**Hellberg, M. E. and V. D. Vacquier. 1999. Rapid evolution of fertilization selectivity and lysin cDNA sequences in teguline gastropods. Mol. Biol. Evol. 1999 16: 839-848.**

Proteins mediating intercellular recognition face opposing selective forces as they evolve: purifying selection to maintain function, and diversifying selection to alter specificity. Lysin is a 16-kDa protein which enables sperm of free-spawning marine snails to make a hole in the vitelline layer (VE) surrounding conspecific eggs. Previous work on abalone (Haliotis spp.) has shown that positive selection promotes rapid interspecific divergence of lysin. Here, we present data on the specificity of VE dissolution by four species of teguline gastropods, along with lysin cDNA sequences. The teguline and abalone lineages diverged over 250 MYA. As in abalone, VE dissolution by lysin in tegulines is species-selective, and positive selection promotes rapid interspecific divergence over the entire mature protein. Nonsynonymous substitution rates, calculated using a mtCOI molecular clock calibrated by two *Tegula* species separated by the Isthmus of Panama, are high (> 25 substitutions per site per 10(9) years). However, the extensive replacements in teguline lysins are overwhelmingly conservative with respect to type, charge, and polarity of residues. Predictions of secondary structure suggest that the size and position of alpha-helices are also conserved, even through pairwise amino acid identities between Haliotis rufescens and the different tegulines are less than 15%.