

Dr. Leslie Leinwand

In addition to being Professor and Chair of the University of Colorado at Boulder's Molecular, Cellular, and Developmental Biology Department, Leslie Leinwand:



- Founded a biotechnology company, Myogen, in 1997. Myogen, which recently went public, conducts clinical trials on heart medications.
 - Established and Co-Directs the University of Colorado's Cardiovascular Research Institute (CU-CVI), a collaborative group of physicians, molecular biologists and geneticists from multiple CU Campuses. Working together to integrate research and clinical applications, CU-CVI physicians and scientists initiate effective treatment programs and preventive therapies.
 - Teaches courses on scientific ethics for undergraduate and graduate students.
- Has authored 185 scientific publications and directs a research laboratory averaging 25-30 people, including 8-10 undergraduates.
 - Is Principal Investigator of CU-Boulder's Howard Hughes Medical Institute Grant and National Institute of Health Cardiovascular Training Grant.
 - Enjoys cooking, traveling, and spending time with her family, including her 15-year old daughter, Emily.

Dr. Leinwand earned her undergraduate degree from Cornell University and her Ph.D. from Yale. She has always been interested in the origins of disease and originally thought she would become a physician. While in high school she was introduced to laboratory science. "I experienced constructing a hypothesis and testing it – from that point on I was hooked." When asked why she chose cardiovascular research, Dr. Leinwand responds, "It may sound corny, but there was a lot of heart disease in my family and I was interested in why certain families had more disease than others. That led me to the genetics of heart disease."

Sudden Death in Young Athletes: The Reggie Lewis Story

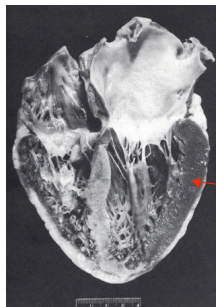
Reggie Lewis is one of several young athletes who has died suddenly due to cardiac causes. Lewis was a 27-year-old team captain for the Boston Celtics, averaging over 21 points per game and leading the Celtics through a great season in 1992. During his first playoff game as team captain, Lewis collapsed at the Boston Garden due to a defect in his heart. A team of doctors advised him to give up basketball, but dissatisfied with that prognosis, Lewis switched doctors. They assured him that his heart was healthy and that he could begin training again under medical supervision. On July 27, 1993, while practicing unsupervised, Lewis collapsed again and died later that evening. Doctors believe the cause of Reggie Lewis' death was hypertrophic cardiomyopathy (HCM), a heart disease that results in abnormal pressures within the heart as well as a decreased ability to pump blood throughout the body.



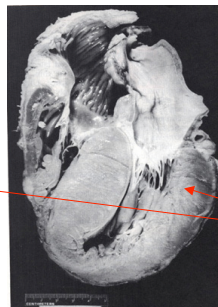
HCM attracts widespread attention because the deaths can occur in young, seemingly healthy people involved in competitive sports. Because premature cardiovascular disease usually has a genetic basis and genetic mutations that cause HCM are thought to be present in at least 1 in every 500 people, screening methods are necessary for HCM diagnosis and management. The most common clinical screening methods for HCM include detailed analysis of family history, physical examination, electrocardiography, and echocardiography. However, a definitive diagnosis is difficult because not all individuals with a genetic defect express the clinical symptoms of HCM.

Dr. Leinwand and her lab at the UCB Molecular, Cellular and Developmental Biology Department are researching how mutations in two different genes can lead to HCM. They hope to better understand the molecular and cellular processes that lead to HCM and find effective tests and treatments for this disease.

Hypertrophic Cardiomyopathy (HCM)



Normal human heart



Human heart from an HCM patient
(note thick walls of left ventricle)

In hypertrophic cardiomyopathy the muscle fibers of the heart do not contract efficiently. The walls of the left ventricle, which are responsible for pumping blood out to the entire body, thicken in an attempt to compensate for this inefficient contraction.

Notice how the walls of the left ventricle of the HCM (right) heart are significantly thicker than those of the normal heart (left)

Mutations Leading to Hypertrophic Cardiomyopathy

Mutations in many different genes can lead to HCM. All of these mutations are autosomal dominant and occur in genes encoding proteins of the sarcomere. The sarcomere is the part of muscle cells that contracts. Two of the most common genes in which mutations occur are the myosin and troponin genes.

Disease characteristics of two different mutations

Myosin Mutations

- Enlarged heart
- Blood flow dysfunction
- Variable sudden death

Troponin Mutations

- Smaller heart
- Blood flow dysfunction
- High incidence of sudden death