CLUSTAL O(1.2.4) sequence alignment (SKK Lp Factor C sequence)

3 horseshoe crab species: Limulus polyphemus, Carcinoscorpius rotundicauda, Tachypleus tridentatus

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Limulus             MVLASFLVSGLVLGLLAQQMHPVQSRGVDLGLCDDTRFECKCGDPGYVFNVPAKQCTYFY   60
Carcinoscorpius     MVLASFLVSGLVLGLLAQKMRPVQSKGVDLGLCDETRFECKCGDPGYVFNIPVKQCTYFY   60
Tachypleus          MVLASFLVSGLVLGILAQQMRPVQSRGVDLGLCDETRFECKCGDPGYVFNVPMKQCTYFY   60
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Limulus             RWRPYCKPCDKLEAKDVCPKYKRCQECRAGLDSCVSCPPNKYGTWCSGECQCKNGGICDQ   120
Carcinoscorpius     RWRPYCKPCDDLEAKDICPKYKRCQECKAGLDSCVTCPPNKYGTWCSGECQCKNGGICDQ   120
Tachypleus          RWRPYCKPCDDLEAKDICPKYKRCQECKAGLDSCVTCPPNKYGTWCSGECQCKNGGICDQ   120
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Limulus             RTGACTCRDRYEGVHCEILQGCPLLQSDPQVQEVKNPPNDPQTIDYSCSPGFKLKGVARI   180
Carcinoscorpius     RTGACACRDRYEGVHCEILKGCPLLPSDSQVQEVRNPPDNPQTIDYSCSPGFKLKGMARI   180
Tachypleus          RTGACTCRDRYEGAHCEILKGCPLLPSDSQVQEVRNPPDNPQTIDYSCSPGFKLKGVARI   180
                    *****:*******.*****:***** ** *****:***::****************:***

Limulus             TCLPNGQWSSFPPKCIRECSMVSSLEHGKVNSPSADLIEGATLRFSCDSPYYLIGQETLT   240
Carcinoscorpius     SCLPNGQWSNFPPKCIRECAMVSSPEHGKVNALSGDMIEGATLRFSCDSPYYLIGQETLT   240
Tachypleus          SCLPNGQWSSFPPKCIRECAKVSSPEHGKVNAPSGNMIEGATLRFSCDSPYYLIGQETLT   240
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Limulus             CQGNGQWSGQIPQCQKLVFCPDLDPVSHAEHQVKIGLEQKYGQFPQGTEVTYTCTGNYFL   300
Carcinoscorpius     CQGNGQWNGQIPQCKNLVFCPDLDPVNHAEHKVKIGVEQKYGQFPQGTEVTYTCSGNYFL   300
Tachypleus          CQGNGQWSGQIPQCKKLVFCPDLDPVNHAEHQVKIGVEQKYGQFPQGTEVTYTCSGNYFL   300
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Limulus             MGLDTLKCNPDGSWSGTQPSCVKVADREVNCDSKAVDFLDDVGEPVRIHCPAGCSLTAGT   360
Carcinoscorpius     MGFDTLKCNPDGSWSGSQPSCVKVADREVDCDSKAVDFLDDVGEPVRIHCPAGCSLTAGT   360
Tachypleus          MGFNTLKCNPDGSWSGSQPSCVKVADREVDCDSKAVDFLDDVGEPVRIHCPAGCSLTAGT   360
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Limulus              VWGTAIYHELSSVCRAAIHAGKVPNSGGAVHVVNNGPYSDFLASDLNGIKSDELKSLAQS   420
Carcinoscorpius      VWGTAIYHELSSVCRAAIHAGKLPNSGGAVHVVNNGPYSDFLGSDLNGIKSEELKSLARS   420
Tachypleus           VWGTAIYHELSSVCRAAIHAGKLPNSGGAVHVVNNGPYSDFLGSDLNGIKSEELKSLARS   420
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Limulus              FRFDYVSSSTAGRKSGCPDGWFEIEENCVYVTSKQRAWERAQGVCTNMAARLAVLDKDVI   480
Carcinoscorpius      FRFDYVRSSTAG-KSGCPDGWFEVDENCVYVTSKQRAWERAQGVCTNMAARLAVLDKDVI   479
Tachypleus           FRFDYVSSSTAG-RSGCPDGWFEVEENCVYVTSKQRAWERAQGVCTNMAARLAVLDKDLI   479
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Limulus              PSSLTETLRGKGLATTWIGLHRLDADNHFIWELMDRSSVALNDSLTFWAPGEPGNETNCV   540
Carcinoscorpius      PNSLTETLRGKGLTTTWIGLHRLDAEKPFIWELMDRSNVVLNDNLTFWASGEPGNETNCV   539
Tachypleus           PSSLTETLRGKGLTTTWIGLHRLDAEKPFVWELMDRSNVVLNDNLTFWASGEPGNETNCV   539
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Limulus              YLDIQDQLQPVWKTKSCFQPSSFVCMMDLSDKNKAKCKDPGPLENGHAKLHGQSIDGFYA   600
Carcinoscorpius      YMDIQDQLQSVWKTKSCFQPSSFACMMDLSDRNKAKCDDPGSLENGHATLHGQSIDGFYA   599
Tachypleus           YLDIRDQLQPVWKTKSCFQPSSFACMMDLSDRNKAKCDDPGPLENGHATLHGQSIDGFYA   599
                     *:**:**** ************.*******:*****.*** ******.***********

