

SUPPLEMENTARY MATERIALS

to the article A.M. Kondybayeva et al. "The characteristics of miRNA binding sites in mRNA of *ZFH3* gene and its orthologs"

Supplementary table 1. The list of abbreviations of animal species, used in the article

Full name	Abbreviations	Full name	Abbreviations
<i>Acinonyx jubatus</i>	<i>Aju</i>	<i>Lipotes vexillifer</i>	<i>Lve</i>
<i>Ailuropoda melanoleuca</i>	<i>Ame</i>	<i>Loxodonta africana</i>	<i>Laf</i>
<i>Alligator mississippiensis</i>	<i>Ami</i>	<i>Macaca fascicularis</i>	<i>Mfa</i>
<i>Anas platyrhynchos</i>	<i>Apl</i>	<i>Macaca mulatta</i>	<i>Mml</i>
<i>Anser cygnoides domesticus</i>	<i>Acy</i>	<i>Mus musculus</i>	<i>Mmu</i>
<i>Balaenoptera acutorostrata</i>	<i>Bac</i>	<i>Myotis davidii</i>	<i>Mda</i>
<i>Bos indicus</i>	<i>Bin</i>	<i>Nannospalax galili</i>	<i>Nga</i>
<i>Bos mutus</i>	<i>Bmu</i>	<i>Nomascus leucogenys</i>	<i>Nle</i>
<i>Bos taurus</i>	<i>Bta</i>	<i>Ornithorhynchus anatinus</i>	<i>Oan</i>
<i>Camelus dromedaries</i>	<i>Cdr</i>	<i>Oryctolagus cuniculus</i>	<i>Ocu</i>
<i>Camelus ferus</i>	<i>Cfe</i>	<i>Ovis aries</i>	<i>Oar</i>
<i>Canis familiaris</i>	<i>Cfa</i>	<i>Pan paniscus</i>	<i>Ppa</i>
<i>Capra hircus</i>	<i>Chi</i>	<i>Pan troglodytes</i>	<i>Ptr</i>
<i>Castor canadensis</i>	<i>Cca</i>	<i>Panthera tigris altaica</i>	<i>Pti</i>
<i>Chelonia mydas</i>	<i>Cmy</i>	<i>Pantholops hodgsonii</i>	<i>Pho</i>
<i>Chlorocebus sabaeus</i>	<i>Csa</i>	<i>Peromyscus maniculatus</i>	<i>Pma</i>
<i>Coturnix japonica</i>	<i>Cja</i>	<i>Pongo abelii</i>	<i>Pab</i>
<i>Cricetulus griseus</i>	<i>Cgr</i>	<i>Pseudopodoces humilis</i>	<i>Phu</i>
<i>Equus asinus</i>	<i>Eas</i>	<i>Pteropus alecto</i>	<i>Pal</i>
<i>Equus caballus</i>	<i>Eca</i>	<i>Rattus norvegicus</i>	<i>Rno</i>
<i>Equus przewalskii</i>	<i>Epr</i>	<i>Rhinolophus sinicus</i>	<i>Rsi</i>
<i>Falco peregrinus</i>	<i>Fpe</i>	<i>Rhinopithecus bieti</i>	<i>Rbi</i>
<i>Felis catus</i>	<i>Fca</i>	<i>Rhinopithecus roxellana</i>	<i>Rro</i>
<i>Ficedula albicollis</i>	<i>Fal</i>	<i>Saimiri boliviensis</i>	<i>Sbo</i>
<i>Gallus gallus</i>	<i>Gga</i>	<i>Sus scrofa</i>	<i>Ssc</i>
<i>Gorilla gorilla</i>	<i>Ggo</i>	<i>Tupaia chinensis</i>	<i>Tch</i>
<i>Heterocephalus glaber</i>	<i>Hgl</i>	<i>Ursus maritimus</i>	<i>Uma</i>
<i>Hipposideros armiger</i>	<i>Har</i>	<i>Xenopus tropicalis</i>	<i>Xtr</i>
<i>Homo sapiens</i>	<i>Hsa</i>		

