

Hellberg, M. E., G. W. Moy, and V. D. Vacquier. 2000. Positive selection and propeptide repeats promote rapid interspecific divergence of a gastropod sperm protein. *Mol. Biol. Evol.* 17: 458-466.

Male-specific proteins have increasingly been reported as targets of positive selection and are of special interest because of the role they may play in the evolution of reproductive isolation. We report the rapid interspecific divergence of cDNA encoding a major acrosomal protein of unknown function (TMAP) of sperm from five species of teguline gastropods. A mitochondrial DNA clock (calibrated by congeneric species divided by the Isthmus of Panama) estimates that these five species diverged 2-10 MYA. Inferred amino acid sequences reveal a propeptide that has diverged rapidly between species. The mature protein has diverged faster still due to high nonsynonymous substitution rates (>25 nonsynonymous substitutions per site per 10^9 years). cDNA encoding the mature protein (89-100 residues) shows evidence of positive selection ($Dn/Ds > 1$) for 4 of 10 pairwise species comparisons. cDNA and predicted secondary-structure comparisons suggest that TMAP is neither orthologous nor paralogous to abalone lysin, and thus marks a second, phylogenetically independent, protein subject to strong positive selection in free-spawning marine gastropods. In addition, an internal repeat in one species (*Tegula aureotincta*) produces a duplicated cleavage site which results in two alternatively processed mature proteins differing by nine amino acid residues. Such alternative processing may provide a mechanism for introducing novel amino acid sequence variation at the amino-termini of proteins. Highly divergent TMAP N-termini from two other tegulines (*Tegula regina* and *Norrisia norrisii*) may have originated by such a mechanism.