

NASA Research Park Partner Changene granted patent

NASA Research Park partner Changene, Inc. was granted patent # 7,163,795 on Jan. 17 by the U.S. Patent and Trademark Office (PTO) for the discovery of nacrein from *Pinctada margaritifera*, a black pearl oyster found in the South Pacific Ocean.

Nacrein is a naturally occurring biological molecule that regulates calcium crystals during pearl formation. The mechanism of building biominerals in shells is similar to bone formation in humans. Studies show that nacreous substances extracted from *Pinctada* species demonstrated significant osteogenic (bone forming) activities in mammalian models.

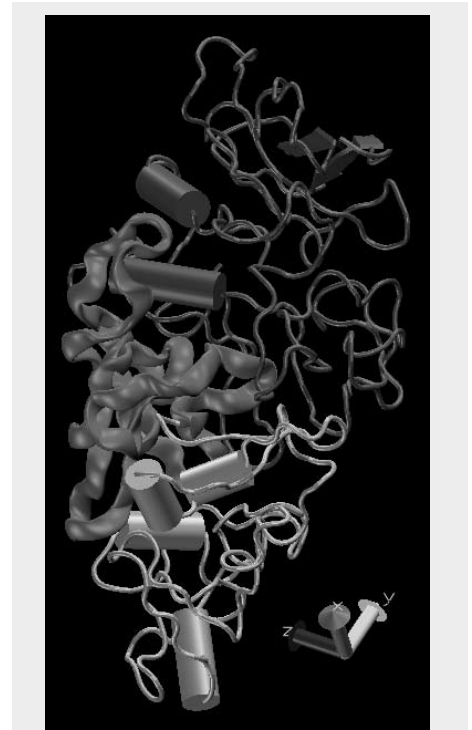
"Changene is investigating nacrein for space missions as a countermeasure for bone mass loss in the micro-gravity environment," said Frank Chang, Changene CEO. "In space, many bones that aid movement on Earth are not subjected to the same stresses as they were on Earth. Over time, calcium normally stored in the bones breaks down and is released into the bloodstream, causing a decrease in bone density, or bone mass,"

he said.

This bone loss begins in the first few days in space at an average rate of 1.6 percent per month. This drop in density, known as disuse osteoporosis, leaves bones weak and less able to support the body's weight and movement upon return to Earth, putting the astronaut at a higher risk of fracture.

Osteoporosis and low-bone density are also major health concerns for the world's aging population. Data-monitor, a leading consulting firm in London, forecasts osteoporosis market sales would reach \$10.4 billion for consumers in 2010.

Chang said Changene collaborated with NASA Ames' Advanced Supercomputing Division for ongoing studies, applying molecular dynamic simulation on the nacrein molecule and deciphering its tertiary structure. He said it is common in biotech field that research and development processes take many years; however, with the known structure and subsequent *in silico* studies, scientists are able to speed up R&D processes.



3D structure of Nacrein (above model) was deciphered with NAMD (NANoscale Molecular Dynamics, a parallel object-oriented molecular dynamics program) by NASA Advanced Supercomputing division and Changene.

Ames hosts visit by Nealy, Cagle



In late January, Angela P. Nealy, top photo, right, visited Ames to meet the teams working in/on her field, that of assessing performance biomarkers for elite athletes. She visited Ames with astronaut Yvonne Cagle (photo to the right) and has worked with Cagle at the University of Texas Medical Center, in addition to training numerous Olympic track and field stars.



NASA photos by Dominic Hart