

March of Dimes Foundation

National Office
1275 Mamaroneck Avenue
White Plains, NY 10605
Telephone (914) 997-4533
Fax (914) 997-4585

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2009 MARCH OF DIMES PRIZE IN DEVELOPMENTAL BIOLOGY

BIOGRAPHICAL SKETCH

KEVIN P. CAMPBELL, PH.D.

**Howard Hughes Medical Institute Investigator
Professor and Head of Molecular Physiology & Biophysics
University of Iowa Roy J. and Lucille A. Carver College of Medicine
Iowa City, Iowa**

Kevin Campbell likes solving problems and to the advantage of those with muscular dystrophy, he's pretty good at it.

For more than 25 years, Dr. Campbell has been researching how muscles work, and specifically how mutations in certain genes alter their protein products, leading to the development of muscular dystrophy.

More than 250,000 Americans are affected by one of the 40 known neuromuscular disorders, which include nine types of muscular dystrophy, facioscapulohumeral muscular dystrophy, amyotrophic lateral sclerosis (ALS, or Lou Gehrig's disease), spinal muscular atrophy and others. Muscular dystrophy is a genetic disorder in which the muscles progressively degenerate. Among this group are late-onset conditions that appear in adulthood, such as limb girdle muscular dystrophy, as well as childhood conditions such as Duchenne and Becker muscular dystrophies and congenital muscular dystrophy.

In addition to the fact that his father had myasthenia gravis, a neuromuscular disorder, Dr. Campbell is also often inspired by – and gets many ideas for his research from – patients and their parents who visit his lab at the Carver Biomedical Research Building in the University of Iowa Roy J. and Lucille A. Carver College of Medicine

“Parents are so informed and ask such good questions,” said Dr. Campbell. He added that it's important for him and the students working in his laboratory to realize that their work affects the lives of human beings.

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Muscular dystrophy is caused by any of a large number of gene mutations affecting the amount or function of various proteins produced in muscle. While Dr. Campbell has researched many of the proteins that affect muscular dystrophy, he has focused on the function of dystrophin. Dystrophin is a key element in a group of proteins that provide muscles with the structural stability that keeps them elastic and prevents them from hardening. Individuals with the Duchenne/Becker form of muscular dystrophy have a mutated gene that doesn't produce enough of the protein dystrophin, or produces poor quality dystrophin. With current treatments, the diseases can be slowed, but not stopped.

Dr. Campbell's early research looked at calcium fluctuations that occur in skeletal muscle cells when they contract. Later in his career, he became involved in muscular dystrophy purely for the science behind it – he began to wonder whether calcium, which is crucial to muscle contraction, might play a role in muscular dystrophy. In fact, work on a particular calcium channel in 1988 led to Dr. Campbell's work with Dr. Louis Kunkel, who is now his co-recipient for the March of Dimes Prize in Developmental Biology.

An important early finding from Dr. Campbell's lab was the discovery of the dystrophin-glycoprotein complex, which is found in skeletal muscle. The complex helps maintain healthy muscle membranes during muscle contraction and relaxation. Without dystrophin or other components of this complex, muscle cells die and muscles become progressively weaker.

Dr. Campbell's later work helped identify dystroglycan, a component of the dystrophin-glycoprotein complex, as a key protein in several new forms of congenital muscular dystrophy, including a muscle-eye-brain disease that causes mental retardation, a form that causes heart damage, and a form that attacks the central nervous system.

Dr. Campbell's research today focuses on the molecular and cellular workings of muscle cells with the intent of developing new treatments. Recently, his lab showed that they can restore muscle function in a mouse model for muscular dystrophy by treating the mice with a missing enzyme. Dr. Campbell is hopeful that one day this same approach will benefit human patients.

A Brooklyn, NY native, Dr. Campbell grew up as an only child in his grandparents' home, where he bred parakeets with his father. He did not come from a family of scientists; rather, both of his parents were corrections officers.

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A physics teacher from his junior year at Xaverian High School in Brooklyn helped Dr. Campbell develop his interest in puzzles, and a summer camp experience gave him his first opportunity to put the scientific method to use.

At summer camp, students were supposed to present an animal they had trained. Dr. Campbell's plan was to walk across the stage with a parakeet on his shoulder – without the bird flying away. Unbeknownst to the worried nuns who ran the camp, Dr. Campbell had picked his favorite parakeet, based on his discovery, through careful observation, that the bird couldn't fly.

Dr. Campbell joined the University of Iowa in 1981 and continues to work there today. He earned his PhD from the University of Rochester and worked as a fellow at the University of Toronto, Canada.

He was a March of Dimes grantee in 1985, and received about \$20,000 to study proteins in muscles and explain muscular dystrophies.

Dr. Campbell and his wife Ann are the parents of three grown children, and live in Iowa City.

The March of Dimes Prize in Developmental Biology has been awarded annually since 1996 to investigators whose research has profoundly advanced the science that underlies the understanding of birth defects. The March of Dimes Foundation created the Prize as a tribute to Dr. Jonas Salk, who received Foundation support for his work to create a polio vaccine.

The March of Dimes is the leading nonprofit organization for pregnancy and baby health. With chapters nationwide and its premier event, March for Babies®, the March of Dimes works to improve the health of babies by preventing birth defects, premature birth and infant mortality. For the latest resources and information, visit marchofdimes.com or nacersano.org.