Supplementary table 2. The list of miRNAs and their sequences (Londin et al., 2015)

miRNA	Sequence	miRNA	Sequence
mir-1-1819-3p	ccuccugccgccgccuccac	mir-11-29856-3p	uacugaguugcaguaggguauc
mir-1-2121-3p	ggcggcggcggcggcggggugggg	mir-12-32603-3p	ucuccuccuccuaccucaucc
mir-1-2770-3p	cuggcggaggccgcgaggaggga	mir-17-39416-3p	gccucgccgccccucugcugc
mir-2-6184-3p	gcaggaguggaggaggagguga	mir-18-39953-5p	ccgccccgccgccccggcgccc
mir-2-6862-5p	ccucuccgccaccuccaccgcg	mir-19-21199-3p	agggcggcggcggcggcggggg
mir-5-14114-5p	gcggggcgaggggaggaggga	mir-19-33623-3p	guggcggcggcggcggggugggg
mir-5-15733-3p	cuugcgcggccgccgccgcc	mir-19-43437-5p	ggguugggaaggugaugggggaa
mir-6-17815-3p	ccgucgccagcgcgccgccgc	mir-20-23817	ggggccggcggcggcggcgccggg
mir-9-20317-3p	ggcgcgccgccuccgccuccgcc	mir-x-48174-3p	uccuccgccaccuccgccccugcc
mir-9-25681-5p	cgcugcuccugcugcuacuga		

Supplementary table 5. Variability of amino acids encoded by the miR-2-8257-5p binding site in the mRNA of the orthologous *ZFH3* genes

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
QTYMEHHC PGARPPPPPPPP REESGSD	<i>Bin, Bta, Chi</i>
QTYMEHHC PGARPPPPPPPP .REESRSD	<i>Oar</i>
QTYMEHHC PSARPPPLREESASD	<i>Hsa, Nle, Pab, Ppa, Ptr, Sbo</i>
QTYMEHHC PSTRPPPLREESASD	<i>Csa, Mfa, Mml, Pro</i>
QTYMEHHC PGTRPPPLREESASD	<i>Cgr</i>
QTYMEHHC PGTHPPPALREESASD	<i>Mmu, Rno</i>
QTYMEHHC PSARPPRPLREESGSD	<i>Ame, Cfa, Fca, Laf, Mda, Pti</i>

Note: Here and in the tables below oligopeptides encoded by the miRNA binding sites highlighted in bold type.

Supplementary table 6. The amino acid regions of *ZFH3* orthologous proteins containing the octapeptide encoded by the miR-20-23817-3p binding site

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
MEGEEAL PAGSAAGPE QPQAGLL	<i>Aju, Ame, Csa, Cfa, Eca, Fca, Ggo, Har, Hgl, Hsa, Mfa, Nga, Nle, Pab, Ppa, Pti, Ptr, Rro, Rsi, Tch</i>
MEGEEAL PAGPAAGPE QPQAGIL	<i>Bac, Cfe, Lve, Pal</i>
MEGEEAL PAGPTAGPE QPQAGLL	<i>Bmu, Bta, Bin, Chi, Pho</i>

Supplementary table 7. Variability of amino acids encoded by miR-12-32603-3p binding sites
in mRNAs of the orthologous *ZFH3* genes

