STRUCTURAL
BIOLOGY

Volume 79 (2023)

Supporting information for article:

Domain structure and cross-linking in a giant adhesin from the *Mobiluncus mulieris* bacterium

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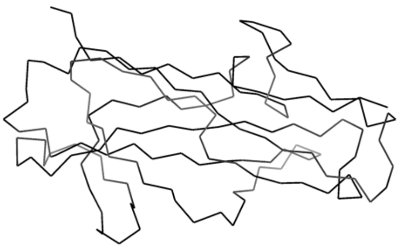
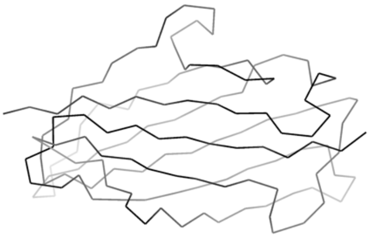
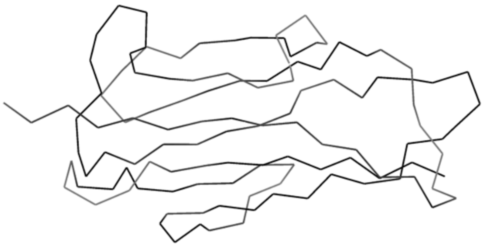
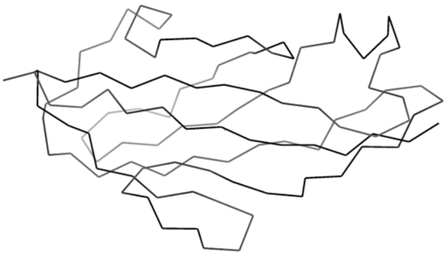
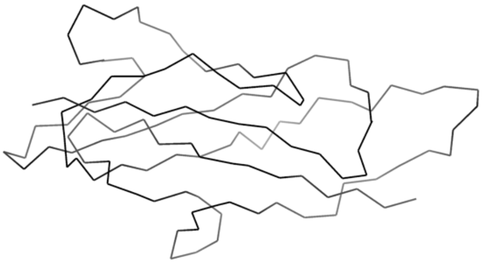
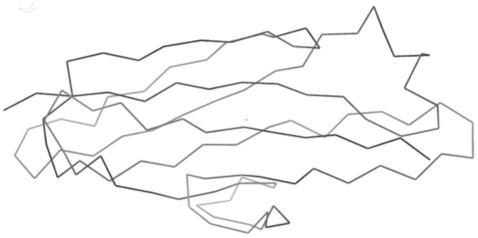
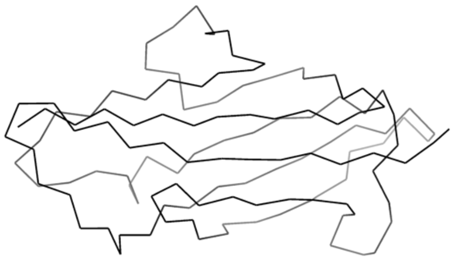
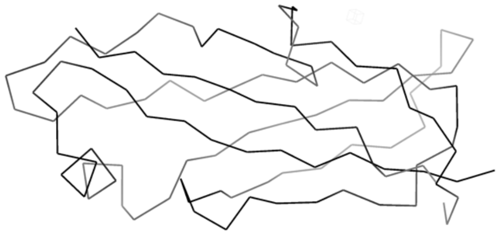
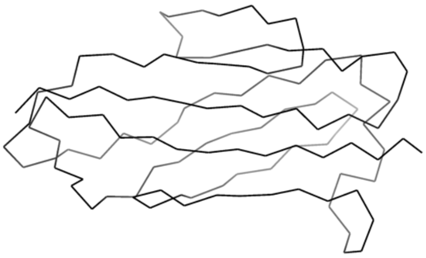
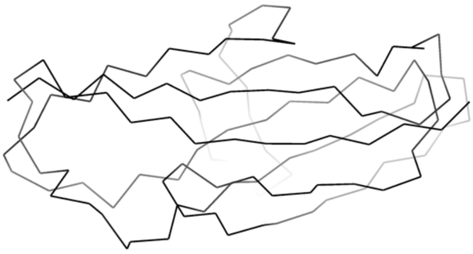
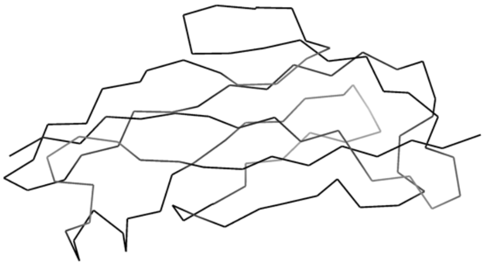
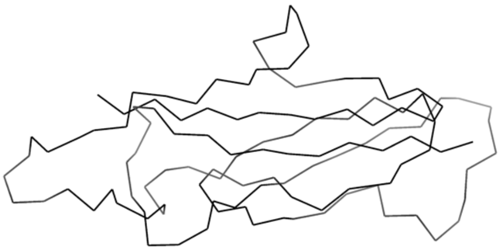
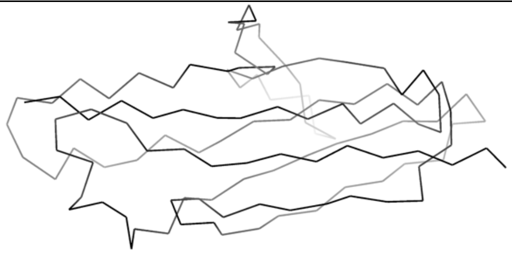
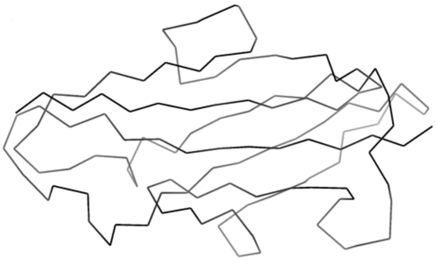
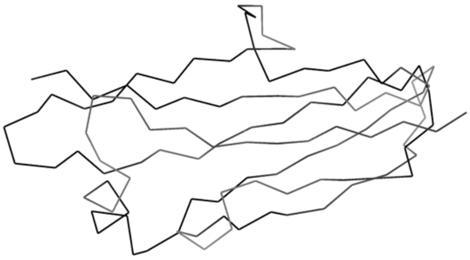
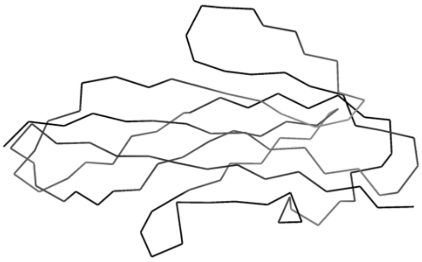
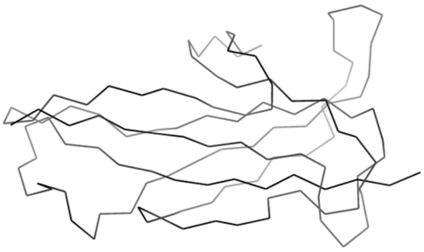
Table S1 *M. mulieris* adhesin AlphaFold2 structure predictions for individual domains.

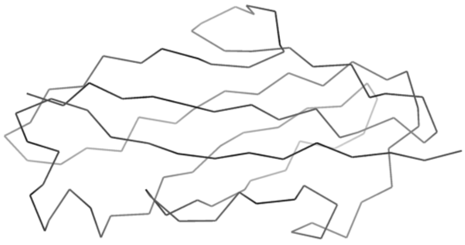
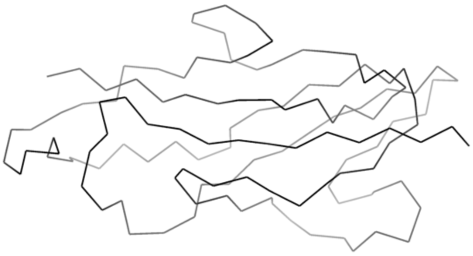
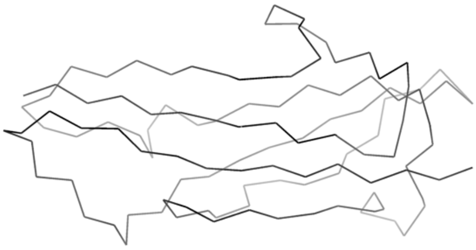
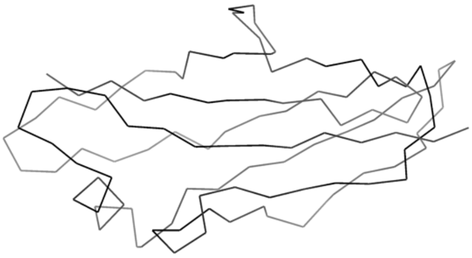
For RMSD calculation, putative isopeptide bond-containing domains were aligned to the major pilin Spy0128 from *Streptococcus pyogenes* (PDB ID 3B2M), and putative ester bond-containing domains were aligned to a repeat domain from *Clostridium perfringens* adhesin Cpe0147 (PDB ID 4NI6). The putative adhesin domain was aligned to the thioester domain of *Enterococcus faecium*, TIE86 (PDB ID 6FWY).

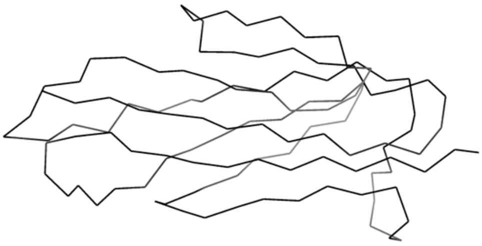
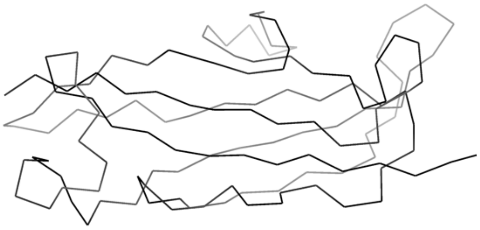
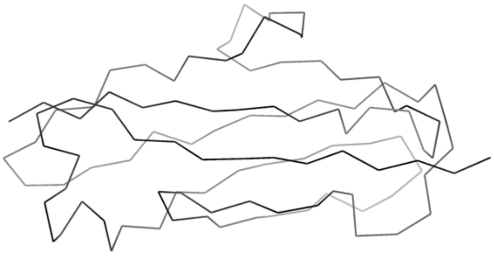
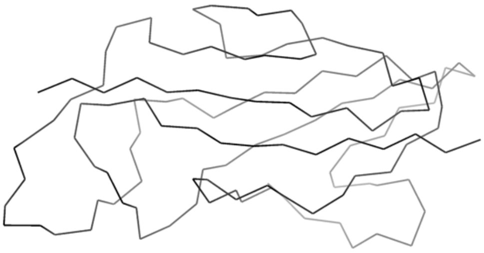
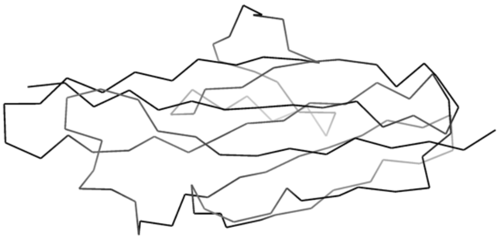
Domain Identifier	Amino acid range	RMSD (Å)	No. Cα aligned	Sequence identity (%)	Predicted structure
n/a	Met1 - Pro472	n/a	n/a	n/a	no structure predicted
A	Ile473 - Ser765	5.33	53/293	9.43	 thioester domain†
1	Ser764 - Gly919	2.92	121/156	16.53	 ester
2	Ser920 - Ala1061	3.11	86/142	9.30	 isopeptide
3	Asp1062 - Glu1181	3.08	95/120	16.84	 isopeptide

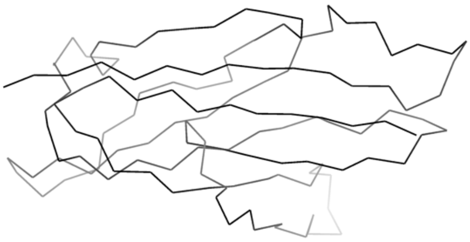
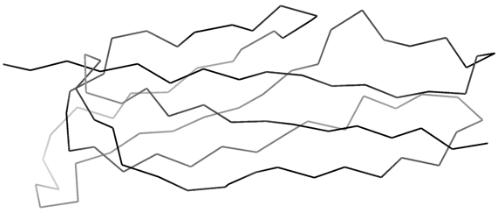
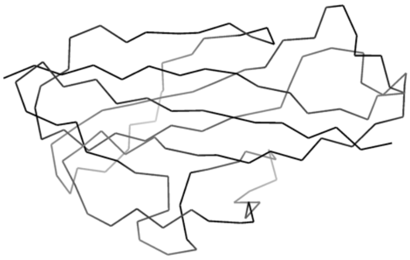
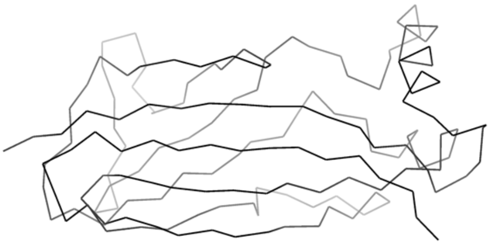
4	Leu1182 - Val1330	3.26	91/149	12.09	 isopeptide
5	Pro1331 - Lys1447	2.09	81/117	16.05	 isopeptide
6	Asp1448 - Pro1574	3.16	90/127	23.33	 isopeptide
7	Lys1575 - Asp1694	3.13	84/120	11.90	 isopeptide
8	Ile1695 - Arg1821	3.68	97/127	6.19	 isopeptide

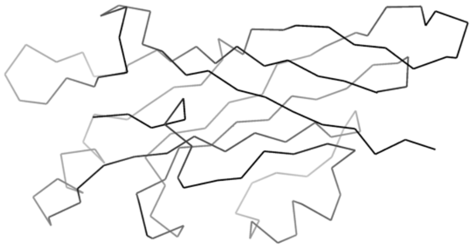
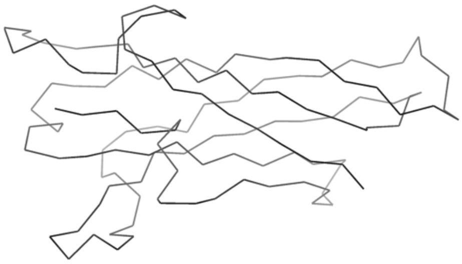
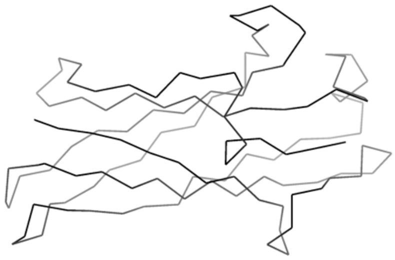
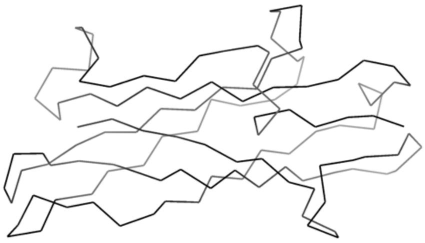
9	Lys1822 - Thr1940	2.70	85/119	8.24	 isopeptide
10	Pro1941 - Arg2062	2.12	88/122	14.77	 isopeptide
11	Gln2063 - Val2191	2.39	87/129	14.94	 isopeptide
12	Gln2192 - Tyr2308	2.34	87/117	19.54	 isopeptide
13	Asn2309 - Val2430	3.14	91/122	10.99	 isopeptide

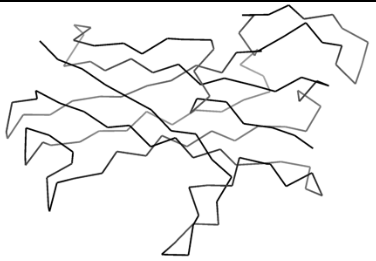
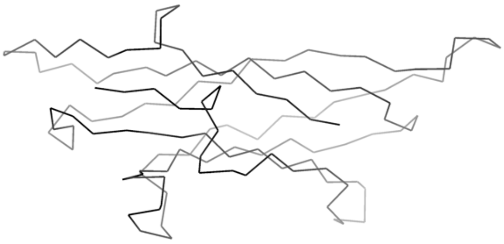
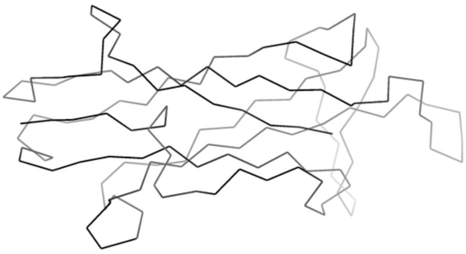
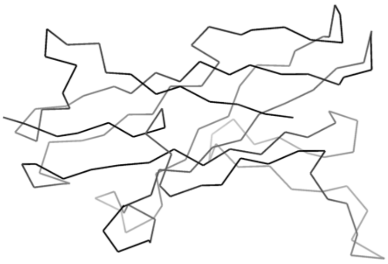
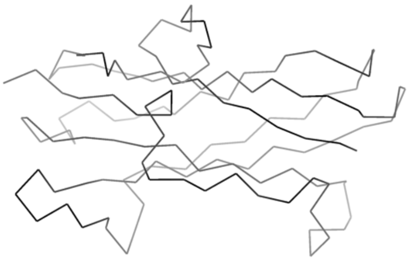
14	Ser2431 - Ile2556	3.10	86/126	4.65	 isopeptide
15	Pro2557 - Arg2682	3.59	92/126	9.78	 isopeptide
16	Lys2683 - Pro2797	3.15	87/115	5.75	 isopeptide
17	Tyr2798 - His2919	2.52	90/122	10.00	 isopeptide
18	Gln2920 - Val3048	2.67	92/129	11.96	 isopeptide

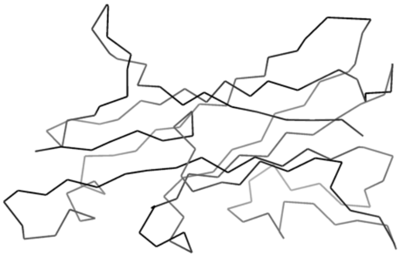
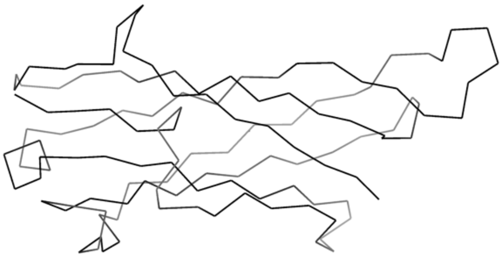
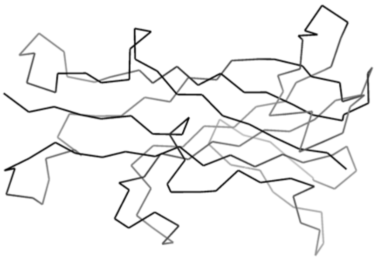
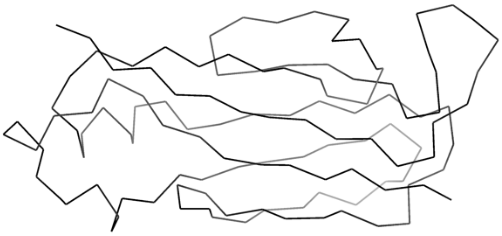
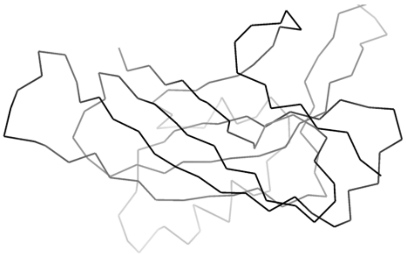
19	His3049 - Thr3164	2.56	88/116	20.45	
20	Tyr3165 - Pro3294	3.25	97/130	27.84	
21	Gln3295 - Val3422	3.06	90/128	13.33	
22	Ser3423 - Arg3543	3.60	89/121	11.24	
23	Glu3544 - Thr3662	2.34	97/119	12.37	

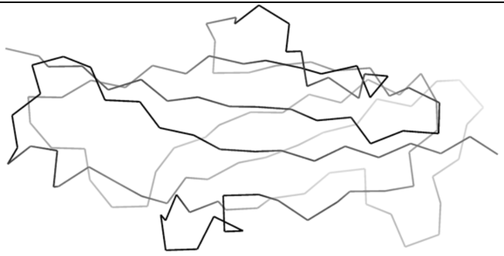
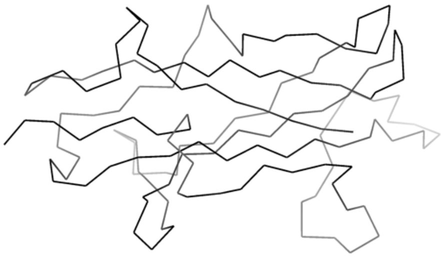
24	Pro3663 - Asp3782	2.00	96/120	22.92	 isopeptide
25	Arg3783 - Val3918	4.73	73/136	6.85	 isopeptide
26	Gln3919 - Tyr4032	2.32	86/114	12.79	 isopeptide
27	Asp4033 - Glu4166	2.78	101/134	27.72	 isopeptide
28	Lys4167 - Ile4293	2.91	87/127	9.20	 isopeptide

29	Pro4294 - Thr4427	3.62	96/134	10.42	 isopeptide
30	Arg4428 - Asp4533	3.91	47/106	4.26	 isopeptide
31	Ser4534 - Gln4676	2.49	86/143	11.63	 isopeptide
32	Thr4677 - Ser4839	3.34	97/163	5.15	 isopeptide
33	Phe4838 - Pro5000	2.42	109/163	13.76	 ester

34	Ile5001 - Phe5147	3.84	59/147	16.95	 ester
35	Thr5148 - Ser5279	1.51	106/132	31.13	 ester
36	Pro5280 - Thr5428	1.58	116/149	31.90	 ester
37	Val5429 - Asn5553	1.59	105/125	25.71	 ester
38	Gly5554 - Gln5680	1.70	108/127	27.78	 ester

39	Glu5681 - Pro5826	2.11	112/146	25.00	 ester
40	Ser5827 - Val5956	1.93	109/130	28.44	 ester
41	Gly5857 - Pro6101	1.56	105/145	28.57	 ester
42	Ser6102 - Thr6248	3.28	81/147	25.93	 ester
43	Ser6249 - His6384	5.63	44/136	9.09	 ester

44	Asn6385 - Lys6541	2.00	111/157	22.52	 ester
45	Ala6542 - Lys6668	1.88	109/127	30.28	 ester
46	Lys6669 - Gln6834	1.73	106/166	20.75	 ***46E* ester domain – X-ray crystal structure also determined**
47	Phe6835 - Tyr6959	2.75	82/125	10.98	 ***47I* isopeptide domain – X-ray crystal structure also determined**
48	Asp6960 - Ser7119	2.39	102/160	23.53	 ester

49	Ser7120 - Tyr7263	2.91	93/144	12.90	 isopeptide
50	Pro7264 - Lys7410	1.44	112/147	35.89	 ester
51	Leu7411 - Thr7544	1.49	105/134	32.38	 ester

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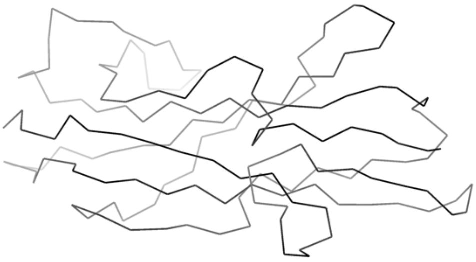
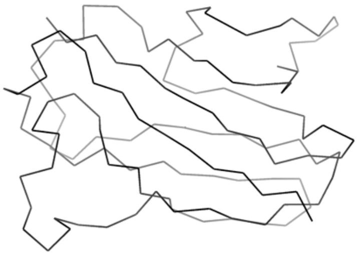
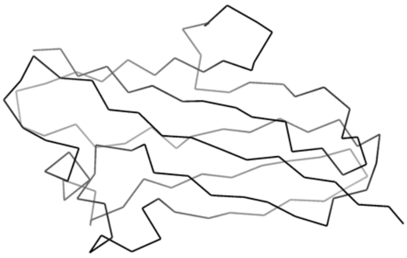
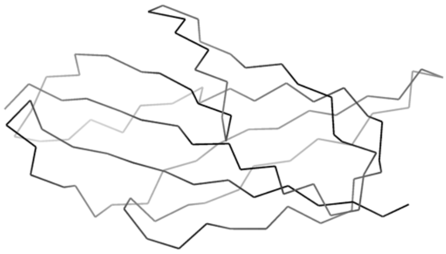
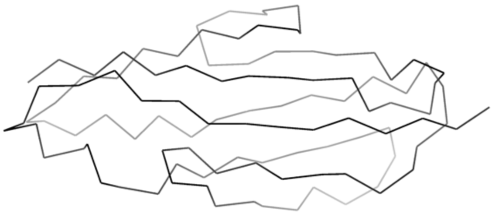
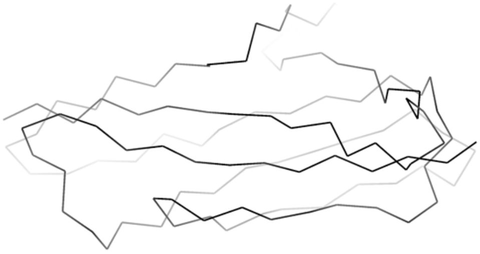
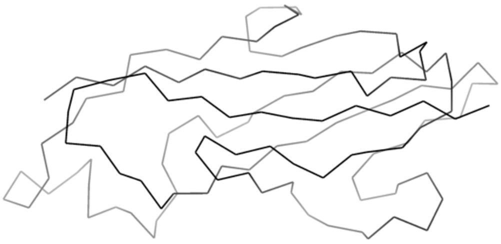
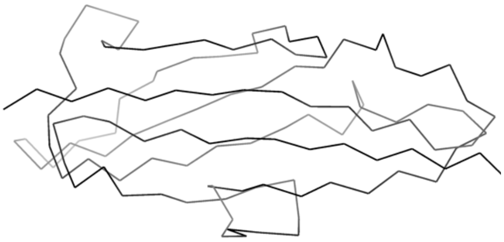
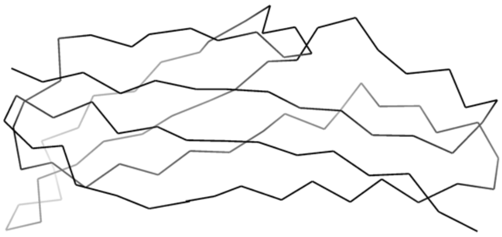
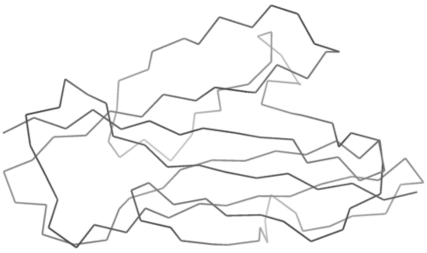
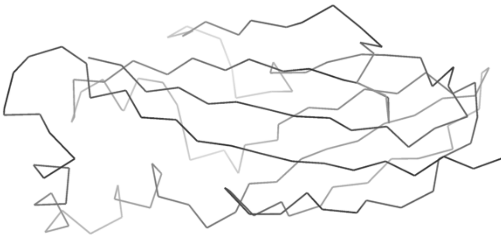
† AlphaFold2 has accurately predicted the expected secondary structure elements of a thioester (TIE) adhesin domain (e.g. PDB ID 6FWY), but has not produced the correct 3D fold.

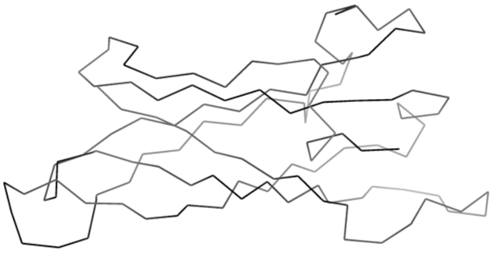
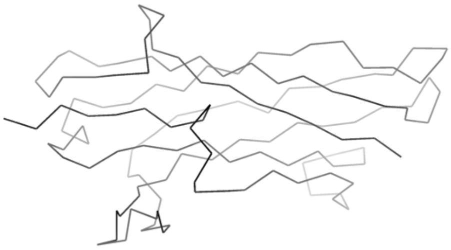
Table S2 *M. curtisii* adhesin AlphaFold2 structure predictions for individual domains.

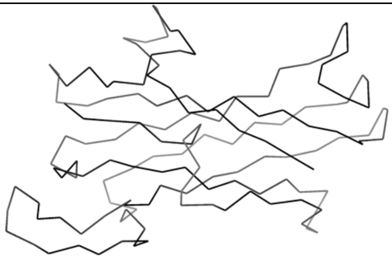
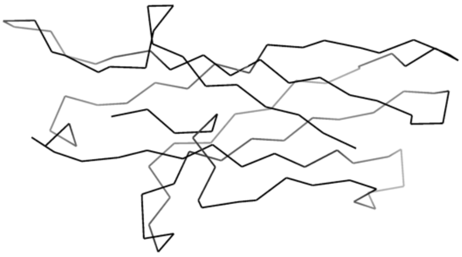
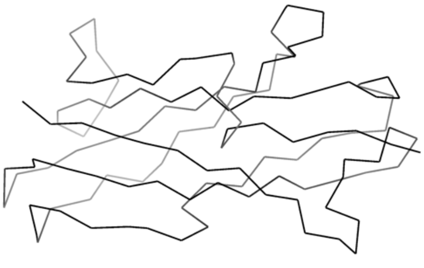
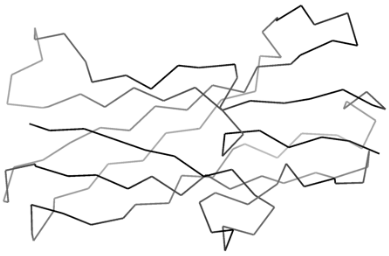
For RMSD calculation, putative isopeptide bond-containing domains were aligned to the major pilin Spy0128 from *Streptococcus pyogenes* (PDB ID 3B2M), and putative ester bond-containing domains were aligned to a repeat domain from *Clostridium perfringens* adhesin Cpe0147 (PDB ID 4NI6). The putative adhesin domain was aligned to the thioester domain of *Enterococcus faecium*, TIE86 (PDB ID 6FWY).

