Woods Hole Oceanographic Institution

Biology Department Seminar

Thursday, November 5, 2015
Redfield Auditorium – 12:00 Noon

Fish responses to environmental chemicals: genotype to phenotype

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The world is overflowing with chemicals that have biological activity and can adversely affect organisms. Animals have evolved a complex network of genes and proteins that protect against these external and internal chemicals. These proteins and pathways collectively allow an organism to sense, transform and eliminate chemicals, and maintain homeostasis in the face of a variable environment. However, the planet has become chemically 'different' in the past century from the condition at any preceding time, with a chemical space that includes many compounds hazardous to animal health and life. Response pathways that evolved to be adaptive in a natural environment may instead be maladaptive in a perturbed system. This talk will focus on the evolution and regulation of a set of chemical response proteins, the cytochrome P450 enzymes, which catalyze the oxidative transformation of many different types of organic substrates. I will describe some of the processes by which these enzymes appear to have evolved, including 'birth and death' evolution; how functional diversity may have evolved in fish; and how some of these enzymes are regulated by xenobiotic and endobiotic chemicals.