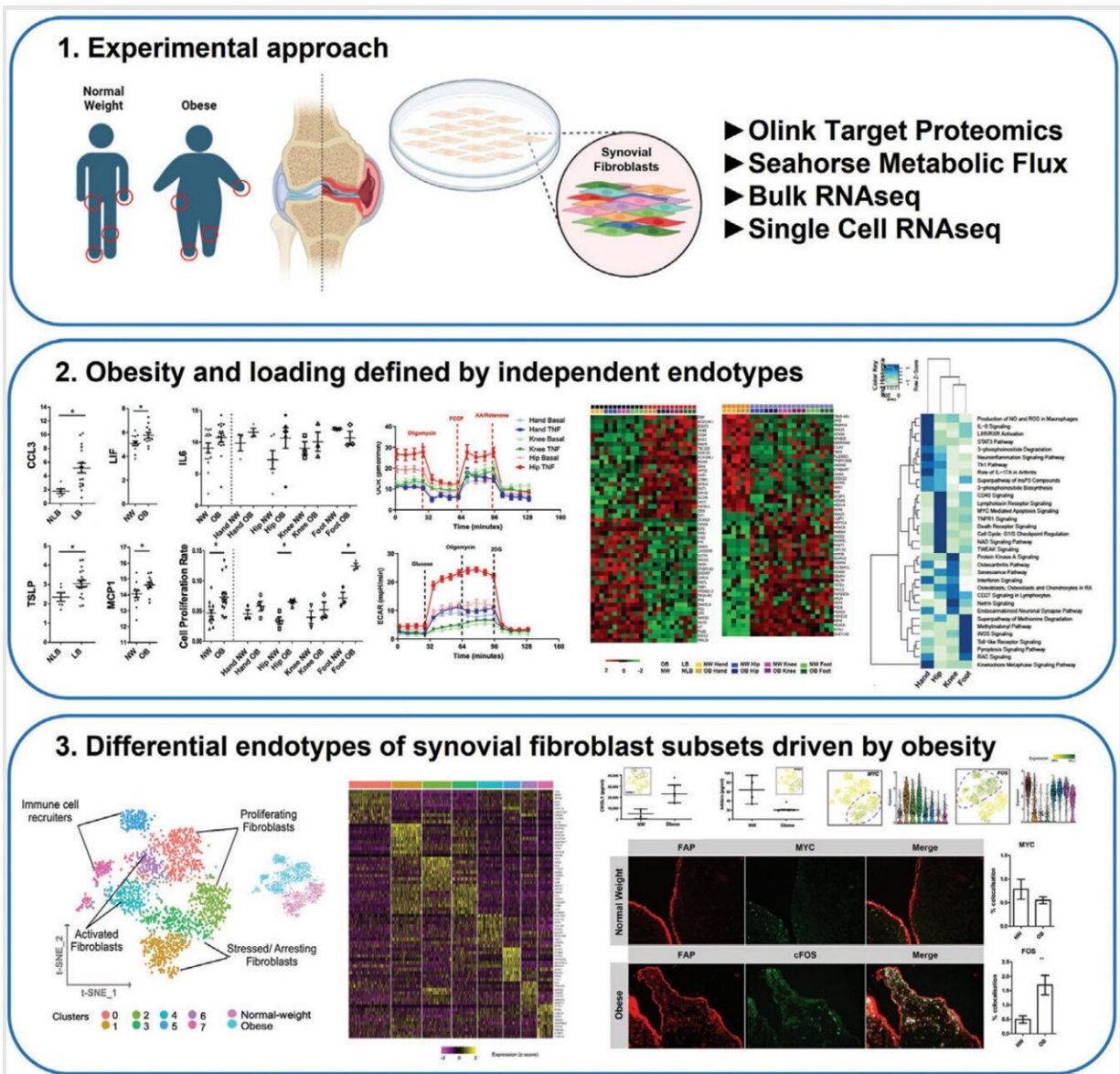


Obesity turning arthritic joint cells into pro-inflammation 'bad apples'

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Graphical Abstract. Credit: *Clinical and Translational Medicine* (2023). DOI:

Being overweight may be physically changing the environment within people's joints, as new research suggests that obesity is promoting pro-inflammatory conditions which worsen arthritis.

In a new study published in *Clinical and Translational Medicine* on April 3, researchers from the University of Birmingham have found that specific cells in the joint lining tissue (synovium) of patients with [osteoarthritis](#) are being changed due to factors associated with [obesity](#).

Previous research has shown that fat tissue that has been metabolically altered by obesity releases proteins called cytokines and adipokines, which are known to promote [inflammation](#) around the body. The newly published study observed that in cells taken from biopsies of arthritic joints, obesity also changes the environment within the joint itself, leaving cells in the joint vulnerable to being 'turned' into those that promote inflammation.

Dr. Susanne Wijesinghe from the Institute of Inflammation and Ageing at the University of Birmingham said, "We have seen that obesity can promote the kind of destructive inflammation in joints that goes far beyond what we might expect to see from wear and tear alone, even in non weight-bearing joints such as the hands."

"Obesity is creating an environment in the body, which is negatively affecting cells called synovial fibroblasts, which are stem cells involved in regulating the lubricating fluid of the joints. The effect is that these cells get recoded into those that promote inflammation within the fluid around the joints. Then, like bad apples in a barrel, they begin to affect the whole joint, increasing secretion of chemicals such as CHI3L1 which

degrade the joint and increase the progression of osteoarthritis."

Hips don't lie—weight isn't driving factor in load-bearing joints

Weight wasn't determined to be the driving factor for impacting the joint cells leading to greater inflammation, the research found.

The team of researchers used biopsy information from a range of joints including both weight-bearing joints such as hips and knees as well as the hands to determine whether the additional physical strain on joints associated with obesity was driving pro-inflammatory cytokines. The results found that there were independent impacts of obesity on load bearing and non-load bearing joints, and that among the 16 patients with BMI of over 30, weight alone didn't account for the [molecular changes](#) in those joints.

Simon Jones, Professor in Musculoskeletal Ageing in the Institute of Inflammation and Ageing at the University of Birmingham said, "This research helps us to both design better studies that more accurately understand the different conditions that affect patients with osteoarthritis, and it also better guides the way we develop drugs for the condition in the future."

"Potential targets and ways of delivering drugs can now be specifically considered for patients who do and don't have [metabolic changes](#) driven by obesity. In addition, if we treat osteoarthritis patients with obesity as a clinical sub-group we can also see whether specific therapies that address the metabolic element driving the disease can halt that underlying risk."

Zoe Chivers, Director of Services and Influencing at the charity Versus

Arthritis said, "This study provides further evidence that osteoarthritis (OA) is not just inevitable 'wear and tear,' but the result of complex and diverse biochemical changes in the joint."

"The research reveals that obesity can lead to a change in the cells in the joint lining to make them more inflammatory, and that these changes occur not only in load bearing joints such as the knee and hips, but also in non-load bearing joints such as the hand."

"These findings greatly enhance our understanding of what can cause osteoarthritis, bringing us closer to discovering more effective treatments in the future."

More information: Susanne N. Wijesinghe et al, Obesity defined molecular endotypes in the synovium of patients with osteoarthritis provides a rationale for therapeutic targeting of fibroblast subsets, *Clinical and Translational Medicine* (2023). [DOI: 10.1002/ctm2.1232](https://doi.org/10.1002/ctm2.1232)

Provided by University of Birmingham

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