Researchers develop mouse model for muscle disease

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Researchers from the University of Minnesota have identified the importance of a gene critical to normal muscle function, resulting in a new mouse model for a poorly understood muscle disease in humans.

Through techniques in genetic engineering, the researchers "knocked out" the gene in mice that encodes the protein gamma actin, which is a protein found in normal muscle cells. Scientists previously thought that if this gene were absent, muscle development would be seriously impaired. But, James Ervasti, Ph.D., professor of biochemistry, molecular biology and biophysics, and his team found that knocking out gamma actin still allowed for muscle formation in the mice, but impaired muscle cell function, ultimately leading to muscle cell death.

Now researchers have a mouse model for centronuclear myopathy, a very poorly understood muscle disease similar to muscular dystrophy that is characterized by generalized muscle weakness and cramps.

The research is published in the September issue of the journal Developmental Cell.

Gamma actin is a protein that plays an important role in giving muscle cells structure. It binds to dystrophin, a protein in muscle cells that if absent, causes Duchenne muscular dystrophy, a severe form of MD that effects primarily males and results in early death.

Originally, Ervasti thought that when they knocked out the gamma actin

gene, the mice would exhibit symptoms similar to Duchenne muscular dystrophy. Instead, when the mice were born, they exhibited symptoms of centronuclear myopathy.

"The availability of this mouse model will provide new insight into a puzzling human muscle disease," according to Kevin Sonnemann, Ph.D., lead author and research associate in the Department of Biochemistry, Molecular Biology and Biophysics.

Now that they know how the lack of the gamma actin gene affects the mice, the researchers will look into the mechanism that causes the muscle cells to die.

This discovery also gives geneticists who study degenerative muscle diseases a new target to study centronuclear myopathy in humans. Since Ervasti's group has identified a likely gene in the mice, geneticists can screen their patients for that specific gene, instead of screening all 30,000 genes to find the mutation.

Source: University of Minnesota