

E	-----AQQNAFYQVLNMPNLNADQRNGFIQSLKDDPSQSANVLGEAQKLNDSQAPK	51	(SEQ	ID	NO:1)
D	ADAQQNKFNKDQQSAFYIELNMPNLNEEQRNGFIQSLKDDPSQSTNVLGEAKKLNESQAPK	61	(SEQ	ID	NO:5)
A	--ADNN-FNKEQQNAFYIELNMPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNESQAPK	58	(SEQ	ID	NO:2)
B	---ADNKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDAQAPK	58	(SEQ	ID	NO:3)
C	---ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK	58	(SEQ	ID	NO:4)
Z	---VDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQAPK	58	(SEQ	ID	NO:6)

Figure 1. amino acid sequence alignment

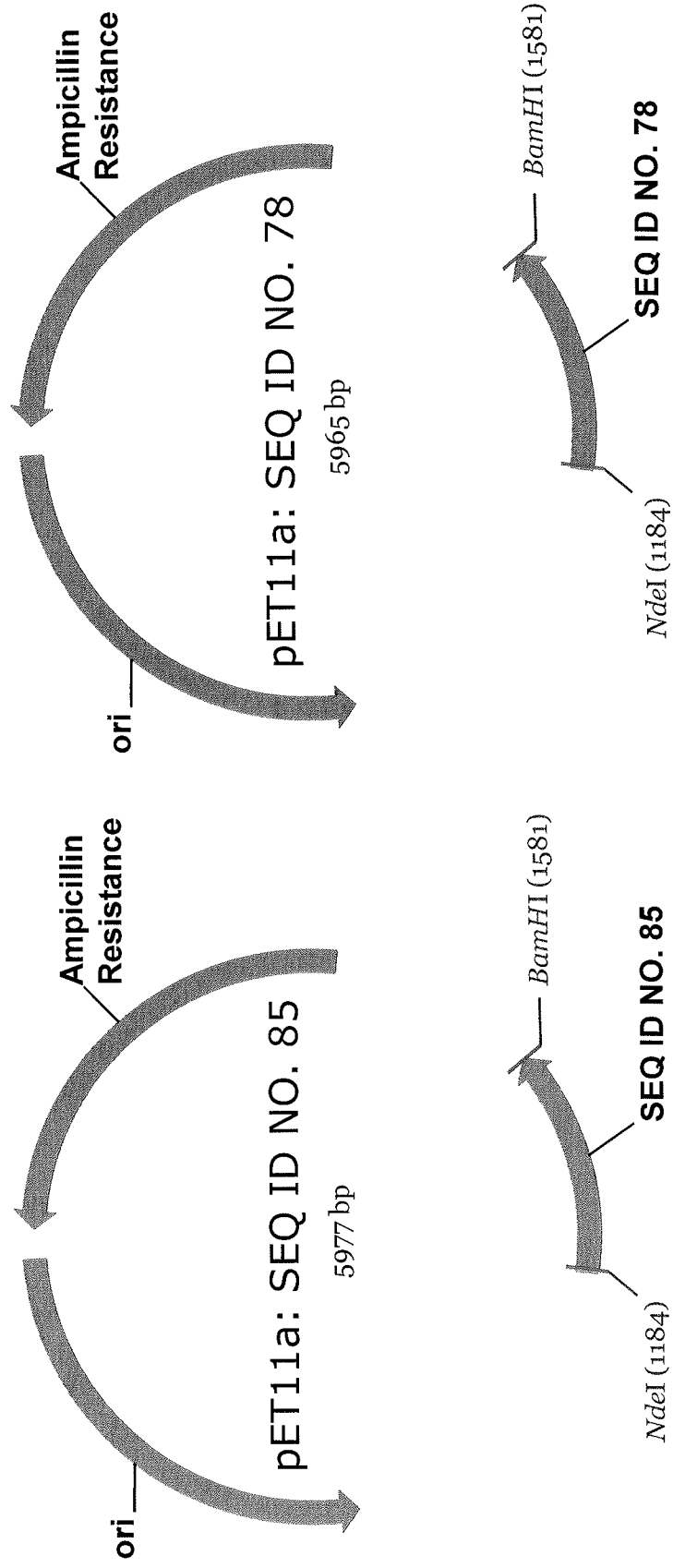


Figure 2. plasmid map

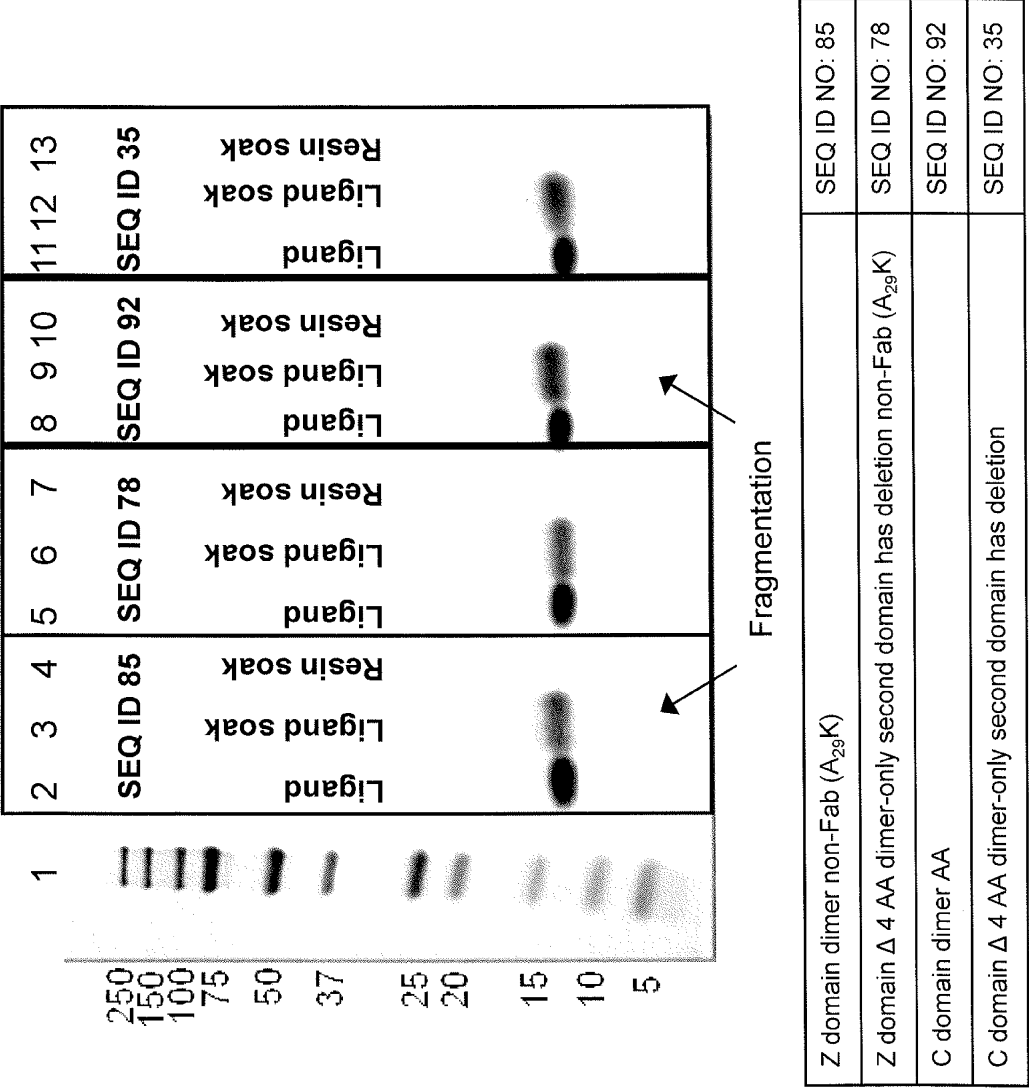


Figure 3. SDS-PAGE comparison of ligands (before and after extended caustic soak) and immobilized ligands (after extended caustic soak)