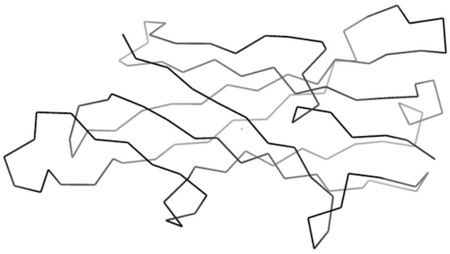
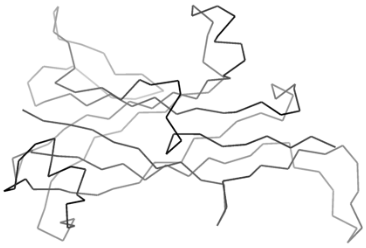
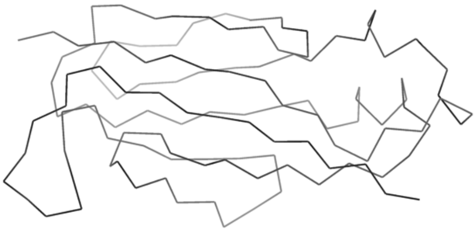
Domain Identifier	**Amino acid range**	**RMSD (Å)**	**No. Cα aligned**	**Sequence identity (%)**	**Predicted structure**
n/a	Met1 - Val421	n/a	n/a	n/a	no structure predicted
A	Pro422 - Gln724	6.31	48/303	10.42	 thioester domain†
1	Ile22 - Asn175	2.10	119/154	16.81	 ester
2	Lys176 - Arg304	3.09	78/129	6.41	 isopeptide
3	Glu305 - Pro340	2.14	93/126	22.58	 isopeptide

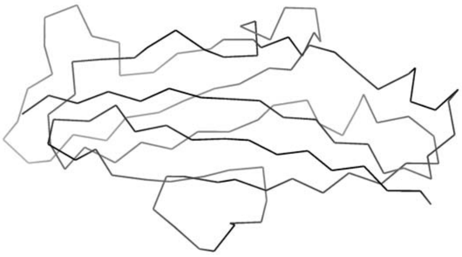
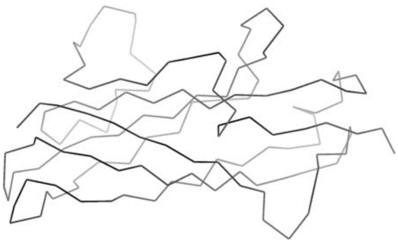
4	Ala341 - Gln548	3.15	85/118	8.24	 isopeptide
5	Lys549 - Ala655	2.99	85/107	20	 isopeptide
6	Asn656 - Tyr771	2.47	81/116	17.28	 isopeptide
7	Asp772 - Glu905	3.57	70/133	4.29	 isopeptide
8	Lys905 - Val1034	2.93	86/130	4.65	 isopeptide

9	Pro1035 - Glu1158	3.52	98/124	9.18	 isopeptide
10	Leu1159 - Lys1264	4.51	59/106	6.78	 isopeptide
11	Ala1265 - Tyr1406	2.86	88/142	9.09	 isopeptide
12	Glu1407 - Cys1566	5.02	87/160	5.75	 isopeptide
13	Phe1567 - Gln1731	1.99	105/165	15.24	 ester

14	Trp1732 - Tyr1877	1.64	102/146	22.55	 ester
15	Thr1878 - Tyr2003	3.70	58/126	12.07	 ester
16	Asn2004 - Pro2161	1.82	115/158	33.91	 ester
17	Gly2161 - His2296	1.47	103/135	29.13	 ester
18	Ser2297 - Asn2433	1.93	108/137	25.00	 ester

19	Ser2434 - Pro2578	2.09	111/145	24.32	 ester
20	Ser2579 - Arg2695	1.56	103/117	26.21	 ester
21	Val2696 - Trp2840	1.58	104/145	27.88	 ester
22	Ser2841 - Val2966	1.85	103/126	25.24	 ester
23	Lys2967 - Asp3096	1.67	114/130	25.44	 ester

24	Tyr3097 - Asp3244	1.43	107/148	22.43	 ester
25	Val3245 - Lys3378	2.03	112/134	25.89	 ester
26	His3379 - Pro3548	1.77	106/170	21.70	 ester
27	Glu3549Asn3674	2.88	84/126	13.10	 isopeptide
28	Glu3765 - Thr3824	2.29	103/150	25.24	 ester

29	His3825 - Val3959	3.24	95/135	11.58	 isopeptide
30	Lys3960 - Arg4102	1.93	111/143	25.23	 ester
31	Pro4103 - Pro4239	1.26	99/138	36.36	 ester

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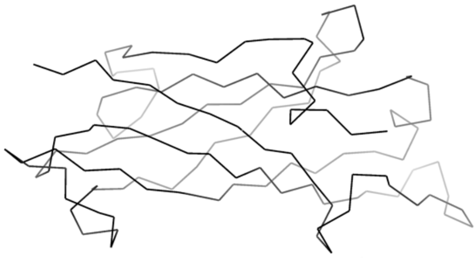
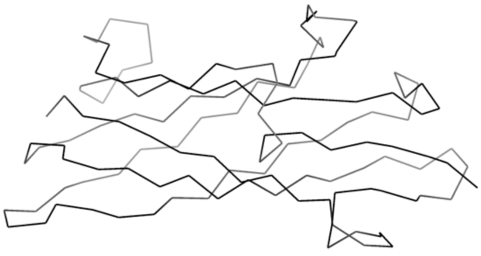
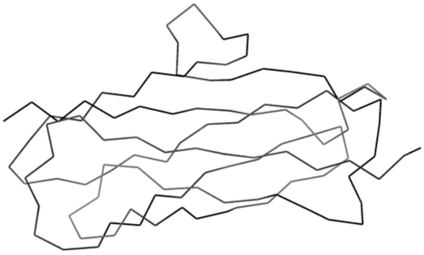
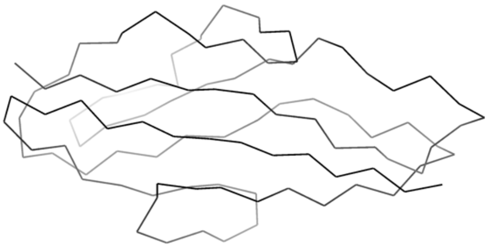
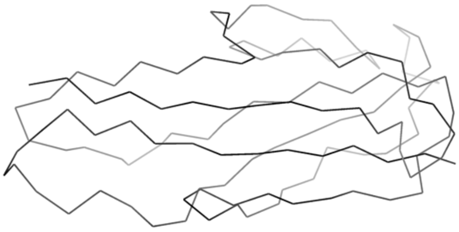
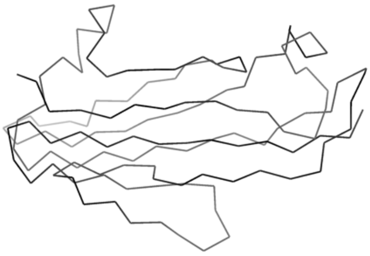
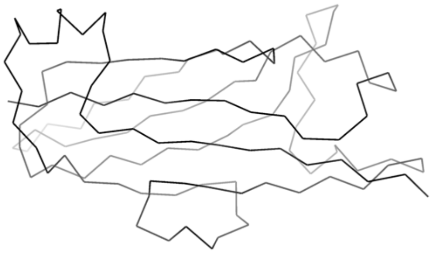
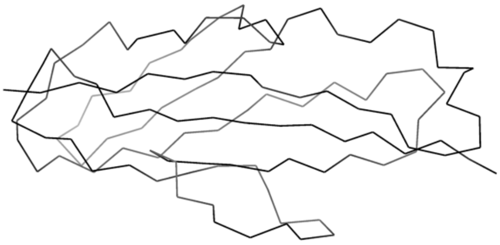
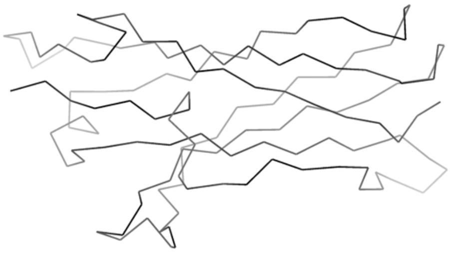
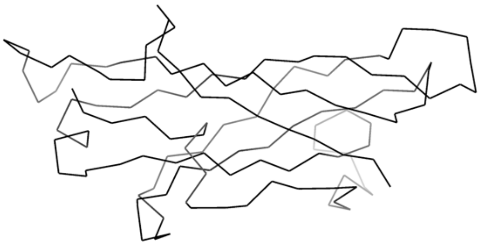
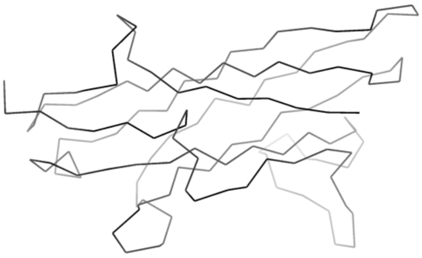
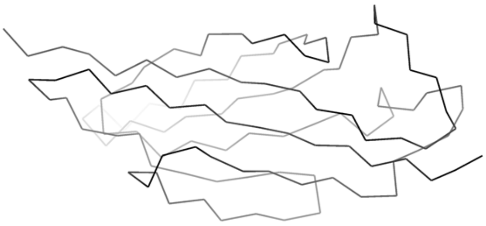
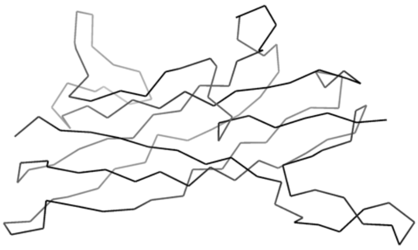
† AlphaFold2 has accurately predicted the expected secondary structure elements of a thioester (TIE) adhesin domain (e.g. PDB ID 6FWY), but has not produced the correct 3D fold.

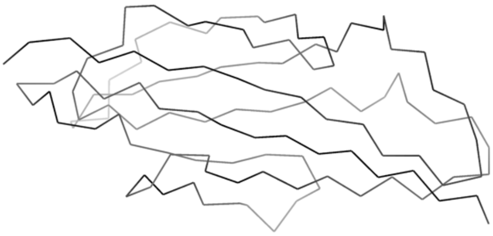
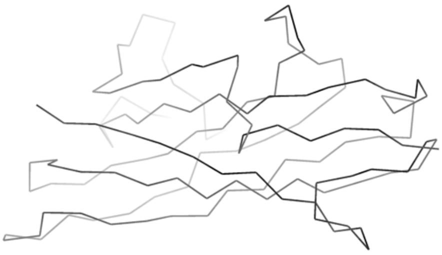
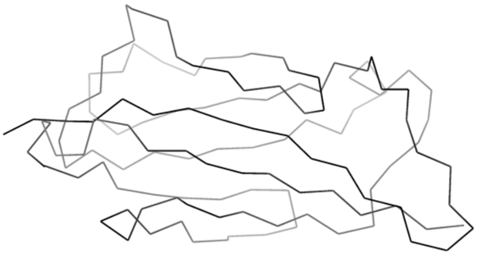
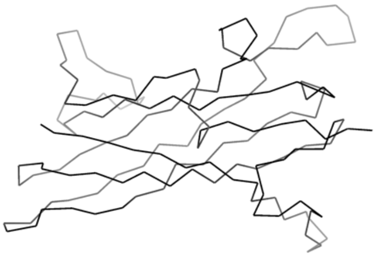
Table S3 *V. cambrienseu* adhesin AlphaFold2 structure predictions for individual domains.

For RMSD calculation, putative isopeptide bond-containing domains were aligned to the major pilin Spy0128 from *Streptococcus pyogenes* (PDB ID 3B2M), and putative ester bond-containing domains were aligned to a repeat domain from *Clostridium perfringens* adhesin Cpe0147 (PDB ID 4NI6). The putative adhesin domain was aligned to the thioester domain of *Enterococcus faecium*, TIE86 (PDB ID 6FWY).

Domain Identifier	Amino acid range	RMSD (Å)	No. Cα aligned	Sequence identity (%)	Predicted structure
1	Leu19 - Thr513	4.57	49/511	8.16	 thioester†
2	Ala515 - Thr652	2.12	111/138	21.62	 ester
3	Glu653 - Lys788	1.55	107/136	30.84	 ester
4	Lys791 - Pro921	1.59	105/131	27.62	 ester

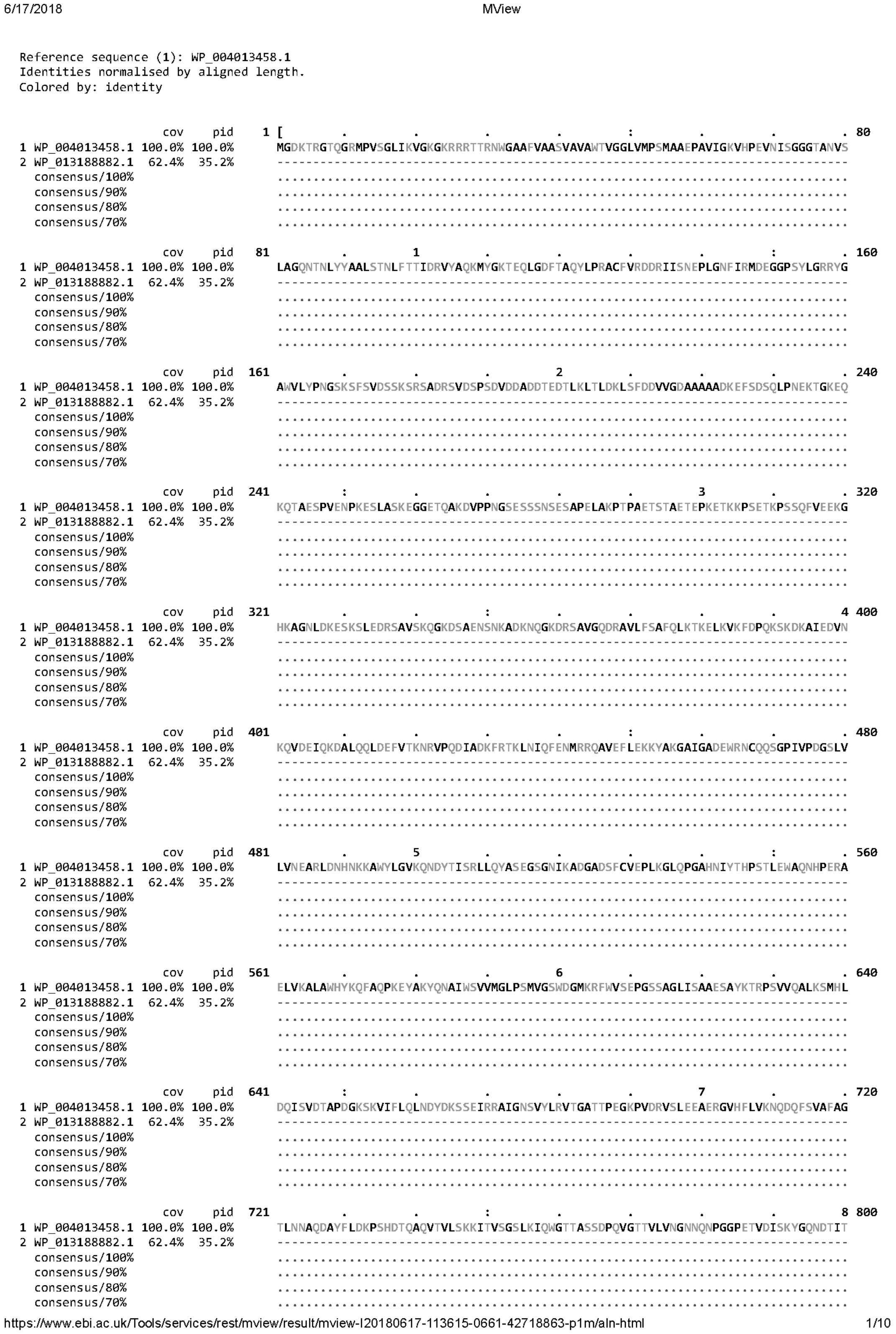
5	Pro924 - Pro1037	2.15	87/114	11.49	 isopeptide
6	Gln1039 - Glu1146	3.14	86/108	6.98	 isopeptide
7	Thr1148 - Asn1274	2.95	91/127	14.29	 isopeptide
8	Lys1276 - Gln1407	1.84	97/132	23.71	 isopeptide
9	Leu1409 - Ile1545	3.35	77/137	7.79	 isopeptide
10	Lys1548 - Asp1671	2.89	100/124	17.00	

					isopeptide
11	Pro1670 - Pro1802	1.20 1.62	108/133	25.93	 ester
12	Asn1801 - Gly1935	1.94	110/135	28.18	 ester
13	Pro1936 - 2069	1.53 2.06	108/134	27.77	 ester
14	Ser2072 - Pro2196	3.25	87/125	10.34	 isopeptide
15	Glu2197 - Thr2340	3.40 2.02	106/144	25.47	 ester

16	Pro2344 - Met2469	3.28	97/126	11.34	
17	Gly2470 - Glu2606	2.05	111/137	34.23	isopeptide 
18	Ala2607 - Glu2742	2.72 2.22	104/136	27.88	ester 
19	Lys2745 - Lys2873	2.849	90/129	14.44	ester 
20	Asp2874 - Ala3013	3.62 1.67	108/140	25.00	isopeptide 
21	Thr3019 - Pro3174	2.16 6.46	49/156	6.12	ester 

ester

[†] AlphaFold2 has accurately predicted the expected secondary structure elements of a thioester (TIE) adhesin domain (e.g. PDB ID 6FWY), but has not produced the correct 3D fold.



6/17/2018 MView

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Colored by: identity

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1 WP_004013458.1 100.0% 100.0%        AWVLYPNGSKSFSVDSSKSRSADRSVDSPSDVDDADDTEDTLKLTLDKLSFDDVVGDAAAAADKEFSDSQLPNEKTGKEQ
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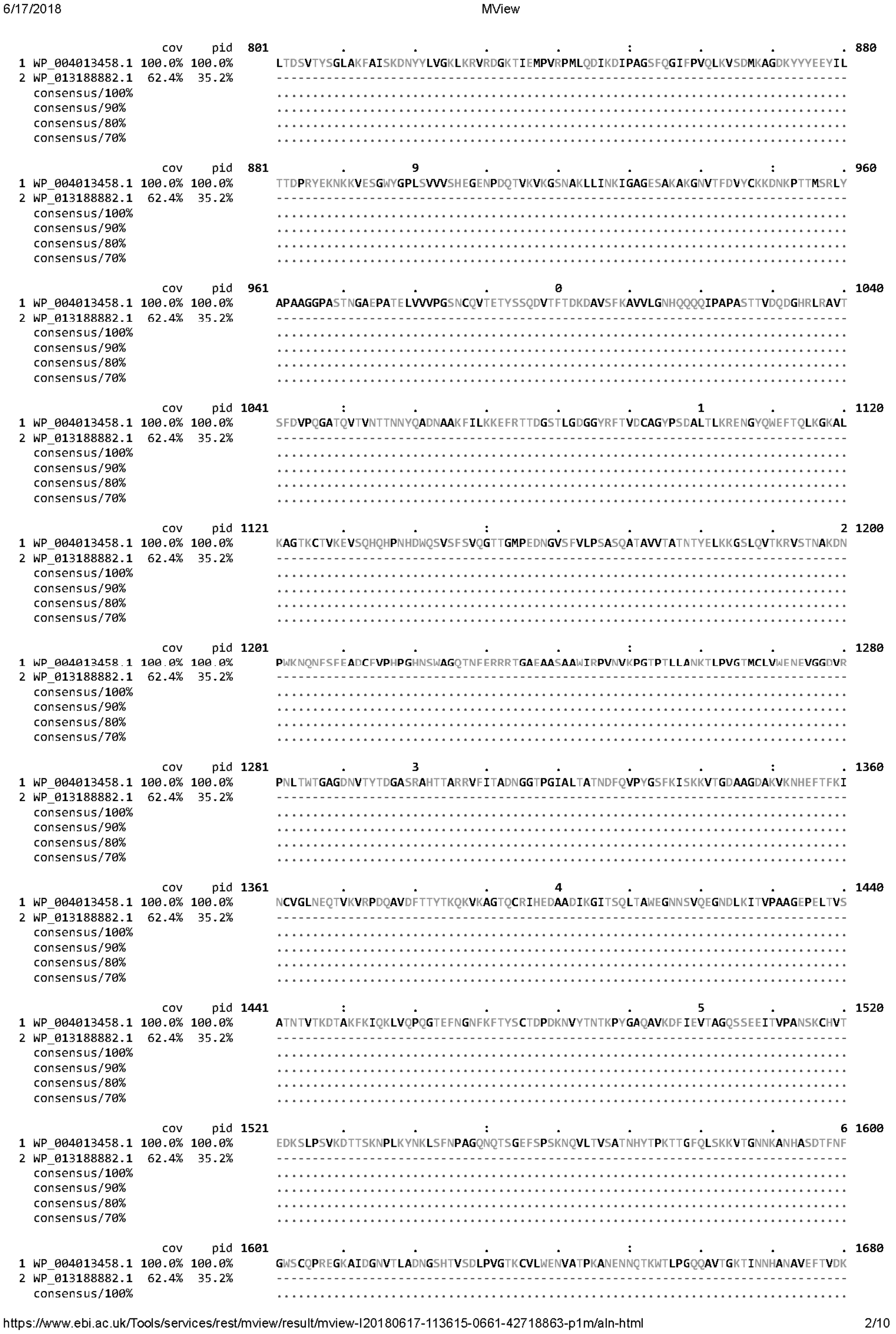

6/17/2018 MView

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                      cov    pid 1041         :         .         .         .         .         1         .         . 1120
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                      cov    pid 1121         .         .         :         .         .         .         .         2 1200
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    consensus/70%                     ................................................................................

                      cov    pid 1521         .         .         :         .         .         .         .         6 1600
  1 WP_004013458.1 100.0% 100.0%      EDKSLPSVKDTTSKNPLKYNKLSFNPAGQNQTSGEFSPSKNQVLTVSATNHYTPKTTGFQLSKKVTGNNKANHASDTFNF
  2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
    consensus/100%                    ................................................................................
    consensus/90%                     ................................................................................
    consensus/80%                     ................................................................................
    consensus/70%                     ................................................................................

