyqlllf
841 askgpnsnii edisgkntli qytesielvy gvngeslylk spnetikfsn kfftnngltnn
901 fticfwlrft gknddktrli gnkvnnogwe iyfednglvf eiidsngnqe svylsniind
961 nwyysisvd rldkqllifi ndknvanvsi dqilsiytn iislvnknns iyveelsvld
1021 npitseevir nyfsyldnsy irdsskslle ynknyqlyny vfpetslyev ndnnksylsl
1081 kntdginiss vkfklinide skgyvqkwde ciicvldgte kyldispenn riqlvsskdn
1141 akkitvntdl frpdcitfsy ndkyfslslr dgdynwmicn dnnkvpkgah lwiles

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FIG. 5E

NTNHA E: *Clostridium botulinum* type E (WP_003409842) variant (SEQ ID NO: 27)

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1 mkingnlnid spvdknkvai vrsrksdvff kafqvapniw iaperyyges lkinedqksd
61 ggiydsnfls tnnekdeflq atikllqrin nnvvgaklls listaipfpy enntedyrqt
121 nylsskneh yytanlvifg pgsniiknnv iyykkeyaen gmgtmleiwf qpflthkyde
181 fyvdpaleli kcliksllyl ygikpndnl ipyrlrnefn sleyseldmi dflisggidy
241 kllntnpywf idkyfidtsk nfekykndye ikiknnnyia nsiklyleqk fkinvkdiwe
301 lnlsyfskef qimmperynn alnhyyrkey yvidyfkyn ingfkngqik tkpllskynk
361 eiinkpeliv nlinqntvl mksniygdl kgtvdfnysn yiipynlnye hsinyssyldn
421 vniecekip pindediypy rknadtfpv ynltkakein tttplpvnlyl qaqmidsndi
481 nlssdfkvi sskgslvysf lnntmdylef ikydkipdtd kkykwlkai frnysldite
541 tqeismqfgd tkiipwigra lnlnntnsf veefknlgpi slinkkenit ipkikideip
601 ssmlnfsfkd lsenlfniyc knnfylkkiy ynflqgwtq yysqyfdlic masksvlage
661 klikkliqkq lrylmensni sstnlilinl tttntlrdis nqsqiainni dkffnnaamc
721 vfenniypkf tsfmeqcikn inkstkefil kctninetek shlimqnsfs nldfdfldiq
781 nmklfnsyt ellikeytsp yelslyafqe qdnnvigdts gkntlvveypk diglvyginn
841 naihlgtanq nikftndyfe ngltnnfsiy fwlrnlngnt ikskligske dncgweiyfe
901 nnglvfniid sngnekniyl snisnkswhy ivisinrlkd qlifidnil vanedikeil
961 niyssdiisl lsdnnvyie glsvlnktin sneiltdyfs dlmsyirnf deeilqynrt
1021 yelfnyvfpe iainkieqnn niylsnenn slnfkplkfk llntnnpnkqy vqkwdevifs
1081 vldgtekyld isidnnriql vdnknaktf iinddifsn cltltynnv nvyysiknqdy
1141 nwwicdlnhd ipkksylwil kni

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FIG. 5F

NTNHA F: *Clostridium botulinum* type F (YP_001390122.1) (SEQ ID NO: 28)

