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“Determining the optimal bone-derived stem cell source for cartilage regeneration in the treatment of osteoarthritis”

Stem cells are immature cells capable of transforming into specialized cell types (e.g. bone, cartilage, or muscle cells). Stem cells normally rest within specific areas of the body, preparing for future growth and tissue repair. They are critical for recovery from injury and diseases like osteoarthritis (OA), which damage joint tissues, cause pain, and impair function.

Stem cells that regenerate cartilage are found in many tissues (called “niches”), including fat and bone marrow. Presently, there is very little research evaluating which type of stem cell is best for cartilage regeneration. Meanwhile, the great promises of stem cell therapy have clinicians injecting stem cells at the bedside, often at considerable cost to the patient since this treatment is not covered under the public health care plan.

Our goal is to find and isolate the best source of stem cells for cartilage regeneration. We will look at stem cells from bone marrow, synovium and fat. The growth plate produces massive amounts of cartilage during bone growth and shows great promise for cartilage regeneration. In addition to the tissues above, we will also look at stem cells from the closed adult growth plate (epiphyseal scar), and the growth plate from young individuals whose bones are still growing, something which has never been done. Finding the ideal stem cells for cartilage regeneration will be a game-changer for clinical trials of cartilage regeneration and for curing joint-damaging diseases such as OA.