                      cov    pid 1601         .         .         .         .         :         .         .         . 1680
  1 WP_004013458.1 100.0% 100.0%      GWSCQPREGKAIDGNVTLADNGSHTVSDLPVGTKCVLWENVATPKANENNQTKWTLPGQQAVTGKTINNHANAVEFTVDK
  2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
    consensus/100%                    ................................................................................
```

https://www.ebi.ac.uk/Tools/services/rest/mview/result/mview-I20180617-113615-0661-42718863-p1m/aln-html 2/10

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  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1681          .         7         .         .         .         .         :         . 1760
1 WP_004013458.1 100.0% 100.0%      ENAAIVVEANNSFDIPNTSLTVQKKVVKGDQAVVDNNKEYRVSVSCVYPTDKTNHVVATDKALKADGILKFEADENGIKI
2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1761          .         .         .         8         .         .         .         . 1840
1 WP_004013458.1 100.0% 100.0%      PVGASCTVEENRTSAELEGHNLAIQLKVGGKNIADSNANKAENITVPAEGKTVTVENTYNRKLGGFKLTKVVTGEGLDTA
2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1841          :         .         .         .         .         9         .         . 1920
1 WP_004013458.1 100.0% 100.0%      EALQANGGKFVFTYDCALGGKSVKTGTLEVTPQTGAEANNIPAGATCTLTEKAVTAPSGFRAPERPTWKVNGADASGVIK
2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1921          .         .         :         .         .         .         .         0 2000
1 WP_004013458.1 100.0% 100.0%      IVEKTDATQNPVLEATNTYTPYQVKFNLRKIVNTDDHTQPGGEYGFHVDCGQGATKDVKLNQDNKYTWDSASTPEFSRLS
2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2001          .         .         .         .         :         .         .         . 2080
1 WP_004013458.1 100.0% 100.0%      AKSCTVTETVLPTLEGYTYQGVKYSVSDASAATDAAKRSVTFAFPPKGDVSVAVSATNSYRRQQGSIEVEKIVTIADNAK
2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2081          .         1         .         .         .         .         :         . 2160
1 WP_004013458.1 100.0% 100.0%      NPWDGKRYSFEADCANPVMNWSDHDRVEVEAGKKGQMHRGRWVGSVCHVWENTADTVDVINQLNWENGCEAVEPYTDKQG
2 WP_013188882.1  62.4%  35.2%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2161          .         .         .         2         .         .         .         . 2240
1 WP_004013458.1 100.0% 100.0%      VEHPQACKVTIKADSKGTSGVKVSAKNHLTVQYGTFSLAKKLSGDAADDAKALNTDFNFRVNCGEAYNEVVKIKPGATWA
2 WP_013188882.1  62.4%  35.2%      ---------------------------------------------------------------MANYMEVFSM-------
  consensus/100%                    ...............................................................htsY.EVhph.......
  consensus/90%                     ...............................................................htsY.EVhph.......
  consensus/80%                     ...............................................................htsY.EVhph.......
  consensus/70%                     ...............................................................htsY.EVhph.......

                    cov    pid 2241          :         .         .         .         .         3         .         . 2320
1 WP_004013458.1 100.0% 100.0%      LPDGKVKVGSTCTVHELPAEIPGLSSTFAGWEGNGYTPADDNGITVNVAKTEPGAQPVV-FTANN--QADYNLGKFKIRK
2 WP_013188882.1  62.4%  35.2%      -----------------------------------------SAIAKDPRQNQPGKPTLVSFKQKGKKGRNWTAGVIA---
  consensus/100%                    .........................................suIshsstpspPGt.slV.Fptps..ttsashGhht...
  consensus/90%                     .........................................suIshsstpspPGt.slV.Fptps..ttsashGhht...
  consensus/80%                     .........................................suIshsstpspPGt.slV.Fptps..ttsashGhht...
  consensus/70%                     .........................................suIshsstpspPGt.slV.Fptps..ttsashGhht...

                    cov    pid 2321          .         .         :         .         .         .         .         4 2400
1 WP_004013458.1 100.0% 100.0%      SVVPQGTSFEGTFHFTYNCTPPAGKTVKPDLALNGEVDVPAGEASAEITVPADSTCTVTEADPKDAPKPVVADDKNPLKY
2 WP_013188882.1  62.4%  35.2%      SAIAVAWAVGGLVMPSLAATPTAQASVKPTVNVSPDANFNMGTN---------------------------GNVRYRLAY
  consensus/100%                    Ssls.uhuhtGhhh.ohssTPsAttoVKPslslss-sshshGps...........................uss+..LtY
  consensus/90%                     Ssls.uhuhtGhhh.ohssTPsAttoVKPslslss-sshshGps...........................uss+..LtY
  consensus/80%                     Ssls.uhuhtGhhh.ohssTPsAttoVKPslslss-sshshGps...........................uss+..LtY
  consensus/70%                     Ssls.uhuhtGhhh.ohssTPsAttoVKPslslss-sshshGps...........................uss+..LtY

                    cov    pid 2401          .         .         .         .         :         .         .         . 2480
1 WP_004013458.1 100.0% 100.0%      QGTSFQGVPGLASKAITVGKDQVIEFEAVNKYVSQEGGFEFFKSVVGNNASKHTQDKFNFHWYCQARDKQVFSGSQNLSD
2 WP_013188882.1  62.4%  35.2%      TGQLFSTKDPQEAAA---------------HY--------------GD---TAQVGDFTAHYL-----------------
  consensus/100%                    pGp.Fpshss.tutA...............+Y..............Gs...ptp.scFshHah.................
  consensus/90%                     pGp.Fpshss.tutA...............+Y..............Gs...ptp.scFshHah.................
  consensus/80%                     pGp.Fpshss.tutA...............+Y..............Gs...ptp.scFshHah.................
  consensus/70%                     pGp.Fpshss.tutA...............+Y..............Gs...ptp.scFshHah.................

                    cov    pid 2481          .         5         .         .         .         .         :         . 2560
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 1 WP_004013458.1 100.0% 100.0%      KGNKKVTKLPVGTKCALWEDSFKKLEDEAKPETKWLQGSSEIKTEKVKDAQGNTHDGVNFEIKSEKDTFSVTAQNKFDIP
 2 WP_013188882.1  62.4%  35.2%      -----------PKECITKANRFDTMGD-MKGTPRWDGYDA-L--EQV---------------------------------
   consensus/100%                    ...........spcChhhtspFcphtD.hKsps+W.thsu.l..EpV.................................
   consensus/90%                     ...........spcChhhtspFcphtD.hKsps+W.thsu.l..EpV.................................
   consensus/80%                     ...........spcChhhtspFcphtD.hKsps+W.thsu.l..EpV.................................
   consensus/70%                     ...........spcChhhtspFcphtD.hKsps+W.thsu.l..EpV.................................

                     cov    pid 2561          .         .         .         6         .         .         .         . 2640
 1 WP_004013458.1 100.0% 100.0%      STELKVKKLVKADKASKVAAGKQFTVNVTCVYPTDGQTYTIADAEKDGVFKHNQEKTFKTDKSGKNPIPVGAICTVTEDV
 2 WP_013188882.1  62.4%  35.2%      -------------------------------APDRG-------------------KIAQKPLGQNAPMGFG---------
   consensus/100%                    ...............................hPscG...................KhhppshutpsPhshG.........
   consensus/90%                     ...............................hPscG...................KhhppshutpsPhshG.........
   consensus/80%                     ...............................hPscG...................KhhppshutpsPhshG.........
   consensus/70%                     ...............................hPscG...................KhhppshutpsPhshG.........

                     cov    pid 2641          :         .         .         .         .         7         .         . 2720
 1 WP_004013458.1 100.0% 100.0%      ASADVPGHNWSVQIADGSTVVKTHT-----------TRVKVPKAGKTVTITNDYERKVGSFKLSKFVAGVDVNTALAAND
 2 WP_013188882.1  62.4%  35.2%      --------AWVIFPGSSSATLPFNPSGSASRAATSDRSAAEPEEEDADTLTLSLEPIE----------GEATET--GATQ
   consensus/100%                    ........sWsl..usuSssl.hps...........ppst.PcttcssTlT.shE.h...........G.sspT..uAsp
   consensus/90%                     ........sWsl..usuSssl.hps...........ppst.PcttcssTlT.shE.h...........G.sspT..uAsp
   consensus/80%                     ........sWsl..usuSssl.hps...........ppst.PcttcssTlT.shE.h...........G.sspT..uAsp
   consensus/70%                     ........sWsl..usuSssl.hps...........ppst.PcttcssTlT.shE.h...........G.sspT..uAsp

                     cov    pid 2721          .         .         :         .         .         .         .         8 2800
 1 WP_004013458.1 100.0% 100.0%      AKFEFKYNCKLDGKPVKDGTISLSATQMSTEITGIPAGAKCVVSEPKVKAPHGYAVPTLSWKLDGAQAADGTATITEGNT
 2 WP_013188882.1  62.4%  35.2%      AR-IFGKT----ADPSGDSGTSTEPS-GAGNAPQLPANPEEPSSAP-----------ELSPESPA-PAAVGEDRAA-NPT
   consensus/100%                    A+..Fths....ucPstDushShpso.husphstlPAsscpssStP...........pLS.c.su..AAsGpsphs.ssT
   consensus/90%                     A+..Fths....ucPstDushShpso.husphstlPAsscpssStP...........pLS.c.su..AAsGpsphs.ssT
   consensus/80%                     A+..Fths....ucPstDushShpso.husphstlPAsscpssStP...........pLS.c.su..AAsGpsphs.ssT
   consensus/70%                     A+..Fths....ucPstDushShpso.husphstlPAsscpssStP...........pLS.c.su..AAsGpsphs.ssT

                     cov    pid 2801          .         .         .         .         :         .         .         . 2880
 1 WP_004013458.1 100.0% 100.0%      STLDATNTYTPYQVKFDLK--KLV----KANDQAKLDGDFTFQVSCAQTSVD---------------------------V
 2 WP_013188882.1  62.4%  35.2%      PTKTILSGAVPFGYKFEPTMKEIKLKFDPSVDKDTAIANFNKQVDEAQADVMNQLEQFMNGKPFDARTKKAMVDNLNLQF
   consensus/100%                    sThshhsshsPathKF-.p..clh.....usDpsph.usFshQVspAQssV............................h
   consensus/90%                     sThshhsshsPathKF-.p..clh.....usDpsph.usFshQVspAQssV............................h
   consensus/80%                     sThshhsshsPathKF-.p..clh.....usDpsph.usFshQVspAQssV............................h
   consensus/70%                     sThshhsshsPathKF-.p..clh.....usDpsph.usFshQVspAQssV............................h

                     cov    pid 2881          .         9         .         .         .         .         :         . 2960
 1 WP_004013458.1 100.0% 100.0%      TLNQANDYSWDSSKFAGKPILSGE----TC----TIVETGTADIANYNHKSVEYTVSGSGVTKGNKAPAKGVSFTLPKTG
 2 WP_013188882.1  62.4%  35.2%      DNLRKQGLAWFEEQYSKHPSASKFPGIKACEDNGPIVPVGSFILV-----------------K---------NWTAATKG
   consensus/100%                    s..ptpshuW.pppaut+P.hSt.....sC....sIV.sGoh.ls.................K.........saThsppG
   consensus/90%                     s..ptpshuW.pppaut+P.hSt.....sC....sIV.sGoh.ls.................K.........saThsppG
   consensus/80%                     s..ptpshuW.pppaut+P.hSt.....sC....sIV.sGoh.ls.................K.........saThsppG
   consensus/70%                     s..ptpshuW.pppaut+P.hSt.....sC....sIV.sGoh.ls.................K.........saThsppG

                     cov    pid 2961          .         .         .         0         .         .         .         . 3040
 1 WP_004013458.1 100.0% 100.0%      DASVSV------TATNTYDHQLGSLQLTKAVSVKDNAANPWDNKSYGFTVDCYQPGEGEQVGEKLSTKAVSLKAGETKTV
 2 WP_013188882.1  62.4%  35.2%      EPNVWQWARKHRNEGQAYHAAIDFLALYPS-----DTKNSF--KVDGQASFCVEPFYGYQIGNHKVYTD-----------
   consensus/100%                    -ssV........stspsYcttls.LtLh.u.....sstNsa..Ks.G.ss.ChpPh.G.QlGp+hshps...........
   consensus/90%                     -ssV........stspsYcttls.LtLh.u.....sstNsa..Ks.G.ss.ChpPh.G.QlGp+hshps...........
   consensus/80%                     -ssV........stspsYcttls.LtLh.u.....sstNsa..Ks.G.ss.ChpPh.G.QlGp+hshps...........
   consensus/70%                     -ssV........stspsYcttls.LtLh.u.....sstNsa..Ks.G.ss.ChpPh.G.QlGp+hshps...........

                     cov    pid 3041          :         .         .         .         .         1         .         . 3120
 1 WP_004013458.1 100.0% 100.0%      VEKAKVGTVCFVKETVADTPD---------------------------------------VTNQLTWENAGTTVTSPDGV
 2 WP_013188882.1  62.4%  35.2%      ---PSKSTIYWAKD-NPEKAETVKALAWHYAKYNRGANWGHYQNAIWMVIFGITDNGRAWNLDQMSWGDTGVTDVKDL-I
   consensus/100%                    ...sphuTlhasK-.ss-ps-.......................................shsQhoWtssGsTssps..l
   consensus/90%                     ...sphuTlhasK-.ss-ps-.......................................shsQhoWtssGsTssps..l
   consensus/80%                     ...sphuTlhasK-.ss-ps-.......................................shsQhoWtssGsTssps..l
   consensus/70%                     ...sphuTlhasK-.ss-ps-.......................................shsQhoWtssGsTssps..l

                     cov    pid 3121          .         .         :         .         .         .         .         2 3200
 1 WP_004013458.1 100.0% 100.0%      ANARRVVIAEDQGKTPAMSVTATNRLEVHYGTFTLQKTLTGEAAADEDVTKTPVNFKVKCGDLSEQTVTVIPGGAPVDYA
 2 WP_013188882.1  62.4%  35.2%      QQ----ALTAYQHRQDGNVVKAL--ETMHLDQVSLQPANDGSSL-----------LTVQL----------------NDYN
   consensus/100%                    tp....slst.Qt+psu.sVpAh...phHhspholQ.s.sGpuh...........hpVph................sDYs
   consensus/90%                     tp....slst.Qt+psu.sVpAh...phHhspholQ.s.sGpuh...........hpVph................sDYs
   consensus/80%                     tp....slst.Qt+psu.sVpAh...phHhspholQ.s.sGpuh...........hpVph................sDYs
   consensus/70%                     tp....slst.Qt+psu.sVpAh...phHhspholQ.s.sGpuh...........hpVph................sDYs

                     cov    pid 3201          .         .         .         .         :         .         .         . 3280
 1 WP_004013458.1 100.0% 100.0%      TATGQKVKVGTACTVHEVPAKVTGVSSELTWQG----SGTPAADNGVSVEIPAVGAPNVAIKAVNNVTY---NKAAFKIK
 2 WP_013188882.1  62.4%  35.2%      PNST--------------EGRIIGDQVYLTVQGATYADGKPIPNNRISLL-----------EALNGVTLKIANQNAFKIS
   consensus/100%                    ssos...............u+lhGsps.LThQG....sGpPhssNtlSl............cAlNsVTh...NpsAFKIp
   consensus/90%                     ssos...............u+lhGsps.LThQG....sGpPhssNtlSl............cAlNsVTh...NpsAFKIp
   consensus/80%                     ssos...............u+lhGsps.LThQG....sGpPhssNtlSl............cAlNsVTh...NpsAFKIp
   consensus/70%                     ssos...............u+lhGsps.LThQG....sGpPhssNtlSl............cAlNsVTh...NpsAFKIp

                     cov    pid 3281          .         3         .         .         .         .         :         . 3360
 1 WP_004013458.1 100.0% 100.0%      KTVDPVATKFLGDFQFTYRCVAPNGKVYTQATPFNNQASAQYVSVAAGEESAEIIVPTDSKCTVTEADPQTTPAVDNKGA
 2 WP_013188882.1  62.4%  35.2%      FAG------SVKNVEDPYFIDNPNGPTQAQVVVLRKDL-----DLSGSL---------EVKW---TYIPQPKPAIS----
   consensus/100%                    hss.......ltshp.sYhhssPNG.s.sQssshppph.....sluuu..........-sKh...ph.PQspPAls....
   consensus/90%                     hss.......ltshp.sYhhssPNG.s.sQssshppph.....sluuu..........-sKh...ph.PQspPAls....
   consensus/80%                     hss.......ltshp.sYhhssPNG.s.sQssshppph.....sluuu..........-sKh...ph.PQspPAls....
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    consensus/70%                     hss.......ltshp.sYhhssPNG.s.sQssshppph.....sluuu..........-sKh...ph.PQspPAls....

                      cov     pid 3361          .         .         .         4         .         .         .         . 3440
  1 WP_004013458.1 100.0% 100.0%      NPVKYSGTQFTPGGKGLTSASFTVTKGTEVVTATA--KNLYVPQTTGFQFSKAVSGNNVANHPGKFNFGYTCKLPNGQKT
  2 WP_013188882.1  62.4%  35.2%      TTAKVNGAESVPGGAETA--TFS--RADEVITLTDDVKYENIPADTGMN--------------RKYLIGSLTKVSEGIAK
    consensus/100%                    sssKhsGsp.sPGGtths..oFo..+usEVlThTs..K...lPtsTGhp..............tKa.hG.hsKlspG.tp
    consensus/90%                     sssKhsGsp.sPGGtths..oFo..+usEVlThTs..K...lPtsTGhp..............tKa.hG.hsKlspG.tp
    consensus/80%                     sssKhsGsp.sPGGtths..oFo..+usEVlThTs..K...lPtsTGhp..............tKa.hG.hsKlspG.tp
    consensus/70%                     sssKhsGsp.sPGGtths..oFo..+usEVlThTs..K...lPtsTGhp..............tKa.hG.hsKlspG.tp

                      cov     pid 3441          :         .         .         .         .         5         .         . 3520
  1 WP_004013458.1 100.0% 100.0%      AVKTEQLGAN--D---------PAVNVTDLPVGTECVLWEESVEKTQPSEK-ISTTWTVGAAKPVVGSKQADHQGTPHDN
  2 WP_013188882.1  62.4%  35.2%      KVLTQVADADISDQGTVTGLFPYEVKASEVKKGD-RFYYEEILVTSDPKYAGGETAFTKGYGNLNV---IAKHTGENPDQ
    consensus/100%                    tVhTp.hsAs..D..........tVpso-l.hGs.phhaEE.l.popPp.t.hpTsaThGhup.sV....AcHpGps.Dp
    consensus/90%                     tVhTp.hsAs..D..........tVpso-l.hGs.phhaEE.l.popPp.t.hpTsaThGhup.sV....AcHpGps.Dp
    consensus/80%                     tVhTp.hsAs..D..........tVpso-l.hGs.phhaEE.l.popPp.t.hpTsaThGhup.sV....AcHpGps.Dp
    consensus/70%                     tVhTp.hsAs..D..........tVpso-l.hGs.phhaEE.l.popPp.t.hpTsaThGhup.sV....AcHpGps.Dp

                      cov     pid 3521          .         .         :         .         .         .         .         6 3600
  1 WP_004013458.1 100.0% 100.0%      AVKFKVDKENEAVSITAENTFEVSGTELTVKKTVTKDNNSEIADSKSFKVSIKCVYPTDK-----AEHTIATNEPLTNGQ
  2 WP_013188882.1  62.4%  35.2%      TVLIAKNK-----------------AELTLSKEAIGA-ADKADGNVTFR--VSCDDGTAATLYAPARGGVANTNPAWAG-
    consensus/100%                    sVhhthsK.................sELTlpKpshts.sschssshoF+..lpCs.sTst.....ActslAsspPhhsG.
    consensus/90%                     sVhhthsK.................sELTlpKpshts.sschssshoF+..lpCs.sTst.....ActslAsspPhhsG.
    consensus/80%                     sVhhthsK.................sELTlpKpshts.sschssshoF+..lpCs.sTst.....ActslAsspPhhsG.
    consensus/70%                     sVhhthsK.................sELTlpKpshts.sschssshoF+..lpCs.sTst.....ActslAsspPhhsG.

                      cov     pid 3601          .         .         .         .         :         .         .         . 3680
  1 WP_004013458.1 100.0% 100.0%      SKTFKTDDTGTAIPVGAKCTVTEDETSAKVA---GHTWKL----EVKDPNQVSTKGL-------SAEKDKAKNTVELVND
  2 WP_013188882.1  62.4%  35.2%      -----YQASSIEVTPGAICTVEETYSPAPVDLATAPRWVGGNAEMVSDPTPVNVNGKTIGSKAKFKMGDAGDINLAVTNT
    consensus/100%                    .....hpsouhtlssGAhCTVpEs.osA.Vs...u.pWhh.....VpDPs.VsspGh........t.tDtuc.sltlsNs
    consensus/90%                     .....hpsouhtlssGAhCTVpEs.osA.Vs...u.pWhh.....VpDPs.VsspGh........t.tDtuc.sltlsNs
    consensus/80%                     .....hpsouhtlssGAhCTVpEs.osA.Vs...u.pWhh.....VpDPs.VsspGh........t.tDtuc.sltlsNs
    consensus/70%                     .....hpsouhtlssGAhCTVpEs.osA.Vs...u.pWhh.....VpDPs.VsspGh........t.tDtuc.sltlsNs

                      cov     pid 3681          .         7         .         .         .         .         :         . 3760
  1 WP_004013458.1 100.0% 100.0%      YKREVGGFKLTKAVAGKG-IDFAKAADANNGKFEFTYDCVLDG--KTVKNGKGKLDLTKDKQTVEVKDIPTDATCTLKET
  2 WP_013188882.1  62.4%  35.2%      YREPTGGFKVFKYVNSDGKFDAYTAANANGGKFNFYYRCDKGIAGSFALPEDPSTDADGDPWSYEVKDLPIGARCSVTEM
    consensus/100%                    Y+c.sGGFKlhKhVsucG.hDhhpAAsANsGKFpFhYcCshsh..phshstcsphDhstD..ohEVKDlPhsApColpEh
    consensus/90%                     Y+c.sGGFKlhKhVsucG.hDhhpAAsANsGKFpFhYcCshsh..phshstcsphDhstD..ohEVKDlPhsApColpEh
    consensus/80%                     Y+c.sGGFKlhKhVsucG.hDhhpAAsANsGKFpFhYcCshsh..phshstcsphDhstD..ohEVKDlPhsApColpEh
    consensus/70%                     Y+c.sGGFKlhKhVsucG.hDhhpAAsANsGKFpFhYcCshsh..phshstcsphDhstD..ohEVKDlPhsApColpEh

                      cov     pid 3761          .         .         .         8         .         .         .         . 3840
  1 WP_004013458.1 100.0% 100.0%      APTAPTGFAAPTAPTWKIGST--TSDSGMVTIKEGQTAEVVATNTYTPYQVKFTLKKVIKA--DKTLDGDFKFQVTCGDK
  2 WP_013188882.1  62.4%  35.2%      KPTAPSGYDVTISAADALVKPVQSNTVSLRPIRADFANQVSFMNQYLPADASFSLRKIARFTDGQLINDNFALHYSCSDR
    consensus/100%                    tPTAPoGassshuss.tlsps..osssuhhsI+ts.sspVshhNpYhPhpspFoL+Klh+h..sphlsssFthphoCuD+
    consensus/90%                     tPTAPoGassshuss.tlsps..osssuhhsI+ts.sspVshhNpYhPhpspFoL+Klh+h..sphlsssFthphoCuD+
    consensus/80%                     tPTAPoGassshuss.tlsps..osssuhhsI+ts.sspVshhNpYhPhpspFoL+Klh+h..sphlsssFthphoCuD+
    consensus/70%                     tPTAPoGassshuss.tlsps..osssuhhsI+ts.sspVshhNpYhPhpspFoL+Klh+h..sphlsssFthphoCuD+

                      cov     pid 3841          :         .         .         .         .         9         .         . 3920
  1 WP_004013458.1 100.0% 100.0%      TQSVTLNKDNKYTWESSELKTPQILSGVKCHLEETSEQAFKSHTWKSLDYQVDGKGVDTSVDKDAKRVTFTLPATGDADV
  2 WP_013188882.1  62.4%  35.2%      SGKTV-SGDVTVAGNGEAVSVKGVKAGMTCTITEPRKPAIAKANFKDLSFDLSGTQYNVS---NSERLEFDVPRNPNAVV
    consensus/100%                    otpss.stDsphshpuptlps.tlhuGhpCplpEspc.AhtptsaKsLsaplsGpthssS...sucRlpFslPtsssAsV