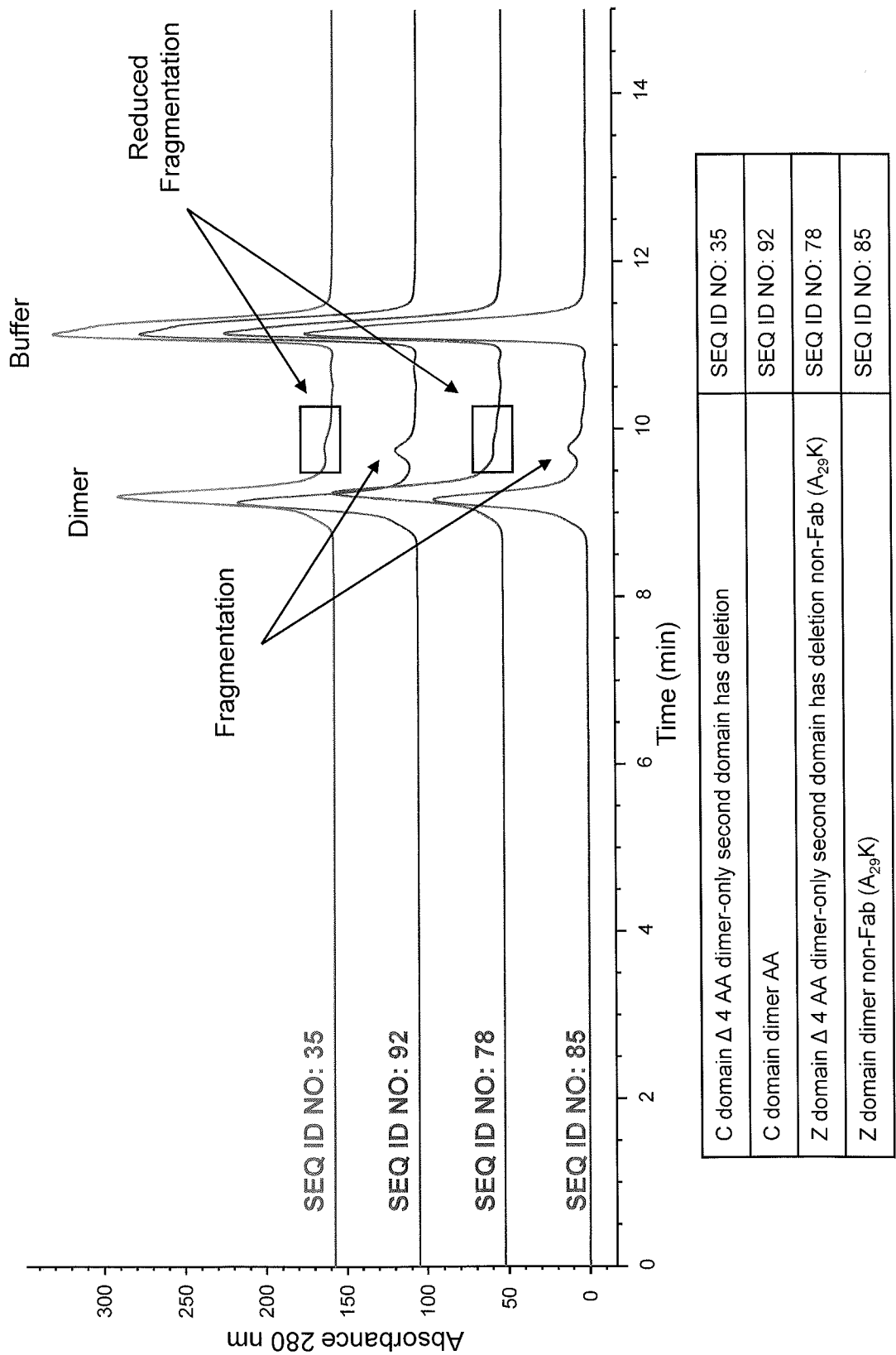


Figure 4. SEC comparison of ligands after extended caustic soak

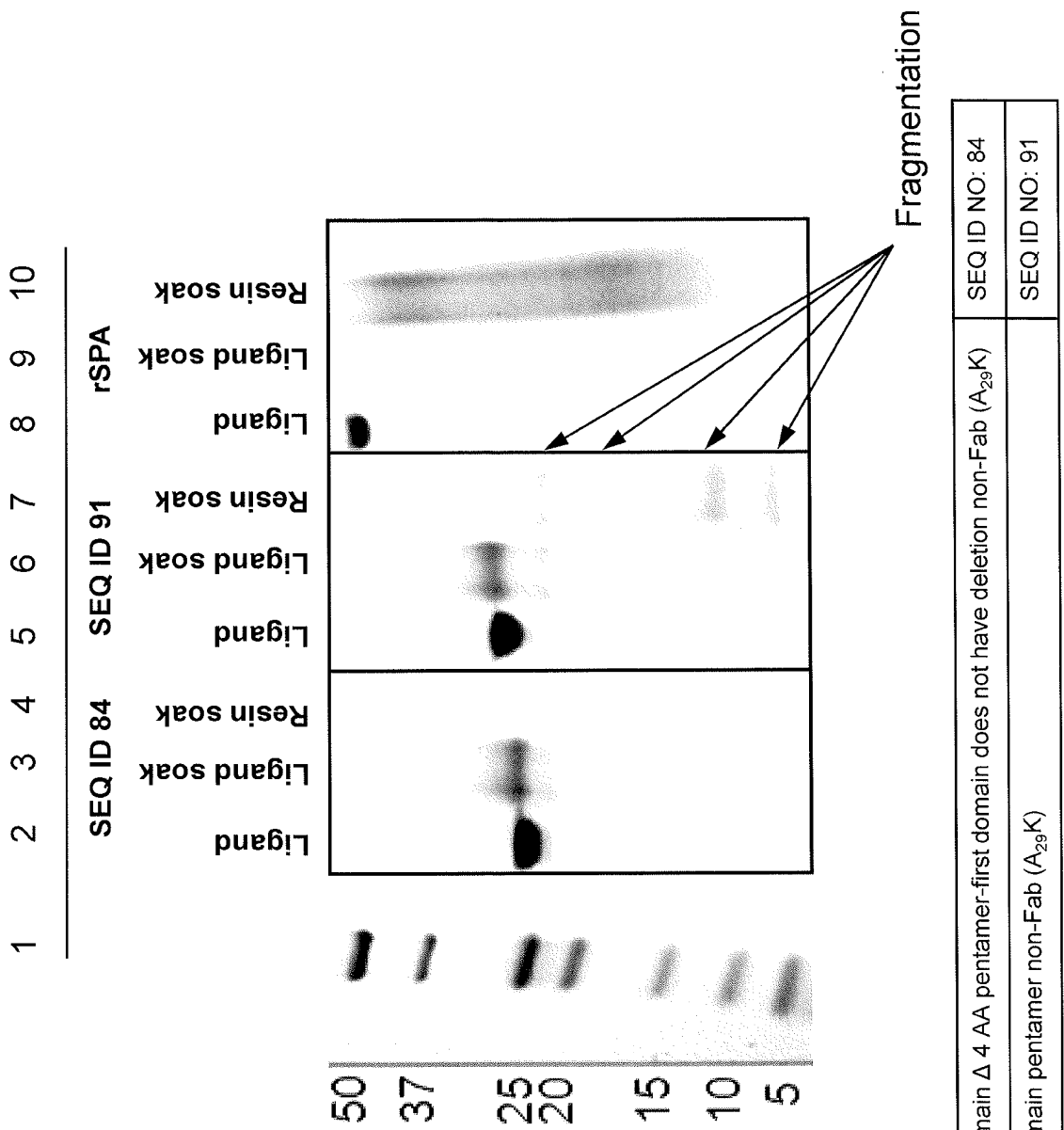


Figure 5. SDS-PAGE comparison of ligands (before and after extended caustic soak) and immobilized ligands (after extended caustic soak)

