Mutation responsible for cystic fibrosis also involved in muscle atrophy

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Patients with cystic fibrosis (CF) usually experience significant muscle loss, a symptom traditionally considered to be a secondary complication of the devastating genetic disease. However, a recent study by Dr. Basil Petrof reverses the equation: his results show that muscle atrophy and weakness may be a primary symptom caused by the effects of CFTR gene mutations on the muscle itself. Dr. Petrof's findings will be published on July 31 in *Public Library of Science -- Genetics*.

Cystic fibrosis is known to be caused by a specific mutation on the CFTR gene. Dr. Petrof's study demonstrates for the first time that the CFTR gene is also present in skeletal muscles, where it plays a role in calcium regulation.

"After analyzing our results, we believe that defects in the CFTR gene are directly involved in the skeletal muscle wasting and weakness seen in many CF patients," Dr. Petrof explained. "And in the specific case of the diaphragm, a muscle required for breathing, this can potentially lead to fatal respiratory failure when the lungs are infected."

The researchers' data also show that lung infection and increased inflammation in the body are major triggers which interact with the genetic mutation to cause muscle atrophy and weakness in CF mice. These results are also applicable to humans.

"Our study suggests that one way to fight CF-related muscle atrophy is to aggressively control inflammation and infection in our patients. In fact",

continued Dr. Petrof, "this is what current treatments already try to do; we simply need to reinforce them. In addition, our study suggests that a new way to treat the problem in the future may be to use drugs which can prevent an excess calcium build-up in their muscle cells."

These new findings run contrary to the traditional belief that muscle atrophy in CF patients is simply the consequence of a lack of exercise or poor nutrient absorption. Although these explanations undoubtedly play a role in some patients, it now appears that a primary cause of the muscle loss could actually be genetic in origin. This new evidence that the CFTR gene plays a role in skeletal muscle could help researchers to develop novel therapies for improving the function of the diaphragm and other muscles in CF patients.

CF is a genetic disease caused by mutations in the CFTR gene. This gene is involved in the movement of chloride and other ions across cell membranes; its mutation causes a thickening of secretions in the lungs and other organs. In the lungs, these thicker secretions clog and block air passages which promote respiratory infections.

Source: McGill University Health Centre (news : web)