

Summary of *Mitochondrial Medicine 2007*

The 2007 UMDF Symposium in San Diego covered a broad spectrum of topics in formats that included both detailed reviews of current knowledge by invited faculty and cutting edge research on mitochondrial function and disease presented by investigators from around the world.

Day One – Mitochondrial Mechanisms and Disease

Topics covered included the role of mitochondrial DNA variation in age-related diseases, a mitochondrial toxin model of Parkinson's disease and molecular mechanisms of Barth syndrome. Detailed explanations of the roles of oxidative stress and ischemia in mitochondrial neuropathies and myopathies were also presented. A noteworthy research presentation was Volkmar Weissig's "Internalization of Isolated Mitochondria by Mammalian Cells," in which he demonstrated that mitochondrial uptake can restore respiration in human cells lacking functional mitochondria.

Day Two – Role of Mitochondria in Diseases of Aging

Insights into the importance of pro-oxidant signaling to metabolism in mitochondria and other cell organelles and also the multi-faceted contribution of mitochondrial polymerase gamma to various diseases were highlights of the invited talks. Wolfgang Sperl's research presentation on "The Relevance of Functional Investigations of Intact Mitochondria in the Diagnosis of Mitochondrial Disorders," held out the possibility of developing diagnostic tests more sensitive in recognizing mitochondria-based metabolic defects than are currently available.

Day Three – Current Options for Treatment of Mitochondrial Disease

The many obstacles to receiving approval for clinical trials of promising drugs for treatment of rare diseases were addressed by one of the faculty, while another surveyed the potential for drugs to increase respiratory function in animal models of mitochondrial disease. Jennifer Barber-Singh's research presentation "Protective Role of NDI1 in a Mouse Parkinson's Model" examined the utility of an animal model for assessing the ability of gene therapy to protect against mitochondrial complex I defects in Parkinson's disease.

Day Four – Future Treatment Prospects

The emphasis was on increasing the accuracy of mitochondrial disease diagnosis and of assessment of treatment efficacy through the use of technologies such as computerized or polarographic analyses and high-resolution respirometry. Another presentation detailed the roles of muscle mitochondrial function in type-2 diabetes and chronic obstructive pulmonary disease. Sarah Calvo's research presentation "Systematic Identification of Human Mitochondrial Disease Genes Through Integrative Genomics," disclosed an especially promising means of discovering currently unknown genes that contribute to mitochondrial genes.