

**Supporting File 1.** All 50 full-length MLSML superfamily sequences.

>ML.coronatus.TRINITY\_DN558\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_556.60 0  
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>ML.ebraeus.TRINITY\_DN659\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_41951.58 1  
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>ML.rattus.TRINITY\_DN825\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_2206.26 5  
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>ML.rattus.TRINITY\_DN825\_c0\_g1\_i3\_1 supFam\_MLSML tpm\_2127.53 6  
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>ML.SRR14407584.C.abbreviatus.TRINITY\_DN11\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_994.28 16  
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>ML.SRR14407587.C.aristophanes.TRINITY\_DN475\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_339.89 17  
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>ML.SRR15402271.C.textile.TRINITY\_DN602\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_2188.42 18  
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>ML.SRR1544627.C.miliaris.TRINITY\_DN3169\_c0\_g1\_i1\_1 supFam\_MLSML tpm\_511.66 20  
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>ML.SRR17653514.C.judaeus.TRINITY\_DN505\_c0\_g1\_i2\_1 supFam\_MLSML tpm\_1597.20 21  
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>ML.SRR17653514.C.judaeus.TRINITY\_DN740\_c0\_g1\_i3\_1 supFam\_MLSML tpm\_2116.13 22  
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>ML.SRR2124878.C.betulinus.TRINITY\_DN401\_c0\_g1\_i2\_1 supFam\_MLSML tpm\_13467.75 23  
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>ML.MLSML-Gm1\_gloriamaris.TRINITY\_DN3174\_c0\_g1\_i2\_1 supFam\_MLSML tpm\_354.33 25  
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>ML.MLSML-Gm2\_gloriamaris.TRINITY\_DN3174\_c0\_g1\_i3\_1 supFam\_MLSML tpm\_365.71 26  
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>ML.DAZ86972.1 TPA\_inf: conotoxin precursor Tpra06 [Conus judaeus] 27  
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>ML.UMA83964.1 conotoxin precursor Tpra06 [Conus judaeus] 28  
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PPRRG

>ML.DAZ86971.1 TPA\_inf: conotoxin precursor Tpra06 [Conus judaeus] 29

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>ML.UMA83620.1 conotoxin precursor Tpra06 [Conus judaeus] 30  
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>ML.UMA83315.1 conotoxin precursor Tpra06 [Conus judaeus] 31  
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>ML.UMA82655.1 conotoxin precursor Tpra06 [Conus ebraeus] 32  
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>ML.UMA82382.1 conotoxin precursor Tpra06 [Conus ebraeus] 33  
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>ML.UMA82383.1 conotoxin precursor Tpra06 [Conus ebraeus] 34  
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>ML.UMA83966.1 conotoxin precursor Tpra06 [Conus judaeus] 35  
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>ML.UMA82654.1 conotoxin precursor Tpra06 [Conus ebraeus] 36  
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>ML.UMA83967.1 conotoxin precursor Tpra06 [Conus judaeus] 37  
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>ML.DAZ86973.1 TPA\_inf: conotoxin precursor Tpra06 [Conus judaeus] 39  
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>ML.AXL95365.1 conotoxin-like precursor unassigned superfamily 13 [Conus ermineus] 42  
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>ML.ATF27771.1 conotoxin [Conus praecellens] 45  
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>ML.QFQ61139.1 superfamily Cerm-13 [Conus magus] 46  
MLSMLAWTLMTAMVVMNAKSQYCPTMRDSYPKQHECLYKNALCGKEDSGGRCSSICNCKNGQMCSTDRDHNVTIVIHENTLPKKRYITCLSLWRLNECSETEKALHRLTHRTKELKSVKVLRCRCPYPKAYVTLESRYRYTCALVQ VLGD

>ML.UBT01704.1 conotoxin precursor superfamily Tpra 06, partial [Conus ammiralis] 47

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PYYTEDGPYEKKYYTCGDPSELDECYDIDKALEVNESDDPNSVEVLCHCPSDQIYLWIHLQYYICTPPPQDI  
>ML.UMA83598.1 conotoxin precursor Cver06 [Conus judaeus] 55  
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>ML.UMA82347.1 conotoxin precursor Cver06 [Conus ebraeus] 56  
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>ML.UMA82346.1 conotoxin precursor Cver06 [Conus ebraeus] 57  
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>ML.UMA82627.1 conotoxin precursor Cver06 [Conus ebraeus] 59  
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>ML.GCVH01000118.1 TSA: Conus lenavati Cln\_SF2\_1 transcribed RNA sequence 62  
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