    consensus/90%                     otpss.stDsphshpuptlps.tlhuGhpCplpEspc.AhtptsaKsLsaplsGpthssS...sucRlpFslPtsssAsV
    consensus/80%                     otpss.stDsphshpuptlps.tlhuGhpCplpEspc.AhtptsaKsLsaplsGpthssS...sucRlpFslPtsssAsV
    consensus/70%                     otpss.stDsphshpuptlps.tlhuGhpCplpEspc.AhtptsaKsLsaplsGpthssS...sucRlpFslPtsssAsV

                      cov     pid 3921          .         .         :         .         .         .         .         0 4000
  1 WP_004013458.1 100.0% 100.0%      TITATNTYDRNKGALQLQKVAKLNGQDVSKDAKANPLPNHQYQFEVTCYDPADNGLGAKTQAVTVPLQAGAPPQTVIKDA
  2 WP_013188882.1  62.4%  35.2%      LVTATNVYEQKAGSFTLQKTVK--------AGESNPLKGTAFTFRISCGEEDPF---------TVSLKAG--QTWTSKSY
    consensus/100%                    hlTATNsY-pptGuhpLQKssK........sucuNPL.sptapFcloCh-.ss..........TVsLpAG...phs.Ksh
    consensus/90%                     hlTATNsY-pptGuhpLQKssK........sucuNPL.sptapFcloCh-.ss..........TVsLpAG...phs.Ksh
    consensus/80%                     hlTATNsY-pptGuhpLQKssK........sucuNPL.sptapFcloCh-.ss..........TVsLpAG...phs.Ksh
    consensus/70%                     hlTATNsY-pptGuhpLQKssK........sucuNPL.sptapFcloCh-.ss..........TVsLpAG...phs.Ksh

                      cov     pid 4001          .         .         .         .         :         .         .         . 4080
  1 WP_004013458.1 100.0% 100.0%      PVGSVCFIKETPVKTEAVIGTLSWEGDGTNAVGPDNAANVRKVVIGGEKGDVQQVNVKAVNDLTVQYGIFSLHKELTGDA
  2 WP_013188882.1  62.4%  35.2%      PVGTECLIHEYDPSTQAATSTVSYQGAMPM--GTTDA------VLT-VKEGKAAVKVEAVNTVKANYGKFALTKKVEGDA
    consensus/100%                    PVGo.ChI+EhsspTpAshuTlSapGshs...GsssA......Vls..KtshttVpVcAVNslpspYGhFuLpKclpGDA
    consensus/90%                     PVGo.ChI+EhsspTpAshuTlSapGshs...GsssA......Vls..KtshttVpVcAVNslpspYGhFuLpKclpGDA
    consensus/80%                     PVGo.ChI+EhsspTpAshuTlSapGshs...GsssA......Vls..KtshttVpVcAVNslpspYGhFuLpKclpGDA
    consensus/70%                     PVGo.ChI+EhsspTpAshuTlSapGshs...GsssA......Vls..KtshttVpVcAVNslpspYGhFuLpKclpGDA

                      cov     pid 4081          .         1         .         .         .         .         :         . 4160
  1 WP_004013458.1 100.0% 100.0%      QNDKDVKSKDFEFTVKCPGLDD--QKVTLKGGETKTLPEGKMKVGTKCSVHEVPATVAGVTFDPVSWSQNATARTDG---
  2 WP_013188882.1  62.4%  35.2%      KAA----ATTFAFDYKCNDAAHTNGTLEVRGGQTKTVG-DNILVGTTCYIKEKPVQIDGVTVTP-SWVTNLPNGTGAYAS
    consensus/100%                    pss....upsFtFshKCsshsc..tplpl+GGpTKTls.sphhVGTpC.l+EhPsplsGVThsP.SWspNhsstTsu...
    consensus/90%                     pss....upsFtFshKCsshsc..tplpl+GGpTKTls.sphhVGTpC.l+EhPsplsGVThsP.SWspNhsstTsu...
    consensus/80%                     pss....upsFtFshKCsshsc..tplpl+GGpTKTls.sphhVGTpC.l+EhPsplsGVThsP.SWspNhsstTsu...
    consensus/70%                     pss....upsFtFshKCsshsc..tplpl+GGpTKTls.sphhVGTpC.l+EhPsplsGVThsP.SWspNhsstTsu...

                      cov     pid 4161          .         .         .         2         .         .         .         . 4240
  1 WP_004013458.1 100.0% 100.0%      GIDVTI--PATG-VKDLSFTATNKAVYDKATFQIQKVISSTENLAFEDGFKFTYTCKAPNGKTFTQKAPFGAQTGVDTIN
  2 WP_013188882.1  62.4%  35.2%      YKQFTIPQPQNGKAQVLQLEAKNTLEYDKASFTIKKVIQGGAVFTPDATFKFTYSCKAPDGKTYTQATPFGSQAKAKFIE
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  consensus/100%                    hhphTI..PtsG.spsLphpApNph.YDKAoFpIpKVIpustshs.-ssFKFTYoCKAPsGKTaTQtsPFGuQstschIp
  consensus/90%                     hhphTI..PtsG.spsLphpApNph.YDKAoFpIpKVIpustshs.-ssFKFTYoCKAPsGKTaTQtsPFGuQstschIp
  consensus/80%                     hhphTI..PtsG.spsLphpApNph.YDKAoFpIpKVIpustshs.-ssFKFTYoCKAPsGKTaTQtsPFGuQstschIp
  consensus/70%                     hhphTI..PtsG.spsLphpApNph.YDKAoFpIpKVIpustshs.-ssFKFTYoCKAPsGKTaTQtsPFGuQstschIp

                    cov    pid 4241          :         .         .         .         .         3         .         . 4320
1 WP_004013458.1 100.0% 100.0%      VKAGQPSGIITVPQGSKCTVSEANPKD---LPKLVNDPNRNPVKYQENGT-----SIKVGDKTVTGLTSAEFTADGQMVT
2 WP_013188882.1  62.4%  35.2%      VAAGQESAAIVVPQGSKCSVSEPQAQLYVTNQKLVNNPNANPLKYVSTSFVPEGKGLTSGEQT---------VTDSQTFQ
  consensus/100%                    VtAGQ.SuhIsVPQGSKCoVSEspsp......KLVNsPNtNPlKY.psuh.....ulpsG-pT.........ssDuQhhp
  consensus/90%                     VtAGQ.SuhIsVPQGSKCoVSEspsp......KLVNsPNtNPlKY.psuh.....ulpsG-pT.........ssDuQhhp
  consensus/80%                     VtAGQ.SuhIsVPQGSKCoVSEspsp......KLVNsPNtNPlKY.psuh.....ulpsG-pT.........ssDuQhhp
  consensus/70%                     VtAGQ.SuhIsVPQGSKCoVSEspsp......KLVNsPNtNPlKY.psuh.....ulpsG-pT.........ssDuQhhp

                    cov    pid 4321          .         .         :         .         .         .         .         4 4400
1 WP_004013458.1 100.0% 100.0%      VIATNTYVEKITGFQFKKTLDGNNAGKYQDQQFSFGYTCKTPKEVRSG--DAKLKSADDPVKVENLPVGTECTLWENKVN
2 WP_013188882.1  62.4%  35.2%      FAATNVYTEKMTGFKFYKAAVTGNNAGNHTEQFYFNYSCQTPAGEVKNGVGYDLGAGSDPVTVENLPVGTKCVVWEKPAV
  consensus/100%                    hhATNsYsEKhTGFpFhKshsssNsut.pspQF.FsYoCpTPtt.hps..shcLtuusDPVpVENLPVGTcCslWEp.ss
  consensus/90%                     hhATNsYsEKhTGFpFhKshsssNsut.pspQF.FsYoCpTPtt.hps..shcLtuusDPVpVENLPVGTcCslWEp.ss
  consensus/80%                     hhATNsYsEKhTGFpFhKshsssNsut.pspQF.FsYoCpTPtt.hps..shcLtuusDPVpVENLPVGTcCslWEp.ss
  consensus/70%                     hhATNsYsEKhTGFpFhKshsssNsut.pspQF.FsYoCpTPtt.hps..shcLtuusDPVpVENLPVGTcCslWEp.ss

                    cov    pid 4401          .         .         .         .         :         .         .         . 4480
1 WP_004013458.1 100.0% 100.0%      PKNAEKVSTTWTIDGK-PVSSGSVTDHNGVKHTNANGVTFKVETEGTPVNVVATNKFDIPSTSFKIHKTVTNKTDGYHVP
2 WP_013188882.1  62.4%  35.2%      AQANEKVTTKWTVGTAEPVEGKDVKPFDNNARTQANGVAFTVDQENQALMVGATNDFTVPDTKLVVSKTIVAGE--NTTV
  consensus/100%                    spssEKVoTpWTlsst.PVputsVpsassst+TpANGVsFpV-pEspsl.VsATNcFslPsTphhlpKTlsstp...pss
  consensus/90%                     spssEKVoTpWTlsst.PVputsVpsassst+TpANGVsFpV-pEspsl.VsATNcFslPsTphhlpKTlsstp...pss
  consensus/80%                     spssEKVoTpWTlsst.PVputsVpsassst+TpANGVsFpV-pEspsl.VsATNcFslPsTphhlpKTlsstp...pss
  consensus/70%                     spssEKVoTpWTlsst.PVputsVpsassst+TpANGVsFpV-pEspsl.VsATNcFslPsTphhlpKTlsstp...pss

                    cov    pid 4481          .         5         .         .         .         .         :         . 4560
1 WP_004013458.1 100.0% 100.0%      ADKGFKFDVTCTYPTDDAEHVIAKDELVKGGQDSKNFEADVDGVPIPVGASCTVTEKNAA--VANYSLAVTMKDGGKALT
2 WP_013188882.1  62.4%  35.2%      GNKSVKLSATCKYPTDNAEHVIMDGKTFKNG-DSAEFTTDVNGVKIPVGATCTISESEPSAKVAGHLWTVQMKEGKRVLS
  consensus/100%                    usKuhKhssTCpYPTDsAEHVIhcschhKsG.DStpFpsDVsGV.IPVGAoCTloEppsu..VAsa.hsVpMK-Gt+sLo
  consensus/90%                     usKuhKhssTCpYPTDsAEHVIhcschhKsG.DStpFpsDVsGV.IPVGAoCTloEppsu..VAsa.hsVpMK-Gt+sLo
  consensus/80%                     usKuhKhssTCpYPTDsAEHVIhcschhKsG.DStpFpsDVsGV.IPVGAoCTloEppsu..VAsa.hsVpMK-Gt+sLo
  consensus/70%                     usKuhKhssTCpYPTDsAEHVIhcschhKsG.DStpFpsDVsGV.IPVGAoCTloEppsu..VAsa.hsVpMK-Gt+sLo

                    cov    pid 4561          .         .         .         6         .         .         .         . 4640
1 WP_004013458.1 100.0% 100.0%      VETKQADQTKSEPGYTAKVITTVEAKTVNVENTYTRDFGIFKIEKKTTAQSYIEKPSSFDFKYTCKDPKDSKAEVKQGIL
2 WP_013188882.1  62.4%  35.2%      DKA-----------TATVTLNAEKGRTVEVINTYERELGKFKIMKSVSAAKNITVKESYSFSYTCADPQDATQKVAGKVT
  consensus/100%                    scs...........hsshslss.cu+TVpV.NTYpR-hGhFKI.KpsoAtp.Iph.pSasFpYTCtDPpDuptcVtttlh
  consensus/90%                     scs...........hsshslss.cu+TVpV.NTYpR-hGhFKI.KpsoAtp.Iph.pSasFpYTCtDPpDuptcVtttlh
  consensus/80%                     scs...........hsshslss.cu+TVpV.NTYpR-hGhFKI.KpsoAtp.Iph.pSasFpYTCtDPpDuptcVtttlh
  consensus/70%                     scs...........hsshslss.cu+TVpV.NTYpR-hGhFKI.KpsoAtp.Iph.pSasFpYTCtDPpDuptcVtttlh

                    cov    pid 4641          :         .         .         .         .         7         .         . 4720
1 WP_004013458.1 100.0% 100.0%      NVGEA-AVSSQQIPVGYKCEVSEVDPKV---KGAKWAHTLSQKTFVIQKSEVQTASLTATNDFTDSTGKFKVTKKVKNDD
2 WP_013188882.1  62.4%  35.2%      GVTDKGYKIVDGIPLGYKCHITEDQAGAKTEEGSTLSATLSANDFVVEKDNVVDV--SVTNTYSKANGKFSVKKAIAKDS
  consensus/100%                    sVs-t.hh.sptIPlGYKCcloEspsts...cGuphutTLStpsFVlpKspV.ss..osTNsaocusGKFpVpKtltpDs
  consensus/90%                     sVs-t.hh.sptIPlGYKCcloEspsts...cGuphutTLStpsFVlpKspV.ss..osTNsaocusGKFpVpKtltpDs
  consensus/80%                     sVs-t.hh.sptIPlGYKCcloEspsts...cGuphutTLStpsFVlpKspV.ss..osTNsaocusGKFpVpKtltpDs
  consensus/70%                     sVs-t.hh.sptIPlGYKCcloEspsts...cGuphutTLStpsFVlpKspV.ss..osTNsaocusGKFpVpKtltpDs

                    cov    pid 4721          .         .         :         .         .         .         .         8 4800
1 WP_004013458.1 100.0% 100.0%      KLALPLNATYNFEWWCGPKGAE---APQKWNTFSLKQGETFESGEIASGSECGIREVKPTGDFAAVGANVEVTWSLAETK
2 WP_013188882.1  62.4%  35.2%      T-AAIADGTYNFEYWCVTPDGSEVGTAAAPNKFSIKAGQTWTSGNIATGSKCAIREVTPSGTTT--GVAAEVSWSLQEST
  consensus/100%                    p.Ah.hsuTYNFEaWCss.sup...sstt.NpFSlKtGpTapSGpIAoGScCuIREVpPoGshs..GsssEVoWSLtEop
  consensus/90%                     p.Ah.hsuTYNFEaWCss.sup...sstt.NpFSlKtGpTapSGpIAoGScCuIREVpPoGshs..GsssEVoWSLtEop
  consensus/80%                     p.Ah.hsuTYNFEaWCss.sup...sstt.NpFSlKtGpTapSGpIAoGScCuIREVpPoGshs..GsssEVoWSLtEop
  consensus/70%                     p.Ah.hsuTYNFEaWCss.sup...sstt.NpFSlKtGpTapSGpIAoGScCuIREVpPoGshs..GsssEVoWSLtEop

                    cov    pid 4801          .         .         .         .         :         .         .         . 4880
1 WP_004013458.1 100.0% 100.0%      TTQGATSVKAPVLVDSEQAFVFGKQGDSAGKFTIGKNGSEQILTATNEVKQTYVDLSLEKVAQSSNNNGDPGLSVDKFNY
2 WP_013188882.1  62.4%  35.2%      TMQGVEPTP-YQAVGAENNFVFGAEGSTAGKFTIGKNGTTTGLTATNKLSYEEVKLKLQKIAEATSAHGRTDYSQTNFEN
  consensus/100%                    ThQGspss....hVsuEpsFVFGtpGsoAGKFTIGKNGopphLTATNclp.p.VcLpLpKlApuosspGcsshS.spFp.
  consensus/90%                     ThQGspss....hVsuEpsFVFGtpGsoAGKFTIGKNGopphLTATNclp.p.VcLpLpKlApuosspGcsshS.spFp.
  consensus/80%                     ThQGspss....hVsuEpsFVFGtpGsoAGKFTIGKNGopphLTATNclp.p.VcLpLpKlApuosspGcsshS.spFp.
  consensus/70%                     ThQGspss....hVsuEpsFVFGtpGsoAGKFTIGKNGopphLTATNclp.p.VcLpLpKlApuosspGcsshS.spFp.

                    cov    pid 4881          .         9         .         .         .         .         :         . 4960
1 WP_004013458.1 100.0% 100.0%      WNSYYQAWGGFVTRNFVEMQVTCNDKPVADKAHPEGIWKVPLNGKIDLPVKVAIGSKCTVAELD-KGFNDYKMLFYGRWR
2 WP_013188882.1  62.4%  35.2%      MKQ-YGAYYRYMNRDYVNMHVTCKNGAKTVV---DKTVQVNVNGDALDFGMVPYNSKCTVAELDDESFNDWNAMQYGGWR
  consensus/100%                    hpp.YtAahtahsRsaVpMpVTCpstshssh...-thhpVslNGch...shVshsSKCTVAELD.cuFNDaphh.YGtWR
  consensus/90%                     hpp.YtAahtahsRsaVpMpVTCpstshssh...-thhpVslNGch...shVshsSKCTVAELD.cuFNDaphh.YGtWR
  consensus/80%                     hpp.YtAahtahsRsaVpMpVTCpstshssh...-thhpVslNGch...shVshsSKCTVAELD.cuFNDaphh.YGtWR
  consensus/70%                     hpp.YtAahtahsRsaVpMpVTCpstshssh...-thhpVslNGch...shVshsSKCTVAELD.cuFNDaphh.YGtWR

                    cov    pid 4961          .         .         .         0         .         .         .         . 5040
1 WP_004013458.1 100.0% 100.0%      HSVDMSAKSLDGI--DVSKRYDFDAVEDDKAQAAIDFDVSGKTKVEVKMTNNWDCFSKVTSELGTNLTDA----KK--VN
2 WP_013188882.1  62.4%  35.2%      HKAVITATDASGKALASEVNYAFDMMSSDGEQAAITFDVTSEADVSVLMRNRWDCFASIESVLDAPDHEAVADGKRVLKN
  consensus/100%                    HpsshoApshsGh..ssphpYsFDhhpsDttQAAIsFDVoucscVpVhMpNpWDCFuplpS.Lsss.p-A....K+..hN
  consensus/90%                     HpsshoApshsGh..ssphpYsFDhhpsDttQAAIsFDVoucscVpVhMpNpWDCFuplpS.Lsss.p-A....K+..hN
  consensus/80%                     HpsshoApshsGh..ssphpYsFDhhpsDttQAAIsFDVoucscVpVhMpNpWDCFuplpS.Lsss.p-A....K+..hN
  consensus/70%                     HpsshoApshsGh..ssphpYsFDhhpsDttQAAIsFDVoucscVpVhMpNpWDCFuplpS.Lsss.p-A....K+..hN
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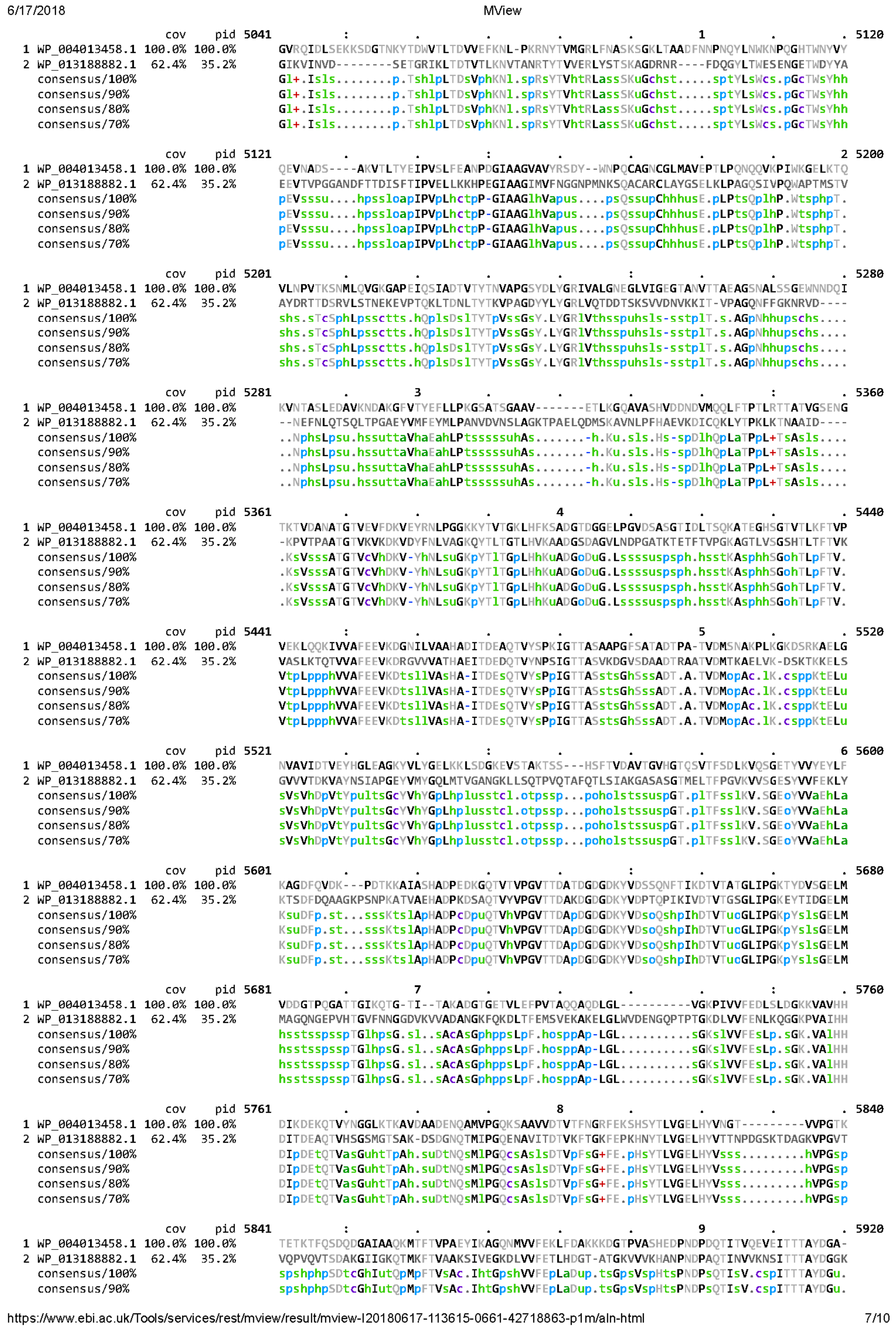

6/17/2018 MView

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                     cov     pid 5041          :         .         .         .         .         1         .         . 5120
 1 WP_004013458.1 100.0% 100.0%       GVRQIDLSEKKSDGTNKYTDWVTLTDVVEFKNL-PKRNYTVMGRLFNASKSGKLTAADFNNPNQYLNWKNPQGHTWNYVY
 2 WP_013188882.1  62.4%  35.2%       GIKVINVD--------SETGRIKLTDTVTLKNVTANRTYTVVERLYSTSKAGDRNR----FDQGYLTWESENGETWDYYA
   consensus/100%                     Gl+.Isls........p.TshlpLTDsVphKNl.spRsYTVhtRLassSKuGchst.....sptYLsWcs.pGcTWsYhh
   consensus/90%                      Gl+.Isls........p.TshlpLTDsVphKNl.spRsYTVhtRLassSKuGchst.....sptYLsWcs.pGcTWsYhh
   consensus/80%                      Gl+.Isls........p.TshlpLTDsVphKNl.spRsYTVhtRLassSKuGchst.....sptYLsWcs.pGcTWsYhh
   consensus/70%                      Gl+.Isls........p.TshlpLTDsVphKNl.spRsYTVhtRLassSKuGchst.....sptYLsWcs.pGcTWsYhh

                     cov     pid 5121          .         .         :         .         .         .         .         2 5200
 1 WP_004013458.1 100.0% 100.0%       QEVNADS----AKVTLTYEIPVSLFEANPDGIAAGVAVYRSDY--WNPQCAGNCGLMAVEPTLPQNQQVKPIWKGELKTQ
 2 WP_013188882.1  62.4%  35.2%       EEVTVPGGANDFTTDISFTIPVELLKKHPEGIAAGIMVFNGGNPMNKSQACARCLAYGSELKLPAGQSIVPQWAPTMSTV
   consensus/100%                     pEVsssu....hpssloapIPVpLhctpP-GIAAGlhVapus....psQssupChhhusE.pLPtsQplhP.WtsphpT.
   consensus/90%                      pEVsssu....hpssloapIPVpLhctpP-GIAAGlhVapus....psQssupChhhusE.pLPtsQplhP.WtsphpT.
   consensus/80%                      pEVsssu....hpssloapIPVpLhctpP-GIAAGlhVapus....psQssupChhhusE.pLPtsQplhP.WtsphpT.
   consensus/70%                      pEVsssu....hpssloapIPVpLhctpP-GIAAGlhVapus....psQssupChhhusE.pLPtsQplhP.WtsphpT.

                     cov     pid 5201          .         .         .         .         :         .         .         . 5280
 1 WP_004013458.1 100.0% 100.0%       VLNPVTKSNMLQVGKGAPEIQSIADTVTYTNVAPGSYDLYGRIVALGNEGLVIGEGTANVTTAEAGSNALSSGEWNNDQI
 2 WP_013188882.1  62.4%  35.2%       AYDRTTDSRVLSTNEKEVPTQKLTDNLTYTKVPAGDYYLYGRLVQTDDTSKSVVDNVKKIT-VPAGQNFFGKNRVD----
   consensus/100%                     shs.sTcSphLpssctts.hQplsDslTYTpVssGsY.LYGRlVthsspuhsls-sstplT.s.AGpNhhupschs....
   consensus/90%                      shs.sTcSphLpssctts.hQplsDslTYTpVssGsY.LYGRlVthsspuhsls-sstplT.s.AGpNhhupschs....
   consensus/80%                      shs.sTcSphLpssctts.hQplsDslTYTpVssGsY.LYGRlVthsspuhsls-sstplT.s.AGpNhhupschs....
   consensus/70%                      shs.sTcSphLpssctts.hQplsDslTYTpVssGsY.LYGRlVthsspuhsls-sstplT.s.AGpNhhupschs....

                     cov     pid 5281          .         3         .         .         .         .         :         . 5360
 1 WP_004013458.1 100.0% 100.0%       KVNTASLEDAVKNDAKGFVTYEFLLPKGSATSGAAV-------ETLKGQAVASHVDDNDVMQQLFTPTLRTTATVGSENG
 2 WP_013188882.1  62.4%  35.2%       --NEFNLQTSQLTPGAEYVMFEYMLPANVDVNSLAGKTPAELQDMSKAVNLPFHAEVKDICQKLYTPKLKTNAAID----
   consensus/100%                     ..NphsLpsu.hssuttaVhaEahLPtsssssuhAs.......-h.Ku.sls.Hs-spDlhQpLaTPpL+TsAsls....
   consensus/90%                      ..NphsLpsu.hssuttaVhaEahLPtsssssuhAs.......-h.Ku.sls.Hs-spDlhQpLaTPpL+TsAsls....
   consensus/80%                      ..NphsLpsu.hssuttaVhaEahLPtsssssuhAs.......-h.Ku.sls.Hs-spDlhQpLaTPpL+TsAsls....
   consensus/70%                      ..NphsLpsu.hssuttaVhaEahLPtsssssuhAs.......-h.Ku.sls.Hs-spDlhQpLaTPpL+TsAsls....

                     cov     pid 5361          .         .         .         4         .         .         .         . 5440
 1 WP_004013458.1 100.0% 100.0%       TKTVDANATGTVEVFDKVEYRNLPGGKKYTVTGKLHFKSADGTDGGELPGVDSASGTIDLTSQKATEGHSGTVTLKFTVP
 2 WP_013188882.1  62.4%  35.2%       -KPVTPAATGTVKVKDKVDYFNLVAGKQYTLTGTLHVKAADGSDAGVLNDPGATKTETFTVPGKAGTLVSGSHTLTFTVK
   consensus/100%                     .KsVsssATGTVcVhDKV-YhNLsuGKpYTlTGpLHhKuADGoDuG.Lssssuspsph.hsstKAsphhSGohTLpFTV.
   consensus/90%                      .KsVsssATGTVcVhDKV-YhNLsuGKpYTlTGpLHhKuADGoDuG.Lssssuspsph.hsstKAsphhSGohTLpFTV.
   consensus/80%                      .KsVsssATGTVcVhDKV-YhNLsuGKpYTlTGpLHhKuADGoDuG.Lssssuspsph.hsstKAsphhSGohTLpFTV.
   consensus/70%                      .KsVsssATGTVcVhDKV-YhNLsuGKpYTlTGpLHhKuADGoDuG.Lssssuspsph.hsstKAsphhSGohTLpFTV.

                     cov     pid 5441          :         .         .         .         .         5         .         . 5520
 1 WP_004013458.1 100.0% 100.0%       VEKLQQKIVVAFEEVKDGNILVAAHADITDEAQTVYSPKIGTTASAAPGFSATADTPA-TVDMSNAKPLKGKDSRKAELG
 2 WP_013188882.1  62.4%  35.2%       VASLKTQTVVAFEEVKDRGVVVATHAEITDEDQTVYNPSIGTTASVKDGVSDAADTRAATVDMTKAELVK-DSKTKKELS
   consensus/100%                     VtpLppphVVAFEEVKDtsllVAsHA-ITDEsQTVYsPpIGTTASstsGhSssADT.A.TVDMopAc.lK.csppKtELu
   consensus/90%                      VtpLppphVVAFEEVKDtsllVAsHA-ITDEsQTVYsPpIGTTASstsGhSssADT.A.TVDMopAc.lK.csppKtELu
   consensus/80%                      VtpLppphVVAFEEVKDtsllVAsHA-ITDEsQTVYsPpIGTTASstsGhSssADT.A.TVDMopAc.lK.csppKtELu
   consensus/70%                      VtpLppphVVAFEEVKDtsllVAsHA-ITDEsQTVYsPpIGTTASstsGhSssADT.A.TVDMopAc.lK.csppKtELu

                     cov     pid 5521          .         .         :         .         .         .         .         6 5600
 1 WP_004013458.1 100.0% 100.0%       NVAVIDTVEYHGLEAGKYVLYGELKKLSDGKEVSTAKTSS---HSFTVDAVTGVHGTQSVTFSDLKVQSGETYVVYEYLF
 2 WP_013188882.1  62.4%  35.2%       GVVVTDKVAYNSIAPGEYVMYGQLMTVGANGKLLSQTPVQTAFQTLSIAKGASASGTMELTFPGVKVVSGESYVVFEKLY
   consensus/100%                     sVsVhDpVtYpultsGcYVhYGpLhplusstcl.otpssp...poholstssuspGT.plTFsslKV.SGEoYVVaEhLa
   consensus/90%                      sVsVhDpVtYpultsGcYVhYGpLhplusstcl.otpssp...poholstssuspGT.plTFsslKV.SGEoYVVaEhLa
   consensus/80%                      sVsVhDpVtYpultsGcYVhYGpLhplusstcl.otpssp...poholstssuspGT.plTFsslKV.SGEoYVVaEhLa
   consensus/70%                      sVsVhDpVtYpultsGcYVhYGpLhplusstcl.otpssp...poholstssuspGT.plTFsslKV.SGEoYVVaEhLa

                     cov     pid 5601          .         .         .         .         :         .         .         . 5680
 1 WP_004013458.1 100.0% 100.0%       KAGDFQVDK---PDTKKAIASHADPEDKGQTVTVPGVTTDATDGDGDKYVDSSQNFTIKDTVTATGLIPGKTYDVSGELM
 2 WP_013188882.1  62.4%  35.2%       KTSDFDQAAGKPSNPKATVAEHADPKDSAQTVYVPGVTTDAKDGDGDKYVDPTQPIKIVDTVTGSGLIPGKEYTIDGELM
   consensus/100%                     KsuDFp.st...sssKtslApHADPcDpuQTVhVPGVTTDApDGDGDKYVDsoQshpIhDTVTuoGLIPGKpYslsGELM
   consensus/90%                      KsuDFp.st...sssKtslApHADPcDpuQTVhVPGVTTDApDGDGDKYVDsoQshpIhDTVTuoGLIPGKpYslsGELM
   consensus/80%                      KsuDFp.st...sssKtslApHADPcDpuQTVhVPGVTTDApDGDGDKYVDsoQshpIhDTVTuoGLIPGKpYslsGELM
   consensus/70%                      KsuDFp.st...sssKtslApHADPcDpuQTVhVPGVTTDApDGDGDKYVDsoQshpIhDTVTuoGLIPGKpYslsGELM

                     cov     pid 5681          .         7         .         .         .         .         :         . 5760
 1 WP_004013458.1 100.0% 100.0%       VDDGTPQGATTGIKQTG-TI--TAKADGTGETVLEFPVTAQQAQDLGL---------VGKPIVVFEDLSLDGKKVAVHH
 2 WP_013188882.1  62.4%  35.2%       MAGQNGEPVHTGVFNNGGDVKVVADANGKFQKDLTFEMSVEKAKELGLWVDENGQPTPTGKDLVVFENLKQGGKPVAIHH
   consensus/100%                     hsstsspsspTGlhpsG.sl..sAcAsGphppsLpF.hosppAp-LGL.........sGKslVVFEsLp.sGK.VAlHH
   consensus/90%                      hsstsspsspTGlhpsG.sl..sAcAsGphppsLpF.hosppAp-LGL.........sGKslVVFEsLp.sGK.VAlHH
   consensus/80%                      hsstsspsspTGlhpsG.sl..sAcAsGphppsLpF.hosppAp-LGL.........sGKslVVFEsLp.sGK.VAlHH
   consensus/70%                      hsstsspsspTGlhpsG.sl..sAcAsGphppsLpF.hosppAp-LGL.........sGKslVVFEsLp.sGK.VAlHH

                     cov     pid 5761          .         .         .         8         .         .         .         . 5840
 1 WP_004013458.1 100.0% 100.0%       DIKDEKQTVYNGGLKTKAVDAADENQAMVPGQKSAAVVDTVTFNGRFEKSHSYTLVGELHYVNGT---------VVPGTK
 2 WP_013188882.1  62.4%  35.2%       DITDEAQTVHSGSMGTSAK-DSDGNQTMIPGQENAVITDTVKFTGKFEPKHNYTLVGELHYVTTNPDGSKTDAGKVPGVT
   consensus/100%                     DIpDEtQTVasGuhtTpAh.suDtNQsMlPGQcsAslsDTVpFsG+FE.pHsYTLVGELHYVsss.........hVPGsp