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1 M K I N D D L N I N S P V D N K N V V I V R A R K T N I F F
31 K A F Q V A P N I W V A P E R Y Y G E P L N I S D Q E K S D
61 G G I Y D E N F L K E N S E K E E F L Q A I I L L L K R I N
91 N N I I G Q K L L S L M C T S I P F L H E Y K Q G D Y R Q S
121 N Y L G S K N S E Y L Y S A N I V I F G P G S N I V K N N T
151 I Y Y K K N F A E N G M G T M A E I L F Q P F L T Y K Y N Q
181 F Y A D P A L E L I K C L I K A I Y F L Y G I K P N D N L N
211 I P Y R L R N E F S N V E Y S E L N I I D F L I S G G I D Y
241 K F I N T N P Y W F I D N Y F I D V P K V F E K H K N D Y E
271 I N I K N N S E I G T S I K L Y L E Q K F K T N V Q D I W E
301 L N L S Y F S K E F Q I M M P E K H N N A L K H Y Y R K E Y
331 Y K I N Y S K Q Y D I N G F V N G Q I A T K L L L S E K N Q
361 Y I I N K P Q L I I N L I N K S N N S L L M K S N I Y G D G
391 L N G T T D N F Y R N Y K I P D N I A Y Q Y H P N N T Y L D
421 N V N I E E I N N I P Q I T D A D I Y P Y T N N C D T F I P
451 I Y N I T Q S R E I N T T V P Y S I N Y L Q S Q I M N S D D
481 I T L S S D F W E V V C S N D K S L V Y S Y L D N V I N Y L
511 D S I K N N T P I N T D K K Y Y L W L K E I F R N Y S F D I
541 T A T E E I T T E C G I N K I V S W F G K A F N I L N T D N
571 S F K I E F Q N S G A I A L I N K K D N I I I P K I E I D E
601 M P N S M L N L S F E D L N E Q L Y S I Y S K N I T Y F K K
631 I Y Y N F L D Q W W T E Y Y S Q Y F D L I C M A K K S I L A
661 Q E N L I K K I I Q K K I S Y L I G A S N I P D D I L A V M
691 R L T T T N T L R D I S V E S Q I A M N N L N N F L N K A A
721 M C V F Q S N I Y P K F I S F M E Q C I K H I N K S T K E F
751 I Q K C T N I N E T E K L Q L I M Q N S F S N L D F D F L D
781 I Q N M K N L F N S Y T E L L I K E Q T S P Y E L S L Y A F
811 E E Q D N N V I G D A S G K N T L V E Y P K G I E L V Y G I
841 N N S A L Y L N G S N Q S I I F T N D Y F E N G L T N S F S
871 I Y F W L R N L G Q D T I K S K L I G S K E Y N C G W E I Y
901 F Q E I G H V F N M I D S N G N E K N I Y L S D V S N N S W
931 H Y I T I S V D R L K E Q L L I F I D D N L V V N E S I K D
961 I L N I Y S S N I I S L L S D N K A S Y I E G L T I L N K P
991 T T G E E V L R N Y F K N L N N S Y V R D S N D E R L E Y N
1021 K T Y Q L Y D Y V F P D N P I C E V K Q D N N I Y L T I N N
1051 I N N L N M K P C K F K L L S I N S N K Q Y V Q K W D E V I
1081 I S V L Y D T E K Y V C I S N E N N R V K I I D N K I M Q V
1111 K F I I S N D I F I S N C L T H A H N N K Y I C L S M K D E
1141 N Y N W M I C N N E S N I P K K A Y L W I L K E V

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FIG. 5G

NTNHA G: *clostridium botulinum* (*Clostridium argentinense*) type G ATCC
27322 (CAA61228.1) (SEQ ID NO: 29)

