**File S1. Alignment of modern and ancestrally reconstructed S100 proteins used in this study.**

>hA9\_protein

------MTCKMSQLERNIETIINTFHQYSVKLGHPDTLNQGEFKELVRKDLQNFLKKENKNEKVIEHIMEDLDTNADKQLSFEEFIMLMARLTWASHEKMHEG--DEGPGHHHKPGLGEGTP-------------

>mA9\_protein

-----MANKAPSQMERSITTIIDTFHQYSRKEGHPDTLSKKEFRQMVEAQLATFMKKEKRNEALINDIMEDLDTNQDNQLSFEECMMLMAKLIFACHEKLHENN-PRGHGHSHGKGCGK----------------

>opA9\_protein

--------MENCTMEKALDIIVNTFHHYSTRVGNPDTLVKGEMKQLITKELPNFIKNA-KDLQDVKHLMQELDTNQNGQVDFKEFSMMMARLTMATHEKMHENA-PDKDHHSHGPGLEGKGGSSCGSGHGHGHSH

>ancA9\_protein

----------MSQLEKAIETIINVFHQYSVRVGHPDTLNKKELKQLIQKELPNFLKNAKKDPQTINHLMQELDTNQDGQISFEEFMMLVARLTVASHEKMHENA-PEGDGHSHGPGLGGG---------------

>altancA9\_protein

----------MSELEKSIETIINVFHQYSVRVGHPDTLSKGELKQLIQKELPNFLKNAKKDPQAIDHLFQDLDTNQDGQVSFEEFMVLVARLTVASHEKMHENA-PDKPHHSHGPGLEEK---------------

>hA8\_protein

---------MLTELEKALNSIIDVYHKYSLIKGNFHAVYRDDLKKLLETECPQYIRK-----KGADVWFKELDINTDGAVNFQEFLILVIKMGVAAHKKSHEESHKE----------------------------

>mA8\_protein

---------MPSELEKALSNLIDVYHNYSNIQGNHHALYKNDFKKMVTTECPQFVQN-----INIENLFRELDINSDNAINFEEFLAMVIKVGVASHKDSHKE--------------------------------

>opA8\_protein

---------MATKLECAINCLVEVFHKYSLTGGHPHALSREQFGKLLEKECSEFTK---KSKKTVPEFMKELDINQDGFINFEEFLILTLKMVIEHHEDSHKE--------------------------------

>ancA8\_protein

----------MTELEKAINSLIDVFHKYSLVAGHYHALSRDDLKKLLETECPQFLKKK-KDPKTVDTLFKELDVNKDGAINFEEFLILVTRVGVAAHEDIHKE--------------------------------

>altancA8\_protein

----------MTELEKAINSLIDVFHKYSLVAGHYHALSKDDLKKLLEKECPEFMKKQ-KDPKTVDTFFKELDTNKDGQINFEEFLVLVTKVGVAAHEDIHKE--------------------------------

>hA12\_protein

----------MTKLEEHLEGIVNIFHQYSVRKGHFDTLSKGELKQLLTKELANTIKNI-KDKAVIDEIFQGLDANQDEQVDFQEFISLVAIALKAAHYHTHKE--------------------------------

>chMRP126\_protein

MSKGCQTQGPLSELEKAIDVIIDVFHQYSRREGDKDTLTRKELKLLIEKQLANYLKHV-KNQVSIDQIFKDLDNNKDQQLSFGEVMLLIIRVTVATHEHLHFCEDHQQQHQHQHQHQHNH---------------

>ancCG\_protein

----------MSELEKAIETIINVFHQYSVRVGHPDTLSKKELKQLIQKELPNFLKNA-KDPATIDNLFQELDKNKDGQISFEEFMVLVARVTVACHEHMHKE--------------------------------

>altancCG\_protein

----------MSQLEKSIETIINVFHQYSVRVGHPDTLSKGELKQLIQKELPNFLKNA-KDPATIDNLFQDLDTNKDGQVSFEEFMVLVARVTVASHEHIHKE--------------------------------