Docket #: S16-017

Biomarker to Enrich for Inflammation-Resistant Cartilage to Treat Osteoarthritis

Stanford researchers have identified a biomarker on cartilage precursor cells that can predict which cells will develop into inflammation-resistant and functionally appropriate tissue for autologous transplants to treat osteoarthritis. Osteoarthritis involves inflammation and damage to articular cartilage. Current cartilage replacement sources often produce weak, non-resembling tissue. However, chondrocyte cells expressing the new biomarker proliferate quickly and consistently form tissue that resists inflammation and closely resembles articular cartilage. This biomarker could provide a new, improved source of regenerative cells to treat osteoarthritis and prevent further tissue damage.

Figure

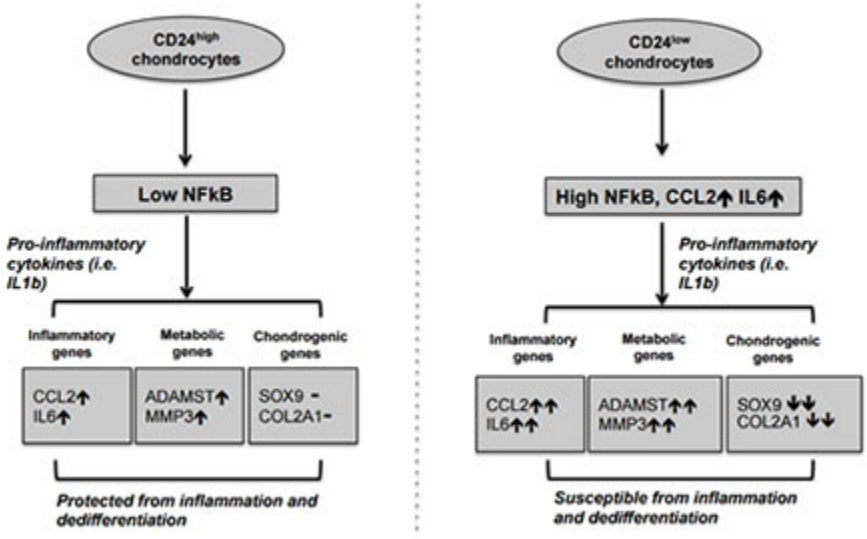


Figure Description: Schematic demonstrating the signaling processes associated with CD24 presence or absence, ultimately leading to significant differences in tissue specialization and likelihood of inflammation.

Stage of Research:
The inventors have further demonstrated that a gain of CD24 function is beneficial in both normal and Osteoarthritic human chondrocytes and are currently testing the performance of CD24 rich cartilage constructs compared to the normal CD24 low cartilage constructs in rat models of cartilage defects.

Applications

- **Regenerative medicine/tissue engineering** - biomarker can enrich chondrocytes for autologous transplant to promote cartilage repair in patients with osteoarthritis or joint-injury

Advantages

- **Inflammation-resistant** - articular cartilage grown using this method shows resistance to inflammation, countering one of the primary complications of osteoarthritis
- **Specific** - chondrocytes with this biomarker consistently develop into tissue like articular cartilage, unlike previous cell sources which generate inferior fibrocartilage which can dedifferentiate with in vitro expansion
- **Fast growth** - tissues grown from cells displaying this biomarker develop quickly, ideal for patient treatment scenarios

Publications

- Lee J, Smeriglio P, Dragoo J, Maloney WJ, Bhutani N. "CD24 enrichment protects while its loss increases susceptibility of juvenile chondrocytes towards inflammation." Arthritis Res Ther. 2016 Dec 12;18(1):292.

Patents

- Published Application: 20170312316
- Issued: 10,758,574 (USA)

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