



# SCIENCE



## Doctors and Dinosaurs

**Study of dinosaurs, other fossils part of plan by Pitt's medical school to graduate better doctors through unique collaboration with Carnegie Museum of Natural History**

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By Lisa Rossi

Back pain, knee problems, hernias—those are just a few of today's more common medical ailments whose roots can be traced back millions of years, when our human ancestors evolved from walking on all fours to standing on two hind legs.

Cancer can be dated back even further. Carnegie Museum of Natural History researchers have proof in the form of a 150-million-year-old Jurassic dinosaur bone, its tumor still preserved.

Understanding the origins of human diseases could help identify fresh avenues toward their prevention and treatment. At the very least, an appreciation of the evolutionary history of humans and other animals should make for better medical doctors and physician-scientists, which is why Pitt's School of Medicine is collaborating with Carnegie Museum of Natural History to offer Pitt medical students educational and research opportunities unlike any available at other medical schools. The partnership, the Natural History of Medicine Initiative, is the first of its kind involving a medical school and a natural history museum.

"This partnership is unique among medical schools," said John S. Lazo, Allegheny Foundation Professor of Pharmacology in Pitt's School of Medicine and a Carnegie Museum of Natural History board member. "Our goal is to give medical students insight into the interrelationships between medicine and natural science, which we believe will enhance their understanding of the scientific discovery process while getting them to think about medicine in



Researchers from Pitt's School of Medicine and the Carnegie Museum of Natural History use a new-generation computed tomography (CT) scanner to image a dinosaur fossil found in 2004 by Pitt undergraduate Adam Striegel during a

new ways. Together, the two institutions are able to create a uniquely enriching environment with an approach to medical education that focuses on how research themes of interest to museum scientists can reveal so much about contemporary medicine.”

geology class field trip. Pictured: Douglas Robertson (right), Pitt associate professor of radiology, and Carnegie Museum of Natural History scientists Amy Henrici and David Berman.

Four museum curators will have faculty appointments in the medical school, teaching workshops, seminars, and courses as well as mentoring medical students choosing to conduct scholarly research projects at the museum.

According to Christopher Beard, curator and head of the Section of Vertebrate Paleontology at Carnegie Museum of Natural History, paleontologists have much to teach medical students.

“Many orthopaedic problems occur because human ancestors walked on all fours,” Beard said. “When our ancestors began walking on only their hind legs, it allowed modern humans to do things with our hands. But at the same time, it made it harder for women to give birth, and it led to chronic lower back pain, hernias, and other orthopaedic conditions.

“Using what we know about the fossil record and anatomical changes through time, we, as museum scientists, are beginning to piece together information about how genetics has influenced evolution, and vice versa. Interestingly, some physicians, including those at Pitt, are becoming increasingly aware of how medicine itself is evolutionary.”

Beard, a former John D. and Catherine T. MacArthur Foundation “genius award” recipient, and Lazo, who directs Pitt’s Drug Discovery Institute and for 17 years chaired the medical school’s Department of Pharmacology, conceived the idea for the initiative.

John Mahoney, assistant dean for medical education in the School of Medicine, has been working closely with the museum on developing the initiative’s specific programs and planning for their incorporation into the medical student curriculum. The initiative’s first offering, beginning this month, is a mini-elective course, The Natural History of Medicine, for first-year medical students. It will cover the evolutionary origins of human disease, including the history of disease-causing pathogens, a topic that should help students better understand such relevant contemporary public health concerns as avian flu, and think about treatment and prevention approaches that modern society may have overlooked.

“This course, which is one-of-a-kind, represents just one way we hope to expand students’ horizons about how medicine is a single discipline within the broad domain of natural sciences, and how understanding the natural sciences will enhance learning about medicine,” Mahoney said. “Our students and our faculty, me included, have so much to learn from the museum’s eminent researchers.”

As part of the initiative, students will receive instruction from four of the museum’s scientists. In addition to Beard, they are Zhe-Xi Luo, curator of vertebrate paleontology and associate director for research and collections, who is considered one of the world’s leading authorities on the evolution of the earliest mammals; Sandra L. Olsen, curator of anthropology, whose work focuses on cultures in north-central Kazakhstan from the Neolithic to Bronze Age; and John Wible, curator and head of the museum’s mammals section, whose work includes the evolutionary history of mammals and the evolution of the mammalian skull.

The museum offers Pitt’s medical school access to one of the largest and most important natural history collections in the world, including dinosaur fossils displaying evidence of cancer and gout. The museum will gain access to the newest generation of medical technologies, including computed tomography (CT) scanners and electron microscopes, which will enable its researchers to engage in cutting-edge studies that help identify the significance of its vast and varied collection.

The museum has already taken advantage of the partnership. Making use of the most state-of-the-art CT technology, the researchers worked with imaging specialists at the University of Pittsburgh Medical Center to scan the spine and pelvis of a *Camptosaurus*, a Jurassic-period dinosaur. In order to exhibit the fossil in the museum’s “Dinosaurs in Their World” expansion project, researchers need to remove the pelvis and tail from its matrix. While in the matrix, the fossil’s ossified tendons are preserved, but the process of fully preparing the fossil, or removing it from the rock, would destroy them. The CT scan, performed in December 2005, has produced

3-D digital views, thereby "preserving" the tendons and enabling museum researchers to conduct additional studies.

The museum also will be scanning a fossil skull of a recently discovered genus and species of amphibian that lived in this region 300 million years ago. Museum researchers are hoping the CT scan will reveal some of the sutures between skull bones that are currently obscured by matrix. The skull was found in March 2004 by Pitt undergraduate Adam Striegel while on a geology class field trip.

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