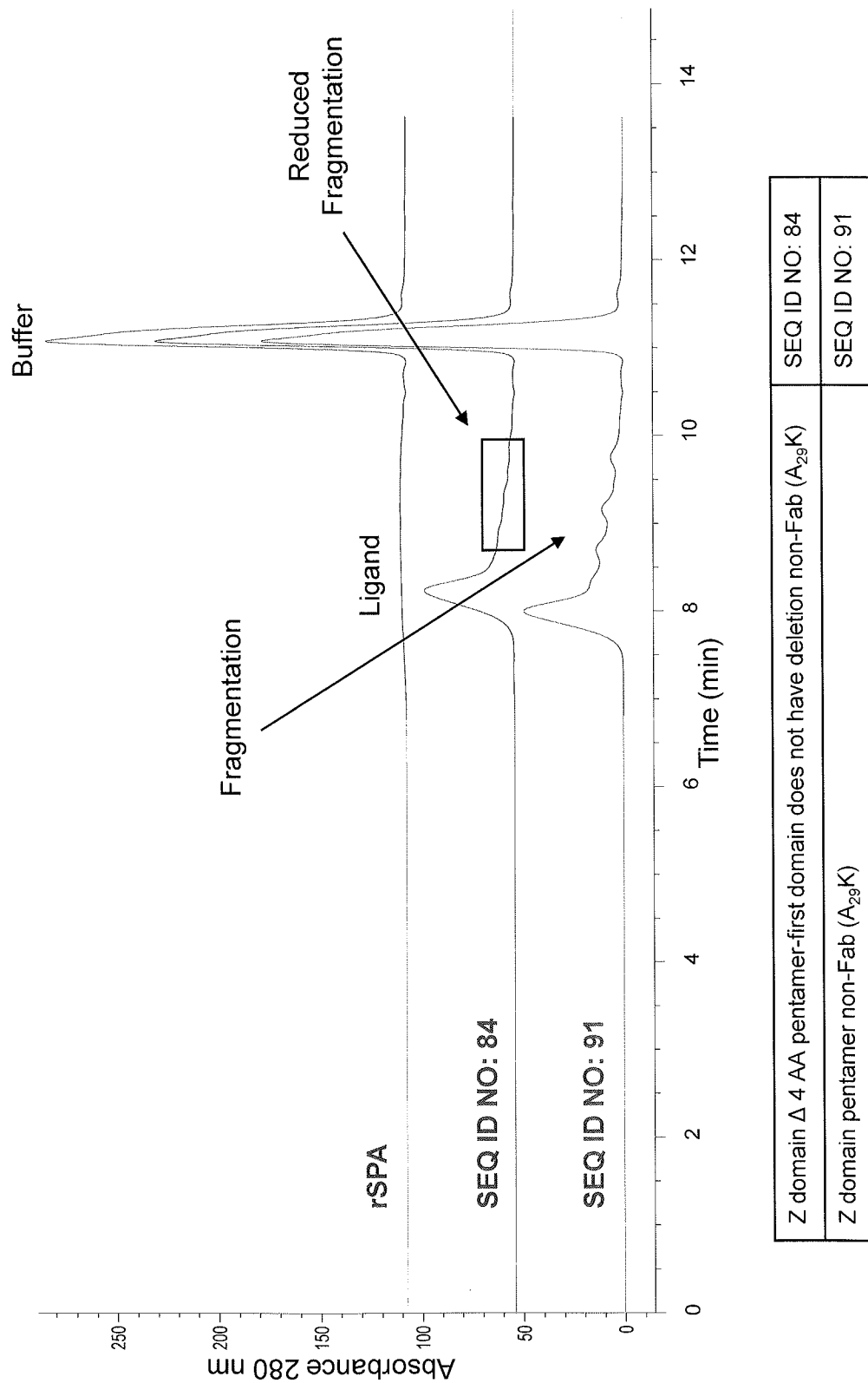


Figure 6. SEC comparison of ligands after extended caustic soak

