

## Technology Offer

# Cytokine-Loaded Microparticles in Hyaluronic Acid for Treatment of Osteoarthritis

Ref. No.: CH519

### Background

The intra-articular injection of hyaluronic acid (HA) in patients with osteoarthritis is so far the most promising treatment as it has been shown to delay the degeneration of cartilage. In this regard, HA is a well-tolerated visco-supplementation of the synovial fluid for mild and moderate osteoarthrosis joints. Until now however, there is no treatment option which is both able to delay or stop degeneration and which has regenerative potential.

### Technology

A novel approach for the treatment of osteoarthritis and other cartilage defects is to inject biodegradable chemokine-loaded microparticles (e.g. Polylactid-Co-Glycolid (PLGA) -based) in a suspension of HA into the joint cavity. The microparticles ensure that the chemokines are released in a controlled manner (not at once) over a defined period of time thereby establishing stable chemo-attracting gradients that are required for effective stem cell recruitment to the site of cartilage defect. *In vitro* results surprisingly show that the combined administration of HA and the chemokine CCL25 (thymus expressed chemokine) or CXCL12 (stromal cell-derived factor-1 $\alpha$ ) synergistically promote the migration of human stem- and/or progenitor cells. Treatment of osteoarthritic guinea pigs with CCL25 and HA can significantly improve cartilage score than animals treated with HA solely. Further on in surgical induced osteoarthritis rabbits the effect of the controlled long-term release of CCL25 from PLGA particles on the de- and regeneration of the articular cartilage was studied. CCL25-PLGA-particles treated rabbits show a better regeneration (cartilage score lower) than the HA treated rabbits.

### Benefits

- ✓ Stimulation of cartilage regeneration
- ✓ Biocompatible and biodegradable microparticles (PLGA) (Degradation within 50-60 days)
- ✓ No phagocytosis of the microparticles by leukocytes
- ✓ Gradually local cytokine release

### Application

Intra-articular injection for the treatment of osteoarthritis  
Arthroscopic application of a paste containing HA, cytokine-loaded particles and fibrinogen

### Commercial Opportunity

Searching for a licensing or developing partner

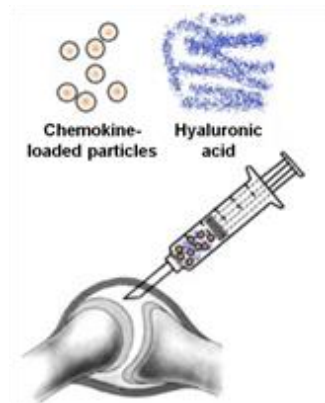


Fig. 1: Intra-articular injection

### Key words

Osteoarthritis, hyaluronic acid, cytokine, microparticles, tissue regeneration, local drug delivery

### Developmental Status

*In vivo* (guinea pig and rabbit)

### IP Status

DE patent application (12/2010)  
EP patent granted in 08/2014  
validated in: DE, GB, FR,  
IT, CH, AT  
US patent granted (01/2017)

publication [here](#)

### Patent Owner

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