

EC93 AGDLSLRGKTLHTAGTTQGQNLTVQADRWANS**SVQATGNLTASATGQLTSTG DIMSQGD** 802
 STECO31_IV **GGDVSNQEGTL**-----**AAGRDLNAHLNVLENQOGTVVSNGN** 805
 .***: * : ** * :*. * . . * :***:

EC93 **TTLNAATTDNRGSLLS-AGTSLDGNSLDNS**GTVQGNHVTIRQNGVTNSG**TLTGIAALTL** 861
 STECO31_IV **SRLDVTRFDNQGGRLVAQOQLTSLSTDI**-----**INDASGLIQSGASLNLRADTL** 854
 : *.: : **:* . * :*:*..... :. * :***: .: * **

EC93 **AARMDMASQPALMNNNGSLLTSGDLTITAGSLANSGAIQA-ADSLTARLTGELVSTAGS** 920
 STECO31_IV SNR-----NSGDRG**GVISQGPMTLNAGTLDSTAGVLLSGDAL--SLTAGVVNNTSG** 903
 : * .: *.:***: * :*:*:* * :...: .*: * ** .: *.....

EC93 **KVTSNGEMALSALNLSNSGQWIAKNLTLKANSLTSAGDITGVDALTLTVNQTLNNHASGK** 980
 STECO31_IV **QVVANGLLG**-----**WNSQALNNQSG**-----**LIQGRGISINTAGQTLDN-RRGT** 945
 :*.:** :. * : : * . :. * * . *..***:* *.

EC93 **LLSAGVLTALKADSVKNDGQLQGNATTITAGQLTNGGHLQGETLTLAASGGVNNRSGGVLM** 1040
 STECO31_IV **LNSLQELTVSTGAMDNRG**-----**GTVGAKTTADLSTTSLDNREGGRLV** 988
 * * **:.:***: * * : : * : : : :.***.* * :

EC93 **SRNALNVSTATLSN-QGTIQGGGGVSLNATDRLO--NDGKILSGSNLTLTAQ-----VLA** 1092
 STECO31_IV **SEGELRLHTGGLQNSHQIQSVGDMLLNSVRGVVDNVSGLIRSGSAITLNALQFINRHTQ** 1048
 *.. *.: * . *.* : * ** . *.: ***: : . * * *** :***.*

EC93 **NTGSGLVQAATLLLDVNVTVNGGRLVATGSADV-KGTT-LNNTGTFQ-GADLLVN--YHT** 1147
 STECO31_IV **NTQOGLEAQTIIHITTQDLNQEGSILADRALTVMADRTLSNNDGVLSSGATLSVSGRQLA** 1108
 ***.* : : : * :** : * . * ** *.: ** * * . :

EC93 **FSNSGTLGTSGLGVKGSLLQNGTGRLYSAGNLLLD-AQDFSGQGQVATGDVTLKLI** 1206
 STECO31_IV **FSNRDGVVK-AGQSVSVDAGQLGGDGKLLSLGNMMLKSNTTFSNSGQTIANGNLTLVNG** 1167
 *** . : : * * . . : . * ** * * ** : * . **..***:***:***: .

EC93 **ALTNHGTLAAGKTLVTSQNAVTT--NGVMOGDAMVLGAGEFTNNGTLTAGKNSV---** 1261
 STECO31_IV **DVSNTGSLLAGSRLDLNSIRLENTEKGEISAGQ-TWLVNTDTLLNRGLID-GKYTRLQAN** 1225
 : * * : * * . *.: * . . : * : * : *.. : : * * : * * . :

EC93 -----**FSAQRLFLNAPGSLQAGGDVSLNRSRDI**TISGFTGT-**AGSLTMNVAGTLL**-----**NSA** 1313
 STECO31_IV **TLTNSGTGRIYGDVGVCAA**-----**TFNNLEENGVAATLAGRERVDLGVQTLNNRTHS** 1278
 .: ***: * * * : : : . *.: * * ** : : . * . :

EC93 **LIYAGNNLKLFTDRLHNQ**HGDILAGNSLWVQKDSSTG-----ANSEIINRSGNIETTRGD 1368
 STECO31_IV **LIYS**-----**AGDMHTGMLDANGAATGKAGVLNNHSATIEAAGYLVLVLSAGQ** 1324
 ***: ** : * . * . : :*. : * * : * : : * :