The region of ZFH3 protein with the oligopeptide, encoded by miRNA binding sites	Object
FSEKAEPAAEEEEEEEEEEEEEEEEVEEEEEDEEEEEEEEEDEGCKGLF	<i>Bac</i>
FSEKAEPAAEEEEVEEEEEEEEEAAEEEEEEEEEEEEEEEEDE . GCKGLF	<i>Cca</i>
FSEKAEPAAEEEEEEEEEEEEAAEEEEEEEEAAEEEEEEEEDE . GCKGLF	<i>Pal</i>
FSEKAEPAAEEEEEEEEEEEEAAEEEEEEEEEEEEEEEEDE . GCKGLF	<i>Hgl</i>
FSEKVEPAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEE . . GCKGLF	<i>Mmu</i>
FSEKAEPAAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Cgr</i>
FSEKAEPAAEEEEAAEEEEEEEEAAEEEEEEEEDEEEEEEEEEDE . . GCKGLL	<i>Ame</i>
FSEKVEPAEEEEAAEEEEEEEEAAEEEEDEEEEEEEEEEEEEDE . . GCKGLF	<i>Sbo</i>
FSEKVEPAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Csa, Ggo, Hsa, Mfa, Mml, Ptr</i>
FSEKAEPAAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Aju, Cfa, Chi, Eca, Fca, Pti, Rsi, Ssc, Tch</i>
FSEKAEPAAEEEEAAEEEEEEEEAAEEEEEEEEDEEEEEEEEE . . GCKGLF	<i>Pho, Bmu, Bta</i>
FSEKVEPAEEEEAAEEEEEEEEVEEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Rro</i>
FSEKAEPAAEEEEAAEEEEEEEEAAEEEEEEEEDEEEEEEEEEDE . . GCKGLF	<i>Cfe</i>
FSEKAEPAAEEEEAAEEEEEEEEVEEEEEEEEEDEEEEEEEEE . . GCKGLF	<i>Oar</i>
FSEKVEPAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Nle</i>
FSEKAEPAAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Nga</i>
FSEKVEPAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Rno</i>
FSEKAEPAAEEVEEEEEEEEEAAEEEEEEEEEEEEEEEEDE . . GCKGLF	<i>Har</i>
FSEKVEPAEEEEAAEEEEEEEEVEEEEEEEEEEEEEEEEEDE . . . GCKGLF	<i>Pab</i>
FSEKAEPAAEEEEEEEEEEEEAAEEEEEEEEEEEEEEEEDE GCKGLF	<i>Laf</i>
FSEKVEPAEEEEAAEEEEEEEEAAEEEEEEEEEEEEEEEEDE GCKGLF	<i>Ppa</i>

Supplementary table 10. Variability of amino acids encoded by the miR-11-29856-3p binding site in the mRNA of the orthologous *ZFH3* genes

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
LLPHFPMT TETLLQL QQQQHLLF	<i>Ggo</i>
LLPHFPMA TETLLQL QQQQHLLF	<i>Lve</i>
LLPHFPMT TETLLQL QQQQ . HLLF	<i>Acy, Aju, Ame, Ami, Apl, Bac, Bin, Bmu, Bta, Cca, Cdr, Cfa, Cfe, Cgr, Chi, Cja, Cmy, Csa, Eca, Eas, Epr, Fal, Fca, Fpe, Gga, Har, Hsa, Hgl, Laf, Mda, Mfa, Mml, Mmu, Oan, Oar, Ocu, Pab, Pal, Pho, Phu, Pma, Ppa, Pti, Ptr, Rbi, Rro, Rsi, Sbo, Ssc, Tch, Xtr, Uma</i>
LLPHFPMT TETLLQL QQHQ . HLLF	<i>Nga</i>
LLPHFPMT TETLLQL QQQ . HLLLF	<i>Rno</i>

Supplementary table 11. Variability of amino acids encoded by miR-5-14114-5p, miR-2-6184-3p and miR-19-43437-5p binding sites in mRNA of the orthologous *ZFH3* genes

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
PLRPQTPE PPPPPPPPPPPPPP LPAAAPPQF	<i>Laf</i>
PLRPQTPE PPPPPPPPPPPP . LPAAPPQQ	<i>Cfa</i>
PLRPQTPE PPPPPPPPPPPP . LPTAPPQF	<i>Fca</i>
PLRPQTPE PPPPPPPPPPPP . LPSAPPQF	<i>Pti</i>
PLRPQTPE PPPPPPPPPPPP . LPAAPPQF	<i>Ame, Uma</i>
PLRPQTPE PPPPPPPPPPPP . . LPAAPPQF	<i>Bac, Bin, Bta, Cgr, Chi, Csa, Hsa, Ssc, Ptr, Rro, Mda, Mfa, Mml, Ocu, Pab, Rno</i>
PLRPQTPE PPPPPPPPPPPP . . LPTAPPQF	<i>Mmu</i>
PLRPQTPE PPPPPPPPPPPP . . LPAAPPQA	<i>Eca</i>
PLRPQTPE PPPPPPPPPPPP . . LPPAPPQF	<i>Ami, Fpe, Gga</i>
PLRPQTPE PPPPPPPPPPPP . . LPTAPPQF	<i>Cmy</i>
PLRPQTPE PPPPPPPPPPPP . . . LPAAPPPP	<i>Lve</i>
PLRPQTPE APPPPPPPPPPPPP . . . ATPQF	<i>Xtr</i>

