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"Cellular and molecular characterization of the normal and arthritic hip's intra-articular adipose tissue"

Hip osteoarthritis (OA) is a common cause of pain, decreased quality of life and morbidity. Every year, 60,000 Canadians undergo a hip replacement, and millions declare suffering from hip OA. Thus, the financial burden associated is significant. Whilst the mechanics leading to hip OA are understood, the biological processes are not. This study will focus on the hip's fatty tissue, known as the intra-articular adipose tissue (IAAT). IAATs are present in all joints. In the hip the IAAT comprises up to two-thirds of the surface, but its function is uncharacterized and poorly understood. The proposed work will examine IAATs from different groups of patients, to study its cellular composition and gene expression to assess how IAATs change with ageing and OA development. Such knowledge will provide insights on the biological processes of ageing and OA development, and potentially provide targets for non-surgical treatment options to reverse or hault these processes.

In Canada, it is estimated that over 50% of the population eventually suffer from osteoarthritis.
The osteoarthritis (OA) epidemic is creating significant societal- and healthcare- burdens. To minimize the rapid increase in the prevalence of OA novel strategies for its prevention ought to be identified. Up to two-thirds of the acetabulum in the hip joint is filled with fatty tissue [intra-articular adipose tissue (IAAT)], whose contribution to the joint's biology is unknown. This study aims to better understand the hip's IAAT function by characterising how the processes of aging and OA influence its characteristics. To achieve this, IAAT from 5 patient groups obtained during (arthroscopic or arthroplasty) surgery will be studied for cellular and molecular differences. These will include: (1) patients <20 years, without OA; (2) patients between 20–40 years old, without OA; (3) patients <40 years with OA; (4) patients >70 years with OA and (5) patients >70 without OA undergoing arthroplasty for hip fracture. Differences between groups will uncouple the effects of aging and OA on the IAAT. Advanced techniques will be used to determine differences in cellular composition; vascularity; innervation; stem-cell presence and molecular characteristics between groups. Such knowledge will aid understanding the pathophysiology of OA with the overarching aim of identifying biomarkers/ therapeutic targets to monitor or halt OA progression.