

BIOTECH - SCIENCE FROM THE SEA

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More than 80% of Earth's living organisms are found only in aquatic ecosystems, and we know little about their biochemical characteristics. Our challenge as a nation is to discover the life-enhancing and lifesaving qualities these unique organisms possess. Florida has a rightful place in this quest to discover new products and processes from the ocean's living resources. With an enormous natural storehouse of biodiversity and an extensive university-based network of scientific talent, Florida boasts advantages for developing new medicines, industrial products, methods of detecting contaminants and practices for restoring damaged environments, all adapted or derived from coastal and ocean systems. Florida Sea Grant is providing leadership to set the key priorities for this emerging field known as Marine Biotechnology.

Florida Sea Grant sponsored researchers are working on a variety of biotech related projects, some of which I've summarized below.

In the early 1990s, researchers from Harbor Branch Oceanographic Institute discovered a particular species of red sponge with cancer killing abilities. The researchers have isolated a group of compounds called lasonolides which possess these cancer killing abilities. To understand how lasonolides work, researchers have been evaluating proteins in cancer cells in hopes of isolating the protein which attaches to the lasonolides. Harbor Branch has made substantial progress towards understanding how these lasonolides work, but the story is far from over as they continue to work towards the goal of getting the drugs into clinical trials and hopefully on to the market.



Researchers from Florida Atlantic University are looking at cone snail venoms for their pain killing abilities. Biomedical scientists took an interest in the cone snails decades ago when they learned that humans killed by the snails felt no pain as they slipped away. Researchers now know that cone snail venom

(Continued on page 2)



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components affect the human nervous system. Some of the components change the way electrical signals such as those responsible for pain are conducted through the brain and the rest of the neurological system. Those changes also have the potential to alter both the way humans perceive pain and the effects or progression of strokes and nervous system diseases such as Parkinson's and Alzheimer's.

The world market for marine paints that prevent the damaging growth of barnacles and other organisms on boat and ship hulls is worth billions of dollars. Unfortunately all paints currently available pose significant threats to the ecosystems with some being regulated off the market. Researchers from the University of Florida are evaluating a flat worm known commonly as Chevron nemertine, which produces a wide range of pyridine alkaloids that are toxic to marine organisms. Certain com-

pounds which have been isolated from these toxins show great promise in preventing barnacles from settling on hulls, but they may also harm innocent crustaceans. To solve this problem the team has synthesized a variety of compounds with structures similar to but altered from the most promising nemertine worm toxic compound. The results, on which patents have been filed, were a group of compounds that continue to block settlement but dramatically reduce crustacean mortality.

The projects highlighted here are but a sampling of the marine biotechnological research now underway in Florida. The vast majority of Florida's and for that matter the planet's submerged resources remains unexplored. At the national level, nearly a dozen potentially life-saving compounds derived from marine creatures are already in human clinical trials with the potential for approval from the Food and Drug Administration in the next few years.

Sources:

-*The Promise of Marine Biotechnology in Florida. Florida Sea Grant TP-132 - 2004.*

-*Marine Biotechnology Research in Florida Sea Grant 1996-2003: An Outreach and Communication Foundation. Florida Sea Grant TP-134.*

Helpful Link:

www.flseagrant.org/program_areas/biotechnology/biotech_pm.htm

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