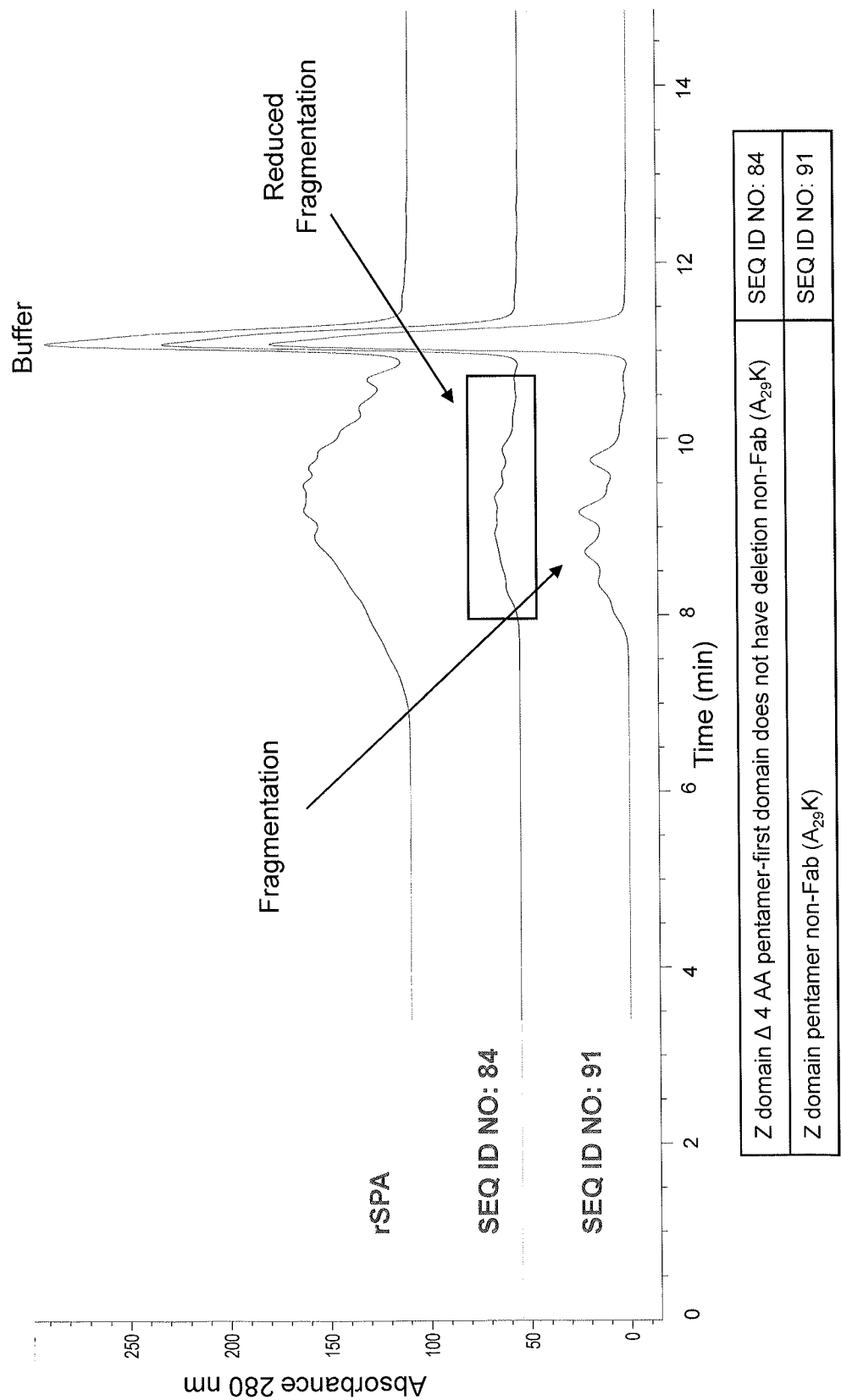
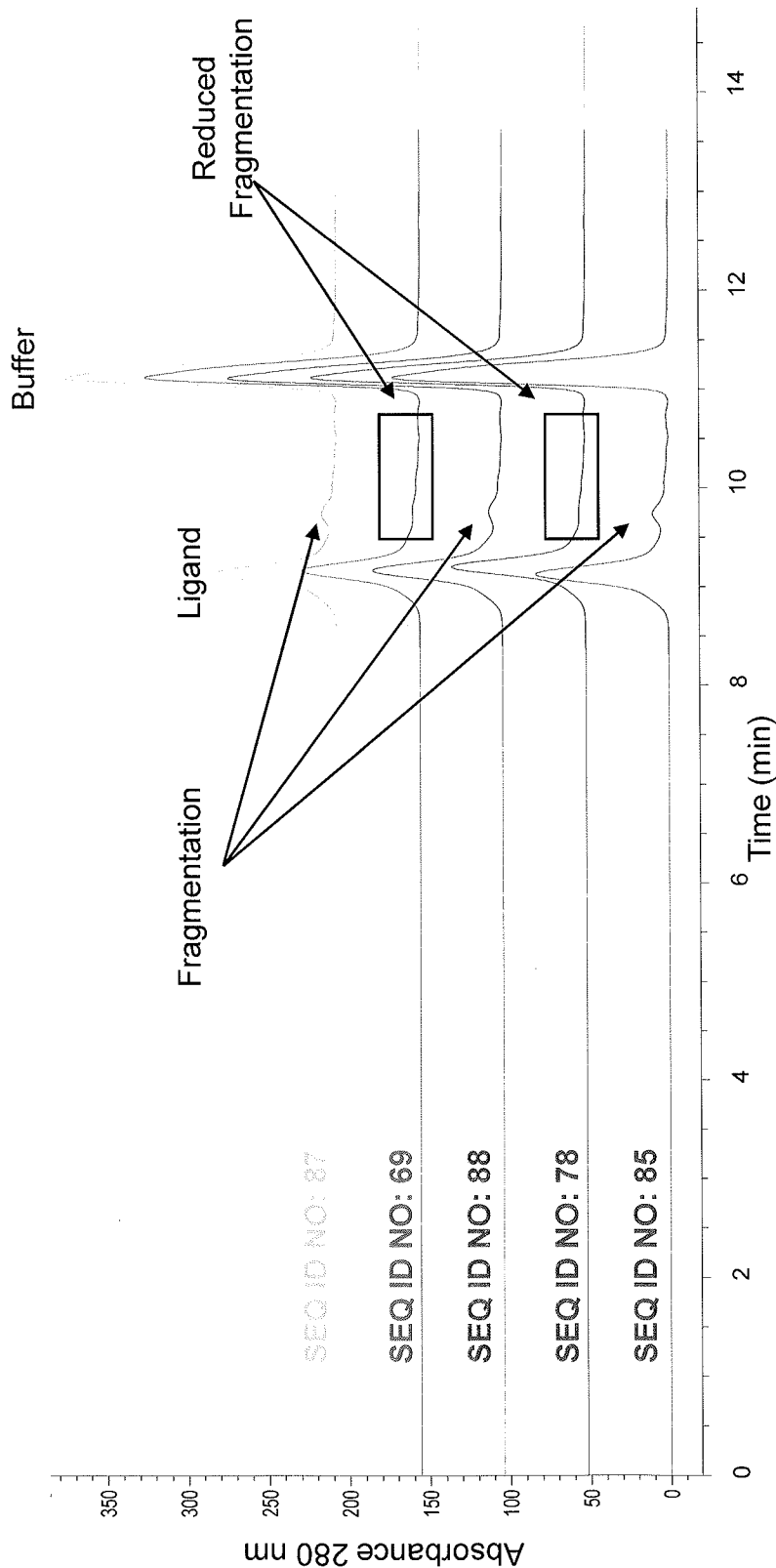


