PITTMED

PUBLISHER
Arthur S. Levine, MD

EDITOR IN CHIEF
Erica Lloyd

ART DIRECTOR
Elena Gialamas Cerri

SENIOR EDITOR
Chuck Staresinic

ASSOCIATE EDITOR
Joe Miksch

PRODUCTION MANAGER
Chuck Dinsmore

STAFF CONTRIBUTOR
Brandon Ellis

OBITUARIES CONTRIBUTOR
Macy Levine, MD '43

CIRCULATION MANAGER
Crystal Kubic

CHIEF EDITORIAL ADVISOR
Kenneth S. McCarty Jr., MD, PhD

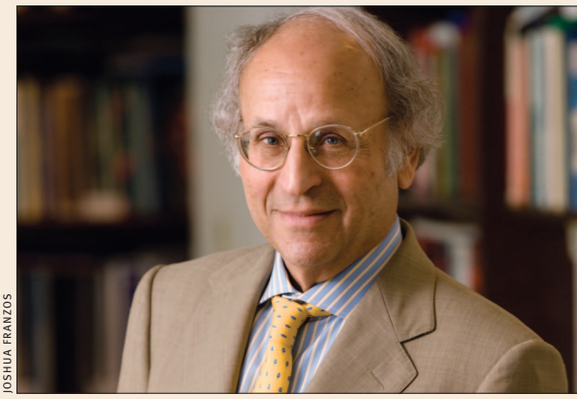
EDITORIAL ADVISORS
Paula Davis, MA
Susan Dunmire, MD '85, Res '88
Joan Harvey, MD
John Horn, PhD
Steven Kanter, MD
Joan Lakoski, PhD
Margaret Larkins-Pettigrew, MD '94, Res '98
David Lewis, MD
Margaret C. McDonald, PhD
David Perlmutter, MD
Kevin Proctor, Class of '11
Gabriel Silverman, Class of '11
Peter Strick, PhD
Bennett Van Houten, PhD
Simon Watkins, PhD
Marshall Webster, MD, Res '70
Julius Youngner, ScD

OFFICE OF PUBLIC AFFAIRS
Robert Hill
John D. Harvith, JD

University of Pittsburgh

Pitt Med is published by the Office of the Dean and Senior Vice Chancellor for the Health Sciences in cooperation with the alumni and public affairs offices. It is produced quarterly for alumni, students, staff, faculty, and friends of the School of Medicine. PR 6708

The University of Pittsburgh is an affirmative action, equal opportunity institution. © 2009, University of Pittsburgh


JOSHUA FRANZOS

In the long history of humankind (and animal kind, too), those who learned to collaborate and improvise most effectively have prevailed.

— Attributed to Charles Darwin

In the previous issue of *Pitt Med*, we described the research of Cecilia Lo, the founding chair of our new Department of Developmental Biology. We noted that in 2007, she identified a gene in mice, homologous to a human gene, that when mutated causes a complex congenital heart disease known as "heterotaxy," in which a severely abnormal heart is on the right instead of the left. The mutation also results in a defect in the function of the cilia that line the respiratory tract (primary ciliary dyskinesia). This was the first evidence that the heart disease is genetically linked to this dysfunction in cilia.

As it turns out, virtually all of our cells have cilia—hairlike "antennae" that protrude from the cell surface, with some moving like a wave and others remaining stationary; and these structures are highly conserved in evolution. (You may remember meeting the cilia's lengthier ancestor, the flagellum of the single cell *paramecium,* in high school biology.) Dr. Lo and others suggest that at the earliest stages of embryonic development, the orchestrated waving of the cilia on primitive heart cells affects the patterning of the cardiovascular system, possibly by making the cells "swim" from right to left in the embryonic fluid (in typically developing embryos). Non-motile, single cilia detect light, odor, fluid flow, mechanical stress, and sound. They act as a signaling machine, communicating indirectly with our genes and transporting proteins in both directions between the cilium and the cell body, thereby influencing the regulation of critical cellular processes such as cell division, cell differentiation, and wound healing—as well as embryonic development. Motile cilia dysfunction may lead not only to respiratory and cardiac disease, but to male infertility, cystic kidney disease, or hydrocephalus. In some circumstances, both types of cilia might work together; for example, motile cilia on kidney tubule cells could influence fluid flow and stationary cilia could sense that flow.

Cilia allow the *paramecium* to move toward food, and later in evolution, they bring the sperm toward the egg, shape us, and organize our brains. It strikes me that the activity of cilia is a fine metaphor for human behavior. We often stay still, sensing our environment and reacting accordingly—sometimes joining others as we move together in response to what we have sensed. But our collective behavior isn't always coordinated or constructive. I think of this metaphor now as I view the ongoing debate over health care reform. Most of us agree that every American should have health insurance and decent care of good quality at a cost that will not bankrupt us individually nor as a country. Yet, as I write this, powerful institutions and Congress have not yet fully sensed the needs of all of our people, nor moved collectively and constructively to address those needs.

In the end, an appropriate strategy for reform will hopefully be selected—by legislation if not by nature—only several decades after Harry Truman recognized the imperative to do so. But then again, evolution moves slowly. *Paramecium* to person didn't happen overnight.

Arthur S. Levine, MD
Senior Vice Chancellor for the Health Sciences
Dean, School of Medicine