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1 mkinsnltin spidknvvi vraretskff kafkvapniw vaperyyges lsieeskkvn
61 ggvydsnfls qnnedkflq aiitllkrin sniageklls lvstaipfpy gyiggggyypc
121 nivtfgstik ynkkinslis ttipfpyggy retnylsskd tenfyaaniv ifgpganive
181 nntvfykkeed aengmgmae icfqpfltyk ydqfyvdpal elmecliisl yflygikpnn
241 nltvpyrlrn elsniefsq sldvllisgg idskfintdp ywfidsyfsn akttfeehks
301 iyeteikggn aigndiklrl kqkfqtthvd iwqlnldyfs kefqimmpyr fnnalkyyyr
361 keyykidype kysiagfvdg qlntqlslsd knqyiinkpe livnlisenn islmrsniyg
421 dglkyttndf ystykipynr ayeyhfnns tsslennvve eisnipeiid inpyrensdi
481 fspveniiet kevntktwp inylqaqipn neeftlssdf sqvvsyktqs lvysfslsvi
541 syldsvktdn pidtdekyyl wlreifrny fdiataeein tscginkvvs wfgklniln
601 tsnsfvkefk nlgpislink kenlsmpiie vneipndmlg lslkdlnekl fnyiylknily
661 fkkvyfsfld qwwteyysqy fglicmakqs ilagenlikk ivqkklsdls kqsnisnekl
721 nlmnlttekt fidlsnqsqi amnninnfln kaaicvfesn iypkfisfme qyinninikt
781 tafirkctni tekeklqlin qntfnnldfe ffdiqtienl ltsetnliik ektspydlil
841 fslqeadrkv ikdisgkdtl vqysdtidls ygvngdalyl kepqsvnfs nnifengltn
901 sfsicfwlrn lgqdnlsnl ignivncgw qiyfennglv fsmvdcngne kniylsdvls
961 kywyysvsv dlrnkllif indklivnes iegilniyss niislennn picieelsil
1021 nkaltseevl nsyftnlans yirdsygarl eynknyelyn yvfpenslye viennnmysl
1081 iknikntnil gakfklintd eskqyvqkw eviicvlgdt ekyadiqagn nriqlvnskd
1141 narkiiwnnn ifrpncvlfs ynnkylslsl rnrnynwnic ndnsfipkha hlwilkki

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FIG. 5H

NTNHA E: *Clostridium botulinum* type E (WP_012450714.1) (SEQ ID NO: 30)

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1 mkingnlnid spvdnknvai vrarksdvff kafqvapniw ivperyyges lkinedqkfd
61 ggiydsnfls tnnedkflq atikllqrin nnavgakils listaipfpy enntedyrgt
121 nylssakneh yytanlvifg pgnaiiknnv iyykkeyaes gmgtmleiwf qpflthkyde
181 fyvdpaleli kcliksllyl ygikpndaln ipyrlrnefn sleyseldmi dflisggidy
241 kllatnpywf idkyfidtsk nfekykndye ikiknnnyia nsiklylegk fkinvkdwe
301 lnsyfskef qimmperynn alnhyyrkey yvidyfkyn ingfknagqik tkilplekynk
361 eiinkpeliv nlingnntvl mkeniygdgl kgtvdafysn yiipynlnye hsinysyldn
421 vniceekkip pindediypy rkndatfipv ynltkakein tttplpvnyl qagmidendi
481 nlsedflkvi sskgsivysf lnnmdylef ikydkiptd kkykwlkai frnyaldite
541 tqeianqfgd tkilpwigra lnilntnnaf veefknlgpi alinkkanit ipkikidaip
601 ssmlnfsfkd leenlfniyc knnfylkxiy ynfldgwwtq yysqyfdlic masksvlage
661 klikkliqkq lrylmanani setnlilnl tttntlrdis nqsqiainni dkffnnaamc
721 vfenniyphf tefmeqoikn inketkefil kotninetek shlimqnsfs nldfdldiq
781 nmknlfnsyt ellikeqtsp yelslyafqe qdnnvigds gkntlveyph diglvyginn
841 naikltgang nikftndyfa ngltnnfsiy fwlrnlkqnt ikskligake dnogwewyfe
901 ndglvfniid sngnekniyl enisnnswy ivisinrlkd qlifidnil vanedikeil
961 niysediisl lsdannvyie glavlnktin sneiltayfs dlnnnyirn deeilqynrt
1021 yelfnyvffe iainkieggn niylsinnan nlnfkplkfx llnatpnhqy vqkwdevife
1081 vldgtekyld isttnnriql vdnknnaqif iinndifian cltltynwn vylsikhqdy
1141 nwwicdlnd ipkksylwil kni