Limulus              GSSVRYSCEVLHYLSGTETVSCTSNGTWSAPKPRCIKVITCQTPPVPSYGSVDIKPPSRT   660
Carcinoscorpius      GSSIRYSCEVLHYLSGTETVTCTTNGTWSAPKPRCIKVITCQNPPVPSYGSVEIKPPSRT   659
Tachypleus           GSSIRYSCEVLHYLSGTETVTCTTNGTWSAPKPRCIKVITCQNPPVPSYGSVEIKPPSRT   659
                     ***:****************:**:******************.*********:*******

Limulus              NSISRVGSPFLRLPRLPLPLARAAGPPPKPRSAPPSTVDLSSKVKLPEGHYRVGSQAIYT   720
Carcinoscorpius      NSISRVGSPFLRLPRLPLPLARAAKPPPKPRSSQPSTVDLASKVKLPEGHYRVGSRAIYT   719
Tachypleus           NSISRVGSPFLRLPRLPLPLARAAKPPPKPRSSQPSTVDLASKVKLPEGHYRVGSRAIYT   719
                     ********************** *******: ******:**************:****

Limulus              CESRYYELLGSQGRRCDSNGKWSGRPASCIPVCGRSDSPRSPFIVNGNSTEIGQWPWQAG   780
Carcinoscorpius      CESRYYELLGSQGRRCDSNGNWSGRPASCIPVCGRSDSPRSPFIWNGNSTEIGQWPWQAG   779
Tachypleus           CESRYYELLGSQGRRCDSNGNWSGRPASCIPVCGRSDSPRSPFIWNGNSTEIGQWPWQAG   779
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Limulus              ISRWLADHNMWFLQCGGALLNEKWIITAAHCVTYSATAEIIDPSQFKFYLGKYYRDDSKD   840
Carcinoscorpius      ISRWLADHNMWFLQCGGSLLNEKWIVTAAHCVTYSATAEIIDPNQFKMYLGKYYRDDSRD   839
Tachypleus           ISRWLADHNMWFLQCGGSLLNEKWIVTAAHCVTYSATAEIIDPSQFKIYLGKYYRDDSRD   839
                     *****************:*******:*****************.***:**********:*

Limulus              DDYVQVREAIEIHVNPNYDPGNLNFDIALIQLKTSVALTTRVQPICLPTDLTTRENLKEG   900
Carcinoscorpius      DDYVQVREALEIHVNPNYDPGNLNFDIALIQLKTPVTLTTRVQPICLPTDITTREHLKEG   899
Tachypleus           DDYVQVREALEIHVNPNYDPGNLNFDIALIQLKTPVTLTTRVQPICLPTDITTREHLKEG   899
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Limulus              ALAVVTGWGLNENNTYSEMIQQAVLPVVAASTCEQGYQDSGLPLTVTENMFCAGYKQGRY   960
Carcinoscorpius      TLAVVTGWGLNENNTYSETIQQAVLPVVAASTCEEGYKEADLPLTVTENMFCAGYKKGRY   959
Tachypleus           TLAVVTGWGLNENNTYSEMIQQAVLPVVAASTCEEGYKEADLPLTVTENMFCAGYKKGRY   959
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Limulus              DACSGDSGGPLVFADDSRTDRRWVLEGIVSWGSPNGCGKSNQYGGFTKVNVFLSWIRQFI  1020
Carcinoscorpius      DACSGDSGGPLVFADDSRTERRWVLEGIVSWGSPSGCGKANQYGGFTKVNVFLSWIRQFI  1019
Tachypleus           DACSGDSGGPLVFADDSRTERRWVLEGIVSWGSPSGCGKANQYGGFTKVNVFLSWIRQFI  1019
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Key:

- * : Fully conserved residues.
- : : Conservation between groups of strongly similar properties (Gonnet PAM 250 score > 0.5).
- . : Conservation between groups of weakly similar properties (Gonnet PAM 250 score ≤ 0.5).
- ␣ : Non-conserved residues.

Note: I scored a residue as a non-conservative substitution in Limulus (red highlight) only if it was identified as non-conservative in this Clustal Omega alignment AND the Limulus sequence differed from BOTH of the other species for which Factor C sequence was available prior to 2013.

OVERALL non-conservative substitutions = 11/1020 = 1.1%; overall similarity = 98.9%