Figure 7. SEC comparison of immobilized ligands after extended caustic soak



Z domain dimer non-Fab ($A_{29}K$)	SEQ ID NO: 85
Z Domain Δ 1 AA dimer-first domain does not have deletion non-Fab ($A_{29}K$)	SEQ ID NO: 87
Z Domain Δ 2 AA dimer-first domain does not have deletion non-Fab ($A_{29}K$)	SEQ ID NO: 88
Z domain Δ 3 AA pentamer-first domain does not have deletion non-Fab ($A_{29}K$)	SEQ ID NO: 69
Z domain Δ 4 AA dimer-first domain does not have deletion non-Fab ($A_{29}K$)	SEQ ID NO: 78

Figure 8. SEC comparison of ligands after extended caustic soak

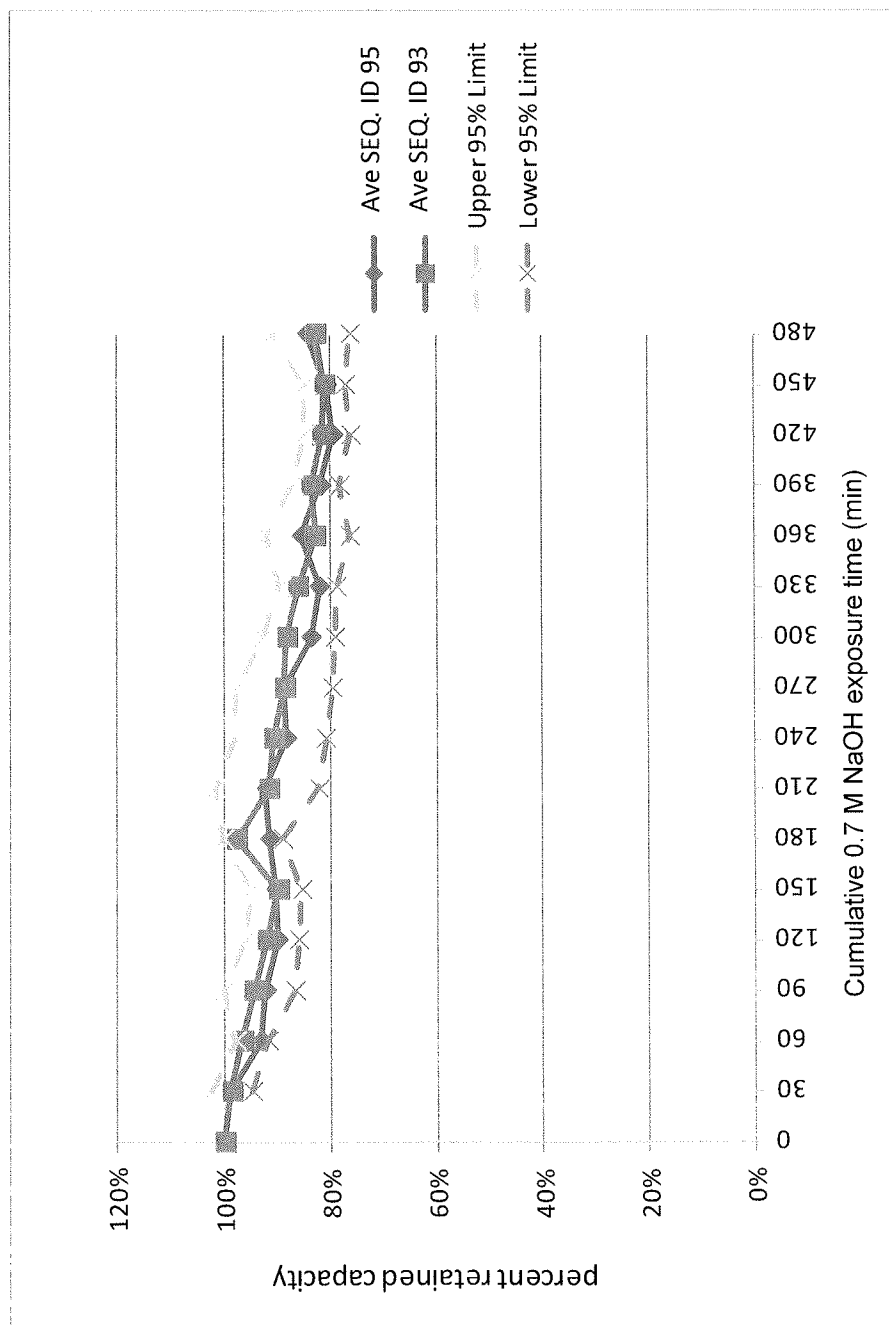


Figure 9.

