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DNA, Red Tide and the Sea: a new exhibit at Mystic Aquarium & IFE

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DNA, Red Tide, and the Sea

A New Exhibit at Mystic Aquarium & IFE

Peg Van Patten

Ever tap your feet dancing to a “Codon Hoedown”? Or extract some DNA from a piece of fruit on a rainy weekend? You can, if you visit the new interactive “DNA, Red Tide, and the Sea” exhibit at Mystic Aquarium and Institute for Exploration in Mystic, Connecticut. The questions “What is DNA?” and “How is DNA connected to red tides in the ocean?” are answered there, and the DNA Lab is open on Saturdays and Sundays from 11 am to 2pm for aquarium visitors to get up-close and personal with DNA.

As they enter the exhibit, guests pass through a large colorful arch that reveals the genetic code of mitotic cyclin, a universal protein that controls cell division in organisms, including red tide-producing dinoflagellates. Beneath a 10-foot high double helix sculpture which shows the structure of DNA, guests can learn what DNA is, and more.

“Would you like to take some DNA out of a banana?” the exhibit interpreter asks 8-year old Delana and her little brother Aaron, 5, from upstate New York. The parents, Judi and Eric Bonci, smile.

“Sure,” the children answer in unison. Next, they are given chunks of a peeled banana to mush up in a plastic baggie. A solution made of shampoo, salt, and water is added, which breaks down the cell walls. Next, the instructor helps them add alcohol to separate out the DNA, which is seen as a distinct foamy white, webby-looking material forming its own layer in the solution. The DNA is then collected with a pipette, and put into a small vial that can be

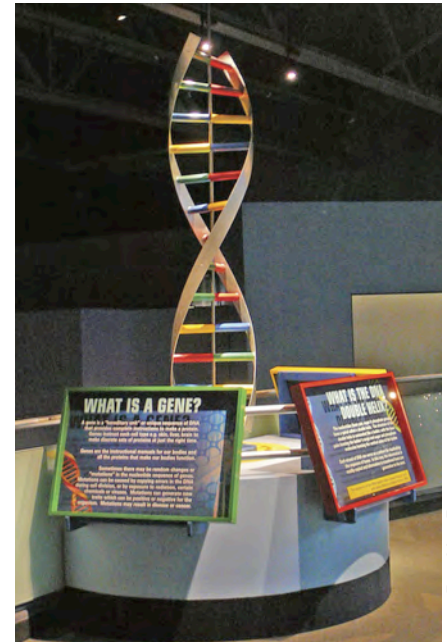
worn as a necklace, should the visitor wish to take it home. Who knew it was that easy?

“Do you know what DNA is?” the interpreter asks another young visitor. “No,” the boy replies, shaking his head back and forth, but he raises an eyebrow. He’s clearly heard of it and would like to understand.

“The DNA has a code that forms a set of instructions for our bodies,” the interpreter explains. “It’s like the recipe you use if you make cookies in the kitchen with your mom, only these instructions tell whether your body is a boy or a fish.” The lad smiles; this is an explanation he can understand and relate to.

How many genes do you think a human might share in common with a puffer fish or a chimpanzee? A sea squirt? Rice? The guests learn by turning a knob on “Share and Share Alike,” a genome similarity dial, to reveal how humans’ genetic makeup compares to that of various animals and plants. The answers may be surprising.

At the Codon Hoedown, guests can challenge their physical agility while building a virtual DNA strand by following the correct chemical base sequence, or code, on a dance pad marked with the four letters that symbolize molecules called bases that form sequences that encode information. The new exhibit highlights research led by Senjie Lin, professor of marine sciences at the University of Connecticut at Avery Point, and his graduate students. It is the outreach component of a four-year \$1 million grant from the National Science



A 10-foot model of DNA's double-helix structure, built by Aquarium staff, greets DNA exhibit visitors.

Foundation.

Dissecting the DNA codes that make dinoflagellates unique and able to form red tides and produce toxins may someday help scientists find genetic markers that will predict when a toxic red tide is forming and its



Turn the genome similarity dial to find out how genetically similar you are to other species.

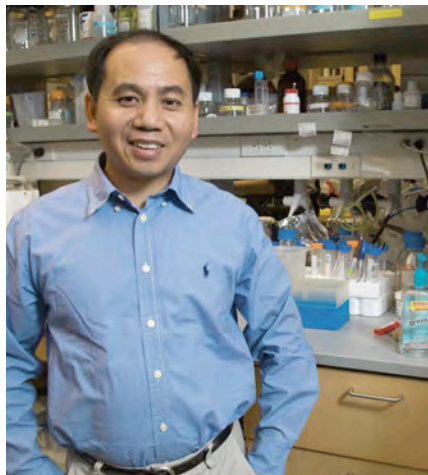
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Cindy Weiss, UConn CLAS



Professor Senjie Lin, the man behind the DNA, Red Tide and the Sea exhibit.

intensity. Toxins from red tide can spread up the food chain, from shellfish to marine animals to humans, causing illness and, in some cases, death.

"Understanding the DNA structure is the key to cracking the secret behind dinoflagellates' ability to form red tides and produce toxins, and that endeavor is accessible to anyone, as you can experience in the exhibit," said Lin, who hopes the exhibit will interest youngsters in science.

Working with colleagues at the Scripps Institution of Oceanography, the University of Maryland's Center of Marine Biotechnology and the Venter Institute, Professor Lin is trying to determine which genes are active when a red tide is formed and toxins are produced by dinoflagellates.

Dinoflagellates, whose name means "terrible tail", are microscopic red phytoplankton. Professor Lin's phytoplankton research focuses on dinoflagellates because of their multi-faceted features: they provide food for animals in the sea and are necessary for the growth of coral reefs, yet when too abundant,

they are also major contributors to a coastal environmental hazard, red tide and marine toxins.

"DNA is the building block of life, and consequently connects us with marine life in many ways," said Dr. Tracy Romano, senior vice president of research and zoological operation at Sea Research.

"This exhibit reveals our genetic similarities to various creatures, how genes vary and the incredible ways in which DNA plays a role in everything, from eye color to species



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Aquarium visitors Aaron and Delana Bonci from upstate New York learn how to extract DNA from a banana at the new exhibit's DNA Laboratory.

determination to the creation of toxic waters that affect human health and the health of our oceans." Romano is also associated with the UConn Department of Marine Sciences.

The exhibit is part of an established research partnership between Sea Research and UConn, in which graduate students' marine research is supported by both institutions. Working with the National Oceanic and Atmospheric Administration, the two institutions also helped form an interdisciplinary graduate training and post-doctoral mentoring initiative that focuses on major problems impacting coastal ecosystems and how these problems relate to human health.

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The Codon Hoedown-dancepad puts science in motion. Stepping on the right letter lets you build a virtual strand of DNA with the correct components. You have to be fast on your feet!

For more information on the "DNA, Red Tide and the Sea" exhibit, including DNA lab hours and more details on Professor Lin's research, visit <http://searesearch.org> and <http://phytoplankton.uconn.edu>