EC93 **ITMNTAHLNLSWDAISASHEVIPGSSHGVISPVPENNRWWGVVR-----HDGVEYLAVYW** 1423
 STECO31_IV **INNVNDHF**-----**TTERVVVSTEKVTEYQLSGSDKRWSAGEPGVYVDNDSSNSLKKLH** 1377
 * . * : : : : * : . . . :*** . : * . : *

EC93 **-GKGAT-VPDEYRIRTDGTETVTVSASGHAARISGGADMHIRAGRLDNEASFILAGGMT** 1481
 STECO31_IV **TPEGARDKFTQYDYTR-TVEE-TRVKESDPGKILSGAGMTIVADKLLNDKSQVVAGLLT** 1435
 :** : * . * . . . : * .*** * * * : * : * : * : * :

EC93 **LSGDTLNNQGWQEGTTGKETVWRLASGSLPKAWFTEPWYKVYRQVSPDAT-EASGTSPAG** 1540
 STECO31_IV **IPSGSVENVSVSG**-----**ERH**-----**VTDSGTSTYYRIRKKGKDKQGEKTSQYTPPT** 1483
 : .:***: . . :. : : : : * : : : . . : * * : *

EC93 **QYRAVISAAGDVSASFATDTGNTTVMPRAGGAGNTITVPSLNSLTPP--TVSQGVSGEAL** 1598
 STECO31_IV VIQTITLKPGE~~LTSH~~-----GQ--VQSHV~~TLS~~---PLKPQGT~~DVQTGLTGNVD~~ 1527
 ::: *:::: : *. ::: *. * *::::.

EC93 **LNESGTG--ITGPVW~~N~~DALPDTLKDIPGALSLSGASVSSYPLPSGNNGYFVPSTDPDPSY** 1656
 STECO31_IV ATVAGTDRIP~~LRPVVSAGEP~~--VILLPGQ-----Q-FEVSAPQGSIHVAGP~~DTR~~----- 1573
 . :*. ** . . * : :*. . . *.* *.*

EC93 LITVNP~~KL~~DGLGKV~~D~~SSLFAGLYD~~LL~~RMQ~~P~~GEAP~~RE~~TD~~P~~AYT~~D~~EKQ~~F~~LGSSY~~I~~LDR~~L~~GLK 1716
 STECO31_IV -----LP~~D~~SSL~~F~~K-----TNPA~~V~~NV~~P~~YL~~V~~ET~~D~~PR~~F~~T~~N~~Q~~K~~T~~W~~L~~G~~S~~D~~Y~~M~~Q~~K~~A~~F~~S~~Q~~N 1617
 ***** ***** :*::* :*:*.*: . . :

EC93 PEKDYR~~F~~L~~G~~DA~~A~~F~~D~~TRY~~V~~SN~~V~~IL~~N~~Q~~T~~GS~~R~~Y~~I~~NG~~T~~GS~~D~~LA~~Q~~M~~K~~Y~~L~~M~~D~~S~~A~~A~~A~~Q~~Q~~K~~A~~L~~G~~L~~T~~F~~G~~ 1776
 STECO31_IV G~~D~~N~~M~~L~~K~~R~~L~~G~~D~~G~~F~~Y~~E~~Q~~R~~L~~I~~R~~E~~Q~~V~~V~~A~~L~~T~~G~~R~~Y~~L~~D~~G~~Y~~S~~N~~D~~E~~E~~Q~~F~~K~~A~~L~~M~~D~~A~~G~~I~~A~~F~~G~~K~~Q~~Y~~N~~L~~T~~P~~G 1677
 :: : **. :: * : : : **.***:* ..* **: * * * : * * . * *

EC93 VSLTAG~~Q~~V~~A~~Q~~L~~TR~~S~~LL~~W~~ES~~V~~TIN-----G~~Q~~T~~V~~M~~V~~P~~K~~LY~~L~~S~~P~~E~~D~~I~~T~~L~~H~~-NG~~S~~V~~I~~S~~G~~N~~N~~V~~Q~~ 1830
 STECO31_IV VAL~~T~~A~~E~~Q~~M~~ALL~~T~~G~~D~~I~~V~~W~~L~~V~~N~~T~~T~~V~~T~~L~~P~~D~~G~~S~~T~~Q~~T~~V~~Q~~V~~P~~Q~~V~~Y~~A~~R~~V~~K~~P~~G~~D~~V~~N~~S~~A~~G~~A~~L~~I~~A~~G~~R~~D~~M~~V~~ 1737
 *:*** **: * * . : * . . * . * * * * : : : * : * : * : * :

