

# Dickkopf-1 reduces hypertrophic changes in human chondrocytes derived from bone marrow stem cells

Rojas, Andrea

Mardones, Rodrigo

Pritzker, Kenneth

van Wijnen, Andre J.

Galindo, Mario A.

Las Heras, Facundo

© 2018 The in vitro process of chondrogenic differentiation of mesenchymal stem cells (MSCs) induces a pre-apoptotic hypertrophic phenotype, guided by the active status of the WNT/ $\beta$ -catenin pathway. To achieve a stable chondrocyte phenotype for cartilage tissue engineering, it is necessary to gain a better understanding of specific genes that regulate the cartilage tissue phenotype. RNA sequencing (RNA-seq) analysis of tissue samples from bone, cartilage, growth plate and muscle show that Dickkopf-1 (DKK1), a natural WNT canonical signaling inhibitor, is expressed in cartilage tissue. This observation reinforces the concept that inhibition of the WNT/ $\beta$ -catenin pathway is critical for preventing avoid chondrocyte hypertrophy in vitro. We used two doses of DKK1 in a pellet cell culture system to inhibit the terminal differentiation of chondrocytes derived from bone marrow mesenchymal stem cells (MSCs). Bone marrow MSCs were cultured in chondrogenic induction medium with 50 and 200 ng/ml o