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FIG. 5I

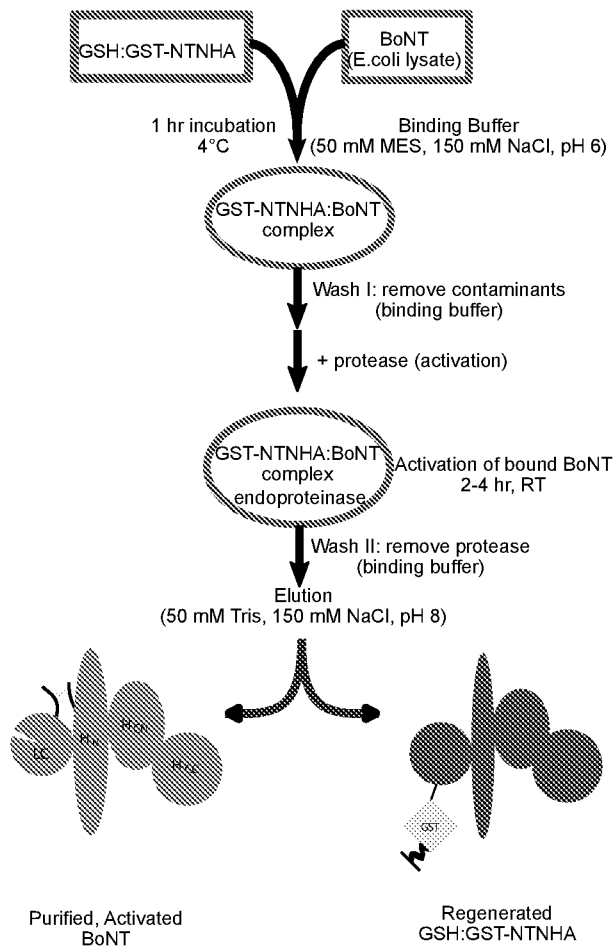
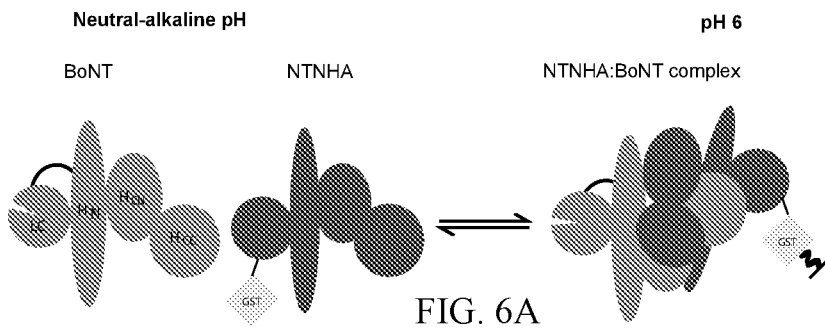


