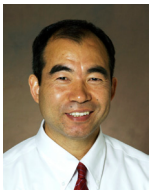
Assistant professor publishes paper pancreatic cancer therapy


Wu

Erxi Wu, assistant professor of pharmaceutical sciences, co-wrote the article, "Perspectives on the role of photodynamic therapy in the treatment of pancreatic cancer," which has been accepted by International Journal of Photoenergy. The paper will appear in the focus issue, "Photodynamic Therapy."

According to the authors, photodynamic therapy is a non-invasive procedure involving a photosensitizing agent that is activated by light to produce reactive oxygen species that selectively destroy tumor cells. In recent years, it has been used in the treatment of pancreatic cancer. The anti-tumor effects of photodynamic therapy include three main mechanisms: direct tumor cell death (necrosis, apoptosis and autophagy), vascular destruction and immune system activation. The paper was co-written with Qingyong Ma and Wei Li in the Ma lab at Xi'an Jiaotong University, China.

"This article systematically summarizes the effects of photodynamic therapy in the treatment of pancreatic cancer from the experimental studies to the clinical studies and discusses the mechanisms of PDT-induced pancreatic cancer destruction," Wu said. "Together with the Ma lab, we commit to finding cancer therapeutics and elucidating the mechanisms of the targeted therapy for pancreatic cancer, the fourth leading cause of cancer death."

International Journal of Photoenergy is a peer-reviewed, open-access journal that publishes original research articles, as well as review articles in all areas of photoenergy. The journal consolidates research activities in photochemistry and solar energy utilization into a single forum for discussing and sharing knowledge. For more information on the journal, visit **www.hindawi.com/journals/ijp**.

Stockwell contemporary evolution study published


Stockwell

Studies of threatened species typically focus on factors associated with extinction risk, but a recent study published in PLoS ONE reports a case of a contemporary evolution for a recently introduced population of a protected fish. Craig Stockwell, James A. Meier associate professor in biological sciences, co-wrote the PLoS ONE paper, "Contemporary Evolutionary Divergence for a Protected Species Following Assisted Colonization." Stockwell collaborated with lead author and his former doctoral student, Michael Collyer, now at Western Kentucky University, and his former postdoctoral fellow, Jeffrey Heilveil, now with SUNY College at Oneonta.

Since 1995, Stockwell's research group has conducted work on the evolutionary ecology of the White Sands pupfish, a species found in southern New Mexico. Evolutionary biologists have been interested in the pupfish's of the western deserts because this family provides a classic example of rapid speciation, which happened as populations were rapidly isolated in very different habitats as the Pleistocene Lakes dried.

"Darwin, instead of visiting the Galapagos Islands, could have visited the western United States and deduced the same patterns of speciation following isolation by studying the various pupfish species," Stockwell said. "Today, most pupfish species are threatened with extinction. As a consequence, pupfish are routinely transplanted to new habitats to reduce their risk of extinction."

These newly established "refuge populations" are considered "genetic replicates" of the native population that could be used for re-stocking in the case of catastrophic loss of the native population. Because pupfish populations have been isolated during both pre-historic and contemporary time scales, they provide an ideal opportunity to evaluate the mode and tempo of evolutionary divergence.

In the PLoS ONE paper, the authors synthesize data from two studies to demonstrate a case of adaptive evolutionary divergence of a pupfish population established around 1970. Two native populations of the White Sands pupfish were isolated in Salt Creek (a saline creek) and Malpais Spring (a relatively fresh water spring) about 3,000 to 5,000 years ago. In the 1970s, two new populations were established with one population introduced to another saline creek, Lost River, and the other to another spring, Mound Spring. Stockwell previously used molecular markers to show that both of these introduced populations descended from the native Salt Creek population. Subsequently, Collyer's dissertation research focused on applying geometric morphometrics to study body shape variation within and among native and recently established pupfish populations. The fish from the spring populations were found to be deep bodied, whereas the fish from the salty creeks were slender. These body shapes make evolutionary sense because salt increases the density of water, giving a selective advantage to fish with slender bodies compared to fish with deep bodies.

The paper provides geometric morphometric analyses to evaluate fish raised in a common garden study to demonstrate that body shape is heritable and thus the divergence reflects adaptive evolutionary divergence over two different time scales. The PLoS ONE paper also reports the results of a microsatellite DNA survey that showed limited neutral divergence indicating that the body shape divergence was not likely due to genetic drift. Collectively, the data show a case of contemporary adaptive divergence with the Mound Spring pupfish evolving a deep body shape during the 30-year period.

The findings suggest the Mound Spring population is a poor "replicate" for the native Salt Creek population. In addition, the observed morphological divergence of pupfishes instead of taking millennia could theoretically have happened soon after the populations were isolated, maybe within a few decades.

"Studies concerning threatened species often focus on factors promoting extinction risk, but our study shows that a common management practice such as assisted colonization can have observable evolutionary impacts within a few decades," Stockwell said. "This is important because such evolution may result in refuge populations that are actually mal-adapted to their native habitat."

These findings suggest conservation biologists and managers should consider the prospect that populations transferred to new environments may rapidly evolve and thus foil original management plans.

The research was funded by Department of Defense Legacy grants, a ND EPSCoR EPA grant to Stockwell, as well as an EPA-STAR fellowship to Collyer.