   consensus/90%                      DIpDEtQTVasGuhtTpAh.suDtNQsMlPGQcsAslsDTVpFsG+FE.pHsYTLVGELHYVsss.........hVPGsp
   consensus/80%                      DIpDEtQTVasGuhtTpAh.suDtNQsMlPGQcsAslsDTVpFsG+FE.pHsYTLVGELHYVsss.........hVPGsp
   consensus/70%                      DIpDEtQTVasGuhtTpAh.suDtNQsMlPGQcsAslsDTVpFsG+FE.pHsYTLVGELHYVsss.........hVPGsp

                     cov     pid 5841          :         .         .         .         .         9         .         . 5920
 1 WP_004013458.1 100.0% 100.0%       TETKTFQSDQDGAIAAQKMTFTVPAEYIKAGQNMVVFEKLFDAKKKDGTPVASHEDPNDPDQTITVQEVEITTTAYDGA-
 2 WP_013188882.1  62.4%  35.2%       VQPVQVTSDAKGIIGKQTMKFTVAAKSIVEGKDLVVFETLHDGT-ATGKVVVKHANPNDPAQTINVVKNSITTTAYDGGK
   consensus/100%                     spshphpSDtcGhIutQpMpFTVsAc.IhtGpshVVFEpLaDup.tsGpsVspHtsPNDPsQTIsV.cspITTTAYDGu.
   consensus/90%                      spshphpSDtcGhIutQpMpFTVsAc.IhtGpshVVFEpLaDup.tsGpsVspHtsPNDPsQTIsV.cspITTTAYDGu.
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https://www.ebi.ac.uk/Tools/services/rest/mview/result/mview-I20180617-113615-0661-42718863-p1m/aln-html 7/10

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    consensus/80%                     spshphpSDtcGhIutQpMpFTVsAc.IhtGpshVVFEpLaDup.tsGpsVspHtsPNDPsQTIsV.cspITTTAYDGu.
    consensus/70%                     spshphpSDtcGhIutQpMpFTVsAc.IhtGpshVVFEpLaDup.tsGpsVspHtsPNDPsQTIsV.cspITTTAYDGu.

                      cov    pid 5921          .         .         :         .         .         .         .         0 6000
  1 WP_004013458.1 100.0% 100.0%      AGDKSDPKDKNLDASKETVTIYDQVDYKGLNVGEEYTITGTLHYQADATLADGTQVKRGDEVPAQYVNVTPVKITANKAS
  2 WP_013188882.1  62.4%  35.2%      DGKGADPKDKNLDNSHAKVAIYDLVDYEGLQVGKEYTVTGTLHYQADATLADGTQVHTGDPIDAKYVTVTPAKFTAKTPS
    consensus/100%                    sGctuDPKDKNLDsS+tpVsIYD.VDYcGLpVGcEYTlTGTLHYQADATLADGTQV+pGD.lsApYVsVTPsKhTAppsS
    consensus/90%                     sGctuDPKDKNLDsS+tpVsIYD.VDYcGLpVGcEYTlTGTLHYQADATLADGTQV+pGD.lsApYVsVTPsKhTAppsS
    consensus/80%                     sGctuDPKDKNLDsS+tpVsIYD.VDYcGLpVGcEYTlTGTLHYQADATLADGTQV+pGD.lsApYVsVTPsKhTAppsS
    consensus/70%                     sGctuDPKDKNLDsS+tpVsIYD.VDYcGLpVGcEYTlTGTLHYQADATLADGTQV+pGD.lsApYVsVTPsKhTAppsS

                      cov    pid 6001          .         .         .         .         :         .         .         . 6080
  1 WP_004013458.1 100.0% 100.0%      SDESGAVKAIVKFEVQKTALATAPVVVFETLYQGTVEVATHQDIDDGSQVVYHPSLRTLATVNGAKVIQMKKDSKENLTV
  2 WP_013188882.1  62.4%  35.2%      SKDQGAVKAIVKFEVDKAALATAPVVVFEDLQDGTVTVATHHDINDDSQVVYNPSLATVATVNDGKLVQLKKDQK-AVTV
    consensus/100%                    Sc-pGAVKAIVKFEVpKsALATAPVVVFEsL.pGTVpVATHpDIsDsSQVVYpPSLtTlATVNsuKllQhKKDpK.slTV
    consensus/90%                     Sc-pGAVKAIVKFEVpKsALATAPVVVFEsL.pGTVpVATHpDIsDsSQVVYpPSLtTlATVNsuKllQhKKDpK.slTV
    consensus/80%                     Sc-pGAVKAIVKFEVpKsALATAPVVVFEsL.pGTVpVATHpDIsDsSQVVYpPSLtTlATVNsuKllQhKKDpK.slTV
    consensus/70%                     Sc-pGAVKAIVKFEVpKsALATAPVVVFEsL.pGTVpVATHpDIsDsSQVVYpPSLtTlATVNsuKllQhKKDpK.slTV

                      cov    pid 6081          .         1         .         .         .         .         :         . 6160
  1 WP_004013458.1 100.0% 100.0%      TDQITWANLAPGTYTLEGSLMEVKDGQLVSNTPVAKGQTQKVEVAAGKAGATTSTGEAQMTFKLPVDKVKSGSQFVVYQI
  2 WP_013188882.1  62.4%  35.2%      DDEVTITNAAPGTYTLKGELMSADGKTVISTSEVKN-----VKVTKGE------ATVQKVTFQVPANQVKAGAKFVVFEE
    consensus/100%                    sDplThsNhAPGTYTLcGpLMpscstpllSso.Vtp.....VcVstGc......ss.tphTFplPsspVKuGupFVVap.
    consensus/90%                     sDplThsNhAPGTYTLcGpLMpscstpllSso.Vtp.....VcVstGc......ss.tphTFplPsspVKuGupFVVap.
    consensus/80%                     sDplThsNhAPGTYTLcGpLMpscstpllSso.Vtp.....VcVstGc......ss.tphTFplPsspVKuGupFVVap.
    consensus/70%                     sDplThsNhAPGTYTLcGpLMpscstpllSso.Vtp.....VcVstGc......ss.tphTFplPsspVKuGupFVVap.

                      cov    pid 6161          .         .         .         2         .         .         .         . 6240
  1 WP_004013458.1 100.0% 100.0%      LKDKSGQVVATHADPKSDDQTVTVGSLDTTATDAADGNKHADNAAAVTINDKVDYSGLNLAATYPDGTLKAYLVRGELMD
  2 WP_013188882.1  62.4%  35.2%      LVDAKGVVVADHKDLASEAQTVRVGSLETTATDKADGDHVADNTKTVTIVDKVDYSGLNLDAKYADGTPQAYLLSGQLMD
    consensus/100%                    LhDtpG.VVAsHtD.tS-sQTVpVGSL-TTATDtADGs+hADNstsVTIsDKVDYSGLNLsApYsDGT.pAYLlpGpLMD
    consensus/90%                     LhDtpG.VVAsHtD.tS-sQTVpVGSL-TTATDtADGs+hADNstsVTIsDKVDYSGLNLsApYsDGT.pAYLlpGpLMD
    consensus/80%                     LhDtpG.VVAsHtD.tS-sQTVpVGSL-TTATDtADGs+hADNstsVTIsDKVDYSGLNLsApYsDGT.pAYLlpGpLMD
    consensus/70%                     LhDtpG.VVAsHtD.tS-sQTVpVGSL-TTATDtADGs+hADNstsVTIsDKVDYSGLNLsApYsDGT.pAYLlpGpLMD

                      cov    pid 6241          :         .         .         .         .         3         .         . 6320
  1 WP_004013458.1 100.0% 100.0%      KATGKPVAGVAPVERVIGAANSVYRV-GDQNRPVEEEITSGAGSVVLSFQVPAKLTQGKVLVAFETVYEEGREFLIHHDI
  2 WP_013188882.1  62.4%  35.2%      KQTKQAVPGLAPVERVIGPAGSVYRAEGQPDRPVEKVITSGTGFELLEFEVPANLILGKPVVVFETVYQEGKEYLIHHDI
    consensus/100%                    KtTtpsVsGlAPVERVIGsAsSVYRs.Gp.sRPVEc.ITSGsG..lLpFpVPApLh.GKslVsFETVYpEG+EaLIHHDI
    consensus/90%                     KtTtpsVsGlAPVERVIGsAsSVYRs.Gp.sRPVEc.ITSGsG..lLpFpVPApLh.GKslVsFETVYpEG+EaLIHHDI
    consensus/80%                     KtTtpsVsGlAPVERVIGsAsSVYRs.Gp.sRPVEc.ITSGsG..lLpFpVPApLh.GKslVsFETVYpEG+EaLIHHDI
    consensus/70%                     KtTtpsVsGlAPVERVIGsAsSVYRs.Gp.sRPVEc.ITSGsG..lLpFpVPApLh.GKslVsFETVYpEG+EaLIHHDI

                      cov    pid 6321          .         .         :         .         .         .         .         4 6400
  1 WP_004013458.1 100.0% 100.0%      NDDAQTVYTPSVKTQARVDSERNLLLADKDSTIKDTVTLSGLKTGETYVLSGVLMDKATGQPVLGKDMQAITAVSEPLKA
  2 WP_013188882.1  62.4%  35.2%      NDDSQTVWSPKLATKASVENERGLVIADAKSTVKDTVTFTGMKVGETYVVAGELWNKTQNK------STGIKVTSKPFKA
    consensus/100%                    NDDuQTVaoPpltTpApV-sERsLllADtcSTlKDTVThoGhKsGETYVluG.LhsKspsp.......puIpssScPhKA
    consensus/90%                     NDDuQTVaoPpltTpApV-sERsLllADtcSTlKDTVThoGhKsGETYVluG.LhsKspsp.......puIpssScPhKA
    consensus/80%                     NDDuQTVaoPpltTpApV-sERsLllADtcSTlKDTVThoGhKsGETYVluG.LhsKspsp.......puIpssScPhKA
    consensus/70%                     NDDuQTVaoPpltTpApV-sERsLllADtcSTlKDTVThoGhKsGETYVluG.LhsKspsp.......puIpssScPhKA

                      cov    pid 6401          .         .         .         .         :         .         .         . 6480
  1 WP_004013458.1 100.0% 100.0%      ESGAFVKTDAVSFTVPAGTVKADTELVVFEKLWVANEVTVDTKTKTVTPKDTKTGKSQPAASHEDITDENQTVKSGTSPS
  2 WP_013188882.1  62.4%  35.2%      DKASWTATDFMTFEVPAGTVAENDELVVFETLYRGDKVTN-----------------NPASTHKDPNDPAQTVGSGVKPA
    consensus/100%                    -puuastTDhhoFpVPAGTVttssELVVFEpLahuscVTs.................pPAuoHcD.sD.sQTVtSGspPu
    consensus/90%                     -puuastTDhhoFpVPAGTVttssELVVFEpLahuscVTs.................pPAuoHcD.sD.sQTVtSGspPu
    consensus/80%                     -puuastTDhhoFpVPAGTVttssELVVFEpLahuscVTs.................pPAuoHcD.sD.sQTVtSGspPu
    consensus/70%                     -puuastTDhhoFpVPAGTVttssELVVFEpLahuscVTs.................pPAuoHcD.sD.sQTVtSGspPu

                      cov    pid 6481          .         5         .         .         .         .         :         . 6560
  1 WP_004013458.1 100.0% 100.0%      LKTVLSADGKREWVENNTNIPTVPHASDSLIDTVLYTGLTEGVSYRLDAKLMEINPVTGKVSETPVATGYTEFTAKTSDG
  2 WP_013188882.1  62.4%  35.2%      IKTVLSTDGNRV---AGADIPTIPVDTTQLVDTVSYVGLTPGIKYTLNATLMEIGL-DGKVSDTG-ITGTATFTPTAANG
    consensus/100%                    lKTVLSsDGpR....ssssIPTlPhsospLlDTV.YsGLT.GlpYpLsApLMEIs..sGKVS-Ts.hTGhspFTspsusG
    consensus/90%                     lKTVLSsDGpR....ssssIPTlPhsospLlDTV.YsGLT.GlpYpLsApLMEIs..sGKVS-Ts.hTGhspFTspsusG
    consensus/80%                     lKTVLSsDGpR....ssssIPTlPhsospLlDTV.YsGLT.GlpYpLsApLMEIs..sGKVS-Ts.hTGhspFTspsusG
    consensus/70%                     lKTVLSsDGpR....ssssIPTlPhsospLlDTV.YsGLT.GlpYpLsApLMEIs..sGKVS-Ts.hTGhspFTspsusG

                      cov    pid 6561          .         .         .         6         .         .         .         . 6640
  1 WP_004013458.1 100.0% 100.0%      TAQVTFNGI-TGKLKAGYKYVAYEKMTRPGQPDKPVPPPHEDPKDPNQTVVSEHNPGITTTLTDAQAAKGTDGKVISLTR
  2 WP_013188882.1  62.4%  35.2%      TQKVGYNSFDKGILKPGYKYVAYETLIRNDKPNEP-PLKHEDPKDSDQTVKTDYHPSVVTDLTQDGSQ------V--IAT
    consensus/100%                    TtpVsaNuh.pGhLKsGYKYVAYEphhRsspPscP.P..HEDPKDssQTVho-apPulsTsLTpstut......V..lsp
    consensus/90%                     TtpVsaNuh.pGhLKsGYKYVAYEphhRsspPscP.P..HEDPKDssQTVho-apPulsTsLTpstut......V..lsp
    consensus/80%                     TtpVsaNuh.pGhLKsGYKYVAYEphhRsspPscP.P..HEDPKDssQTVho-apPulsTsLTpstut......V..lsp
    consensus/70%                     TtpVsaNuh.pGhLKsGYKYVAYEphhRsspPscP.P..HEDPKDssQTVho-apPulsTsLTpstut......V..lsp

                      cov    pid 6641          :         .         .         .         .         7         .         . 6720
  1 WP_004013458.1 100.0% 100.0%      DAQLKDVVRVTQTGLIEGAKYHVFSKLVNQANP--DQVVSAGMQEFTATGDQLRSVTVKFTVPKETLQE--LAGSDPSAE
  2 WP_013188882.1  62.4%  35.2%      DAALDLQDKVQMKGLVKGEKYVLVSRLVYNAGQPNETVVTDGLEKFTADSVNMTK-VIKFNVTTDQLKAPMAAAKAAGSE
    consensus/100%                    DAtLc..s+Vp.pGLlcGtKYhlhS+LV.pAs...-pVVosGhpcFTAsusphpp.slKFsVsp-pLpt..hAupssuuE
    consensus/90%                     DAtLc..s+Vp.pGLlcGtKYhlhS+LV.pAs...-pVVosGhpcFTAsusphpp.slKFsVsp-pLpt..hAupssuuE
    consensus/80%                     DAtLc..s+Vp.pGLlcGtKYhlhS+LV.pAs...-pVVosGhpcFTAsusphpp.slKFsVsp-pLpt..hAupssuuE
    consensus/70%                     DAtLc..s+Vp.pGLlcGtKYhlhS+LV.pAs...-pVVosGhpcFTAsusphpp.slKFsVsp-pLpt..hAupssuuE

                      cov    pid 6721          .         .         :         .         .         .         .         8 6800
  1 WP_004013458.1 100.0% 100.0%      FKLVAYEYLALDSDTDIVNKEATSEIEAVGFKTGKTWAATHADPNDAGQTVTVVKAPKIGTTLKYGQS-KTVWVADKVEL
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2 WP_013188882.1  62.4%  35.2%       LKLVAYEYLTRASLVTGD--D---ATIKASVTDASKWDATHAQANDTRQTVTVVDVPRIGTKLQYAQGQKVVWEGDNVKL
  consensus/100%                     hKLVAYEYLshsS.sshs..-...th.tsuhpsuppWsATHApsNDstQTVTVVcsP+IGTpLpYuQu.KsVW.uDpVcL
  consensus/90%                      hKLVAYEYLshsS.sshs..-...th.tsuhpsuppWsATHApsNDstQTVTVVcsP+IGTpLpYuQu.KsVW.uDpVcL
  consensus/80%                      hKLVAYEYLshsS.sshs..-...th.tsuhpsuppWsATHApsNDstQTVTVVcsP+IGTpLpYuQu.KsVW.uDpVcL
  consensus/70%                      hKLVAYEYLshsS.sshs..-...th.tsuhpsuppWsATHApsNDstQTVTVVcsP+IGTpLpYuQu.KsVW.uDpVcL

                  cov    pid 6801    .         .         .         .         :         .         .         . 6880
1 WP_004013458.1 100.0% 100.0%       TDTVEYFNLQPKTKYTLSGNLMGGTSAESLSDTGVKATTEFTTPAAANGAQTVSGT------AVVKFTVPREVLERNEKL
2 WP_013188882.1  62.4%  35.2%       TDFVEYYNLLPATEYTLNGKLMGIATDGKVSDTGVVGTAKFTTPKATNGATRVSGTIADKTAAKVEFTVPLSVLKANDKL
  consensus/100%                     TDhVEYaNL.PtTcYTLsGpLMGhsostplSDTGVhuTscFTTPtAsNGAppVSGT......AhVcFTVPhpVLctN-KL
  consensus/90%                      TDhVEYaNL.PtTcYTLsGpLMGhsostplSDTGVhuTscFTTPtAsNGAppVSGT......AhVcFTVPhpVLctN-KL
  consensus/80%                      TDhVEYaNL.PtTcYTLsGpLMGhsostplSDTGVhuTscFTTPtAsNGAppVSGT......AhVcFTVPhpVLctN-KL
  consensus/70%                      TDhVEYaNL.PtTcYTLsGpLMGhsostplSDTGVhuTscFTTPtAsNGAppVSGT......AhVcFTVPhpVLctN-KL

                  cov    pid 6881    .         9         .         .         .         .         :         . 6960
1 WP_004013458.1 100.0% 100.0%       VAYEYLTIDGNPVASHEDPKDENQTVTSKKPGVGTYATVDKLKAFDVTDG-------KKDAFTIKDTVRLYNVEEGKTYA
2 WP_013188882.1  62.4%  35.2%       VAYEALLLKGQPVADHEDPNDENQTVKVKHPGVGTIAHVGDDTNLEVWEGVNQEGKKAPETYTVHDVIRMVNVEEGKTYA
  consensus/100%                     VAYEhLhlcGpPVAsHEDPpDENQTVpsK+PGVGThApVsc.psh-Vh-G.......t.-saTl+DslRhhNVEEGKTYA
  consensus/90%                      VAYEhLhlcGpPVAsHEDPpDENQTVpsK+PGVGThApVsc.psh-Vh-G.......t.-saTl+DslRhhNVEEGKTYA
  consensus/80%                      VAYEhLhlcGpPVAsHEDPpDENQTVpsK+PGVGThApVsc.psh-Vh-G.......t.-saTl+DslRhhNVEEGKTYA
  consensus/70%                      VAYEhLhlcGpPVAsHEDPpDENQTVpsK+PGVGThApVsc.psh-Vh-G.......t.-saTl+DslRhhNVEEGKTYA

                  cov    pid 6961    .         .         .         0         .         .         .         . 7040
1 WP_004013458.1 100.0% 100.0%       IAGQLYEQSVAGD--EGSALAKAATTVKVTASMAKPATEVEKTKYGEDVKVYETEMDLTVKREDLTKNQVVKDDIALVVY
2 WP_013188882.1  62.4%  35.2%       LGGQVYSKNAYDANAQTPALAANAKTVKVTADMAKPATDAEKAQYGADVKVYETSMDIPVKAADIKT-----HGDKLVVF
  consensus/100%                     luGQlYppsshss..pssALAtsApTVKVTAsMAKPAT-sEKspYGtDVKVYETpMDlsVKttDlpp.....cs.tLVVa
  consensus/90%                      luGQlYppsshss..pssALAtsApTVKVTAsMAKPAT-sEKspYGtDVKVYETpMDlsVKttDlpp.....cs.tLVVa
  consensus/80%                      luGQlYppsshss..pssALAtsApTVKVTAsMAKPAT-sEKspYGtDVKVYETpMDlsVKttDlpp.....cs.tLVVa
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                  cov    pid 7041    :         .         .         .         .         1         .         . 7120
1 WP_004013458.1 100.0% 100.0%       EQLWAEGTYEKVNDTEVTPKGKSEPVAKHNDPQSSSQSIT-AEPQFGSLKLTKTVTGWEDAFAKVARPEASYKFTVKCVQ
2 WP_013188882.1  62.4%  35.2%       EQLWAEGTYESADGGKVTPKGNHKPVAAHNEITADSQSINVNRPEFGSLTLTKAVTGWDENTANVERAKATYVFTVKCAQ
  consensus/100%                     EQLWAEGTYEpsssscVTPKGppcPVAtHN-.pusSQSIs.scPpFGSLpLTKsVTGW--shApVtRscAoYhFTVKCsQ
  consensus/90%                      EQLWAEGTYEpsssscVTPKGppcPVAtHN-.pusSQSIs.scPpFGSLpLTKsVTGW--shApVtRscAoYhFTVKCsQ
  consensus/80%                      EQLWAEGTYEpsssscVTPKGppcPVAtHN-.pusSQSIs.scPpFGSLpLTKsVTGW--shApVtRscAoYhFTVKCsQ
  consensus/70%                      EQLWAEGTYEpsssscVTPKGppcPVAtHN-.pusSQSIs.scPpFGSLpLTKsVTGW--shApVtRscAoYhFTVKCsQ

                  cov    pid 7121    .         .         :         .         .         .         .         2 7200
1 WP_004013458.1 100.0% 100.0%       KGSVDEFTLKEGEEKTVEGIPLGDTCTISEDVQGAVNQAGLKDTVKFTAVNGVTVDSQVNGEAVVKIGGTANGSDTVANV
2 WP_013188882.1  62.4%  35.2%       KGSVDTITLHEGGSHTIDGIPVGDKCTITEDVQHAELQAGLKDTVKFTETNGVTVESVKNGEGTVMVGGTSNGTDRVPNV
  consensus/100%                     KGSVDphTL+EGtp+Tl-GIPlGDpCTIoEDVQtA..QAGLKDTVKFTtsNGVTV-S.hNGEusVhlGGTuNGoDpVsNV
  consensus/90%                      KGSVDphTL+EGtp+Tl-GIPlGDpCTIoEDVQtA..QAGLKDTVKFTtsNGVTV-S.hNGEusVhlGGTuNGoDpVsNV
  consensus/80%                      KGSVDphTL+EGtp+Tl-GIPlGDpCTIoEDVQtA..QAGLKDTVKFTtsNGVTV-S.hNGEusVhlGGTuNGoDpVsNV
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1 WP_004013458.1 100.0% 100.0%       EVTAENSFSYDPVITTNTISQFGKVLENGGVLTDTVTYKQMPAGNYVLHTYFVEMVKDEATGKTVAKKIDYVPSYVTEQT
2 WP_013188882.1  62.4%  35.2%       TVVADNKFTNEVTIGTNTTGQFGKKSSNGGKITDLVKYQNLQAGKYLLHTYFVEYDKAG-----QAHKIDYVPSEVREVT
  consensus/100%                     pVsA-NpFo.-ssIsTNThuQFGKh.pNGGhlTDhVpYpph.AGpYlLHTYFVEhsKst......A+KIDYVPS.VpE.T
  consensus/90%                      pVsA-NpFo.-ssIsTNThuQFGKh.pNGGhlTDhVpYpph.AGpYlLHTYFVEhsKst......A+KIDYVPS.VpE.T
  consensus/80%                      pVsA-NpFo.-ssIsTNThuQFGKh.pNGGhlTDhVpYpph.AGpYlLHTYFVEhsKst......A+KIDYVPS.VpE.T
  consensus/70%                      pVsA-NpFo.-ssIsTNThuQFGKh.pNGGhlTDhVpYpph.AGpYlLHTYFVEhsKst......A+KIDYVPS.VpE.T

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1 WP_004013458.1 100.0% 100.0%       VKADATTPENGYNGTWTVSVDIPDTLHEVGKKVVVWQDVYVAPQTADMTKFKDGLNKLSAGETSKVAKLVVSHHETSEQQ
2 WP_013188882.1  62.4%  35.2%       VEGG--YVPGGHSGTWSVDMTVPTELTQAHKTVVVWEDLYKLPQNVD--TFTTELSKLPTGRT--GAGLIASHHEDNLGA
  consensus/100%                     Vcus..hs.sGasGTWoVshslPspLppstKpVVVWpDlYhhPQssD..pFpstLsKLssGcT..sAtLlsSHHEss.tt
  consensus/90%                      Vcus..hs.sGasGTWoVshslPspLppstKpVVVWpDlYhhPQssD..pFpstLsKLssGcT..sAtLlsSHHEss.tt
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2 WP_013188882.1  62.4%  35.2%       GAGTQWLEVSTHFGGFQVNKVVKPAPDLPADVISKIPTTWNFTYVAKLPDGKKAKEGTALEGNFNLTVDPKDPSKAVSQK
  consensus/100%                     GsGhQWhcVSopaGuFQVpKsVcsussLstsV.pplPpTapFpY.AKLPsGthhK.GTt.cGpFsLTVDspsPuhAhS.h
  consensus/90%                      GsGhQWhcVSopaGuFQVpKsVcsussLstsV.pplPpTapFpY.AKLPsGthhK.GTt.cGpFsLTVDspsPuhAhS.h
  consensus/80%                      GsGhQWhcVSopaGuFQVpKsVcsussLstsV.pplPpTapFpY.AKLPsGthhK.GTt.cGpFsLTVDspsPuhAhS.h
  consensus/70%                      GsGhQWhcVSopaGuFQVpKsVcsussLstsV.pplPpTapFpY.AKLPsGthhK.GTt.cGpFsLTVDspsPuhAhS.h

                  cov    pid 7441    :         .         .         .         .         5         .         . 7520
1 WP_004013458.1 100.0% 100.0%       FEGFPVGTEVAITETGVEGTMPTGATMSTTWATADGKAKTKAWSSDRKSDKVTVKIQPRGLLQVKATNHFESTYPKLATL
2 WP_013188882.1  62.4%  35.2%       FDGFPMGTEITITETDAKAQIPTQAKLKVSWKS-------EGWTDAAEGPTKTFTITPAATVSVTALNEFSLVKPTLATV
  consensus/100%                     F-GFPhGTElsITETsscuphPTtAphpsoWto.......cuWosstcusphThpIpPtuhlpVpAhNcFp.shPpLATl
  consensus/90%                      F-GFPhGTElsITETsscuphPTtAphpsoWto.......cuWosstcusphThpIpPtuhlpVpAhNcFp.shPpLATl
  consensus/80%                      F-GFPhGTElsITETsscuphPTtAphpsoWto.......cuWosstcusphThpIpPtuhlpVpAhNcFp.shPpLATl
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1 WP_004013458.1 100.0% 100.0%       ATTVDGAKMLKPSEATPVLDTVTYSGLVADREYWLLTQLVYTD------DSTPVLGADGQPLARWTKVSAGKDGQGTWVV
2 WP_013188882.1  62.4%  35.2%       ARTADDGKMLKPSEDTAVVDTVTYTNLVQGRDYWLKTELVYVDGTPDPNDNQPVLGADGNPLVKWTKVTAEGD-NSEWVV
  consensus/100%                     ApTsDsuKMLKPSEsTsVlDTVTYosLVtsR-YWLhTpLVYsD......DspPVLGADGpPLs+WTKVoAttD.pupWVV
  consensus/90%                      ApTsDsuKMLKPSEsTsVlDTVTYosLVtsR-YWLhTpLVYsD......DspPVLGADGpPLs+WTKVoAttD.pupWVV
  consensus/80%                      ApTsDsuKMLKPSEsTsVlDTVTYosLVtsR-YWLhTpLVYsD......DspPVLGADGpPLs+WTKVoAttD.pupWVV
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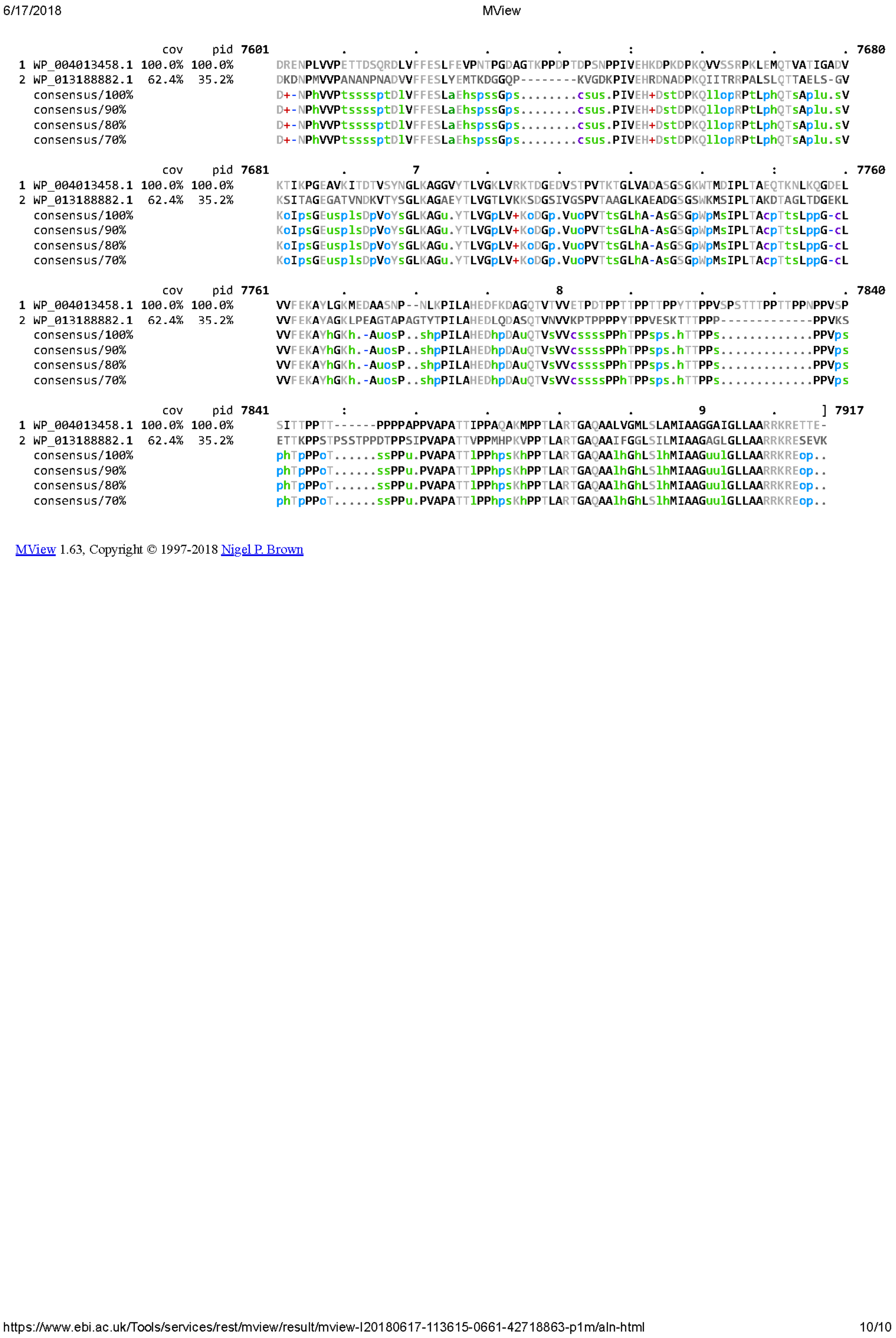

6/17/2018 MView

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 2 WP_013188882.1  62.4%  35.2%     DKDNPMVVPANANPNADVVFFESLYEMTKDGGQP--------KVGDKPIVEHRDNADPKQIITRRPALSLQTTAELS-GV
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   consensus/90%                    D+-NPhVVPtssssptDlVFFESLaEhspssGps........csus.PIVEH+DstDPKQllopRPtLphQTsAplu.sV
   consensus/80%                    D+-NPhVVPtssssptDlVFFESLaEhspssGps........csus.PIVEH+DstDPKQllopRPtLphQTsAplu.sV
   consensus/70%                    D+-NPhVVPtssssptDlVFFESLaEhspssGps........csus.PIVEH+DstDPKQllopRPtLphQTsAplu.sV

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 1 WP_004013458.1 100.0% 100.0%     KTIKPGEAVKITDTVSYNGLKAGGVYTLVGKLVRKTDGEDVSTPVTKTGLVADASGSGKWTMDIPLTAEQTKNLKQGDEL
 2 WP_013188882.1  62.4%  35.2%     KSITAGEGATVNDKVTYSGLKAGAEYTLVGTLVKKSDGSIVGSPVTAAGLKAEADGSGSWKMSIPLTAKDTAGLTDGEKL
   consensus/100%                   KoIpsGEusplsDpVoYsGLKAGu.YTLVGpLV+KoDGp.VuoPVTtsGLhA-AsGSGpWpMsIPLTAcpTtsLppG-cL
   consensus/90%                    KoIpsGEusplsDpVoYsGLKAGu.YTLVGpLV+KoDGp.VuoPVTtsGLhA-AsGSGpWpMsIPLTAcpTtsLppG-cL
   consensus/80%                    KoIpsGEusplsDpVoYsGLKAGu.YTLVGpLV+KoDGp.VuoPVTtsGLhA-AsGSGpWpMsIPLTAcpTtsLppG-cL
   consensus/70%                    KoIpsGEusplsDpVoYsGLKAGu.YTLVGpLV+KoDGp.VuoPVTtsGLhA-AsGSGpWpMsIPLTAcpTtsLppG-cL

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 1 WP_004013458.1 100.0% 100.0%     VVFEKAYLGKMEDAASNP--NLKPILAHEDFKDAGQTVTVVETPDTPPTTPPTTPPYTTPPVSPSTTTPPTTPPNPPVSP
 2 WP_013188882.1  62.4%  35.2%     VVFEKAYAGKLPEAGTAPAGTYTPILAHEDLQDASQTVNVVKPTPPPPYTPPVESKTTTPPP-------------PPVKS
   consensus/100%                   VVFEKAYhGKh.-AuosP..shpPILAHEDhpDAuQTVsVVcssssPPhTPPsps.hTTPPs.............PPVps
   consensus/90%                    VVFEKAYhGKh.-AuosP..shpPILAHEDhpDAuQTVsVVcssssPPhTPPsps.hTTPPs.............PPVps
   consensus/80%                    VVFEKAYhGKh.-AuosP..shpPILAHEDhpDAuQTVsVVcssssPPhTPPsps.hTTPPs.............PPVps
   consensus/70%                    VVFEKAYhGKh.-AuosP..shpPILAHEDhpDAuQTVsVVcssssPPhTPPsps.hTTPPs.............PPVps

                    cov    pid 7841          :         .         .         .         .         9         .      ] 7917
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 2 WP_013188882.1  62.4%  35.2%     ETTKPPSTPSSTPPDTPPSIPVAPATTVPPMHPKVPPTLARTGAQAAIFGGLSILMIAAGAGLGLLAARRKRESEVK
