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“GRANDEUR IN THIS VIEW OF LIFE”

As we approach the bicentennial of the birth of Charles Darwin (in 2009) and the 150th anniversary of the publication of *The Origin of Species*, the subject of evolution remains as central to scientific discourse today as it was in the mid-19th century. Pick up a newspaper or magazine, turn on the television or radio, cruise the Web and you will invariably encounter a discussion about evolution—from reports about new scientific insights that deepen our understanding of the connectedness of life forms, to debates about whether evolution should be taught in tandem with creationism or intelligent design, and data that point to deep public ambivalence about science as a way of understanding the world.

A plurality of Americans believe that human beings and other creatures have evolved over time—a central premise of Darwin’s theory of evolution—but an almost equal number (41 percent) believe that all living things have existed in their present form since the beginning of time, according to research by the Pew Center for People and the Press. Moreover, fully one-third of the public believes there’s no consensus among scientists about evolution, and a clear majority of those polled (65 percent) believes that creationism should be taught alongside evolution.

So what is the role of the Howard Hughes Medical Institute? As an organization focused on basic biomedical research and science education, our stand is clear. We are committed to the scientific investigation of the natural world—what Darwin’s contemporary Thomas Huxley described as “the mode at which all phenomena are reasoned about, rendered precise and exact.”

The work of numerous HHMI investigators bears witness to the evolution of biological molecules, of viruses, and of living creatures. Over and over again, we scientists have identified genes in simple organisms such as baker’s yeast or the fruit fly and then used this DNA information to isolate a human gene with a similar function—a pathway predicated on the evolutionary relatedness of all living things. This issue of the *HHMI Bulletin* provides a lively sampling of research that makes use of evolution and, at the same time, helps fill in missing details. As investigator Sean B. Carroll observes, “Many biologists would now agree that a grounding in evolution is fundamental to biology. Before, I think they would have said that evolution is a branch of biology but not an integral foundation.”

But our interest in evolution extends beyond the discoveries that emerge from HHMI laboratories. We are developing educational resources and programs to serve

a broad spectrum of students and teachers. One vibrant component is our annual Holiday Lectures on Science, which have an immediate impact on the Washington-area high school students in attendance and then an ongoing impact through television rebroadcasts and the thousands of DVDs and educational materials we distribute. This year’s Holiday Lectures—“Evolution: Constant Change and Common Threads”—feature Sean Carroll, an investigator at the University of Wisconsin–Madison and author of a popular book about evolution, and David M. Kingsley, an investigator at the Stanford University School of Medicine. Their talks can be viewed at [www.holidaylectures.org](http://www.holidaylectures.org).

Carroll and Kingsley use tools of genetics and molecular biology that Darwin could hardly have imagined. Although focused on different questions, these scientists have shown that an understanding of the function of key genes can elucidate general rules of evolution that can then be applied to diverse organisms. For example, Kingsley has demonstrated that changes in a single gene triggered a major shift in the armor plating found in wild populations of stickleback fish. Interestingly enough, the gene that controls the armor plating in sticklebacks also plays a role in human development; mutations result in a syndrome that Darwin himself observed while traveling through the Indian subcontinent.

What is most important about the Holiday Lectures is that they provide the nation’s high school students and the general public with access to topflight scientists and exposure to an experimentally testable approach to understanding the world. It’s not the only way to think about the world, but it does represent a scientific consensus. In that context, the magisterial final sentence of Darwin’s *The Origin of Species* is worth recalling: “There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.” Indeed.

A handwritten signature in black ink that reads "Thomas R. Cech". The signature is fluid and cursive, written in a professional style.