SEQUENCE LISTING

SEQ ID NO. 1 wt E domain AA

AQQNAFYQVLNMPNLNADQRNGFIQSLKDDPSQSANVLGEAQKLNDSQAPK

SEQ ID NO. 2 wt A domain AA

ADNNFNKEQQNAFYEILNMPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNES
QAPK

SEQ ID NO. 3 wt B domain AA

ADNKFNKEQQNAFYEILHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 4 wt C domain AA

ADNKFNKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APK

SEQ ID NO. 5 wt D domain AA

ADAQQNKFNKDQQSAFYEILNMPNLNEEQRNGFIQSLKDDPSQSTNVLGEAKKL
NESQAPK

SEQ ID NO. 6 Z domain AA

VDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 7 wt E domain NA

GCGCAACAAAACGCTTTCTATCAGGTACTGAACATGCCTAACCTGAACGCCG
ATCAGCGTAACGGCTTCATCCAAAGCCTGAAGGACGACCCGAGCCAGTCCGC
AAACGTTCTGGGTGAAGCTCAAAAACCTGAACGACAGCCAGGCACCGAAAGC
TGAC

SEQ ID NO. 8 wt A domain NA

GCCGACAACAACCTTCAACAAAGAGCAGCAAAAACGCTTTCTACGAAATCCTGA
ATATGCCAAATCTGAACGAAGAGCAGCGTAACGGTTTCATCCAATCTCTGAA
AGACGATCCGTCCCAGTCCGCGAATCTGCTGGCGGAGGCTAAAAAGCTGAAC
GAATCCCAGGCTCCGAAA

SEQ ID NO. 9 wt B domain NA

GCAGACAATAAGTTCAATAAAGAGCAGCAGAACGCATTTTACGAGATCCTGC
ATCTGCCGAACCTGAACGAAGAACAACGCAACGGTTTCATTTCAGAGCCTGAA
AGACGACCCATCTCAGTCCGCTAACCTGCTGGCGGAAGCAAAGAAGCTGAAC
GATGCACAGGCGCCGAAA

SEQ ID NO. 10 wt C domain NA

GCGGATAACAAATTCAACAAGGAGCAACAGAACGCATTCTATGAAATTCTGC
ACCTGCCGAATCTGACGGAGGAGCAACGTAACGGCTTTATCCAGTCCCTGAA
GGATGATCCGTCTGTGTCTAAAGAGATCCTGGCGGAGGCAAAAAAAGTGAAT
GATGCACAAGCTCCGAAA

SEQ ID NO. 11 wt D domain NA

GCCCAACAGAACAAATTTAACAAGACCAGCAGTCCGCGTTCTACGAGATTC
TGAACATGCCTAACCTGAATGAAGAACAGCGCAACGGTTTTATTTCAGTCTCT
GAAGGACGATCCTTCTCAATCCACCAACGTACTGGGCGAAGCGAAGAACTG
AACGAATCTCAGGCTCCGAAG

SEQ ID NO. 12 Z domain NA

GTAGACAACAAATTCAATAAAGAACAGCAGAACGCCTTTCTATGAAATCCTGC
ACCTGCCGAACCTGAACGAAGAACAGCGTAACGCGTTTATCCAGTCCCTGAA
AGACGACCCGAGCCAGAGCGCAAATCTGCTGGCGGAAGCGAAAAAGCTGAA
CGATGCCCAGGCGCCGAAA

SEQ ID NO. 13 B domain Δ 3 AA monomer

KFNKEQQNAFYEILHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDAPK
K

SEQ ID NO. 14 C domain Δ 3 AA monomer

KFNKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAPK

SEQ ID NO. 15 Z domain Δ 3 AA monomer

KFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAPK
K

SEQ ID NO. 16 B domain Δ 3 AA dimer-both domains having deletion AA

KFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDAP
KKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDQA
PK

SEQ ID NO. 17 C domain Δ 3 AA dimer-both domains having deletion AA

KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAPK
KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAPK

SEQ ID NO. 18 Z domain Δ 3 AA dimer-both domains having deletion AA

KFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAP
KKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDQA
PK

SEQ ID NO. 19 B domain Δ 3 AA dimer-only second domain has deletion AA

ADNKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
QAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 20 C domain Δ 3 AA dimer-only second domain has deletion AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLND
APKKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLND
APK

SEQ ID NO. 21 Z domain Δ 3 AA dimer-only second domain has deletion AA

VDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
QAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 22 B domain Δ 3 AA pentamer-all domains have deletion AA

KFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDAP
KKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDQA
PKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
APKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
QAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 23 C domain Δ 3 AA pentamer-all domains have deletion AA

KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
KFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK

SEQ ID NO. 24 Z domain Δ 3 AA pentamer-all domains have deletion AA

KFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQAP
KKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQA
PKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQ
APKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 25 B domain Δ 3 AA pentamer-first domain does not have deletion AA

ADNKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDA
QAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 26 C domain Δ 3 AA pentamer-first domain does not have deletion AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APKKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APKKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APKKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APKKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APK

SEQ ID NO. 27 Z domain Δ 3 AA pentamer-first domain does not have deletion AA

VDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 28 B domain Δ 4 AA monomer AA

FNKEQQNAFYIELHLPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNDAQAPK

SEQ ID NO. 29 C domain Δ 4 AA monomer AA

FNKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK

SEQ ID NO. 30 Z domain Δ 4 AA monomer AA

FNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQAPK

SEQ ID NO. 31 B domain Δ 4 AA dimer-both domains having deletion AA

FNKEQQNAFYEILHLPNLNEEQQRNGFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYEILHLPNLNEEQQRNGFIQSLKDDPSQSANLLAEAKKLNDAQAPK