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   consensus/90%                    phTpPPoT......ssPPu.PVAPATTlPPhpsKhPPTLARTGAQAAlhGhLSlhMIAAGuulGLLAARRKREop..
   consensus/80%                    phTpPPoT......ssPPu.PVAPATTlPPhpsKhPPTLARTGAQAAlhGhLSlhMIAAGuulGLLAARRKREop..
   consensus/70%                    phTpPPoT......ssPPu.PVAPATTlPPhpsKhPPTLARTGAQAAlhGhLSlhMIAAGuulGLLAARRKREop..
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https://www.ebi.ac.uk/Tools/services/rest/mview/result/mview-I20180617-113615-0661-42718863-p1m/aln-html 10/10

Figure S1 Pairwise sequence alignment between *M. mulieris* and *M. curtisii* mega-adhesin. Sequences were aligned using Clustal Omega and visualised using MView.

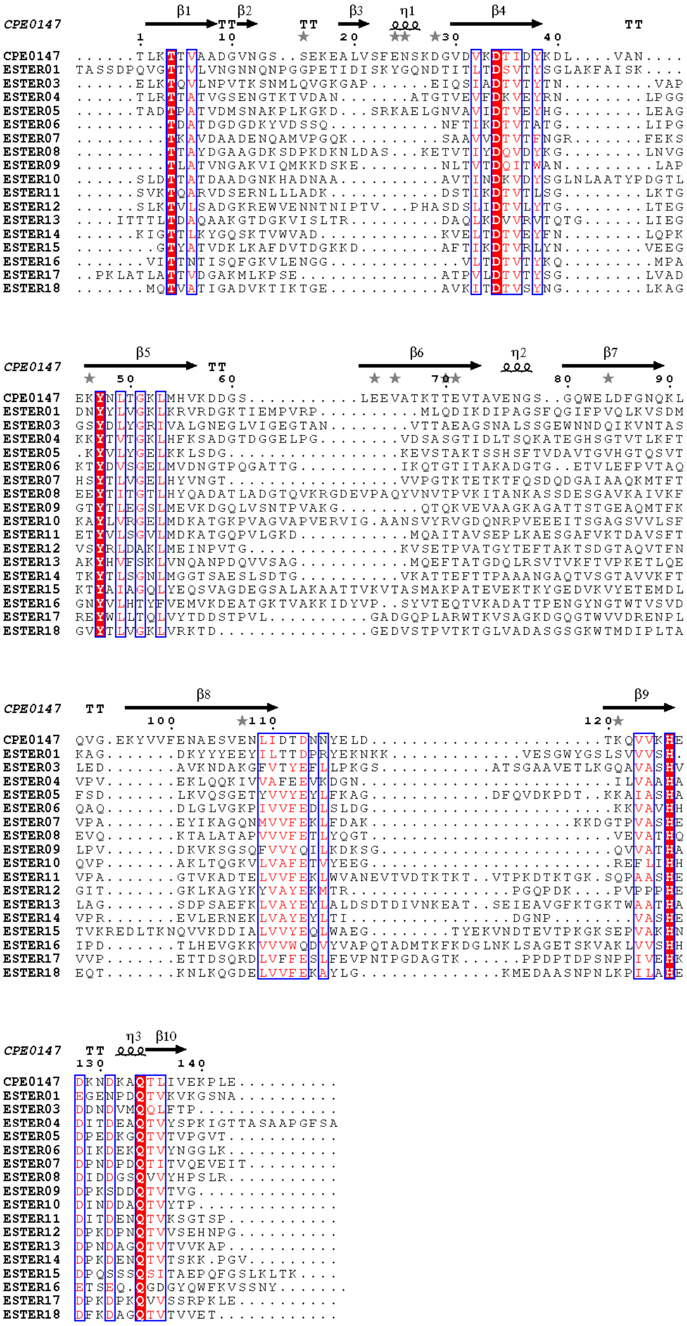

Figure S2 Multiple sequence alignment between ester bond domains within *M. mulieris* mega-adhesin. Sequences were aligned using Clustal Omega and visualised using MView.

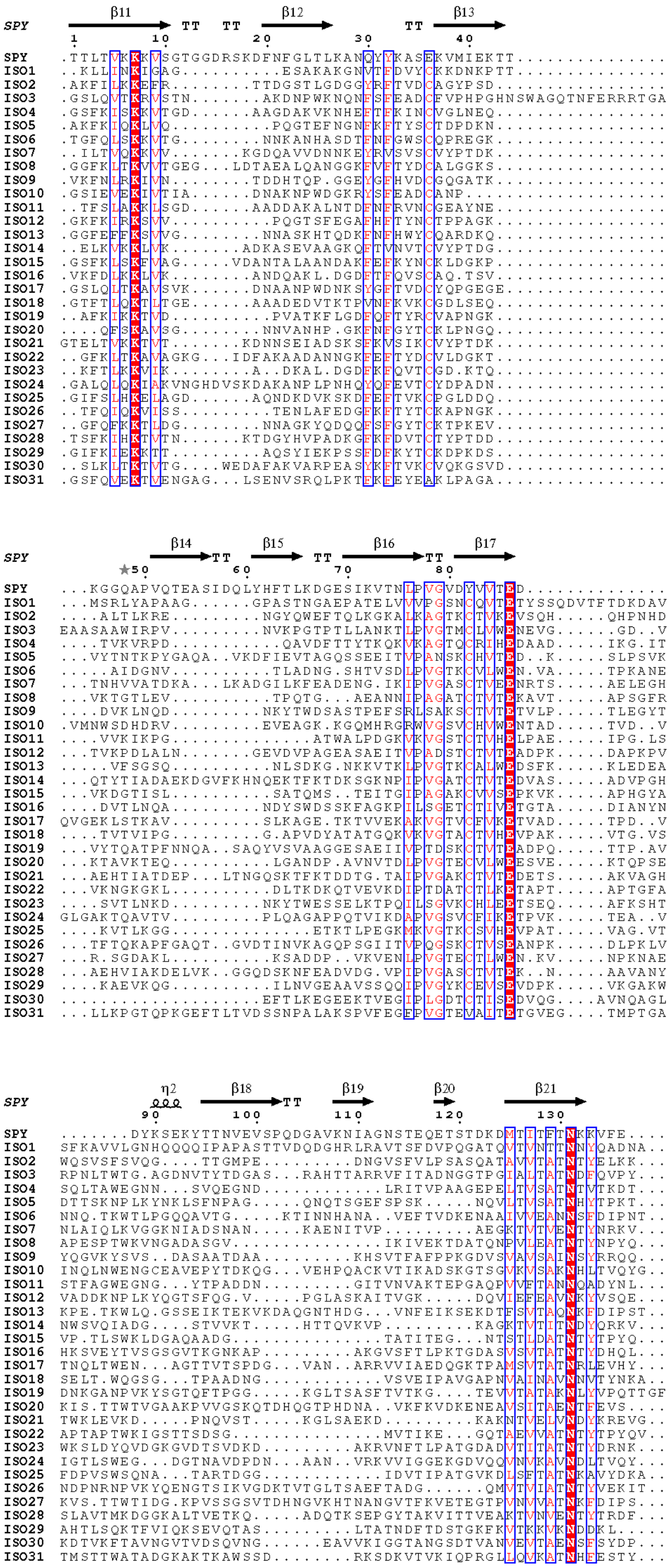

Figure S3 Multiple sequence alignment between isopeptide domains within *M. mulieris* mega-adhesin. Sequences were aligned using Clustal Omega and visualised using MView.

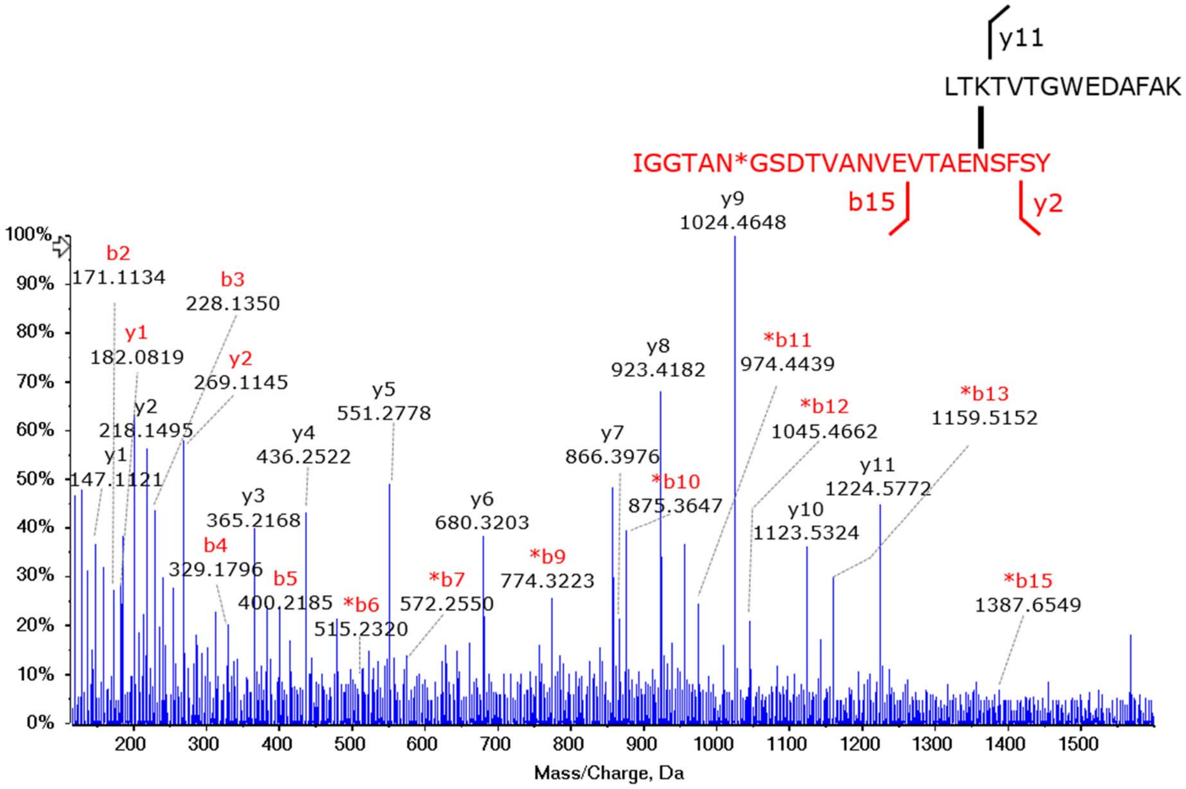

Figure S4 LC-MS/MS analysis of isopeptide bond formation in *M. mulieris* protein construct *46E-47I*. The 4+ ion (m/z 988.97) representing an isopeptide cross-linked peptide from the tryptic digest was collisionally dissociated during LC-MS/MS. Fragment ions labelled in red are derived from the peptide IGGTANGSDTVANVEVTAENSFSY, while those in black are from the peptide LTKTVTGWEDAFAK, with the largest of the respective *b* and *y* series ions shown on the schematic of the cross-linked peptide sequences. The asterisk in the red sequence, and in the red *b* ion series peak labels, indicates the presence of a deamidated asparagine residue at position 6.

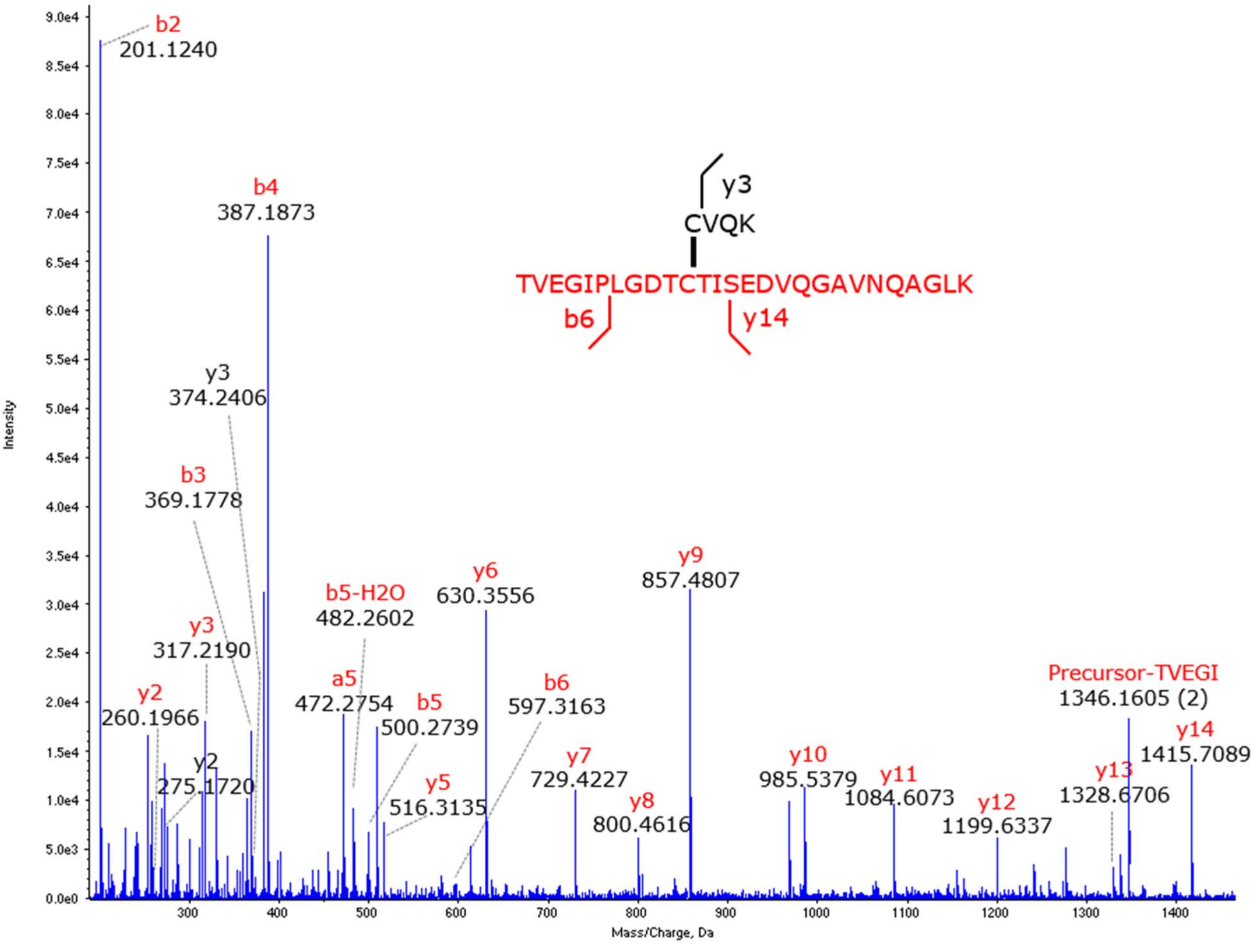

Figure S5 LC-MS/MS analysis of disulfide bond formation in *M. mulieris* protein construct *46E-47I*. The 3+ ion (m/z 1063.87) representing a disulphide cross-linked peptide from the tryptic digest was collisionally dissociated during LC-MS/MS. Fragment ions labelled in red are derived from the peptide TVEGIPLGDTCTISEDVQGAVNQAGLK, while those in black are from the peptide CVQK, with the largest of the respective *b* and *y* series ions shown on the schematic of the cross-linked peptide sequences. Doubly-charged fragment ions indicated in parentheses.

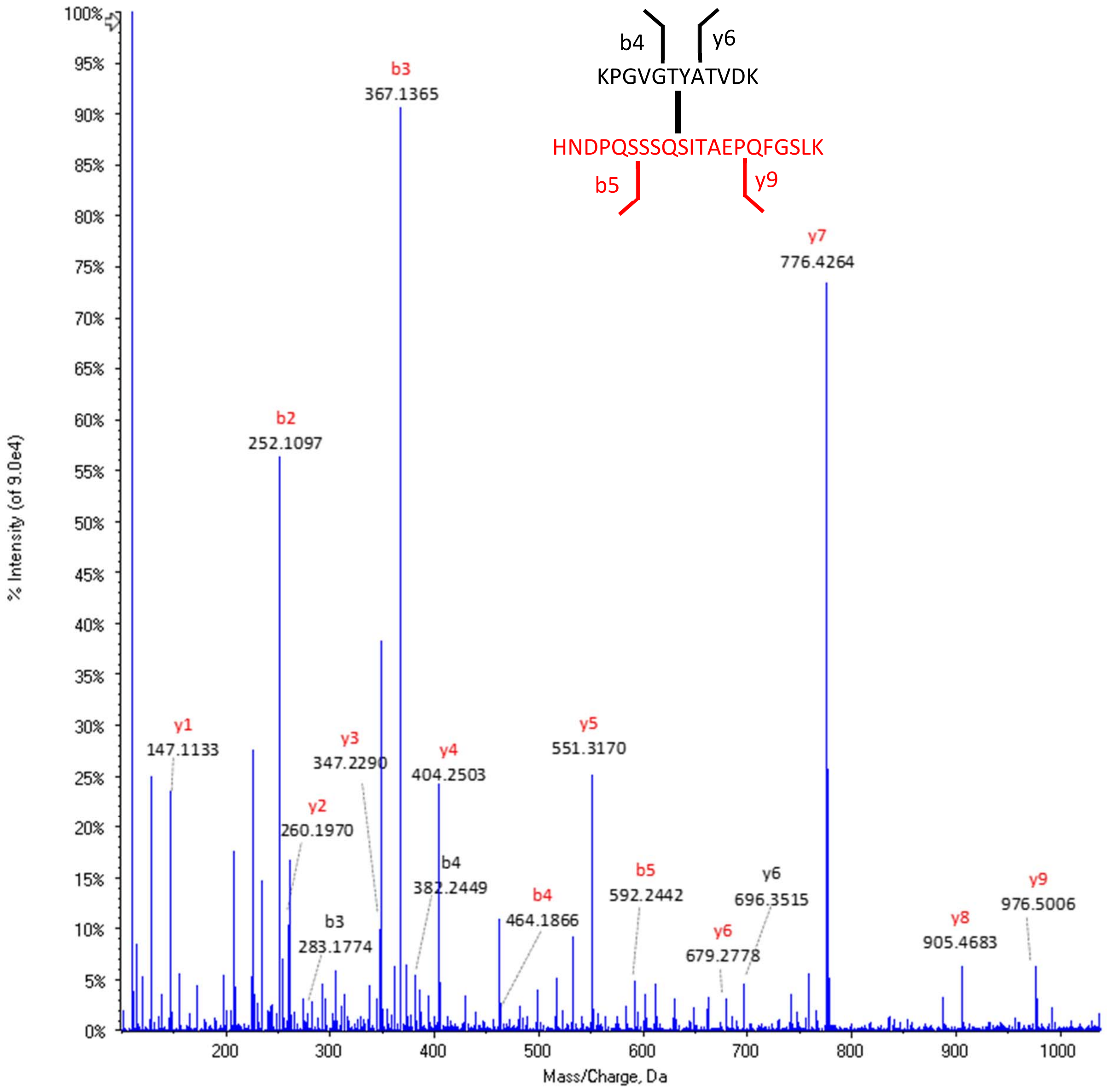

Figure S6 LC-MS/MS analysis of ester bond formation in *M. mulieris* protein construct *46E-47I*. The 3+ ion (m/z 1159.24) representing an ester cross-linked peptide from the tryptic digest was collisionally dissociated during LC-MS/MS. Fragment ions labelled in red are derived from the peptide HNDPQSSSQSITAEPQFGSLK, while those in black are derived from the peptide KPGVGTYATVDK, with the largest of the respective *b* and *y* series ions shown on the schematic of the cross-linked peptide.

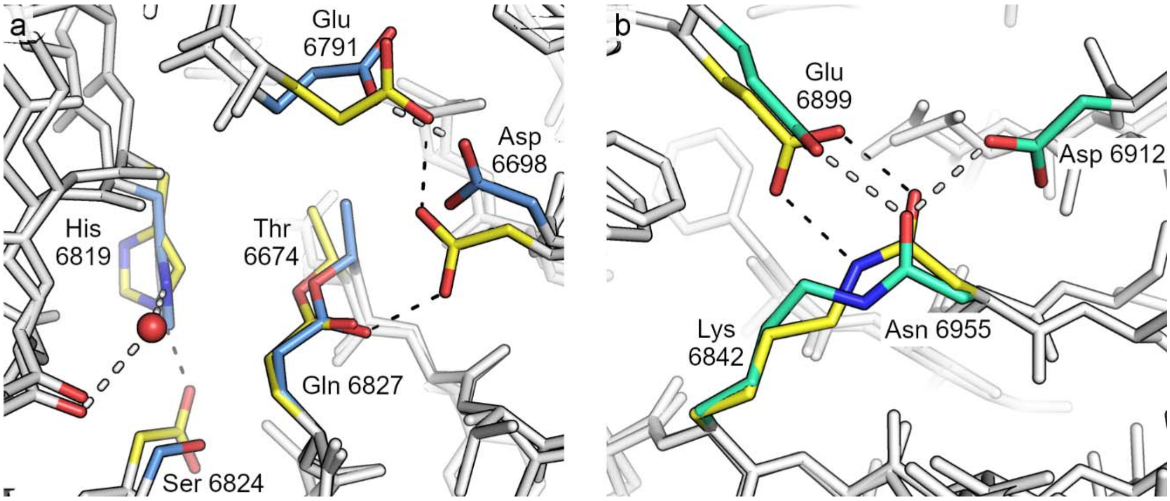

Figure S7 Comparison of *M. mulieris* domains *46E-47I* crosslinks and exemplar crystal structures. **a)** Overlay of ester bond crosslinks in domain *46E* (*M. mulieris*) and domain 1 of the Cpe0147 adhesin (PDB 4NI6). **b)** Overlay of isopeptide bond crosslinks in domain *47I* (*M. mulieris*) and domain 2 of the Spy0128 pilin protein (PDB 3B2M). Hydrogen bonds are shown as dashed lines; sequences are numbered for the *46E-47I M. mulieris* protein. An integral water molecule is highlighted as a red sphere.

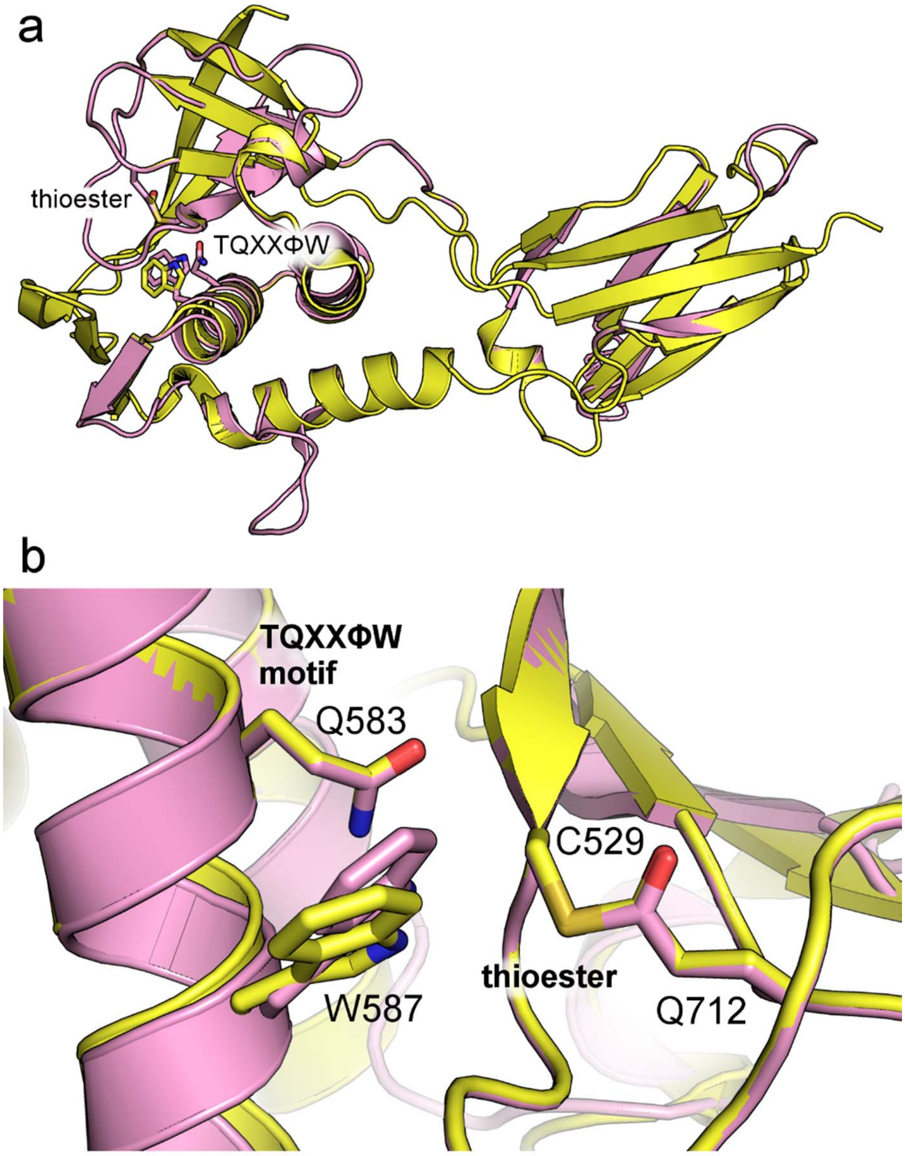

Figure S8 Structure prediction of the N-terminal thioester (TED) domain of *M. mulieris* adhesin. **a)** The predicted *M. mulieris* model (pink) overlaid with the X-ray crystal structure of the class II TED from vancomycin-resistant *Staphylococcus aureus*, SaTIE (yellow; PDB ID 6FX6). **b)** Zoomed view highlighting the predicted intramolecular thioester bond and the conserved TQXXϕW motif. The structure was predicted using the AlphaFold2 server.

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Reference sequence (1): WP_004013458.1
Identities normalised by aligned length.
Colored by: identity



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  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

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2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
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  consensus/70%                     ................................................................................

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  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

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  consensus/90%                     ................................................................................
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  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

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  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 561            .         .         .         6         .         .         .         . 640
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  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

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  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

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2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 801            .         .         .         .         :         .         .         . 880
1 WP_004013458.1 100.0% 100.0%      LTDSVTYSGLAKFAISKDNYYLVGKLKRVRDGKTIEMPVRPMLQDIKDIPAGSFQGIFPVQLKVSDMKAGDKYYYEEYIL
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 881            .         9         .         .         .         .         :         . 960
1 WP_004013458.1 100.0% 100.0%      TTDPRYEKNKKVESGWYGPLSVVVSHEGENPDQTVKVKGSNAKLLINKIGAGESAKAKGNVTFDVYCKKDNKPTTMSRLY
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 961            .         .         .         0         .         .         .         . 1040
1 WP_004013458.1 100.0% 100.0%      APAAGGPASTNGAEPATELVVVPGSNCQVTETYSSQDVTFTDKDAVSFKAVVLGNHQQQQIPAPASTTVDQDGHRLRAVT
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 1041           :         .         .         .         .         1         .         . 1120
1 WP_004013458.1 100.0% 100.0%      SFDVPQGATQVTVNTTNNYQADNAAKFILKKEFRTTDGSTLGDGGYRFTVDCAGYPSDALTLKRENGYQWEFTQLKGKAL
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 1121           .         .         :         .         .         .         .         2 1200
1 WP_004013458.1 100.0% 100.0%      KAGTKCTVKEVSQHQHPNHDWQSVSFSVQGTTGMPEDNGVSFVLPSASQATAVVTATNTYELKKGSLQVTKRVSTNAKDN
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                   cov    pid 1201           .         .         .         .         :         .         .         . 1280
1 WP_004013458.1 100.0% 100.0%      PWKNQNFSFEADCFVPHPGHNSWAGQTNFERRRTGAEAASAAWIRPVNVKPGTPTLLANKTLPVGTMCLVWENEVGGDVR
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................
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                    cov    pid 1281          .         3         .         .         .         .         :         . 1360
1 WP_004013458.1 100.0% 100.0%      PNLTWTGAGDNVTYTDGASRAHTTARRVFITADNGGTPGIALTATNDFQVPYGSFKISKKVTGDAAGDAKVKNHEFTFKI
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1361          .         .         .         4         .         .         .         . 1440
1 WP_004013458.1 100.0% 100.0%      NCVGLNEQTVKVRPDQAVDFTTYTKQKVKAGTQCRIHEDAADIKGITSQLTAWEGNNSVQEGNDLKITVPAAGEPELTVS
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1441          :         .         .         .         .         5         .         . 1520
1 WP_004013458.1 100.0% 100.0%      ATNTVTKDTAKFKIQKLVQPQGTEFNGNFKFTYSCTDPDKNVYTNTKPYGAQAVKDFIEVTAGQSSEEITVPANSKCHVT
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1521          .         .         :         .         .         .         .         6 1600
1 WP_004013458.1 100.0% 100.0%      EDKSLPSVKDTTSKNPLKYNKLSFNPAGQNQTSGEFSPSKNQVLTVSATNHYTPKTTGFQLSKKVTGNNKANHASDTFNF
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1601          .         .         .         .         :         .         .         . 1680
1 WP_004013458.1 100.0% 100.0%      GWSCQPREGKAIDGNVTLADNGSHTVSDLPVGTKCVLWENVATPKANENNQTKWTLPGQQAVTGKTINNHANAVEFTVDK
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1681          .         7         .         .         .         .         :         . 1760
1 WP_004013458.1 100.0% 100.0%      ENAAIVVEANNSFDIPNTSLTVQKKVVKGDQAVVDNNKEYRVSVSCVYPTDKTNHVVATDKALKADGILKFEADENGIKI
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1761          .         .         .         8         .         .         .         . 1840
1 WP_004013458.1 100.0% 100.0%      PVGASCTVEENRTSAELEGHNLAIQLKVGGKNIADSNANKAENITVPAEGKTVTVENTYNRKLGGFKLTKVVTGEGLDTA
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1841          :         .         .         .         .         9         .         . 1920
1 WP_004013458.1 100.0% 100.0%      EALQANGGKFVFTYDCALGGKSVKTGTLEVTPQTGAEANNIPAGATCTLTEKAVTAPSGFRAPERPTWKVNGADASGVIK
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 1921          .         .         :         .         .         .         .         0 2000
1 WP_004013458.1 100.0% 100.0%      IVEKTDATQNPVLEATNTYTPYQVKFNLRKIVNTDDHTQPGGEYGFHVDCGQGATKDVKLNQDNKYTWDSASTPEFSRLS
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2001          .         .         .         .         :         .         .         . 2080
1 WP_004013458.1 100.0% 100.0%      AKSCTVTETVLPTLEGYTYQGVKYSVSDASAATDAAKRSVTFAFPPKGDVSVAVSATNSYRRQQGSIEVEKIVTIADNAK
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2081          .         1         .         .         .         .         :         . 2160
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1 WP_004013458.1 100.0% 100.0%      NPWDGKRYSFEADCANPVMNWSDHDRVEVEAGKKGQMHRGRWVGSVCHVWENTADTVDVINQLNWENGCEAVEPYTDKQG
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2161          .         .         .         2         .         .         .         . 2240
1 WP_004013458.1 100.0% 100.0%      VEHPQACKVTIKADSKGTSGVKVSAKNHLTVQYGTFSLAKKLSGDAADDAKALNTDFNFRVNCGEAYNEVVKIKPGATWA
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2241          :         .         .         .         .         3         .         . 2320
1 WP_004013458.1 100.0% 100.0%      LPDGKVKVGSTCTVHELPAEIPGLSSTFAGWEGNGYTPADDNGITVNVAKTEPGAQPVVFTANNQADYNLGKFKIRKSVV
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2321          .         .         :         .         .         .         .         4 2400
1 WP_004013458.1 100.0% 100.0%      PQGTSFEGTFHFTYNCTPPAGKTVKPDLALNGEVDVPAGEASAEITVPADSTCTVTEADPKDAPKPVVADDKNPLKYQGT
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2401          .         .         .         .         :         .         .         . 2480
1 WP_004013458.1 100.0% 100.0%      SFQGVPGLASKAITVGKDQVIEFEAVNKYVSQEGGFEFFKSVVGNNASKHTQDKFNFHWYCQARDKQVFSGSQNLSDKGN
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2481          .         5         .         .         .         .         :         . 2560
1 WP_004013458.1 100.0% 100.0%      KKVTKLPVGTKCALWEDSFKKLEDEAKPETKWLQGSSEIKTEKVKDAQGNTHDGVNFEIKSEKDTFSVTAQNKFDIPSTE
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2561          .         .         .         6         .         .         .         . 2640
1 WP_004013458.1 100.0% 100.0%      LKVKKLVKADKASKVAAGKQFTVNVTCVYPTDGQTYTIADAEKDGVFKHNQEKTFKTDKSGKNPIPVGAICTVTEDVASA
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 2641          :         .         .         .         .         7         .         . 2720
1 WP_004013458.1 100.0% 100.0%      DVPGHNWSVQIADGSTVVKTHTTRVKVPKAGKTVTITNDYERKVGSFKLSKFVAGVDVNTALAANDAKFEFKYNCKLDGK
2 WP_101929469.1  37.0%  15.7%      ----------------------------------MINSQTAKLLRRW----IVAGLAAALAL---------AWTITTLVA
  consensus/100%                    ..................................hIsspht+hltpa....hVAGlssshAL.........tashph.st
  consensus/90%                     ..................................hIsspht+hltpa....hVAGlssshAL.........tashph.st
  consensus/80%                     ..................................hIsspht+hltpa....hVAGlssshAL.........tashph.st
  consensus/70%                     ..................................hIsspht+hltpa....hVAGlssshAL.........tashph.st

                    cov    pid 2721          .         .         :         .         .         .         .         8 2800
1 WP_004013458.1 100.0% 100.0%      PVKDGTISLSATQMSTEITGIPAGAKCVVSEP----KVKAPHGYAVPTLSWKLDGAQAADGTA-TITEGNTSTLDATNTY
2 WP_101929469.1  37.0%  15.7%      PSQA---STDENVTVDAVSGTPTSLNLKYPDSDNAGRFPYPGAY-TAVESWRNNNPQVYQEWQQRINDSYGGSADTPVEY
  consensus/100%                    Psps...Shsts.hsstloGhPsuhphhhs-s....+h.hPtuY.sss.SW+.sssQshptht.pIs-u.suohDssspY
  consensus/90%                     Psps...Shsts.hsstloGhPsuhphhhs-s....+h.hPtuY.sss.SW+.sssQshptht.pIs-u.suohDssspY
  consensus/80%                     Psps...Shsts.hsstloGhPsuhphhhs-s....+h.hPtuY.sss.SW+.sssQshptht.pIs-u.suohDssspY
  consensus/70%                     Psps...Shsts.hsstloGhPsuhphhhs-s....+h.hPtuY.sss.SW+.sssQshptht.pIs-u.suohDssspY

                    cov    pid 2801          .         .         .         .         :         .         .         . 2880
1 WP_004013458.1 100.0% 100.0%      TPYQVKFDLKKLVKANDQAKLDGDFTFQVSCAQTSVDVTLNQANDYSWDSSKF--------AGKPILSGETCTIVETGTA
2 WP_101929469.1  37.0%  15.7%      RYMTV---------EEPFRDVQG-------------------QWRYKWVDPLGYFLPNAGPGKNQVITESACIDPNVGQD
  consensus/100%                    p.hpV.........tps.tclpG...................t.cYpWssshh........utp.llotpsCh.spsGps
  consensus/90%                     p.hpV.........tps.tclpG...................t.cYpWssshh........utp.llotpsCh.spsGps
  consensus/80%                     p.hpV.........tps.tclpG...................t.cYpWssshh........utp.llotpsCh.spsGps
  consensus/70%                     p.hpV.........tps.tclpG...................t.cYpWssshh........utp.llotpsCh.spsGps

                    cov    pid 2881          .         9         .         .         .         .         :         . 2960
1 WP_004013458.1 100.0% 100.0%      DIANYNHKSVEYTVSGSGVTKGNKAPAKGVSFTLPKTGDAS---VSVTATNTYDHQLGSLQLTKAVSVKDNAANPWDNKS
2 WP_101929469.1  37.0%  15.7%      PIYTTYVKNLSKNAVQ---TRITLDPQKAIEYQKKAGKNYSPEQQGMFKALAYVNTGGDPRLNDFVNYDDATL-KQKIAE
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  consensus/100%                    sIhsh.hKslphssst...T+hshsPtKulpaph.tstshS....uhhts.sYspphGs.pLschVshcDssh...c.tp
  consensus/90%                     sIhsh.hKslphssst...T+hshsPtKulpaph.tstshS....uhhts.sYspphGs.pLschVshcDssh...c.tp
  consensus/80%                     sIhsh.hKslphssst...T+hshsPtKulpaph.tstshS....uhhts.sYspphGs.pLschVshcDssh...c.tp
  consensus/70%                     sIhsh.hKslphssst...T+hshsPtKulpaph.tstshS....uhhts.sYspphGs.pLschVshcDssh...c.tp

                    cov    pid 2961          .         .         .         0         .         .         .         . 3040
1 WP_004013458.1 100.0% 100.0%      YGFTVDCYQPGEGEQVG-EKLSTKAVSLKAGETKTVVEKAKVGTVCFVKETVADTPDVTNQLTWENAGTTVTSPDGVANA
2 WP_101929469.1  37.0%  15.7%      YPAIGDFYNANMALIEAQRDAVAKIKSLKPNQ---------------------KYQVLQGLAWAINR-----------
  consensus/100%                    YshhsDhYpss.u...u.cchssKhhSLKssp.....................p.pVhptLsWt.st...........
  consensus/90%                     YshhsDhYpss.u...u.cchssKhhSLKssp.....................p.pVhptLsWt.st...........
  consensus/80%                     YshhsDhYpss.u...u.cchssKhhSLKssp.....................p.pVhptLsWt.st...........
  consensus/70%                     YshhsDhYpss.u...u.cchssKhhSLKssp.....................p.pVhptLsWt.st...........

                    cov    pid 3041          :         .         .         .         .         1         .         . 3120
1 WP_004013458.1 100.0% 100.0%      RRVVIAEDQGKTPAMSVTATNRLEVHYGTFTLQKTLTGEAAADEDVTKTPVNFKVKCGDLSEQTVTVIPGGAPVDYATAT
2 WP_101929469.1  37.0%  15.7%      ------------------------------------------------------------------------------GN
  consensus/100%                    ..............................................................................us
  consensus/90%                     ..............................................................................us
  consensus/80%                     ..............................................................................us
  consensus/70%                     ..............................................................................us

                    cov    pid 3121          .         .         :         .         .         .         .         2 3200
1 WP_004013458.1 100.0% 100.0%      GQKVKVGTACTVHEVPAKV-TGVSSELTWQGSGTPAADNGVSVEIPAVGAPNVAIKAVNNVTYNKAAFKIKKTVDPVATK
2 WP_101929469.1  37.0%  15.7%      TDWLAIGDNCTYIDQYKTANCQVNKELTQLA-------HDVYADLKVMASSEL--KMYEAYAKYKEQFKNKR--DEYE-K
  consensus/100%                    sphltlGssCThh-..tps.stVspELT..u.......psV.s-l.shuuspl..Khhpshsh.KttFK.K+..D.ht.K
  consensus/90%                     sphltlGssCThh-..tps.stVspELT..u.......psV.s-l.shuuspl..Khhpshsh.KttFK.K+..D.ht.K
  consensus/80%                     sphltlGssCThh-..tps.stVspELT..u.......psV.s-l.shuuspl..Khhpshsh.KttFK.K+..D.ht.K
  consensus/70%                     sphltlGssCThh-..tps.stVspELT..u.......psV.s-l.shuuspl..Khhpshsh.KttFK.K+..D.ht.K

                    cov    pid 3201          .         .         .         .         :         .         .         . 3280
1 WP_004013458.1 100.0% 100.0%      FLGDFQ-FTYRCVAPNGKVYTQATPFNNQASAQYVSVAA-G----------EESAEII-----------------VPTDS
2 WP_101929469.1  37.0%  15.7%      ALKKWQEETQRQVEANEKLYQTNKELLSSI-KIYVDKTDDGKKLAIKLHGSSEALALLQQSKTNIDVNLTVNGKTVPVNG
  consensus/100%                    hLtcaQ..T.RpVtsNtKlYppsp.h.sph.t.YVshss.G..........pEuhtll.................VPssu
  consensus/90%                     hLtcaQ..T.RpVtsNtKlYppsp.h.sph.t.YVshss.G..........pEuhtll.................VPssu
  consensus/80%                     hLtcaQ..T.RpVtsNtKlYppsp.h.sph.t.YVshss.G..........pEuhtll.................VPssu
  consensus/70%                     hLtcaQ..T.RpVtsNtKlYppsp.h.sph.t.YVshss.G..........pEuhtll.................VPssu

                    cov    pid 3281          .         3         .         .         .         .         :         . 3360
1 WP_004013458.1 100.0% 100.0%      KCTVTEADPQTTPAVDNKGANPVKYSGTQFTPGGKGLTSASFTVT---KGTEVVTATAKNLYVPQTTGFQFSKAVSGNNV
2 WP_101929469.1  37.0%  15.7%      VSVAAAASPEGIPV-------PVDSTGLGCDQKLAGTVTASFSGEIEISGTYIFD--GRNKLQRQVVLQKYKVAVSGN--
  consensus/100%                    hsssstAsPpshPs.......PVc.oGhths.thtGhsoASFosp...pGT.lhs..u+Nhh..Qssh.paphAVSGN..
  consensus/90%                     hsssstAsPpshPs.......PVc.oGhths.thtGhsoASFosp...pGT.lhs..u+Nhh..Qssh.paphAVSGN..
  consensus/80%                     hsssstAsPpshPs.......PVc.oGhths.thtGhsoASFosp...pGT.lhs..u+Nhh..Qssh.paphAVSGN..
  consensus/70%                     hsssstAsPpshPs.......PVc.oGhths.thtGhsoASFosp...pGT.lhs..u+Nhh..Qssh.paphAVSGN..

                    cov    pid 3361          .         .         .         4         .         .         .         . 3440
1 WP_004013458.1 100.0% 100.0%      ANHPGKFNFGYTCKLPNGQKTAVKTEQLGANDPAV-----------------NVTDLPVGTECVLWEESVEKTQPSEKI
2 WP_101929469.1  37.0%  15.7%      --TSHDFSFAGTCPVAPERKIGTTLE--GSDGAKVIDTAGKKRTEKVTLVDKVKFENLKGGQNYVIKGELVDGNGN----
  consensus/100%                    ..pstcFsFuhTC.lsstpKhusphE..GussstV.................phpsL.sGpphVlhtE.V-tsts....
  consensus/90%                     ..pstcFsFuhTC.lsstpKhusphE..GussstV.................phpsL.sGpphVlhtE.V-tsts....
  consensus/80%                     ..pstcFsFuhTC.lsstpKhusphE..GussstV.................phpsL.sGpphVlhtE.V-tsts....
  consensus/70%                     ..pstcFsFuhTC.lsstpKhusphE..GussstV.................phpsL.sGpphVlhtE.V-tsts....

                    cov    pid 3441          :         .         .         .         .         5         .         . 3520
1 WP_004013458.1 100.0% 100.0%      STTWTVGAAKPVVGSKQADHQGTPHDNAVKFKVDKENEAVSITAENTFEVSGTELTVKKTVTKDNNSEIADSKSFKVSIK