EC93 -LAG~~N~~I~~T~~NS~~G~~SS~~I~~NA~~Q~~N~~D~~LL~~L~~L~~D~~R~~T~~GS~~I~~D~~N~~L~~N~~AG~~L~~I~~N~~AG~~G~~A~~L~~N~~L~~K~~A~~I~~G~~D~~I~~G~~N~~ISS~~V~~IS~~G~~K 1889
 STECO31_IV MK~~L~~D~~G~~D~~L~~F~~N~~S**GKLAGKQ**-----**TVQLS-AENIHNQAGTIQGA** 1773
 .*:: **. . * : : * . : * * : * * : . * . *

EC93 TV~~S~~L~~E~~S~~A~~T~~G~~N~~I~~S~~N~~L~~T~~R~~T~~E~~Q~~W~~A~~M~~N~~N~~G~~Y~~N~~H~~F~~S~~G~~T~~D~~T~~G~~P~~L~~A~~A~~V~~R~~A~~T~~D~~S~~L~~F~~M~~G~~A~~A~~G~~D~~I~~S~~I~~T~~G~~A~~A 1949
 STECO31_IV **NVSL**-----**TARTDINSTGGL** 1789
 .*** * ** . ** .

EC93 VS~~A~~G~~D~~S~~V~~LL~~A~~A~~G~~N~~D~~L~~N~~M~~N~~A~~I~~Q~~A~~G~~E~~R~~R~~R~~Y~~GG~~S~~G~~W~~Y~~E~~T~~H~~A~~V~~A~~P~~-----TV~~T~~A~~G~~N~~S~~L~~M~~L~~S~~A~~G~~R 2004
 STECO31_IV **LQATDSLLAMAGRDISLTTTTTRTAQRDAGQ-NHFERTRIDSVAGVYVQNDQGRVLVQAGR** 1848
 :.* **:* **.*: . : : * * . : * : . . . * : * . * *

EC93 DV~~N~~S~~Q~~A~~A~~G~~I~~T~~A~~E---NS~~M~~D~~I~~R~~A~~G~~R~~D~~V~~N~~M~~A~~A~~E~~S~~T~~G~~A~~G~~D~~H~~D~~S~~T~~F~~S~~M~~--K~~T~~V~~H~~**DSVRQOQGTDM** 2059
 STECO31_IV **DMNLTAATVVNQKDSLQLSAGRDMTLSTVTTSAQDNI-TWDKNNRLSQVTSQSTGSL** 1907
 **: * * . : . : : * * * : : * * * : * : : . . . * : :

EC93 **TSGGDITVTAGRDI~~T~~SVATAV~~T~~TAKGDIRV~~N~~AGHDIV~~L~~GTATES**-----**DYHYSESGETRNR** 2115
 STECO31_IV **AGNGDVTLTAGRDMTSAASLSAQKGLALMAGHDVTLTGAQNTSSLDEYHKVT**---GSSG 1964
 :. . * * : * * * * * * * * * * : : : * * * : * * : : * * .

EC93 **LLSHQ~~T~~TRTITEDSV~~T~~TREK~~S~~LLSG~~N~~R~~V~~TV~~N~~AG~~N~~N~~L~~TV~~Q~~SD~~V~~V~~A~~DR~~D~~V~~S~~LA~~A~~D~~N~~H~~V~~D~~V~~L** 2175
 STECO31_IV M~~L~~S~~K~~T~~T~~T~~T~~T~~H~~D~~V~~S~~D~~R~~R~~T~~M~~T~~G~~S~~E~~L~~N~~G~~D~~T~~V~~S~~I~~G~~A~~G~~H~~N~~L~~N~~V~~T~~G~~S~~S~~V~~A~~G~~D~~N~~R~~V~~S~~L~~V~~A~~G~~N~~N~~L~~N~~I~~G~~ 2024
 : * * : * * . . * * * * : : * * * * * * * * * * * * * * * * * * : :