FIG. 6B

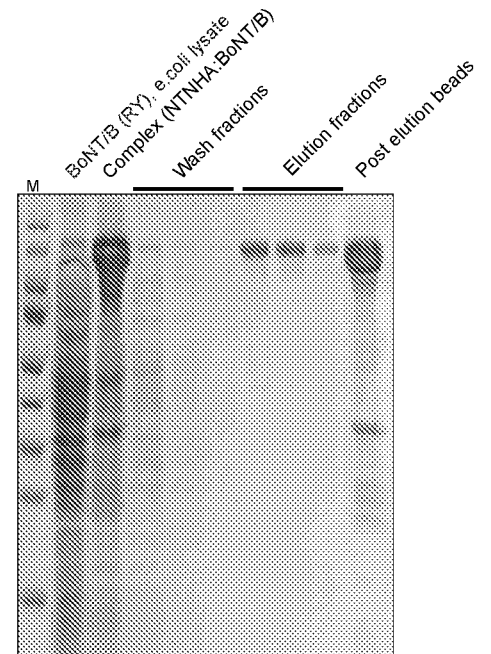


FIG. 6C

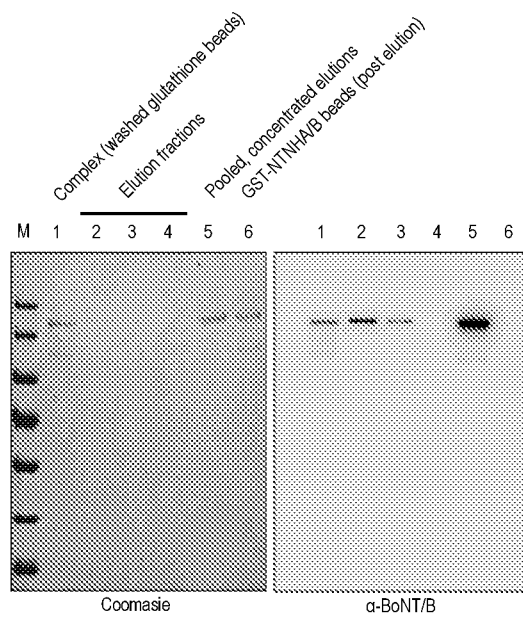


FIG. 7A

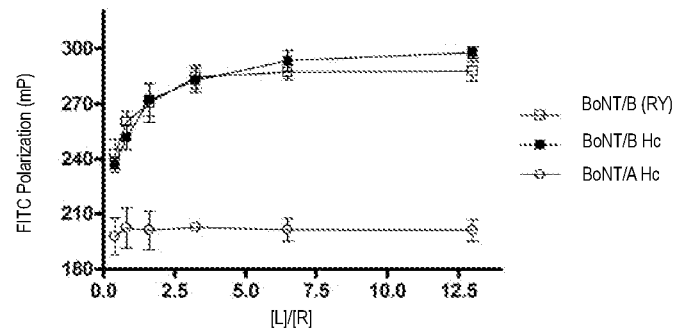


FIG. 7B

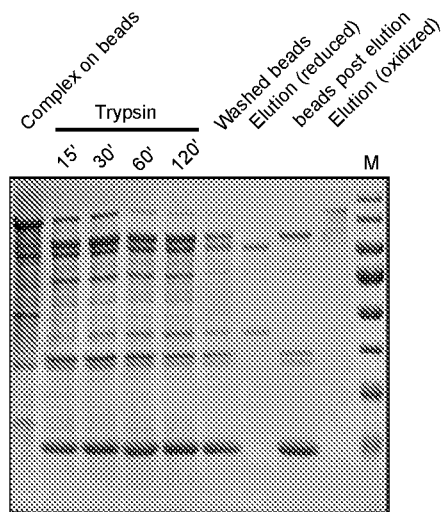


FIG. 8A

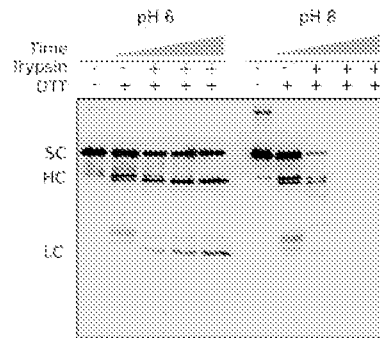


FIG. 8B

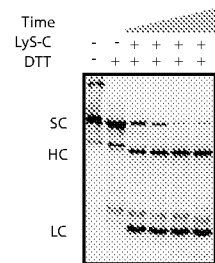


FIG. 8C

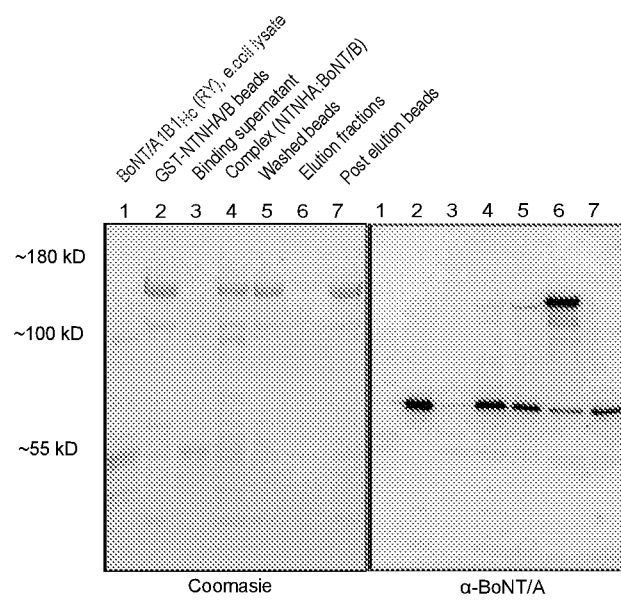


FIG. 9