

Figure S2. Primer-binding sites (PBSs) of *Helenus* families. The tRNA sequence is shown in red in the reverse orientation. The enzymatically added 3' terminal CCA is shown in lowercases. The PBS nucleotides complementary to the tRNA are highlighted in yellow. **(A)** *Helenus* from hymenopteran insects. **(B)** *Helenus* from vertebrates. **(C)** *Helenus* from bivalves. tRNA sequences are from *Apis mellifera* for hymenopteran insects, *Homo sapiens* for vertebrates, and *Aplysia californica* for bivalves.

(A)

tRNA-Lys-CTT	3'-accGCGGGUUGCACCCCGAG-5' (<i>A. mellifera</i>)
BEL-4 NVi-I.	TTT TGGCGCC GAACAGGGACCT
Gypsy-16-I NVi	T TGGCGCC ACTTCGTGGGT
Helenus-1_MeDo-I	TGGCGCCCA CTAAACGACC
Helenus-1_PhiTri-I	TGGCGCCCA CTAATAAATC
Helenus-2_EuAn-I	AC TGGCGCCCA CTAAATAACC
Helenus-4_MusRap-I	TGGCGCCCA CTGAAATACC
Helenus-1_MusRap-I	TGGCGCCCA CTGAATAACC
ULTR-1-I NVi	TGGCGCCCA CTGAATTACC
Helenus-2_PhiTri-I	AA TGGCGCCCA CTCAATAACC
Helenus-2_NVit-I	TGGCGCCCA CTCAAAAACC
Helenus-3_PtePup-I	TGGCGCCCA CTCAAAAACC
Helenus-3_TheEle-I	AA TGGCGCCCA CTCAAAAACC
Helenus-2_EuAd-I	T TGGCGCCCA CTAAAAAACC
Helenus-1_EuAd-I	TT TGGCGCTCA CTAAAAAACC
Helenus-2_PtePup-I	TGGCGCTCA CTGAATTACC
Helenus-1_TrSa-I	TGGC-CCCA CTGAATTACC
tRNA-Leu-AAG	3'-accACCGUGCCACCCU-5' (<i>A. mellifera</i>)
Gypsy-130_CGi-I	TAAATT TGGTGGCAG CGAGCGGT
Gypsy-57_CaAu-I	TT TGGTGGCAG CGGT GGGA
Helenus-2_TheEle-I	AAG TGGTGGCAG CTAATGGG
tRNA-Leu-CAG	3'-accACAGUCUUCACCCU-5' (<i>A. mellifera</i>)
Gypsy-28-I NVi	TTT TGGTGTCA GAAT TGG TT
Helenus-3_EuAn-I	TT TGGTGTCA GAAGCAGGA
tRNA-Trp-CCA	3'-accACUGGGGUGCACUAA-5' (<i>A. mellifera</i>)
Gypsy-32-I NVi	T TGGTGACCCG AC GTGAT T
Helenus-2_SyJa-I	TGGTGACCCG ACACTGCT
tRNA-Arg-TCT	3'-accGUAGGGAACGCCCUA-5' (<i>A. mellifera</i>)
Gypsy-31 NVi-I	TC TGGCATCC CT AC GTGGGG
Helenus-1_TheEle-I	GATGGCATCCCT TG TGTGTC
Helenus-2_MusRap-I	TTCTGGCATCCCT TG TGGGGA
Helenus-2_GasPul-I	AAG TGGCATCTCT TGTGGGGA
Helenus-1_GasPul-I	TTCTGGCAT MCCT TGTGAGG
Helenus-4_NVit-I	CT TGGCATCC CTTGTGCGG
Helenus-1_PtePup-I	CT TGGCATCC CTTGTGCGG
Helenus-3_NVit-I	TTCTGGCATCCCT TA CGGGGG
Helenus-1_CeFu-I	CT TGGCATCC CTGATGGGGA
Helenus-2_TrSa-I	TTCTGGCATCCCT GT TGCGGA
Helenus-3_PhiTri-I	TTCTGGCATCCCT GT TACGGG

(B)

tRNA-His-GTG	3'-accACGGCACUGAGCCUAA-5' (<i>H. sapiens</i>)
Helenus-1_TrDa-I	TT TGTGCCGTGAC CCGGAT T
Helenus-1_ChCh-I	TACAT TGGTGCCGTGAC CCGGATG
LTR-11_DR-I	TGGTGCCGTGAC CCGGATG
tRNA-Leu-CAA	3'-accACAGUCUUCACCCUAAAGCUU-5' (<i>H. sapiens</i>)
Helenus-1_AcRu-I	TGGTGTCA GAAGTGGGAT G
Helenus-1_PolSpa-I	TGGTGT SAGAAGTGGGAC G
tRNA-Lys-CTT	3'-accGCGGGUUGCAUCCCGAGUUU-5' (<i>H. sapiens</i>)
LTR1_LCh	ATGGCGCCCA CT CGATGGCTT
LTR2_LCh	ATGGCGCCCA CT CGATGGCTT

