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## Identification of Biological Novelty Using Comparative Genomics: Looking for the Good Stuff in Genomes

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## ABSTRACT

Genome assemblies are being reported for large numbers of plant and animal species and thousands will be generated over the course of the next few years. However, many genome papers submitted today are largely formulaic and descriptive, and the biological content in these reports is often embarrassingly low and wildly over-interpreted. Genomics can only take us so far without proper authentication via empirical biology. Here, I shall discuss some recent genome efforts in my lab whereby novel features of respective genomes can be exploited to learn about interesting and hitherto uninvestigated biological problems. My thesis is that, while comparisons of the "known" genetic components between species are important and necessary, many salient evo-devo insights will be gotten only when specifically looking for, and investigating, the differences. I will give a couple of examples, including one where we discovered a new molecular mechanism for building a vertebrate immune system and one that describes our recent finding of vertebrate chitin, which we posit to be important for structural roles but also which serve as mediators for cellular and developmental programming.

## BIO:

Dr. Amemiya was born and raised in Hawaii. He completed his undergraduate studies at Purdue University and received his PhD in genetics from Texas A&M University. He was a recipient of an Alfred P. Sloan Fellowship in Molecular Studies of Evolution and completed postdoctoral studies with Dr. Gary Litman in comparative immunology (Tampa Bay Research Institute, Florida). He took a second postdoctoral fellowship where he worked on the Human Genome Project with Dr. Pieter de Jong (Lawrence Livermore National Laboratory, California). After his postdoctoral training, Dr. Amemiya became a faculty member (Assistant-Associate Professor) in the Center for Human Genetics at the Boston University School of Medicine for seven years, where he taught medical genetics and studied the genetics of an X-linked immunodeficiency diseaser. While in Boston he participated in a mutation screen for immunodeficiency loci in zebrafish and began working on the comparative genomics and evolution of vertebrate HOX clusters. Dr. Amemiya moved to Benaroya Research Institute in 2001. In 2007-2008, he served as a Program Director for the National Science Foundation in Washington D.C. He is a full professor in the Biology Department at the University of Washington