

# A

|                  |                                                               |     |
|------------------|---------------------------------------------------------------|-----|
| Anodonta_cyanea  | MKNKKKVSVPLLCSGFLFFTSFLWVFGVYMGVSGCSYMVEWQFFSLCSTDWSLPITID    | 60  |
| Anodonta_anatina | MKNKKKMSVPLLCVSFFFIALLLWVFGVYMGSTGRSYMVEWQFFSLCSDWALPVIID     | 60  |
|                  | *****:***** :* *:*****:*. * *****:*.**: *                     |     |
| Anodonta_cyanea  | YISVIFSCFVCLISGSVSLFSVSYMEEEVFMRRFMMLIMAFVGSMMNLIYIPSLITILLG  | 120 |
| Anodonta_anatina | YISIIFSCFVCLISGSVSLFSVSYMEGEVFMRRFMMLIVAFVGSMMNLLIFIPNLITILLG | 120 |
|                  | ***:***** *****:*.*****:*.**: *****                           |     |
| Anodonta_cyanea  | WDGLGIVSFALVIYYQNKKSLAAGMLTVLANRIGDALLILSICFLVNWGEWRIGYMSGGS  | 180 |
| Anodonta_anatina | WDGLGIVSFALVIYYQNKKSLAAGMLTVLANRIGDVLLILSICFLVNWGEWRIGYGMTGS  | 180 |
|                  | *****.*****:*                                                 |     |
| Anodonta_cyanea  | FSLVICFLVVGAMTKSAQIPFSAWLPAAMAAPTFSALVHSSSTLVTAGVYLIRFYSTL    | 240 |
| Anodonta_anatina | FSMVICFLVVGAMTKSAQIPFSAWLPAAMAAPTFSALVHSSSTLVTAGVYLIIRFYSTL   | 240 |
|                  | *:*****:*****                                                 |     |
| Anodonta_cyanea  | IEAQEVLWFLSKVIGALTLLMAGLSACFEVDLKKIIALSTLSQLGLMMFTVGIGFPLIAVF | 300 |
| Anodonta_anatina | IETQEVWFLSKIGALTLLMAGLSACFEVDLKKIIALSTLSQLGLMMFTVGIGFPLIAVF   | 300 |
|                  | *:*****:*****                                                 |     |
| Anodonta_cyanea  | HLLTHALFKALLFLCAGSIHSTMDTQDGRILGSLNYLLPFSSGCLVLSVALCGMPFLS    | 360 |
| Anodonta_anatina | HLLTHALFKALLFLCAGSIHSTMDTQDGRILGSLNYLLPYSSSCLVLSVVLCGMPFLS    | 360 |
|                  | *****:*.*****.*****                                           |     |
| Anodonta_cyanea  | GFYSKDLILEGAFSGFGSGSLEILVMLVGAGLSLVYSLRIMLIGVFGQNYSSSLVSYGVEG | 420 |
| Anodonta_anatina | GFYSKDLILEGAFSGFGSGSLEVLVMSMGAGLSLIYSRLILLVGFGQNYSSSLVNYSAES  | 420 |
|                  | *****:*****:*.*****:*****:*.*****:*.**                        |     |
| Anodonta_cyanea  | VMWCLLV--\$----- CQLVQLWGEDY-FKEYGLM-----                     | 447 |
| Anodonta_anatina | GYVVSIMILSVGAISGGWLLQSVWVGNGFSLIGVLGKVVISVVTFVGLVYGFINYFMA    | 480 |
|                  | :: * * *: * *. **:                                            |     |
| Anodonta_cyanea  | -----                                                         | 447 |
| Anodonta_anatina | GILGEKSFSGLGRFLSSMWMFNLTSGSFLAGIGLKGMMHLHLDLGWMEVLGGQGVFSV    | 540 |
| Anodonta_cyanea  | -----                                                         | 447 |
| Anodonta_anatina | LGDGVKMSYLMQSGSLLMHTRTYMLMMTVLIMGVYLL                         | 578 |

# B

|                  |                                                               |     |
|------------------|---------------------------------------------------------------|-----|
| Anodonta_anatina | MKNKKKMSVPLLCVSFFFIALLLWVFGVYMGSTGRSYMVEWQFFSLCSDWALPVIID     | 60  |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | YISIIFSCFVCLISGSVSLFSVSYMEGEVFMRRFMMLIVAFVGSMMNLLIFIPNLITILLG | 120 |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | WDGLGIVSFALVIYYQNKKSLAAGMLTVLANRIGDVLLILSICFLVNWGEWRIGYGMTGS  | 180 |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | FSMVICFLVVGAMTKSAQIPFSAWLPAAMAAPTFSALVHSSSTLVTAGVYLIRFYSTL    | 240 |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | IETQEVWFLSKIGALTLLMAGLSACFEVDLKKIIALSTLSQLGLMMFTVGIGFPLIAVF   | 300 |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | HLLTHALFKALLFLCAGSIHSTMDTQDGRILGSLNYLLPYSSSCLVLSVVLCGMPFLS    | 360 |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | GFYSKDLILEGAFSGFGSGSLEVLVMSMGAGLSLIYSRLILLVGFGQNYSSSLVNYSAES  | 420 |
| ptNAD5           | -----                                                         | 0   |
| Anodonta_anatina | GYVVSIMILSVGAISGGWLLQSVWVGNGFSLIGVLGKVVISVVTFVGLVYGFINYFMA    | 480 |
| ptNAD5           | ----- MVGVLGKGIISVVTFVGLSYGVFSYFML                            | 28  |
|                  | ::*****:***** **.:***                                         |     |
| Anodonta_anatina | GILGEKSFSG-LGRFLSSMWMFNLTSGSFLAGIGLKGMMHLHLDLGWMEVLGGQGVFS    | 539 |
| ptNAD5           | EAFKKKVFKGNLWFLSSMWMFNLTSGSFLAGWG-----                        | 62  |
|                  | : * *. * * ***** *                                            |     |
| Anodonta_anatina | VLGDGVKMSYLMQSGSLLMHTRTYMLMMTVLIMGVYLL                        | 578 |
| ptNAD5           | -----                                                         | 62  |

**Additional File 7. (A)** Amino acid alignment of *Anodonta cygnea* NAD5 (MF781083) and *Anodonta anatina* NAD5 (KF030964). **(B)** Amino acid alignment of *A. anatina* (KF030964) NAD5 with the putative translocated NAD5 from *A. cygnea* (MF781083). Alignments conducted using Clustal Omega webserver with default parameters. An asterisk (\*) indicates a fully conserved residue, a colon (:) indicates residues with strongly similar properties, and a period (.) indicates weakly similar properties.