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Evolutionary Biology of Venomous Snails

I am interested in the evolution of adaptations and am currently investigating the evolution of venoms and feeding specializations of predatory marine snails of the genus *Conus*. The genus *Conus* is hyperdiverse and contains over 500 species. Members of the group prey on marine worms, other snails and fish and some species have even been responsible for the deaths of unsuspecting beach combers or shell collectors in the tropical Pacific. The venoms of *Conus* are tremendously complex and diverse and are presumably specialized for the types of prey that are consumed by a species. Many venom components have shown great potential as novel pharmaceuticals and several are now being used to treat chronic pain. Examples of research in my laboratory include (i) analyses of the molecular evolution of conotoxin genes that encode the peptide neurotoxins that *Conus* species use to paralyze prey; (ii) investigations of the dietary preferences of *Conus*; and (iii) studies of the evolutionary history, phylogenetic relationships and population genetics of *Conus* species and their populations. Much of my research utilizes molecular genetic approaches and students who wish to work in my laboratory can learn and apply these methods to studies of ecological adaptations of *Conus*. Otherwise, student projects may involve morphometric analyses of recent or fossil *Conus* or the use of microscopy to identify the diets of *Conus*.



Conus ebraeus, a common Indo-Pacific cone snail.