

## Final "Evolution Matters" Lecture Finds Clues to Human Disease in Genetics of Primates

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"Nothing in biology makes sense, except in the light of evolution," said the famed geneticist Theodosius Dobzhansky in 1973, and biological research since has strongly affirmed that observation. Understanding our origins, then, especially our long genetic history, should prove useful in discovering the causes, mechanisms, and treatments of our diseases. That's the premise of the fifth and final lecture of the "Evolution Matters" series.

"The Genetics of Primate Evolution: A Rosetta Stone for Understanding Human Disease," by Ajit Varki, M.D., Distinguished Professor of Medicine and Cellular and Molecular Medicine at the UC San Diego School of Medicine, will be held at 6:30 p.m. on Thursday, April 24, in the San Diego Natural History Museum. Free registration begins at 6 p.m. at the museum, and the public is invited to attend.

"One powerful way to understand human evolution is through the study of genomes," says Varki. "Human genetic make-up is remarkably similar to that of our closest evolutionary relatives-the so-called 'great apes' (chimpanzees, bonobos, gorillas and orangutans). Despite these genetic similarities, we also find apparent differences between humans and great apes in both the incidence and the severity of major diseases, such as AIDS, certain cancers, heart attacks and malaria, differences which in some cases may eventually be explained on a genetic basis."

His lecture, he says, will focus on the genomic approach to understanding human evolutionary history, and placing some of our diseases in the light of genetic changes that occurred during this process.

Varki has been a pioneer in the field of Glycobiology, which is the study of the structure, biosynthesis and biology of complex sugar chains called glycans which cover all cells and many proteins in nature. Varki's research focuses on a family of sugars called the sialic acids, and their roles in biology, evolution and disease.

"I will discuss my own group's research on the many genetic and biochemical differences between humans and great apes in relation to sialic acids," Varki said. "This family of sugars has implications for understanding human susceptibility to certain infections, unusual features of the human immune system, the human birth process, and the human brain. I will also discuss our research on surprising findings regarding one sialic acid called 'Gc', which is found in the great apes, but not in humans. This non-human molecule can be incorporated into the human body from dietary sources such as red meat and milk, and is also now contaminating biotherapeutic molecules that are produced using animal-derived materials."

Humans, Varki explains, have also been found to have antibodies directed against Gc. This could potentially explain certain dietary associations with human disease, as well as negative reactions to some bio-therapeutic products.

Varki will also introduce the new UC San Diego/Salk Center for Academic Research and Training in Anthropogeny (CARTA), a multidisciplinary approach to understanding human origins, which involves scientists from across San Diego and all over the world. He serves as co-director of CARTA.

In addition to his other duties, Varki is co-director of the Glycobiology Research and Training Center, and associate dean for Physician-Scientist Training at UC San Diego. He is an elected member of the Institute of Medicine, the American Academy of Arts and Sciences, the American Society for Clinical Investigation, and the Association of American Physicians. Visit his Web page here: <http://cmm.ucsd.edu/varki/>.

The five "Evolution Matters" lectures have been sponsored by the Division of Biological Sciences at UC San Diego, Amylin Pharmaceuticals and Kirin Pharma. Previous lectures included "Clockwork Genes: Biological Rhythms in Health and Agriculture," by Steve A. Kay, Dean of the Division of Biological Sciences; "Embryos and Evolution," by William J. McGinnis, professor of biology; "The Evolution of Complexity: From the Human Brain to the Rainforest," by Christopher Wills, professor of ecology, behavior and evolution biology; and "Unraveling the Mysteries of Flower Formation," by Martin Yanofsky, professor of biology.

To view the available lectures in the series in streaming video or to check on broadcast schedules on UCSD-TV, visit: <http://www.ucsd.tv/evolutionmatters/archives.asp>

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