EC93 **AATSTDT~~S~~WR~~F~~K~~E~~T~~K~~T~~S~~G~~L~~T~~G~~T~~G~~G~~I~~G~~F~~T~~T~~G~~S~~S~~K~~T~~T~~H~~D~~R~~R~~E~~A~~G~~T~~T~~Q~~S~~Q~~S~~A~~S~~T~~I~~G~~S~~T~~A~~G~~N~~V~~S** 2235
 STECO31_IV M~~L~~T~~E~~S~~N~~R~~E~~T~~H~~L~~K~~Q~~E~~K~~K~~S~~G~~L~~M~~S~~S~~G~~V~~G~~F~~S~~V~~G~~S~~Q~~S~~L~~K~~V--**RDTATDTTQKGSTVGSVHG~~D~~V** 2082
 * . : : . : * * * . *

EC93 **ITAG~~Q~~A~~H~~I~~S~~G~~S~~D~~V~~I~~A~~N~~R~~D~~I~~S~~I~~T~~G~~S~~V~~V~~V~~D~~P~~G~~H~~R~~R~~T~~V~~D~~E~~K~~F~~E~~Q~~K~~S~~G~~L~~T~~V~~A~~L~~S~~G~~A~~V~~G~~S~~A** 2295
 STECO31_IV **LQAGNRLTVNGSDLIAGRDMALSGKEVSI~~T~~A~~A~~T~~D~~Q~~H~~V~~Q~~T~~H~~T~~V~~E~~Q~~K~~T~~S~~G~~L~~T~~L~~A~~L~~S~~G~~T~~V~~G~~S~~A~~** 2142
 : * * : : . * * * * * * * * * * * * * * : . * : . . * * * * * * * * * * * *

EC93 IN~~N~~A~~V~~T~~M~~A~~R~~E~~A~~K~~E~~T~~S~~D~~S~~R~~L~~A~~A~~L~~K~~G~~T~~Q~~A~~V~~L~~S~~G~~V~~Q~~A~~G~~V~~N~~---H~~G~~L~~Q~~Q~~Q~~S~~A~~D~~P~~N~~N~~G~~I~~G~~V~~S~~I~~S~~L~~ 2352
 STECO31_IV L~~N~~T~~T~~V~~E~~T~~V~~Q~~A~~A~~K~~S~~A~~G~~N~~S~~R~~L~~E~~A~~L~~Q~~G~~V~~K~~A~~A~~L~~S~~G~~A~~Q~~A~~V~~Q~~A~~G~~R~~L~~A~~D~~A~~Q~~G~~A~~D~~A~~G~~N~~N~~N~~T~~V~~G~~I~~S~~L~~S~~Y~~ 2202
 : * : * . : * * . : * * * * * * * * * * * * * * . * . * * * * : * : *

EC93 NHQOSKSETKYQHDIVSGSTLSAGNNVSVTATGKNKDHNNSGDMLITGSQIKSGNDTSLN 2412
 STECO31_IV GSQSSKSEQOSEQTVAKGSTLTAGNNLSIQATGSGVK-GVDGDLTIQGSQIKAGNNVLLQ 2261
 . *.***** : :: :..*****:*****:*. **.. . . .** : * *****:***. *:

EC93 AQNDILLAAAADTRQTTGKNSSKGGVGVVSGGGTNGGGLSIFAGINGSEGREKNGTTW 2472
 STECO31_IV ANRDVNLVSAENTSKLEGKNTSSGGVGVGVGVSGGWGISVSASANQKGSEKNGTTH 2321
 :.: *.:* :* : ***:*.***.***..* *:.* ***: *. * .:* *****

EC93 TETTLDAGKNVSLTSGRDTTLLSGAQVSGEKVTADVGNLTISSLQSDRYDSRQNRVAAG 2532
 STECO31_IV TETTVDAGNRLTIISGRDTTLLTGAQAGGETVKVDAGRHLTLTSEQSDRYDSKQONASAG 2381
 *****:***:..::: *****:***..***..***..***:***:* *****:***:..:***

EC93 GSFTFGSMGSGYASISQDKIKSNYDSVREQSGIYAGKDGFDVTVGNHTQLNGAVIASTA 2592
 STECO31_IV GSFTFGSMGSSASVNLRSRDKMHSNYDSVQEQTGIFAGRGGFDVTTGQHTQLNGAVIASTA 2441
 *****:***. .:*:***:*****:***:***:***:*****.*:*****:*****

EC93 TDDKNSLNTNTLWSDIHNQADYKASHTGISLGGSGMSASQMVASNAIAGAANALTGMS 2652
 STECO31_IV TADKNRLDTGTGLGFSDIENRADFKTEHQAGLSTGGSV-----AGNFLGNMANNLLVGA 2495
 * *** *:*.*****:***.*:***:*. * . ** *..: *.* :.. ** * :

