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RESEARCH AREA

Traditional therapies for the treatment of osteoarthritis, which affects a large proportion of the population worldwide, have limited effectiveness, owing to limited regeneration of articular cartilage. Therefore, cartilage regeneration remains a major challenge, due in part to the lack of detailed knowledge of the molecular processes that regulate cartilage formation. For this reason, a number of biological therapies are currently being developed for which a more complete understanding of cartilage differentiation is essential. Our research group is interested in the biology of cartilage tissue, with particular emphasis on its formation (chondrogenesis). We aim to understand the cell surface proteome (surfaceome) of developing cartilage cells with the hope of identifying new biomarkers. We also aim to gain a better understanding of the biological clock in differentiating chondrocytes and to synchronise these clocks with mechanical stimuli. A more precise mapping of chondrogenic pathways could contribute to the development of more efficient cartilage regeneration procedures.

TECHNIQUES AVAILABLE IN THE LAB

Students interested in our research may get a better understanding of primary cartilage formation (chondrogenesis), as well as the molecular processes of healthy and osteoarthritic cartilage. We use cutting-edge methodology in our laboratory, including:
- in vitro cell and tissue culturing;
- primary chondrifying cell cultures established from embryonic limb buds;
- gene expression studies by RT-qPCR and next generation sequencing (NGS);
- protein expression studies;
- cell surface protein (surfaceome) analysis using high-throughput mass spectrometry

SELECTED PUBLICATIONS

Matta, C., Lewis, R., Fellows, C., Diszhazi, G., Almassy, J., Miosge, N., Dixon, J., Uribe, M. C., May, S., Poliska, S., Barrett-Jolley, R., Fodor, J., Szentesi, P., Hajdú, T., Keller-Pinter, A., Henslee, E., Labeed, F. H., Hughes, M. P., & Mobasheri, A. (2021) Transcriptome-based screening of ion channels and transporters in a migratory chondroprogenitor cell line isolated from late-stage osteoarthritic cartilage. **Journal of cellular physiology 236:** 7421–7439.

Alagha, M. A., Vágó, J., Katona, É., Takács, R., van der Veen, D., Zákány, R., & **Matta, C.** (2021) A Synchronized Circadian Clock Enhances Early Chondrogenesis. **Cartilage 13:** 53S–67S.

Matta, C., Juhász, T., Fodor, J., Hajdú, T., Katona, É., Szűcs-Somogyi, C., Takács, R., Vágó, J., Oláh, T., Bartók, Á., Varga, Z., Panyi, G., Csernoch, L., & Zákány, R. (2019) N-methyl-D-aspartate (NMDA) receptor expression and function is required for early chondrogenesis. **Cell communication and signaling 17:** 166.

Matta, C., Boocock, D. J., Fellows, C. R., Miosge, N., Dixon, J. E., Liddell, S., Smith, J., & Mobasheri, A. (2019) Molecular phenotyping of the surfaceome of migratory chondroprogenitors and mesenchymal stem cells using biotinylation, glycocapture and quantitative LC-MS/MS proteomic analysis. **Scientific reports 9:** 9018.

Matta, C., Fellows, C. R., Quasnichka, H., Williams, A., Jeremiasse, B., Allaway, D., & Mobasheri, A. (2021). Clusterin secretion is attenuated by the proinflammatory cytokines interleukin-1β and tumor necrosis factor-α in models of cartilage degradation. **Journal of orthopaedic research: official publication of the Orthopaedic Research Society 39:** 1017–1029.