

Key stem cells for repairing knee joints identified

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Key stem cells for repairing knee joints identified by Aberdeen scientists. Credit: University of Aberdeen

Stem cells that seem key for maintaining and repairing the body's knee joints have been identified by scientists.

Researchers from the University of Aberdeen's Centre for Arthritis and Musculoskeletal Health published the findings today (Tuesday May 16) in *Nature Communications*.

Our joints are surrounded by a layer of connective tissue called the synovium.

Injury or conditions such as [arthritis](#) cause the normally thin membrane to become inflamed and thicken, creating more synovial fluid and causing pain and swelling.

The scientists have identified the stem [cells](#) in this membrane that have the capacity to reform and repair cartilage.

They have also identified a [key protein](#) which

appears to regulate these stem cells and their ability to contribute to cartilage repair, called Yap. They found that when a joint is injured and the synovial membrane is enlarged there is a high presence of Yap in the stem cells.

The team found in experiments that when Yap was removed from the stem cells, the synovial membrane in an injured joint did not expand. In addition, cells without Yap had reduced ability to contribute to cartilage repair.

The team were intrigued to note that these particular stem cells are derived from the same cells that make our original [knee joints](#) when we are embryos. In essence they seem to have maintained a 'memory' for how to create joint tissues so they are able to reform the joint when we are adults.

This research suggests specific stem cells could be better than others in terms of candidates for maintaining and repairing the joint in adulthood.

The five year study was funded by Arthritis Research UK, Medical Research Council, Wellcome Trust and Tenovus Scotland.

"This is important research as we have identified the particular type of stem cells which appear to be important for repairing joints. We have also identified a key protein that regulates these stem cells," says Professor Cosimo De Bari, Director of the University of Aberdeen's Centre for Arthritis and Musculoskeletal Health.

He adds: "By identifying and understanding these stem cells more fully, it puts us in a better position down the line to be able to target them with drugs or other treatments. Ideally we want to be able to get to a stage where we can give ageing cells that are losing their function a boost.

"We want to prevent joint damage and arthritis or treat arthritis at an early stage. Once the damage is

done, it is difficult to do anything – the challenge is to see if we can support the [stem cells](#) present in the joint to make sure they maintain their functionality."

Dr Natalie Carter, head of research liaison and evaluation at Arthritis Research UK, comments: "At Arthritis Research UK, we're dedicated to harnessing the power of exceptional science to make everyday life better for all people with arthritis. We know that arthritis in the knees impacts the lives of up to 4.71 million people in the UK. We are pleased to have funded this excellent research, which will help us understand the condition better and hopefully bring us one step closer to finding a way to treat, or even prevent, the condition."

More information: Anke J. Roelofs et al. Joint morphogenetic cells in the adult mammalian synovium, *Nature Communications* (2017). [DOI: 10.1038/ncomms15040](https://doi.org/10.1038/ncomms15040)

Provided by University of Aberdeen

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