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Crucial role for molecule in muscle development

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Research led by the University of East Anglia has discovered the crucial role of a molecule in skeletal muscle development.

The finding could have implications in the future for maintenance of healthy muscle or muscle regeneration in certain diseases, for example cancer and neuromuscular conditions such as muscular dystrophy.

The complexity and significance of microRNA molecules has only recently been recognized and they have been implicated in many biological processes, including disease. Until now nothing was known about their role in the development of skeletal muscle, which is pivotal for movement and supports healthy ageing.

Published this week in the journal Proceedings of the National Academy of Sciences (*PNAS*), the study was carried out by researchers in the School of Biological Sciences at UEA and the Weizmann Institute of Science, in Rehovot, Israel.

They showed that a particular microRNA, called miR-206, is crucial for normal muscle development in the embryo. MiR-206 switches off a gene called Pax3, this in turn allows early stage muscle cells to become more specialised contractile cells needed for muscle to function. The researchers suggest that this regulation is also important in adult muscle stem cells, which differentiate in response to muscle injury or exercise.

Lead author Andrea Münsterberg, professor in developmental biology at

UEA, said: "Muscle is vital to our well being, but it can become fragile, for example as we age or through muscle-wasting diseases. Therefore understanding how muscle tissue develops and is maintained is important."

"Discovering how the Pax3 gene is regulated by miR-206 and controls other genes that lead to muscle differentiation is significant. If you control Pax3 you could control when cells become more specialised and take on their unique function. We suggest that what we have learnt about embryo development also applies to adult muscle."

Prof Münsterberg added: "While not the focus of this study, in theory if we could enhance the function of microRNAs in the body we might in the future be able to promote the maintenance of healthy muscle or muscle regeneration in certain diseases."

More information: 'MicroRNA regulation of the paired-box transcription factor Pax3 confers robustness to developmental timing of myogenesis', *Proceedings of the National Academy of Sciences* (*PNAS*): www.pnas.org/content/early/recent

Provided by University of East Anglia