2 WP_101929469.1  37.0%  15.7%      --------GVGVTGTSET---FDPKA---SGATDNGNGYYSGTINMTFQVPVQ-------TIRDNQ--------KLVAFE
  consensus/100%                    ........uhsVsGopps...hsP+s...phtsDptNthhShThp.TFpVssp.......sh+DNp........hhVuhc
  consensus/90%                     ........uhsVsGopps...hsP+s...phtsDptNthhShThp.TFpVssp.......sh+DNp........hhVuhc
  consensus/80%                     ........uhsVsGopps...hsP+s...phtsDptNthhShThp.TFpVssp.......sh+DNp........hhVuhc
  consensus/70%                     ........uhsVsGopps...hsP+s...phtsDptNthhShThp.TFpVssp.......sh+DNp........hhVuhc

                    cov    pid 3521          .         .         :         .         .         .         .         6 3600
1 WP_004013458.1 100.0% 100.0%      CVYPTDKAEHTIATNEPLT-------------NGQS---KTFKTDDTGTAIPVGAKCTVTEDETSAKVAGHTWKLEVKDP
2 WP_101929469.1  37.0%  15.7%      TLYQGDRPETGTKVTEHKDKNDENQTVTEKPRIGTSAEAQGESSDDGKVAVPEEGKDVLI-------KDTVTWNKLK--P
  consensus/100%                    slY.sD+sEpshtssE.hs.............GpS...ps.poDDstsAlP.tuKsslh.......hsshTWph.h..P
  consensus/90%                     slY.sD+sEpshtssE.hs.............GpS...ps.poDDstsAlP.tuKsslh.......hsshTWph.h..P
  consensus/80%                     slY.sD+sEpshtssE.hs.............GpS...ps.poDDstsAlP.tuKsslh.......hsshTWph.h..P
  consensus/70%                     slY.sD+sEpshtssE.hs.............GpS...ps.poDDstsAlP.tuKsslh.......hsshTWph.h..P

                    cov    pid 3601          .         .         .         .         :         .         .         . 3680
1 WP_004013458.1 100.0% 100.0%      NQVSTKGLSAEKDKAKNTVELVNDYKREVGGFKLTKAVAGKGIDFAKAADA----------------NNGKFEFTYDCVL
2 WP_101929469.1  37.0%  15.7%      GTY----------------TLSGQLMKKVGNQVVPVAGTKAAKNFTVNTGQLEGTQELTFTLPAKQIEAGASYVVYEKVF
  consensus/100%                    sph................pLssphh+cVGs.hlshAssttuhsFshssst................psGt..hsY-pVh
  consensus/90%                     sph................pLssphh+cVGs.hlshAssttuhsFshssst................psGt..hsY-pVh
  consensus/80%                     sph................pLssphh+cVGs.hlshAssttuhsFshssst................psGt..hsY-pVh
  consensus/70%                     sph................pLssphh+cVGs.hlshAssttuhsFshssst................psGt..hsY-pVh

                    cov    pid 3681          .         7         .         .         .         .         :         . 3760
1 WP_004013458.1 100.0% 100.0%      DGKTVKNGKGKLDLTKDKQTVEVKDIPTDATCTLKETAPTAPTGFAAP--TAPTWKIGSTTSD-------SGMVTIKE--
2 WP_101929469.1  37.0%  15.7%      KGANNTAG--ILVAS--------HEDPNDKGQ----TVTVNPKQHKLPTIKTVAWVRDDGNSLISTVEADGKDFKVKDKI
  consensus/100%                    cGtsspsG..hLsho........+-.PsDtsp....TssssPptathP..psssWhhssssS........ut.hplK-..
  consensus/90%                     cGtsspsG..hLsho........+-.PsDtsp....TssssPptathP..psssWhhssssS........ut.hplK-..
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  consensus/80%                     cGtsspsG..hLsho........+-.PsDtsp....TssssPptathP..psssWhhssssS........ut.hplK-..
  consensus/70%                     cGtsspsG..hLsho........+-.PsDtsp....TssssPptathP..psssWhhssssS........ut.hplK-..

                    cov    pid 3761         .         .         .         8         .         .         .         . 3840
1 WP_004013458.1 100.0% 100.0%      --------------------------------------------------------------------------------
2 WP_101929469.1  37.0%  15.7%      IYNDLKPGTYTAFATLVNKDNPKEIIASGRQVFTNGAENGSTLVELAVAGSKVKADGKYVVFERIYQGEQTSEPSGEPYA
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 3841         :         .         .         .         .         9         .         . 3920
1 WP_004013458.1 100.0% 100.0%      -----GQTAEVVATNTYTPYQVKFTL-KKVIKADKTLDGDFKFQVTCGDKTQSVTLNKDNKYTWESSELKTPQILSGVKC
2 WP_101929469.1  37.0%  15.7%      KHQEIGDKSQTITVAPKNPVPAEFKIVKKTVGDNANTDRVFDFDVACDGYTGTVSVVVRKGQTQGETKVSNSALTSGMSC
  consensus/100%                    .....GppupslsssshsPh.scFpl.KKsltsstshDtsFcFpVsCsshTtoVolshcpt.T.tpoclpsstlhSGhpC
  consensus/90%                     .....GppupslsssshsPh.scFpl.KKsltsstshDtsFcFpVsCsshTtoVolshcpt.T.tpoclpsstlhSGhpC
  consensus/80%                     .....GppupslsssshsPh.scFpl.KKsltsstshDtsFcFpVsCsshTtoVolshcpt.T.tpoclpsstlhSGhpC
  consensus/70%                     .....GppupslsssshsPh.scFpl.KKsltsstshDtsFcFpVsCsshTtoVolshcpt.T.tpoclpsstlhSGhpC

                    cov    pid 3921         .         .         :         .         .         .         .         0 4000
1 WP_004013458.1 100.0% 100.0%      HLEETSEQAFKSHTWKSLDYQVDGKGVDTSVDKDAKRVTFTLPATGDADVTITATNTYDRNKGALQLQKVAKLNGQDVSK
2 WP_101929469.1  37.0%  15.7%      QV------------------------------------------------------------------------------
  consensus/100%                    pl..............................................................................
  consensus/90%                     pl..............................................................................
  consensus/80%                     pl..............................................................................
  consensus/70%                     pl..............................................................................

                    cov    pid 4001         .         .         .         .         :         .         .         . 4080
1 WP_004013458.1 100.0% 100.0%      DAKANPLPNHQYQFEVTCYDPADNGLGAKTQAVTVPLQAGAPPQTVIKDAPVGSVCFIKETPVKTEAVIGTLSWEGDGTN
2 WP_101929469.1  37.0%  15.7%      ----------------------------------------------------------SEQAVQDDQNTVKVQFSGTDTN
  consensus/100%                    ..........................................................pEpsVps-tshsplpapGssTN
  consensus/90%                     ..........................................................pEpsVps-tshsplpapGssTN
  consensus/80%                     ..........................................................pEpsVps-tshsplpapGssTN
  consensus/70%                     ..........................................................pEpsVps-tshsplpapGssTN

                    cov    pid 4081         .         1         .         .         .         .         :         . 4160
1 WP_004013458.1 100.0% 100.0%      AVGPDNAANVRKVVIGGEKGDVQQVNVKAVNDLTVQYGIFSLHKELTGDAQNDKDVKSKDFEFTVKCPGLDDQKV--TLK
2 WP_101929469.1  37.0%  15.7%      SDGTVAKFNLT-------ENNAKTVVVTATNTFTPKQAKFTVRKNVEAAGV-THFSVPNSFDFSYKCDGDAYWKAIPTLK
  consensus/100%                    usGsssthNlp.......csssppVsVpAsNshTsp.uhFol+Kplpusu..s+.shspsF-FohKCsG.s..Ks..TLK
  consensus/90%                     usGsssthNlp.......csssppVsVpAsNshTsp.uhFol+Kplpusu..s+.shspsF-FohKCsG.s..Ks..TLK
  consensus/80%                     usGsssthNlp.......csssppVsVpAsNshTsp.uhFol+Kplpusu..s+.shspsF-FohKCsG.s..Ks..TLK
  consensus/70%                     usGsssthNlp.......csssppVsVpAsNshTsp.uhFol+Kplpusu..s+.shspsF-FohKCsG.s..Ks..TLK

                    cov    pid 4161         .         .         .         2         .         .         .         . 4240
1 WP_004013458.1 100.0% 100.0%      GGETKTLPEGKMKVGTKCSVHEVPATVAGVTFDPVSWSQNATARTDGGIDVTIPATGVKDLSFTATNKAVYDKATFQIQK
2 WP_101929469.1  37.0%  15.7%      AGETS--AAIKVKPGVECQVKENSGTPENLD-RTLEWLGAQSQ--AGGT-ATFRTDANNTVALVATNTYTEKTGQLEISK
  consensus/100%                    uGETp..sthKhKsGscCpV+EssuTstsls.cslpW.tstot..sGGh.sTh.ssuspsluhsATNphs.cpuphpIpK
  consensus/90%                     uGETp..sthKhKsGscCpV+EssuTstsls.cslpW.tstot..sGGh.sTh.ssuspsluhsATNphs.cpuphpIpK
  consensus/80%                     uGETp..sthKhKsGscCpV+EssuTstsls.cslpW.tstot..sGGh.sTh.ssuspsluhsATNphs.cpuphpIpK
  consensus/70%                     uGETp..sthKhKsGscCpV+EssuTstsls.cslpW.tstot..sGGh.sTh.ssuspsluhsATNphs.cpuphpIpK

                    cov    pid 4241         :         .         .         .         .         3         .         . 4320
1 WP_004013458.1 100.0% 100.0%      --VISSTENLAFEDGFKFTYTCKAPNGKTFTQKAPFGAQTGVDTINVKAGQPSGIITVPQGSKCTVSEANPK-DLPKLVN
2 WP_101929469.1  37.0%  15.7%      QVVDGTAGAGTIPGTFEMKYICATGQKAE-------SVTKKLTSISVNKGGSATITGIPVGSQCAVYEDTTGINVPNTTL
  consensus/100%                    ..V.uostshsh.ssFchpYhCtsspttp.......uspptlsoIsVptGtsusIhslP.GSpCsV.Essst.slPphs.
  consensus/90%                     ..V.uostshsh.ssFchpYhCtsspttp.......uspptlsoIsVptGtsusIhslP.GSpCsV.Essst.slPphs.
  consensus/80%                     ..V.uostshsh.ssFchpYhCtsspttp.......uspptlsoIsVptGtsusIhslP.GSpCsV.Essst.slPphs.
  consensus/70%                     ..V.uostshsh.ssFchpYhCtsspttp.......uspptlsoIsVptGtsusIhslP.GSpCsV.Essst.slPphs.

                    cov    pid 4321         .         .         :         .         .         .         .         4 4400
1 WP_004013458.1 100.0% 100.0%      DP---NRNPVKYQENGTSIKVGDKTVTG--LTSAEFTADGQMVTVIATNTYVE-KITGFQFKKTLDGN--NAGKYQDQQF
2 WP_101929469.1  37.0%  15.7%      TTTFNGKAPQ-------QVTIGGQVLHNAALSNPIKAGESQKATINVENKYVNQKAGGFEVEKLVAGVTNPGTVLKDVAF
  consensus/100%                    ss...s+sP........plplGspslps..Loss.hsu-uQhsTl.spNpYVp.KhsGFphcKhlsGs..sushhpD.tF
  consensus/90%                     ss...s+sP........plplGspslps..Loss.hsu-uQhsTl.spNpYVp.KhsGFphcKhlsGs..sushhpD.tF
  consensus/80%                     ss...s+sP........plplGspslps..Loss.hsu-uQhsTl.spNpYVp.KhsGFphcKhlsGs..sushhpD.tF
  consensus/70%                     ss...s+sP........plplGspslps..Loss.hsu-uQhsTl.spNpYVp.KhsGFphcKhlsGs..sushhpD.tF

                    cov    pid 4401         .         .         .         .         :         .         .         . 4480
1 WP_004013458.1 100.0% 100.0%      SFGYTCKTPKEVRSGDAKL---------KSADDPVKVENLPVGTECTLWENKVNPKNAEKVSTTWTIDGKPVSSGSVTDH
2 WP_101929469.1  37.0%  15.7%      DFGYSCEIPGNAHAVKGSFKLKHGETFTSADPANPQLNNLPVNTVCKVWEETPKSSANADYV------GSELRA---SAT
  consensus/100%                    sFGYoCchPtps+uscuph.........pussssssplpNLPVsT.CplWEppspspsstchs......Gp.lpu...osp
  consensus/90%                     sFGYoCchPtps+uscuph.........pussssssplpNLPVsT.CplWEppspspsstchs......Gp.lpu...osp
  consensus/80%                     sFGYoCchPtps+uscuph.........pussssssplpNLPVsT.CplWEppspspsstchs......Gp.lpu...osp
  consensus/70%                     sFGYoCchPtps+uscuph.........pussssssplpNLPVsT.CplWEppspspsstchs......Gp.lpu...osp

                    cov    pid 4481         .         5         .         .         .         .         :         . 4560
1 WP_004013458.1 100.0% 100.0%      NGVKHTNA---NGVTFKVETEGTPVNVVATNKFDIPSTSFKIHKTVTNKTDGYHVPADKGFKFDVTCTYPTDDAEHVIAK
2 WP_101929469.1  37.0%  15.7%      NGAEVTGTDGKLELTIKLNKAAAKAKILATNQYSQQLGGFTLKKEVQGSADQAL--DIQSYKFKL--TYMDGTNTHVKE-
  consensus/100%                    NGschTss....tlThKlpptus.spllATNpas...suFpl+KpVpspsDthh..s.puaKFcl..TY.ssssphVht.
  consensus/90%                     NGschTss....tlThKlpptus.spllATNpas...suFpl+KpVpspsDthh..s.puaKFcl..TY.ssssphVht.
  consensus/80%                     NGschTss....tlThKlpptus.spllATNpas...suFpl+KpVpspsDthh..s.puaKFcl..TY.ssssphVht.
  consensus/70%                     NGschTss....tlThKlpptus.spllATNpas...suFpl+KpVpspsDthh..s.puaKFcl..TY.ssssphVht.
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                    cov    pid 4561           .         .         .         6         .         .         .         . 4640
1 WP_004013458.1 100.0% 100.0%       DELVKGGQDSKNFEADVDGVPIPVGASCTVTEKNAAVANYSLAVTMKDGGKALTVETKQADQTKSEPGYTAKVITTVEAK
2 WP_101929469.1  37.0%  15.7%       QTIPAGG-GSYSFW------GVPVGSQVQVEELGAVD----------SQGNLIPVNELSTAKVKHSISWNG---------
  consensus/100%                     pplstGG.sShsF.......slPVGupspVpEhsAss..........stGphlsVpphpsspsKpp.uasu.........
  consensus/90%                      pplstGG.sShsF.......slPVGupspVpEhsAss..........stGphlsVpphpsspsKpp.uasu.........
  consensus/80%                      pplstGG.sShsF.......slPVGupspVpEhsAss..........stGphlsVpphpsspsKpp.uasu.........
  consensus/70%                      pplstGG.sShsF.......slPVGupspVpEhsAss..........stGphlsVpphpsspsKpp.uasu.........

                    cov    pid 4641           :         .         .         .         .         7         .         . 4720
1 WP_004013458.1 100.0% 100.0%       TVNVENTYTRDFGIFKIEKKTTAQSYIEKPSSFDFKYTCKDPKDSKAEVKQGILNVGEAAVSSQQIPVGYKCEVSEVDPK
2 WP_101929469.1  37.0%  15.7%       --TQDDSSTASANIFTIN------------------------------------------------------------KA
  consensus/100%                     ..s.-so.TtshsIFpIp.............................................................t
  consensus/90%                      ..s.-so.TtshsIFpIp.............................................................t
  consensus/80%                      ..s.-so.TtshsIFpIp.............................................................t
  consensus/70%                      ..s.-so.TtshsIFpIp.............................................................t

                    cov    pid 4721           .         .         :         .         .         .         .         8 4800
1 WP_004013458.1 100.0% 100.0%       VKGAKWAHTLSQKTFVIQKSEVQTASLTATNDFTDSTGKFKVTKKV----KNDDKLALPLNATYNFEWWCGPKGAEAPQK
2 WP_101929469.1  37.0%  15.7%       MTEAQWKESGKQANVVVKATNT--------YKAIEQKGTFSVQKTAVKVAGESKDKVKNLPTSYNFTYDCSDGIHGNIPN
  consensus/100%                     hptApWtcohpQtshVlptops.........chh-ppGpFpVpKps....tpscchshsLssoYNFpa.Custhtts..p
  consensus/90%                      hptApWtcohpQtshVlptops.........chh-ppGpFpVpKps....tpscchshsLssoYNFpa.Custhtts..p
  consensus/80%                      hptApWtcohpQtshVlptops.........chh-ppGpFpVpKps....tpscchshsLssoYNFpa.Custhtts..p
  consensus/70%                      hptApWtcohpQtshVlptops.........chh-ppGpFpVpKps....tpscchshsLssoYNFpa.Custhtts..p

                    cov    pid 4801           .         .         .         .         :         .         .         . 4880
1 WP_004013458.1 100.0% 100.0%       WNTFSLKQGETFESGEIASGSECGIREV--KPTGDFAAVGANVEVTWSLAETKTTQGAT-----------SVKAPVLVDS
2 WP_101929469.1  37.0%  15.7%       ---VKPGGEPVVAPAQFRAGTVCTLTEQQVLPKGT-----NAQTVSWTVDGKGKGVGPAAGTSATVTIGSDAKHPVAVQA
  consensus/100%                     ...hp.ttt.shtsuphtuGo.CslpE...hPpGs.....ss.pVoWolstptps.Gss...........ssKtPVhVpu
  consensus/90%                      ...hp.ttt.shtsuphtuGo.CslpE...hPpGs.....ss.pVoWolstptps.Gss...........ssKtPVhVpu
  consensus/80%                      ...hp.ttt.shtsuphtuGo.CslpE...hPpGs.....ss.pVoWolstptps.Gss...........ssKtPVhVpu
  consensus/70%                      ...hp.ttt.shtsuphtuGo.CslpE...hPpGs.....ss.pVoWolstptps.Gss...........ssKtPVhVpu

                    cov    pid 4881           .         9         .         .         .         .         :         . 4960
1 WP_004013458.1 100.0% 100.0%       EQAFVFGKQGDSAGK-FTIGKNGSEQILTATNEVKQTYVDLSLEKVAQSSNNNGDPGLSVDKFNYWNSYYQAWGGFVTRN
2 WP_101929469.1  37.0%  15.7%       ANEYQTPDEPKIATELKGEGRNGNIDLVE----------------------GADHTYTLTDKISYWNLEVGKTYKFSGEL
  consensus/100%                     tpta.hscpsc.Asc.hs.G+NGs.pllp......................ssscshh.sDKhsYWN..htthhtFssc.
  consensus/90%                      tpta.hscpsc.Asc.hs.G+NGs.pllp......................ssscshh.sDKhsYWN..htthhtFssc.
  consensus/80%                      tpta.hscpsc.Asc.hs.G+NGs.pllp......................ssscshh.sDKhsYWN..htthhtFssc.
  consensus/70%                      tpta.hscpsc.Asc.hs.G+NGs.pllp......................ssscshh.sDKhsYWN..htthhtFssc.

                    cov    pid 4961           .         .         .         0         .         .         .         . 5040
1 WP_004013458.1 100.0% 100.0%       FVEMQVTCNDKPVADKAH---PEGIWKVPLNGKIDLPVKVAIGSKCTVAELDKGFNDYKMLFYGRWRHSVDMSAKSLDGI
2 WP_101929469.1  37.0%  15.7%       ----VVPNADKTDATRTGIKAEKTVTITTPSGVVELPFKLTQADVA----------KYSTL--------V-----AFEKL
  consensus/100%                     .....VsssDKssAs+st....cslhhss.sGhl-LPhKls.ushs..........cYphL........V.....uh-tl
  consensus/90%                      .....VsssDKssAs+st....cslhhss.sGhl-LPhKls.ushs..........cYphL........V.....uh-tl
  consensus/80%                      .....VsssDKssAs+st....cslhhss.sGhl-LPhKls.ushs..........cYphL........V.....uh-tl
  consensus/70%                      .....VsssDKssAs+st....cslhhss.sGhl-LPhKls.ushs..........cYphL........V.....uh-tl

                    cov    pid 5041           :         .         .         .         .         1         .         . 5120
1 WP_004013458.1 100.0% 100.0%       DVSKRYDFDAVEDDKAQAAIDFDVSGKTKVEVKMTNNWDCFSKVTSELGTNLTDAKKVNGVRQIDLSEKKSDGTNKYTDW
2 WP_101929469.1  37.0%  15.7%       DLQVEGGFEPVTKHE---------DPKDENQTKQVNPWIATV---------LTD---EGGNKQIDTTGK------ADSEL
  consensus/100%                     DlphchsF-sVpccc.........ssKscspsK.sNsW.shs.........LTD....sGs+QIDhotK......t.o-h
  consensus/90%                      DlphchsF-sVpccc.........ssKscspsK.sNsW.shs.........LTD....sGs+QIDhotK......t.o-h
  consensus/80%                      DlphchsF-sVpccc.........ssKscspsK.sNsW.shs.........LTD....sGs+QIDhotK......t.o-h
  consensus/70%                      DlphchsF-sVpccc.........ssKscspsK.sNsW.shs.........LTD....sGs+QIDhotK......t.o-h

                    cov    pid 5121           .         .         :         .         .         .         .         2 5200
1 WP_004013458.1 100.0% 100.0%       VTLTDVVEFKNLPK-RNYTVMGRLFNASKSGK---LTAADFNNPNQYLNWKNPQGHTWNYVYQEVNADSAKVTLTYEIPV
2 WP_101929469.1  37.0%  15.7%       VTLVDTVKYRNLEAGKTYHLTGKLVDGSGKPIGVSSTSKAFTVPGEAG-----------------TLQSGEAKMTFQVTV
  consensus/100%                     VTLsDsVca+NL.t.+sYplhG+LhsuStpsh....TutsFssPsphh.................shpSucsphTaplsV
  consensus/90%                      VTLsDsVca+NL.t.+sYplhG+LhsuStpsh....TutsFssPsphh.................shpSucsphTaplsV
  consensus/80%                      VTLsDsVca+NL.t.+sYplhG+LhsuStpsh....TutsFssPsphh.................shpSucsphTaplsV
  consensus/70%                      VTLsDsVca+NL.t.+sYplhG+LhsuStpsh....TutsFssPsphh.................shpSucsphTaplsV

                    cov    pid 5201           .         .         .         .         :         .         .         . 5280
1 WP_004013458.1 100.0% 100.0%       SLFEANPDGIAAGVAVYRSDYWNPQCAGNCGLMAVEPTL-PQNQQVKPIWKGELKTQVLNPVTKSNMLQVGKGAPEIQSI
2 WP_101929469.1  37.0%  15.7%       GQIRQ-------NAKLVAFEYLHPGQPNTPGDETVITKHEDPNDENQTVNEGPRAATTAQSSTGTKVF----DAKTPAKV
  consensus/100%                     u.hct.......sstlht.-YhpPtpssssG..sV.sph.s.Nppspsl.cG.htspshpssTtophh....sA.p.tpl
  consensus/90%                      u.hct.......sstlht.-YhpPtpssssG..sV.sph.s.Nppspsl.cG.htspshpssTtophh....sA.p.tpl
  consensus/80%                      u.hct.......sstlht.-YhpPtpssssG..sV.sph.s.Nppspsl.cG.htspshpssTtophh....sA.p.tpl
  consensus/70%                      u.hct.......sstlht.-YhpPtpssssG..sV.sph.s.Nppspsl.cG.htspshpssTtophh....sA.p.tpl

                    cov    pid 5281           .         3         .         .         .         .         :         . 5360
1 WP_004013458.1 100.0% 100.0%       ADTVTYTNVAPGSYDLYGRIVALGNEGLVIGEGTANVTTAEAGSNALSSGEWNNDQIKVNTASLEDAVKNDAKGFVTYEF
2 WP_101929469.1  37.0%  15.7%       LDRVTWSKLPAGNYVLVGTLMDKGTKQAVPNVNAEIV------KFTVSNGELKGLQEMT--FTVPAEQAKSNAQFVAFEK
  consensus/100%                     hDpVTaoplssGsYsLhGplhshGscthV.s.sst.V......p.slSsGEhps.Q.hs..hol.st.tpssttFVsaEh
  consensus/90%                      hDpVTaoplssGsYsLhGplhshGscthV.s.sst.V......p.slSsGEhps.Q.hs..hol.st.tpssttFVsaEh
  consensus/80%                      hDpVTaoplssGsYsLhGplhshGscthV.s.sst.V......p.slSsGEhps.Q.hs..hol.st.tpssttFVsaEh
  consensus/70%                      hDpVTaoplssGsYsLhGplhshGscthV.s.sst.V......p.slSsGEhps.Q.hs..hol.st.tpssttFVsaEh

                    cov    pid 5361           .         .         .         4         .         .         .         . 5440
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1 WP_004013458.1 100.0% 100.0%      LLPKGSATSGAAVETLKGQAVASHVDDNDVMQ---------QLFTPTLRTTATVGSENGTKTVDANATGTVEVFDKVEYR
2 WP_101929469.1  37.0%  15.7%      IYRQGDVDENGNVKDGKK-PVVEHSDLNDKAQTVTTGEEPQSPVTPTLTLQKVVKS---------------------EGL
  consensus/100%                    lh.pGssspsusVcshKt.sVspHsD.NDhhQ.........p.hTPTLphptsVtS.....................Ehh
  consensus/90%                     lh.pGssspsusVcshKt.sVspHsD.NDhhQ.........p.hTPTLphptsVtS.....................Ehh
  consensus/80%                     lh.pGssspsusVcshKt.sVspHsD.NDhhQ.........p.hTPTLphptsVtS.....................Ehh
  consensus/70%                     lh.pGssspsusVcshKt.sVspHsD.NDhhQ.........p.hTPTLphptsVtS.....................Ehh

                    cov    pid 5441          :         .         .         .         .         5         .         . 5520
