

Osteochondral repopulation with help of intermittent extracorporal shockwaves and simultaneous intra-articular application of Hyaluronan. Biomechanical and biochemical basics

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Through the effect of mechanical stress on hyalin cartilage tissue an induction of special physical-mechanical signals is achieved, which are able to initiate specific inter- and intracellular biochemical reactions within the chondrocyts or their precursor cells (fibroblasts or stem-cells). Furthermore, they activate special growth factors and they are able to suppress or induce special enzymes, which are important for the osteochondral metabolism. By the way, the hyalin cartilage is hypo cellular, avascular, aneural and alymphatic. That means that every single cartilage cell has much higher regenerative power than other tissue cells, because the chondrocyts are self-sufficient with regard to their environment.

The extra cellular matrix (ECM) of the cartilage contains various protein fibres interwoven in a hydrated gel composed of a network of glycosaminglycan (GAG) chains.

Hyaluronan is the simplest of the GAG`s. Whereas other GAG`s are synthesized inside the cell and released by excytosis, hyaluronan is spun out directly from the cell surface by enzyme complex embedded in the plasma membrane. Hyaluronan synthesises from the basal side of an epithelium, for example, often to create a cell-free space into which cells subsequently migrate. Furthermore Hyaluronan is an important constituent of joint fluid, where it serves as a lubricant.

This both facts are the basic idea for our pilot study:

- 1.the induction of the repopulation of chondrocyts by activation of the precursor-cells (fibroblast and stem cells)
- 2.the setting-up of new intercellular space for the new developed chondrocyts by hyaluronan.