Supplementary table 12. Variability of amino acids encoded by the miR-3692-5p binding site in the mRNA of the orthologous *ZFH3* genes

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
MPFMLFDPS SNPLLASQ LLSGAIPQ	<i>Aju, Ame, Bac, Bin, Bmu, Bta, Cca, Cfa, Cfe, Chi, Cdr, Cgr, Csa, Eas, Eca, Epr, Fca, Ggo, Har, Hgl, Hsa, Laf, Lve, Mda, Mfa, Mmu, Mml, Nga, Nle, Oan, Oar, Ocu, Pab, Pal, Pho, Ppa, Pti, Ptr, Rbi, Rno, Rro, Rsi, Sbo, Ssc, Tch, Uma</i>
MPFMLFDPS SNPLLASQ LLSGTLPQ	<i>Acy, Ami, Apl, Cja, Cmy, Fal, Fpe, Gga, Phu, Pma</i>
MPFMLFDPS SNPLLASQ LLSGGLSQ	<i>Xtr</i>

Supplementary table 14. Variability of amino acids encoded by miR-671-5p and miR-6779-5p binding sites in mRNA of the orthologous *ZFH3* genes

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
QQPKASQ TPVPPGAP SPDKDPAK	<i>Hsa</i>
QQPKASQ TPVPPGAAS SPDKDPAK	<i>Bmu, Bin, Bta, Cfa, Chi, Ggo, Har, Mda, Oar, Oan, Pab, Ppa, Ptr, Pho, Rsi, Sbo, Ssc</i>
QQPKASQ TPVPSGAAS SPDKDPAK	<i>Csa, Mfa, Mml, Rbi, Rro</i>
QQPKASQ TPVPQCAAS SPDKDPAK	<i>Aju, Ame, Bac, Cca, Cdr, Cfe, Cgr, Eca, Eas, Epr, Fca, Hgl, Laf, Lve, Ocu, Pti, Uma</i>
QQPKASQ TPVPOGPA SPDKDPAK	<i>Mmu, Rno</i>
PQPKASQ TPVPPGAAS SPDKDPAK	<i>Pal</i>
QQPKASQ TPVPOGAT SPDKDPAK	<i>Nga</i>
QQPKGSQ TPVPAGAA TSPDKDPAK	<i>Acy, Ami, Apl, Cja, Fal, Fpe, Gga, Phu, Pma</i>
QQPKASQ TPVPPGAAS SPDKDPAK	<i>Nle</i>

Supplementary table 15. Variability of amino acids encoded by miR-17-39416-3p, miR-9-20317-3p, miR-1-1819-3p, miR-5-15733-3p, miR-6-17815-3p, miR-18-39953-5p, miR-2-6862-5p, miR-1260b and miR-X-48174-3p binding sites in mRNA of the orthologous *ZFH3* genes