1 WP_004013458.1 100.0% 100.0%      NLPGGKKYTVTGK---------------------LHFK--------SADGTDGGELPGVDSASGTIDLTSQKATEGHSGT
2 WP_101929469.1  37.0%  15.7%      EVPSTKQFAFTLKCSSPIDGKSKQQTYQVTAGSKISLPYVKGANCTLTEDREGAKVAGIAPSQVTFSADSEKIGL-ITSD
  consensus/100%                    plPusKpashThK.....................lph..........s-sp-GuclsGlssupsThshsSpKhs..hous
  consensus/90%                     plPusKpashThK.....................lph..........s-sp-GuclsGlssupsThshsSpKhs..hous
  consensus/80%                     plPusKpashThK.....................lph..........s-sp-GuclsGlssupsThshsSpKhs..hous
  consensus/70%                     plPusKpashThK.....................lph..........s-sp-GuclsGlssupsThshsSpKhs..hous

                    cov    pid 5521          .         .         :         .         .         .         .         6 5600
1 WP_004013458.1 100.0% 100.0%      VTLKFTVPVEKLQQKIVVAFEEVKDGNILVAAHADITDEAQTVYSPKIGTTASAAPGFSATADTPATVDMSNAKPLKGKD
2 WP_101929469.1  37.0%  15.7%      NSASFKMPAEE-----------TTEVNVVLTATNTY----PAPEKPTVATSAK---------------DANGTKGMYGQS
  consensus/100%                    sohpFphPsEc...........sp-sNlllsApssh.....ss.pPpluToAp...............DhsssKshhGps
  consensus/90%                     sohpFphPsEc...........sp-sNlllsApssh.....ss.pPpluToAp...............DhsssKshhGps
  consensus/80%                     sohpFphPsEc...........sp-sNlllsApssh.....ss.pPpluToAp...............DhsssKshhGps
  consensus/70%                     sohpFphPsEc...........sp-sNlllsApssh.....ss.pPpluToAp...............DhsssKshhGps

                    cov    pid 5601          .         .         .         .         :         .         .         . 5680
1 WP_004013458.1 100.0% 100.0%      SR---KAELGNVAVIDTVEYHGLEAGKYVLYGELKKLSDGKEVSTAKTSSHSFTVDAVTGV-HGTQSVTFSDLKVQSGET
2 WP_101929469.1  37.0%  15.7%      KQANQVYAGTSAKIVDEVSWANLLPGDYVLIGKLMDKETGKAVTSYTSTPAPFTVKAGEKNGKLDNTFTVSGDSLKAGSH
  consensus/100%                    pp...hhthssstllDpVpatsL.sGcYVLhGcLhchpsGKtVoohpoostsFTVcAspts.+hspohThSs.plpuGpp
  consensus/90%                     pp...hhthssstllDpVpatsL.sGcYVLhGcLhchpsGKtVoohpoostsFTVcAspts.+hspohThSs.plpuGpp
  consensus/80%                     pp...hhthssstllDpVpatsL.sGcYVLhGcLhchpsGKtVoohpoostsFTVcAspts.+hspohThSs.plpuGpp
  consensus/70%                     pp...hhthssstllDpVpatsL.sGcYVLhGcLhchpsGKtVoohpoostsFTVcAspts.+hspohThSs.plpuGpp

                    cov    pid 5681          .         7         .         .         .         .         :         . 5760
1 WP_004013458.1 100.0% 100.0%      YVVYEYLFKAGDFQVDKPDTKKA-IASHADPEDKGQTVTVPGVTTDATDGDGDKYVDSSQNFTIKDTVTATGLIP--GKT
2 WP_101929469.1  37.0%  15.7%      YVVYEYIYRAGDVNGATPNNGAKPVVEHAVITDADQTVEAI--TPPTPP---------AAKVKIMKKVVASGMEVSNNRA
  consensus/100%                    YVVYEYla+AGDhpsspPssttt.lspHAs.pDtsQTVps...Tsssss.........utphpIhcpVsAoGh.s..s+s
  consensus/90%                     YVVYEYla+AGDhpsspPssttt.lspHAs.pDtsQTVps...Tsssss.........utphpIhcpVsAoGh.s..s+s
  consensus/80%                     YVVYEYla+AGDhpsspPssttt.lspHAs.pDtsQTVps...Tsssss.........utphpIhcpVsAoGh.s..s+s
  consensus/70%                     YVVYEYla+AGDhpsspPssttt.lspHAs.pDtsQTVps...Tsssss.........utphpIhcpVsAoGh.s..s+s

                    cov    pid 5761          .         .         .         8         .         .         .         . 5840
1 WP_004013458.1 100.0% 100.0%      YDVSGELMVDDGTPQGATT------------GIKQT------------------GTIT----------AKADGTGETVLE
2 WP_101929469.1  37.0%  15.7%      YIFTLSCRDKDGNAAGDKTLLVRPDKATEVTGLRSGYVCSINEDLDAAIEQQVTPSISLTSGTNGFSVQQDSTAGAAHFT
  consensus/100%                    Y.hohphhscDGsstGspT............Gl+ps..................soIo..........tpssssGtshhp
  consensus/90%                     Y.hohphhscDGsstGspT............Gl+ps..................soIo..........tpssssGtshhp
  consensus/80%                     Y.hohphhscDGsstGspT............Gl+ps..................soIo..........tpssssGtshhp
  consensus/70%                     Y.hohphhscDGsstGspT............Gl+ps..................soIo..........tpssssGtshhp

                    cov    pid 5841          :         .         .         .         .         9         .         . 5920
1 WP_004013458.1 100.0% 100.0%      FPVTAQQAQD--------LGLVGKPIVVFEDLSLDGKKVAVHHDIKDEKQTVYNGGLKTKAVDAADENQAMVPGQKSAAV
2 WP_101929469.1  37.0%  15.7%      VPAATEQVPEVLVNVTNTYNKMGKPE------------------------------LQTNAVT--DNGSSSVQAGTATTV
  consensus/100%                    hPssspQs.-........hshhGKP...............................LpTpAVs..Dpspu.V.utpussV
  consensus/90%                     hPssspQs.-........hshhGKP...............................LpTpAVs..Dpspu.V.utpussV
  consensus/80%                     hPssspQs.-........hshhGKP...............................LpTpAVs..Dpspu.V.utpussV
  consensus/70%                     hPssspQs.-........hshhGKP...............................LpTpAVs..Dpspu.V.utpussV

                    cov    pid 5921          .         .         :         .         .         .         .         0 6000
1 WP_004013458.1 100.0% 100.0%      VDTVTFNGRFEKSHSYTLVGELHYVN---GTVVPGTKTETKTFQSDQD-GAIAAQKMTFTVPAEYIKAGQNMVVFEKLFD
2 WP_101929469.1  37.0%  15.7%      TDKVTWKNL--PEGKYLLTGKLMHITDDNAAPVAGVTNEPVVLEITKDNSLAGSTTMKFNVPAGAISQAGKYVVYEYLYN
  consensus/100%                    sDpVTapsh...ptpYhLsGcLhals...ussVsGspsEshshp.spD.uhhuuppMpFsVPAthIptutphVVaEhLas
  consensus/90%                     sDpVTapsh...ptpYhLsGcLhals...ussVsGspsEshshp.spD.uhhuuppMpFsVPAthIptutphVVaEhLas
  consensus/80%                     sDpVTapsh...ptpYhLsGcLhals...ussVsGspsEshshp.spD.uhhuuppMpFsVPAthIptutphVVaEhLas
  consensus/70%                     sDpVTapsh...ptpYhLsGcLhals...ussVsGspsEshshp.spD.uhhuuppMpFsVPAthIptutphVVaEhLas

                    cov    pid 6001          .         .         .         .         :         .         .         . 6080
1 WP_004013458.1 100.0% 100.0%      AKKKDGT-------PVASHEDPNDPDQTITVQEVEITTTA--YDGAAGDKSDPKDKNLDASKETVTIYDQVDYKGLNVGE
2 WP_101929469.1  37.0%  15.7%      YEDTDGHKPKPNTSTVVSHNDPSDDAQTVNVTEAPSVSTTATTDGAN-------EKEIQKG-KAAVVTDTVNWKNLPAGN
  consensus/100%                    hccpDGp.......sVsSHpDPsDssQTlsVpEs..soTs..hDGAs.......-Kplptu.cssslhDpVsaKsLssGp
  consensus/90%                     hccpDGp.......sVsSHpDPsDssQTlsVpEs..soTs..hDGAs.......-Kplptu.cssslhDpVsaKsLssGp
  consensus/80%                     hccpDGp.......sVsSHpDPsDssQTlsVpEs..soTs..hDGAs.......-Kplptu.cssslhDpVsaKsLssGp
  consensus/70%                     hccpDGp.......sVsSHpDPsDssQTlsVpEs..soTs..hDGAs.......-Kplptu.cssslhDpVsaKsLssGp

                    cov    pid 6081          .         1         .         .         .         .         :         . 6160
1 WP_004013458.1 100.0% 100.0%      EYTITGTLHYQADATLADGTQVKRGDEVPAQYVNVTPVKITANKASSDESGAVKAIVKFEVQKTALATAPVVVFETLYQG
2 WP_101929469.1  37.0%  15.7%      YQALSELVDS-------------KGNPVAGATTKAVPF----TVNNGEEAGSVKTKIQLPATATSTAGAKFVVFERIYRA
  consensus/100%                    ..slothlc..............+Gs.VsuthspssPh....shssu-EuGuVKshlph.sptTuhAsA.hVVFEplYpu
  consensus/90%                     ..slothlc..............+Gs.VsuthspssPh....shssu-EuGuVKshlph.sptTuhAsA.hVVFEplYpu
  consensus/80%                     ..slothlc..............+Gs.VsuthspssPh....shssu-EuGuVKshlph.sptTuhAsA.hVVFEplYpu
  consensus/70%                     ..slothlc..............+Gs.VsuthspssPh....shssu-EuGuVKshlph.sptTuhAsA.hVVFEplYpu

                    cov    pid 6161          .         .         .         2         .         .         .         . 6240
1 WP_004013458.1 100.0% 100.0%      TVEVATH-QDIDDGSQVVYHPS-------LRTLATVNGAKVIQMKKDSKENLTVTDQITWANLAPGTYTLEGSLMEVKDG
2 WP_101929469.1  37.0%  15.7%      SDVDSQTGRPAQNAQPVVSELDLNAINQTVRVVESPKGPPAITFTKVTE--------------------------KALDG
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  consensus/100%                    os.supp.pshpsup.VV.c.s.......lRsltospGs.sIphpKsoc..........................cshDG
  consensus/90%                     os.supp.pshpsup.VV.c.s.......lRsltospGs.sIphpKsoc..........................cshDG
  consensus/80%                     os.supp.pshpsup.VV.c.s.......lRsltospGs.sIphpKsoc..........................cshDG
  consensus/70%                     os.supp.pshpsup.VV.c.s.......lRsltospGs.sIphpKsoc..........................cshDG

                    cov    pid 6241          :         .         .         .         .         3         .         . 6320
1 WP_004013458.1 100.0% 100.0%      QLVSNTPVAKGQTQKVEVAAGKAGATTSTGEAQMTFKLPVDKVKSGSQFVVYQILKDKSGQVVATHADPKSDDQTVTVGS
2 WP_101929469.1  37.0%  15.7%      QVPD-------------------------KDRKFQFTISCDKNFGGAYS--FEMP---AGVSAALPA-----DKQLQAGT
  consensus/100%                    Qlss.........................t-tphpFplssDKshuGu....aph....uG.ssAh.A.....DpplpsGo
  consensus/90%                     Qlss.........................t-tphpFplssDKshuGu....aph....uG.ssAh.A.....DpplpsGo
  consensus/80%                     Qlss.........................t-tphpFplssDKshuGu....aph....uG.ssAh.A.....DpplpsGo
  consensus/70%                     Qlss.........................t-tphpFplssDKshuGu....aph....uG.ssAh.A.....DpplpsGo

                    cov    pid 6321          .         .         :         .         .         .         .         4 6400
1 WP_004013458.1 100.0% 100.0%      LDTTATDAADGNKHADNAAAVTINDKVDYSGLNLAATYPDGTLKAYLVRGELMDKATGKPVAGVAPVERVIGAANSVYRV
2 WP_101929469.1  37.0%  15.7%      VCT---------------------------------------L-----TEMLTDEA---NADGILPDAISFSSSNKAMAV
  consensus/100%                    lsT.......................................L.....pt.LhDcA...sssGlhPsthshuuuNpshtV
  consensus/90%                     lsT.......................................L.....pt.LhDcA...sssGlhPsthshuuuNpshtV
  consensus/80%                     lsT.......................................L.....pt.LhDcA...sssGlhPsthshuuuNpshtV
  consensus/70%                     lsT.......................................L.....pt.LhDcA...sssGlhPsthshuuuNpshtV

                    cov    pid 6401          .         .         .         .         :         .         .         . 6480
1 WP_004013458.1 100.0% 100.0%      GDQNRPVEEEITSGAGSVVLSFQVPAKLTQ--GKVLVAFETVYEEGREFLIHHDINDDAQTVYTPSVKTQARVDSERN--
2 WP_101929469.1  37.0%  15.7%      SKI------------NNQTAQFTVPDVDTKVVPEIQVTIKNIYSKD-----------------FPELGTIARDNADQDKV
  consensus/100%                    uc.............ss.shpFpVPsh.Tp..scl.VshcslYpcs.................hPpltT.ARssu-ps..
  consensus/90%                     uc.............ss.shpFpVPsh.Tp..scl.VshcslYpcs.................hPpltT.ARssu-ps..
  consensus/80%                     uc.............ss.shpFpVPsh.Tp..scl.VshcslYpcs.................hPpltT.ARssu-ps..
  consensus/70%                     uc.............ss.shpFpVPsh.Tp..scl.VshcslYpcs.................hPpltT.ARssu-ps..

                    cov    pid 6481          .         5         .         .         .         .         :         . 6560
1 WP_004013458.1 100.0% 100.0%      LLL-ADKDSTIKDTVTLSGLKTGETYVLSGVLMDKATGQPVLGKDMQAITAVSEPLKAESGAFVKTDAVSFTVPAGTVKA
2 WP_101929469.1  37.0%  15.7%      LDLKKGENAQVQDVATWKNLA-PGKYTMMGTLMDKLTGKPVVGANTPAVDFQ-----VKKGEKTGTIYALFTVPGDKVST
  consensus/100%                    L.L.tscsuplpDssThpsLt.stpYsh.GsLMDKhTGpPVlGtsh.Alsh......scpGthstT.hs.FTVPuspVps
  consensus/90%                     L.L.tscsuplpDssThpsLt.stpYsh.GsLMDKhTGpPVlGtsh.Alsh......scpGthstT.hs.FTVPuspVps
  consensus/80%                     L.L.tscsuplpDssThpsLt.stpYsh.GsLMDKhTGpPVlGtsh.Alsh......scpGthstT.hs.FTVPuspVps
  consensus/70%                     L.L.tscsuplpDssThpsLt.stpYsh.GsLMDKhTGpPVlGtsh.Alsh......scpGthstT.hs.FTVPuspVps

                    cov    pid 6561          .         .         .         6         .         .         .         . 6640
1 WP_004013458.1 100.0% 100.0%      DTELVVFEKLWVANEVTVDTKTKTVTPKDTKTGKSQPAASHEDITDENQTVKSGTSPSLKTVLS------ADGKREWV--
2 WP_101929469.1  37.0%  15.7%      KASWVVFEKVYKASDVKDGKVVS----------KATPVVDHSNLEDADQTVQVTPPPASQEQKTREIATVAKNGTTFNDG
  consensus/100%                    csphVVFEKlahAs-Vpssphsp..........KupPsssHpslpDtsQTVpssssPu.pp.ho......Acstppas..
  consensus/90%                     csphVVFEKlahAs-Vpssphsp..........KupPsssHpslpDtsQTVpssssPu.pp.ho......Acstppas..
  consensus/80%                     csphVVFEKlahAs-Vpssphsp..........KupPsssHpslpDtsQTVpssssPu.pp.ho......Acstppas..
  consensus/70%                     csphVVFEKlahAs-Vpssphsp..........KupPsssHpslpDtsQTVpssssPu.pp.ho......Acstppas..

                    cov    pid 6641          :         .         .         .         .         7         .         . 6720
1 WP_004013458.1 100.0% 100.0%      --ENNTNIPTV-PHASDSLIDTVLYTGLTEGVSYRLDAKLMEINPVT--------GKV-SETPVATGYTEFTAKTSDGTA
2 WP_101929469.1  37.0%  15.7%      TKDPNLGKPVLTPGQDAVIVDTVKWKNLEPG-EYTITGSLMDKSTNAPLTYLDKDGNQKDGATAERGSFAVKEGQTEGET
  consensus/100%                    ..-sNhshPsl.PttsssllDTVhapsLp.G.pYplsupLM-hssss........Gp..stssstpG.hthpttpo-Gps
  consensus/90%                     ..-sNhshPsl.PttsssllDTVhapsLp.G.pYplsupLM-hssss........Gp..stssstpG.hthpttpo-Gps
  consensus/80%                     ..-sNhshPsl.PttsssllDTVhapsLp.G.pYplsupLM-hssss........Gp..stssstpG.hthpttpo-Gps
  consensus/70%                     ..-sNhshPsl.PttsssllDTVhapsLp.G.pYplsupLM-hssss........Gp..stssstpG.hthpttpo-Gps

                    cov    pid 6721          .         .         :         .         .         .         .         8 6800
1 WP_004013458.1 100.0% 100.0%      QVTFNGITGKLKAGYKYVAYEKMTRPGQPDKPVP-----------------------------PPHEDPKDPNQTVVSEH
2 WP_101929469.1  37.0%  15.7%      KVYFTVKGEAIQANRQYVVFEDLYKTADIDEHGQPTPGAEKVAQHHDINDAAQTLSGDKPKPGTPPETPKTPNT------
  consensus/100%                    pVhFsshsttlpAshpYVsaEchh+sup.Dc.s..............................sP.EsPKsPNp......
  consensus/90%                     pVhFsshsttlpAshpYVsaEchh+sup.Dc.s..............................sP.EsPKsPNp......
  consensus/80%                     pVhFsshsttlpAshpYVsaEchh+sup.Dc.s..............................sP.EsPKsPNp......
  consensus/70%                     pVhFsshsttlpAshpYVsaEchh+sup.Dc.s..............................sP.EsPKsPNp......

                    cov    pid 6801          .         .         .         .         :         .         .         . 6880
1 WP_004013458.1 100.0% 100.0%      NPGITTTLTDAQAAKGTDGKVISLTRD-AQLKDVVRVT-QTGLIEGAKYHVFSKLVNQANPDQVVSAGMQEFTATGDQLR
2 WP_101929469.1  37.0%  15.7%      -PGTTPPGPTPRTPSGFRGVVSTVLAKTGSTTGIMAMTGVLAMVAGIGLVMIRRYQREELED------------------
  consensus/100%                    .PGhTsshssspsspGhcGhV.olhtc.uphpslhthT..huhltGhthhhhp+h.ppt..D..................
  consensus/90%                     .PGhTsshssspsspGhcGhV.olhtc.uphpslhthT..huhltGhthhhhp+h.ppt..D..................
  consensus/80%                     .PGhTsshssspsspGhcGhV.olhtc.uphpslhthT..huhltGhthhhhp+h.ppt..D..................
  consensus/70%                     .PGhTsshssspsspGhcGhV.olhtc.uphpslhthT..huhltGhthhhhp+h.ppt..D..................

                    cov    pid 6881          .         9         .         .         .         .         :         . 6960
1 WP_004013458.1 100.0% 100.0%      SVTVKFTVPKETLQELAGSDPSAEFKLVAYEYLALDSDTDIVNKEATSEIEAVGFKTGKTWAATHADPNDAGQTVTVVKA
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 6961          .         .         .         0         .         .         .         . 7040
1 WP_004013458.1 100.0% 100.0%      PKIGTTLKYGQSKTVWVADKVELTDTVEYFNLQPKTKYTLSGNLMGGTSAESLSDTGVKATTEFTTPAAANGAQTVSGTA
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
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  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7041          :         .         .         .         .         1         .         . 7120
1 WP_004013458.1 100.0% 100.0%      VVKFTVPREVLERNEKLVAYEYLTIDGNPVASHEDPKDENQTVTSKKPGVGTYATVDKLKAFDVTDGKKDAFTIKDTVRL
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7121          .         .         :         .         .         .         .         2 7200
1 WP_004013458.1 100.0% 100.0%      YNVEEGKTYAIAGQLYEQSVAGDEGSALAKAATTVKVTASMAKPATEVEKTKYGEDVKVYETEMDLTVKREDLTKNQVVK
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7201          .         .         .         .         :         .         .         . 7280
1 WP_004013458.1 100.0% 100.0%      DDIALVVYEQLWAEGTYEKVNDTEVTPKGKSEPVAKHNDPQSSSQSITAEPQFGSLKLTKTVTGWEDAFAKVARPEASYK
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7281          .         3         .         .         .         .         :         . 7360
1 WP_004013458.1 100.0% 100.0%      FTVKCVQKGSVDEFTLKEGEEKTVEGIPLGDTCTISEDVQGAVNQAGLKDTVKFTAVNGVTVDSQVNGEAVVKIGGTANG
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7361          .         .         .         4         .         .         .         . 7440
1 WP_004013458.1 100.0% 100.0%      SDTVANVEVTAENSFSYDPVITTNTISQFGKVLENGGVLTDTVTYKQMPAGNYVLHTYFVEMVKDEATGKTVAKKIDYVP
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7441          :         .         .         .         .         5         .         . 7520
1 WP_004013458.1 100.0% 100.0%      SYVTEQTVKADATTPENGYNGTWTVSVDIPDTLHEVGKKVVVWQDVYVAPQTADMTKFKDGLNKLSAGETSKVAKLVVSH
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7521          .         .         :         .         .         .         .         6 7600
1 WP_004013458.1 100.0% 100.0%      HETSEQQGDGYQWFKVSSNYGSFQVEKTVENGAGLSENVSRQLPKTFKFEYEAKLPAGALLKPGTQPKGEFTLTVDSSNP
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7601          .         .         .         .         :         .         .         . 7680
1 WP_004013458.1 100.0% 100.0%      ALAKSPVFEGFPVGTEVAITETGVEGTMPTGATMSTTWATADGKAKTKAWSSDRKSDKVTVKIQPRGLLQVKATNHFEST
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7681          .         7         .         .         .         .         :         . 7760
1 WP_004013458.1 100.0% 100.0%      YPKLATLATTVDGAKMLKPSEATPVLDTVTYSGLVADREYWLLTQLVYTDDSTPVLGADGQPLARWTKVSAGKDGQGTWV
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7761          .         .         .         8         .         .         .         . 7840
1 WP_004013458.1 100.0% 100.0%      VDRENPLVVPETTDSQRDLVFFESLFEVPNTPGDAGTKPPDPTDPSNPPIVEHKDPKDPKQVVSSRPKLEMQTVATIGAD
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................
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                    cov    pid 7841         :         .         .         .         .         9         .         . 7920
1 WP_004013458.1 100.0% 100.0%      VKTIKPGEAVKITDTVSYNGLKAGGVYTLVGKLVRKTDGEDVSTPVTKTGLVADASGSGKWTMDIPLTAEQTKNLKQGDE
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 7921         .         .         :         .         .         .         .         0 8000
1 WP_004013458.1 100.0% 100.0%      LVVFEKAYLGKMEDAASNPNLKPILAHEDFKDAGQTVTVVETPDTPPTTPPTTPPYTTPPVSPSTTTPPTTPPNPPVSPS
2 WP_101929469.1  37.0%  15.7%      --------------------------------------------------------------------------------
  consensus/100%                    ................................................................................
  consensus/90%                     ................................................................................
  consensus/80%                     ................................................................................
  consensus/70%                     ................................................................................

                    cov    pid 8001         .         .         .         .         :         .        ] 8069
1 WP_004013458.1 100.0% 100.0%      ITTPPTTPPPPAPPVAPATTIPPAQAKMPPTLARTGAQAALVGMLSLAMIAAGGAIGLLAARRKRETTE
2 WP_101929469.1  37.0%  15.7%      ---------------------------------------------------------------------
  consensus/100%                    .....................................................................
  consensus/90%                     .....................................................................
  consensus/80%                     .....................................................................
  consensus/70%                     .....................................................................
```

MView (https://desmid.github.io/mview/) 1.63, Copyright © 1997-2018 Nigel P. Brown (mailto:biomview@gmail.com)

Figure S9 Pairwise sequence alignment between *M. mulieris* and *V. cambriense* mega-adhesin. Sequences were aligned using Clustal Omega and visualised using MView.