EXPERIMENTAL RHEUMATOLOGY

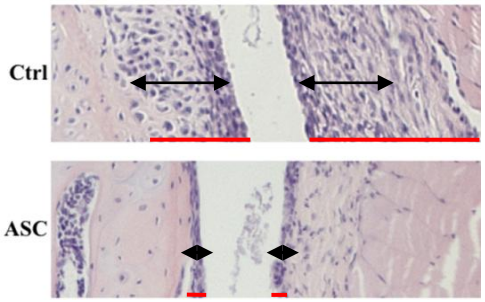
Adipose stem cells as a possible therapeutic approach for inhibiting joint destruction in osteoarthritis

Clinical Relevance

Osteoarthritis (OA) is the most common type of degenerative joint disease. Worldwide estimates indicate that 10% of men and 18% of women aged over 60 years have developed OA. In this disease joints are damaged by cartilage breakdown and bone formation at aberrant locations. The debris induces inflammation in the joint lining layer, causing more cartilage destruction. This vicious circle results in swelling and continuous pain, leading to extensive restrictions in the daily life of OA patients. The cause of OA is not known , which impedes the discovery of a cure. Up till now there are only medications that reduce inflammation and pain. Our lab works on innovative treatments using different approaches, for instance stem cell therapy.

Background

Stem cells (ASCs) are known for their capability to differentiate into many different tissues. Recent studies have shown that ASCs also exhibit anti-inflammatory characteristics that can be induced by an inflammatory environment, as is the case in the lining of an OA joint. Our approach is to isolate these ASCs from easy-accessible fat tissue and inject them in the knee joint of, a mouse model with experimentally induced osteoarthritis. This results in a strong reduction in inflammation (red indicator in pictures) and less joint damage at end stage OA. Interestingly, the injected ASCs disappear within days after injection. Therefore, we hypothesize that the anti-inflammatory characteristics of ASCs are induced by the inflammatory environment of the joint lining layer, which leads to protection of the joint via attraction of anti-inflammatory cells.



Goals

Our goal is to unravel the exact mechanism by which stem cells protect joints from getting damaged during OA. Hereby we focus on the effect of pro-inflammatory cytokines on ASCs, on the interaction between ASCs and different cells of the immune system and how the 'instructions' from the ASCs lead to efficacy of the immune system. We utilize both *in vitro* set-ups with freshly isolated ASCs and *in vivo* experiments using an experimental OA mouse model.

We Offer

We are working in a state of the art laboratory that is internationally renowned for its research that combines therapeutic strategies with diagnostics in OA. You will participate in an interesting project that includes a broad spectrum of techniques, including animal models of osteoarthritis, histology, immunohistochemistry, cell culture, FACS, Luminex and qPCR. You will be able to improve your laboratory skills, develop your scientific thinking and expand your knowledge on molecular processes and immunology.

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