The region of <i>ZFH3</i> protein with the oligopeptide, encoded by miRNA binding sites	Object
EMVLHVPT GGGGSGSGSGGNGSGGGNGGGGS YHCLACES	<i>Laf</i>
EMVLHVPT GGGGSGSGSGGGGGGGGGGGGS . YHCLACES	<i>Hsa</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGGGS . YHCLACES	<i>Csa</i>
EMVLHVPT GGGGSGSGSGSGGGSGSGGS . YHCLACES	<i>Cfe</i>
EMVLHVPT GGGGSGSGSGSGGGGGGGGS . . YHCLACES	<i>Ptr</i>
EMVLHVPT GGGGSGSGSGSGGGGGGGGGGS . . YHCLACES	<i>Pab</i>
EMVLHVPT GGGGSGSGVGGGGGGGGGGGS . . YHCLACES	<i>Cfa</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGS . . . YHCLACES	<i>Rro</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGGGS . . . YHCLACES	<i>Cca</i>
EMVLHVPT GGGGSGSGSGSGGGSGSGGS . . . YHCLACES	<i>Eca</i>
EMVLRVPT GGGGSGSGSGSGGGSGSGGS . . . YHCLACES	<i>Har</i>
EMVLHVPT GGGGSGSGGGGGGGGGSGGS YHCLACES	<i>Mfa, Mml</i>
EMVLHVPT GSGSGSGGGGGSGGGGGGS YHCLACES	<i>Mmu</i>
EMVLHVPT GSGGGGGGGSGGGGGGGGS YHCLACES	<i>Rno</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGS YHCLACES	<i>Nga</i>
EMVLHVPT GGGGSGSGSGSGGGSSGGGS YHCLACES	<i>Mda</i>
EMVLHVPT GGGGSGSGSGGGGGGGGS YHCLACES	<i>Fca</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGS YHCLACES	<i>Nle</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGGGS YHCLACES	<i>Lve</i>
EMVLHVPT GGGGSGSGSGGGGGSGSGGS YHCLACES	<i>Ame</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGS YHCLACES	<i>Sbo</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGGGS YHCLACES	<i>Bin, Bta, Chi</i>
EMVLHVPT GSGGGGGGGGGSGGS YHCLACES	<i>Hgl</i>
EMVLHVPT GGGGSGSGGGGGGGGGGGGS YHCLACES	<i>Ocu</i>
EMVLHVPT SSGGGGGGGGGGGS YHCLACES	<i>Cgr</i>
EMVLHVPT GGGGSGSGGGGS YHCLACES	<i>Bac</i>

Supplementary table 16. Variability of amino acids encoded by miR-19-21199-3p, miR-1-2770-3p, miR-1-2121-3p, miR-19-33623-3p, miR-5-14114-5p, miR-3960 and miR-2-6184-3p binding sites in mRNA of the orthologous *ZFH3* genes

The region of ZFH3 protein with the oligopeptide, encoded by miRNA binding sites	Object
SAAHSNDS PPPPS AAAPSSSSSASP HAS	<i>Chi, Eca, Ocu, Pho</i>
SAAHSNDS PPXPS AAAPSSSSSASP . HAS	<i>Tch</i>
SAAHSNDS PPPPS AAAPSSSSSASP . . HAS	<i>Bin, Bmu, Bta, Cfa, Fca, Har, Pal, Pti, Uma</i>
SAAHSNDS PPPLS AAAPSSSSSASP . . HAS	<i>Bac</i>
SAAHSNDS PPPLS AAAPSSFSASP . . HAS	<i>Lve</i>
SAAHSNDS PPPQS AAAPSSSSSASP . . HAS	<i>Mda</i>
SAAHSNDS PPPPS AAAPSSSSASP . . HAS	<i>Hgl</i>
SAAHSNDS PPPPS AA . PSSSASP . . HAS	<i>Mmu, Rno</i>
SAAHSNDS PPPLA A . PSSSASP . . HAS	<i>Cgr</i>
SAAHSNDS PPPPS AAAPSSASP . . . HAS	<i>Ggo, Hsa, Ptr, Ppa, Sbo</i>
SAAHSNDS PPPPS AAATPSSASP . . . HAS	<i>Csa, Mfa, Mml, Rro</i>
SAAHSNDS PPPPS AAAPPSASP . . . HAS	<i>Laf</i>
SAAHTNDS PPPSL SSSSSASP HAS	<i>Ami</i>
SAAHSNDS PPPPR PPPPASP HAS	<i>Cja, Gga, Phu</i>

Note: X – *Tch* PSP.