SEQ ID NO. 32 C domain Δ 4 AA dimer-both domains having deletion AA

FNKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPKF
NKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK

SEQ ID NO. 33 Z domain Δ 4 AA dimer-both domains having deletion AA

FNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAQAPK

SEQ ID NO. 34 B domain Δ 4 AA dimer-only second domain has deletion AA

ADNKFNKEQQNAFYEILHLPNLNEEQQRNGFIQSLKDDPSQSANLLAEAKKLNDA
QAPKFNKEQQNAFYEILHLPNLNEEQQRNGFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 35 C domain Δ 4 AA dimer-only second domain has deletion AA

ADNKFNKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APKFNKEQQNAFYEILHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
PK

SEQ ID NO. 36 Z domain Δ 4 AA dimer-only second domain has deletion AA

VDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 37 B domain Δ 4 AA pentamer-all domains have deletion AA

QAPKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 43 wt E domain AA, non-Fab (G29K) AA

AQQNAFYQVLNMPNLNADQRNKFIQSLKDDPSQSANVLGEAQKLNDSQAPK

SEQ ID NO. 44 wt A domain AA, non-Fab (G29K) AA

ADNNFNKEQQNAFYEILNMPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNES
QAPK

SEQ ID NO. 45 wt B domain AA, non-Fab (G29K) AA

ADNKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 46 wt C domain AA, non-Fab (G29K) AA

ADNKFNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQ
APK

SEQ ID NO. 47 wt D domain AA, non-Fab (G29K) AA

ADAQQNKFNKDQQSAFYEILNMPNLNEEQRNKFIQSLKDDPSQSTNVLGEAKKL
NESQAPK

SEQ ID NO. 48 Z domain AA, non-Fab (A29K) AA

VDNKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 49 E domain, non-Fab (G29K) NA

GCGCAACAAAACGCTTTCTATCAGGTACTGAACATGCCTAACCTGAACGCCG
ATCAGCGTAACAAATTCATCCAAAGCCTGAAGGACGACCCGAGCCAGTCCGC
AAACGTTCTGGGTGAAGCTCAAAAACCTGAACGACAGCCAGGCACCGAAAGC
TGAC

SEQ ID NO. 50 A domain, non-Fab (G29K) NA

GCCGACAACAACCTTCAACAAAGAGCAGCAAAAACGCTTTCTACGAAATCCTGA
ATATGCCAAATCTGAACGAAGAGCAGCGTAACAAATTCATCCAATCTCTGAA
AGACGATCCGTCCCAGTCCGCGAATCTGCTGGCGGAGGCTAAAAAGCTGAAC
GAATCCCAGGCTCCGAAA

SEQ ID NO. 51 B domain, non-Fab (G29K) NA

GCAGACAATAAGTTCAATAAAGAGCAGCAGAACGCATTTTACGAGATCCTGC
ATCTGCCGAACCTGAACGAAGAACAACGCAACAAATTCATTTCAGAGCCTGAA
AGACGACCCATCTCAGTCCGCTAACCTGCTGGCGGAAGCAAAGAAGCTGAAC
GATGCACAGGCGCCGAAA

SEQ ID NO. 52 C domain, non-Fab (G29K) NA

GCGGATAACAAATTCAACAAGGAGCAACAGAACGCATTCTATGAAATTCTGC
ACCTGCCGAATCTGACGGAGGAGCAACGTAACAAATTTATCCAGTCCCTGAA
GGATGATCCGTCTGTGTCTAAAGAGATCCTGGCGGAGGCAAAAAAACTGAAT
GATGCACAAGCTCCGAAA

SEQ ID 53 D domain, non-Fab (G29K) NA

GCCCAACAGAACAAATTTAACAAGACCAGCAGTCCGCGTTCTACGAGATTC
TGAACATGCCTAACCTGAATGAAGAACAGCGCAACAAATTTATTTCAGTCTCT
GAAGGACGATCCTTCTCAATCCACCAACGTACTGGGCGAAGCGAAGAAACTG
AACGAATCTCAGGCTCCGAAG

SEQ ID NO. 54 Z domain, non-Fab (G29K) NA

GTAGACAACAAATTCAATAAAGAACAGCAGAACGCTTTCTATGAAATCCTGC
ACCTGCCGAACCTGAACGAAGAACAGCGTAACAAATTTATCCAGTCCCTGAA
AGACGACCCGAGCCAGAGCGCAAATCTGCTGGCGGAAGCGAAAAAGCTGAA
CGATGCCCAGGCGCCGAAA

SEQ ID NO. 55 B domain Δ 3 AA monomer domain, non-Fab (G29K) AA

KFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
K

SEQ ID NO. 56 C domain Δ 3 AA monomer domain, non-Fab (G29K) AA

KFNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAPK

SEQ ID NO. 57 Z domain Δ 3 AA monomer domain, non-Fab (A29K) AA

KFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
K

SEQ ID NO. 58 B domain Δ 3 AA dimer-both domains having deletion non-Fab (G29K)
AA

KFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
KKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
PK

SEQ ID NO. 59 C domain Δ 3 AA dimer-both domains having deletion,, non-Fab
(G29K) AA

KFNKEQQNAFYIELHLPNLTEEQRNKFISLKDPSVSKEILAEAKKLNDAPK
KFNKEQQNAFYIELHLPNLTEEQRNKFISLKDPSVSKEILAEAKKLNDAPK

SEQ ID NO. 60 Z domain Δ 3 AA dimer-both domains having deletion, non-Fab (A29K)
AA

KFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
KKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
PK

SEQ ID NO. 61 B domain Δ 3 AA dimer-only second domain has deletion, non-Fab
(G29K) AA

ADNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
QAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
A

SEQ ID NO. 62 C domain Δ 3 AA dimer-only second domain has deletion, non-Fab
(G29K) AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNKFISLKDPSVSKEILAEAKKLNDAPK
APKKFNKEQQNAFYIELHLPNLTEEQRNKFISLKDPSVSKEILAEAKKLNDAPK
APK

SEQ ID NO. 63 Z domain Δ 3 AA dimer-only second domain has deletion, non-Fab
(A29K) AA

VDNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
QAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
A

