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Couple finds molecule that causes obesity, diabetes

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Singapore: A research study from Nanyang Technological University (NTU) has found that by inhibiting a particular molecule produced naturally in the body, muscle loss due to aging or illnesses can be prevented. Blocking the same molecule will also trigger the body to go into a 'fat-burning mode' which will fight obesity and also treat the common form of diabetes.

The discoveries have led NTU scientists to embark on joint clinical research with local hospitals. The research has been published last month in Cell Metabolism, a prestigious journal known for publishing biological breakthroughs. Associate Professor Ravi Kambadur and his team from the NTU School of Biological Sciences found that a protein called Myostatin, which controls muscle cell growth, is responsible for initiating muscle loss.

When excess levels of Myostatin is bound to a muscle cell, it induces heavy loss of mitochondria (the part of the cell responsible for energy production that keeps a cell alive), which in turn causes the muscle cell to waste or lose muscle tissue (atrophy) due to the 'lack of energy'. Under normal healthy conditions, small loss of Mitochondria is needed for the regeneration of new cells, but when a patient is suffering from chronic diseases or is bedridden (and muscles are not used often), this process is disrupted due to high levels of myostatin which results in increased mitochondrial loss and muscle atrophy.

Prof Kambadur said recent studies have shown that extreme muscle wasting can lead to death. "For example, about 30 per cent of cancer patients die not because of cancer, but because of muscle loss also known as cachexia," said Prof Kambadur. "When someone is suffering from a chronic disease and doesn't eat enough, the body starts to generate energy by breaking down muscle proteins and that is the reason we see a lot of muscle wasting under chronic disease conditions. Over the years, our research has revealed that this type of muscle wasting is initiated by excess levels of myostatin in the body. If we block myostatin from binding to cells, then muscles won't waste away and we can then mitigate the effects of aging and chronic diseases."

Prof Kambadur's research projects on myostatin are funded by Ministry of Education, Biomedical Research Council and the National Research Foundation's (NRF) Competitive Research Programme (CRP). The research on myostatin is conducted in collaboration with Associate Professor Mridula Sharma from the National University of Singapore. The husband-and-wife team have collaborated on various research projects in the area of skeletal muscle for many years.