Taking a muscular approach towards diabetes and other diseases

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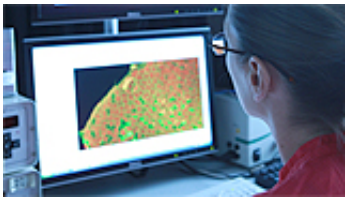

Dr Lowenna Holt examining muscle fibres under the microscope

Australian scientists have identified a gene that regulates muscle size, a finding that could help unlock therapies for Type 2 diabetes and diseases such as muscular dystrophy, where muscles are weakened and damaged.

Type 2 diabetes occurs when the body no longer controls blood sugar levels properly. We need insulin, a hormone released from the pancreas when we eat, to channel sugar from our blood into our cells.

While researching ways to improve the response of muscle to insulin, Dr Lowenna Holt, Associate Professor Greg Cooney and Professor Roger Daly from Sydney's Garvan Institute of Medical Research were surprised to see that a particular strain of genetically modified mice - missing the Grb10 protein - had large muscles. Even newborn mice missing Grb10 had larger muscles, indicating that this protein regulates muscle development before birth. The results are now published online in The FASEB Journal.

"Our main finding is that Grb10 plays a role in regulating the size of muscles during embryonic development, mainly by increasing the number of muscle fibres in the muscle, which is unusual. Usually muscles become bigger by increasing the size of each fibre" said Dr Lowenna Holt.

"We compared global gene expression in large versus normal muscle using gene microarrays and a computer program to visualize changes in gene networks. We saw more replication and proliferation gene sets in the Grb10 knockout muscle, telling us that processes causing proliferation of muscle stem cells could be controlled by Grb10 in the embryo. We also found that gene sets for muscle development were increased."

Apart from its implications in muscle regeneration during healing, the finding is important for diabetes research because muscles are the biggest users of glucose in the body. A drug able to reduce Grb10 expression would increase muscle mass, and so increase the capacity to move glucose from the blood stream into cells, a major goal for any diabetes therapy.

Provided by Garvan Institute