Laura Niedernhofer, M.D., Ph.D., completed the Vanderbilt Medical Scientist Training Program in 1998, earning her Ph.D. in the laboratory of Dr. Larry Marnett studying compounds produced endogenously that cause DNA damage in humans, while also spending time in surgical pathology and oncology clinic. During her thesis work, she discovered that malondialdehyde, a metabolic by-product, is able to crosslink DNA. Crosslinks are a very toxic type of DNA damage because they anchor the two strands of DNA together, preventing access to the information encoded in DNA—information necessary for cell survival.

Prior to entering the MSTP, Dr. Niedernhofer attended Duke University, graduating with a B.S. in Chemistry, followed by an M.S. in Physiology from Georgetown. After completing her MD/PhD degrees from Vanderbilt, she accepted a postdoctoral fellowship at Erasmus Medical Centre in Rotterdam, the Netherlands that was sponsored by the National Science Foundation and the American Cancer Society with the goal of understanding the health impact of crosslinks. While at Erasmus, she genetically engineered mice with defects in the repair of DNA crosslinks. The surprising finding was that mice that cannot repair crosslinks age extremely rapidly. This suggests that DNA damage, which occurs as a consequence of environmental exposures as well as normal metabolism, likely contributes to the fact that we inevitably grow old.

Dr. Niedernhofer joined the University of Pittsburgh Cancer Institute and the Department of Molecular Genetics and Biochemistry at the University of Pittsburgh School of Medicine as an Assistant Professor in 2003. She brought the mice she engineered during her fellowship to Pittsburgh and continued to use them to try and discover ways to prevent cancer and delay the aging process. Her research passion is investigating the health impact of DNA damage. She writes: “Many things in our environment and even by-products of our own metabolism damage DNA. Therefore, cells invest heavily in mechanisms to repair this damage. But what if things go wrong? One clear answer is that unrepaired damage can cause cancer. More recent evidence suggests that DNA damage may drive aging as well.”

In 2005, Dr. Niedernhofer was awarded the PNC Foundation Innovation Award, selected as a Hillman Fellow for Innovative Cancer Research, and the Ellison Medical Foundation as a New Scholar in Aging. She is a member of a number of professional and scientific societies, including the American Cancer Society for Microbiology, the Environmental Mutagen Society, and the American Society for Clinical Investigation. Her website at Pitt is www.cbp.pitt.edu/faculty/niedernhofer.html.

The Chimera asked Dr. Niedernhofer about her decision to pursue a postdoc rather than a residency after graduation. She replied: “This is extremely dependent upon the individual. The experiences of being a physician and a researcher are remarkably different. A researcher must have a lot of self-discipline and self-motivation, and an ability to withstand long periods without success. The reward is absolute independence, a flexible schedule, and the gratification of those rare “AHA!” moments. A physician has a much more rigid schedule and less independence. But the reward is the instant and regular gratification of helping people. The two career tracks complement one another beautifully if you can manage both. I chose to pursue only one track because I was uncomfortable doing less than a perfect job and couldn’t give 100% to both patients and the bench. Having the medical training, however, has dramatically influenced and improved my research. All of my basic research projects directly relate to a clinical question. Also, I am programmed to study disease states from the point of view of the whole organism, rather than molecular changes in a single cell type.” The Vanderbilt MSTP recognizes the outstanding accomplishments of Dr. Niedernhofer and is pleased to count her as one of our distinguished graduates!