(C)

tRNA-Lys-CTT	3'-accGCGGGUUGCUCCCG-5' (A. californica)
Gypsy-125_CGi-I	AATGGCGGCCAACGTGATTG
Helenus-3_CGi-I	TTTGGCGCCCAACGTACAAA
Helenus-4_SaGl-I	TTTGGCGCCCAACGTACAAA
Helenus-3_CVi-I	TTTGGCGCCCAACGTAGATA
Helenus-1_PiIm-I	ATGGCGCCCAACGTAAATC
Helenus-4B_SaGl-I	TTTGGCGCCCAACGAAAATA
Helenus-1_PiNo-I	AATGGCGCCCA-CGTTGGGA
Helenus-1_MiYe-I	TTGGCGCCCA-CGTAGGGA
Helenus-3_MiYe-I	TTGGCGCCCA-CGTAGGGA
Helenus-1_CGi-I	TTTGGCGCCCA-CGTTGGGA
Helenus-3_SaGl-I	TTTGGCGCCCA-CGTTGGGA
Helenus-2_ArIr-I	TTGGCGCCCA-TGTAGGGA
Helenus-1_PeMa-I	TTGGCGCCCA-TGTAGGGA
Helenus-2_CVi-I	TTTGGCGCCCA-TGTTGGGA
Helenus-1_LimFor-I	TTTGGCGCCCACTGAAAAA
Helenus-3_MyGa-I	TTTGGCGCCCACTAAAAAC
Helenus-6_SaGl-I	TTGGCGCCCACTAAAAAA
Helenus-1_MyCo-I	TTGGCGCCCACTAAAAAA
Helenus-2_PeMa-I	AAATGGCGCCCACTAAAAATA
Helenus-5_PiIm-I	GAATTGGCGCCCACTAAATGA
Helenus-3_ArIr-I	TTGGCGCCCACTAAATAA
Helenus-1_BaPl-I	TTGGCGCCCACTAAATAA
Helenus-1_ArIr-I	GAATGGCGCCCACTAAATAA
Helenus-1_MyGa-I	TTGGCGCCCACTAAATAA
Helenus-1_MoPh-I	TTTGGCGCCCACTAAAAAAC
Helenus-1B_MoPh-I	TTTGGCGCCCACTAAAAAAC
tRNA-His-GTG	3'-accACGGCA-CUGGUCCUAAGC-5' (A. californica)
Gypsy-39_CGi-I.	TTATTGGTGCCGT-GACCAGGA
Helenus-3_PeMa-I	TTGGTGCCCGACCACTC
Helenus-4_ArIr-I	TTGGTGCCGTAGACCACTC
Helenus-2_SaGl-I	-----GATTGGTGCCGTTGACCACTC
Helenus-4_PeMa-I	-----GATTGGTGCCGTTGACCACTC
Helenus-5_PeMa-I	TTTGGTGCCGTTGACCACTC
Helenus-2C_CGi-I	TTTGGTGCCGT-GACCAACC
Helenus-1_SaGl-I	TTTGGTGCCGT-G-CCATGC
Helenus-4_MiYe-I	-----AATTGGTGCCGTTGACCTC
Helenus-2_CGi-I	TTTGGTGCCGT-GACCTGCC
Helenus-1_CVi-I	TTTGGTGCCGT-GACCTGCC
Helenus-2B_CGi-I	GATGGTGCCGT-GGCTTCC
Helenus-2_PiIm-I	TTTGGTGCCGT-GAGAGTGA
tRNA-His-GTC	3'-accAC-GGCACUGGUCCUA-5' (A. californica)
Gypsy-39_CGi-I	TTATTGGTG-CCGTGACCAGGAT
Helenus-4_PiIm-I	GTACAGTATTGGTG-CCGTGAGAGTGAA
Helenus-4_CVi-I	-----TTTGGTG-CCATGGGCTTCCC
Helenus-2_MiYe-I	-----TGGGTTCGTGGGCTCCC
tRNA-Ile-AAT	3'-accACCGGUCAUACCCCC-5' (A. californica)
Gypsy-167_CGi-I	TTTGGTGCCAGTGTGGGGG
Helenus-5_SaGl-I	-----TTTGGTGCCAGTGTGGGGG
Helenus-2_TeGr-I	-----GTTGGTGCCAGTGTGGCCC
tRNA-Pro-AGG	3'-accCCCGAGCAGGCCCUA-5' (A. californica)
Gypsy-13_CGi-I	--TAAATATTGGGGGCTCGCTCCGAGG
Helenus-1_TeGr-I	-----TTGGGGCTCGTCCAACCC
tRNA-Glu-NNN	3'-accGCAGCGAUGGGCCUAA-5' (A. californica)
Helenus-2_PiNo-I	-----CTGGCGTCGC CGTAAATGG
Helenus-3_PiNo-I	-----ATGGCGTCGC CGGAAACCG
tRNA-Ser-TGA	3'-accGCGACGCGCGUCCUAA-5' (A. californica)
Helenus-2_LimFor-I	-----TTGGCGCTGC GAGCAACAAC
Helenus-2_MyGa-I	-----TTGGCGCTGC GAGCAATTAC
Helenus-2_MoPh-I	-----TTGGCGCTGC GAGCACTTAC
tRNA-Ser-GCT	3'-accGCUGUCCUACCCCUAA-5' (A. californica)
Helenus-3_PiIm-I	-----TTGGCGACGAGGTGAACAAT
Helenus-6_PiIm-I	-----CTGGCGACGAGGTGAACAAT