EC93 GSSGHAEGTTSSAISGNNLIIRNKESQKQDIAGLSRDPENANGSIAPIFDREKEQKRLQE 2712
 STECO31_IV NHEGHADSTTQSAVSAGNITIRDTKSQKQDVADLNRDAAHANQTLSPIFDREKEHQRLQO 2555
 . .***:*.***:*.***: **:.*****:*.*** ** :** :*:*****:***:

EC93 AQVISQISQMSNIVMTYGETEAMKAARKEHPGMSDA-----QLRETPEY 2757
 STECO31_IV AOLIGEIGNQVADIARTEGQIAGEKAKRDPAA-LNQARAELEAAGKPFTEQDVAQRAYNN 2614
 :*:*.*:***. * *: . ** * . ::* : : :

EC93 REVMKGYGTGSTPQMVVQAITGVLGGLNAGNPGQVLGGLNPAVAQLIKQATGD----- 2811
 STECO31_IV GMAASGFGTGKQYQAIQAATAAVQGLAGGNLSAALAGGAAPYLAEVVKTMTTDPVTGEV 2674
 . .*:***. * .:* ** *..: ** .** . ***** * :*:*** * *

EC93 NREANLMAHAVWGALAAQLGGNNAASGAAGAFSGELAARYIIDNYYGGRTDNLSQEERQO 2871
 STECO31_IV NKAANVTAHAVVNAALAVAQGNALAGAAGAATGEMVG-MIATQMYGKSVSGLSETEKOT 2733
 *: ** : **** .* * ***** :***** :***:.. * : ** ...*** *:

EC93 ISMLATIASGIAGGLVGNSTSAAGTGAQAGRNSVENNAMSGLGFGTGFQSYVQAQEAALV 2931
 STECO31_IV LSTLATVAAGLAGGLVGNSSGASAVAGAQSCKTTIENNSMSGLVPPRVQDA-----SLA 2787
 :* ***:***:*****:*** :** :***:***:..:***:***** . : : :*.

EC93 NNTNLTDKNGKVLNPNATPEEIKYASDKLVTGSIPEGQDPARGLLISWGAGASVFGGELIA 2991
 STECO31_IV FDPSQO---GK-----SAEEISDA-----IGASHMGPSWGTTYKV---HPIV 2823
 : . ** : ***. * * : ***: .* . *.

EC93 PAVGTVAVIGGTLGTTDAVKQFLTLKPEQYSTTDTLIAAGEGGLTQKGKVFSTFIN 3051
 STECO31_IV QAGGDVSFIRGYTLNGTIDDN--HISVNOQDIYSIGA----HGGASLGLSFGPYFPGLIN 2877
 * * *:.* * *.*** * .:***: ** ** * ..* . * * :**

EC93 TMGAYLG-SKAKGEDPTGPMVGNALGALGNKAGDKFTKEMLSRFGSVTSEVTGT-VTG 3109
 STECO31_IV TNNNDYSINGGFGVGS-----GITMG-KDGVSTFTG-VGPSWGSATEIKGVDVNG 2927
 * . . . * . : * :** * * .** :. .:* :***:*. **

EC93 SVIGTVTDYQIEKLGKGNKEGAK 3132
 STECO31_IV TSTNEIYRYDFK----- 2939
 : . : * : :

Figure S3. Alignment of class I CdiA^{EC93} and class IV CdiA^{STEC4} effector proteins. The amino acid sequences of CdiA^{EC93} (AAZ57198.1) and CdiA^{STEC4} (WP_001081258.1) were aligned using Clustal Omega at <http://www.uniprot.org>. Domains and peptide motifs are outlined as determined by the NCBI Conserved Domains sequence analysis site. Pink bold-face indicates the Sec-dependent signal peptide; green indicates the hemagglutinin activity domain (Pfam: PF05860); blue indicates FHA-1 peptide repeats (Pfam: PF05594); orange indicates FHA-2 peptide repeats (PF13332), yellow indicates the pre-toxin-VENN domain (PF04829); and purple indicates the variable CdiA-CT toxins. The receptor-binding domain of CdiA^{EC93} is shown in black bold-face. CdiA^{STEC4} residues Cys1243 and Lys1467 are rendered in red bold font.