SEQ ID NO. 64 B domain Δ 3 AA pentamer-all domains have deletion, non-Fab (G29K)
AA

KFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
KKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
PKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK
APKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK

QAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 65 C domain Δ 3 AA pentamer-all domains have deletion, non-Fab (G29K)
AA

KFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAQPK
KFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAQPK
KFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAQPK
KFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAQPK
KFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAQPK

SEQ ID NO. 66 Z domain Δ 3 AA pentamer-all domains have deletion, non-Fab (A29K)
AA

KFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDQAQ
KKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDQA
PKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDQA
APKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
QAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 67 B domain Δ 3 AA pentamer-first domain does not have deletion non-
Fab (G29K) AA

ADNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
QAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPK

SEQ ID NO. 68 C domain Δ 3 AA pentamer-first domain does not have deletion, non-
Fab (G29K) AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQA
APKKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQA
APKKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQA
APKKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQA
APKKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQA
APK

SEQ ID NO. 69 Z domain Δ 3 AA pentamer-first domain does not have deletion, non-
Fab (A29K) AA

VDNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
QAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
AQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKL
DAQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKL
NDAQAPKKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKK
LNDAPK

SEQ ID NO. 70 B domain Δ 4 AA monomer, non-Fab (G29K) AA

FNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK

SEQ ID NO. 71 C domain Δ 4 AA monomer, non-Fab (G29K) AA

FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAPK

SEQ ID NO. 72 Z domain Δ 4 AA monomer, non-Fab (A29K) AA

FNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK

SEQ ID NO. 73 B domain Δ 4 AA dimer-both domains having deletion, non-Fab (G29K)
AA

FNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK

SEQ ID NO. 74 C domain Δ 4 AA dimer-both domains having deletion, non-Fab (G29K)
AA

FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAPKF
NKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAPK

SEQ ID NO. 75 Z domain Δ 4 AA dimer-both domains having deletion, non-Fab (A29K)
AA

FNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAPK

SEQ ID NO. 76 B domain Δ 4 AA dimer-only second domain has deletion, non-Fab
(G29K) AA

ADNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
QAPKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLND
QAPK

SEQ ID NO. 77 C domain Δ 4 AA dimer-only second domain has deletion, non-Fab
(G29K) AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQ
APKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQ
PK

SEQ ID NO. 78 Z domain Δ 4 AA dimer-only second domain has deletion, non-Fab
(A29K) AA

VDNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPK

SEQ ID NO. 79 B domain Δ 4 AA pentamer-all domains have deletion, non-Fab (G29K)
AA

FNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPK

SEQ ID NO. 80C domain Δ 4 AA pentamer-all domains have deletion, non-Fab (G29K)
AA

FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK

SEQ ID NO. 81 Z domain Δ 4 AA pentamer-all domains have deletion, non-Fab (A29K)
AA

FNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPKF
NKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAQAPK

SEQ ID NO. 82 B domain Δ 4 AA pentamer-first domain does not have deletion, non-
Fab (G29K) AA

ADNKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA
QAPKFNKEQQNAFYIELHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDA

QAPKFNKEQQNAFYEILHLPNLNEEQRNkFIQSLKDDPSQSANLLAEAKKLNDAAQ
APK

SEQ ID NO. 83 C domain Δ 4 AA pentamer-first domain does not have deletion, non-Fab (G29K) AA

ADNKFNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAAQ
APKFNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAAQ
PKFNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAAQAP
KFNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAAQAPK
FNKEQQNAFYEILHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAAQAPK

SEQ ID NO. 84 Z domain Δ 4 AA pentamer-first domain does not have deletion, non-Fab (A29K)

VDNKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKFNKEQQNAFYEILHLPNLNEEQRNKFIQSLKDDPSQSANLLAEAKKLNDAA
QAPK

SEQ ID NO. 85 Z domain dimer AA

VDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKVDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKK
LNDAAQAPK

SEQ ID NO. 86 HIS tag NA sequence

CATCACCATCATCACCAC

SEQ ID NO. 87 Z Domain Δ 1 AA dimer-first domain does not have deletion, non-Fab (G29K) AA

VDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKL
NDAAQAPK

SEQ ID NO. 88 Z Domain Δ 2 AA dimer-first domain does not have deletion, non-Fab (G29K) AA

VDNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDAA
QAPKNKFNKEQQNAFYEILHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKL
NDAAQAPK

SEQ ID NO. 89 A Domain Δ 4 dimer-first domain has wt B domain N-terminal region
AA

ADNKFNKEQQNAFYIELNMPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNES
QAPKFNKEQQNAFYIELNMPNLNEEQRNGFIQSLKDDPSQSANLLAEAKKLNES
QAPK

SEQ ID NO. 90 D Domain Δ 4 dimer-first domain has wt B domain N-terminal region
AA

ADNKFNKDQQSAFYIELNMPNLNEEQRNGFIQSLKDDPSQSTNVLGEAKKLNES
QAPKFNKDQQSAFYIELNMPNLNEEQRNGFIQSLKDDPSQSTNVLGEAKKLNES
QAPK

SEQ ID NO. 91 84 Z domain pentamer, non-Fab (A29K) AA

VDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKKLNDA
QAPKVDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLAEAKK
LNDAQAPKVDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSANLLA
EAKKLNDAQAPKVDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDPSQSA
NLLAEAKKLNDAQAPKVDNKFNKEQQNAFYIELHLPNLNEEQRNAFIQSLKDDP
SQSANLLAEAKKLNDAQAPK

SEQ ID NO. 92 C domain dimer AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQ
APKADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLN
DAQAPK

SEQ ID NO. 93 C domain Δ 4 AA pentamer- deletion of all 5 domains with alanine
leader at N-terminus, non-Fab (G29K) AA

AFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDAQAPK

SEQ ID NO. 94 C domain Δ 4 AA pentamer- deletion of all 5 domains with alanine
leader at N-terminus AA

AFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK
FNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDAQAPK

SEQ ID NO. 95 C domain pentamer - no deletion, non-Fab (G29K) AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNKFIQSLKDDPSVSKEILAEAKKLNDQAAPK

SEQ ID NO. 96 C domain pentamer – wild type AA

ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDQAAPK
ADNKFNKEQQNAFYIELHLPNLTEEQRNGFIQSLKDDPSVSKEILAEAKKLNDQAAPK