

## ACS – Autologous Conditioned Serum

### Arthrosis: Inflammatory processes with a significant role in pathogenesis

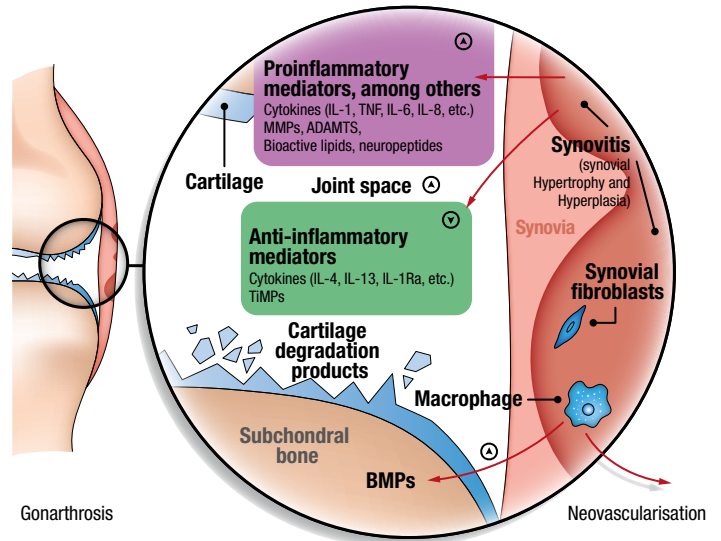
In degenerative and inflammatory joint diseases, an increased release of inflammation-promoting, cartilage-damaging cytokines occurs in the joint. Cytokines are proteins that regulate the growth and differentiation of cells. Some cytokines are accordingly called growth factors, while others play an important role for immunological reactions. Cytokines are the best studied among the mediators of inflammatory processes.

Cytokines such as TNF, IL-1 $\beta$ , IL-6, IL-15, IL-17, IL-18, IL-21 are associated with the pathology of osteoarthritis. Even though the correlations on a molecular level are still unclear, these cytokines are said to have a cartilage-decomposing effect as well as a negative influence on cartilage homeostasis. This disrupts the balance in arthrosis patients: There is an oversupply of inflammation-promoting cytokines.

### Cytokine imbalance: ACS strikes a balance

Despite all the heterogeneity of osteoarthritis, it can be stated that containing the chronic inflammatory reaction in the joint as early as possible can be a component of treatment. It is assumed that various cytokines, such as IL-1 Ra or IL-10, have an anti-inflammatory effect on certain aseptic inflammatory processes. In the production of autologous conditioned serum (ACS), the endogenous production of anti-inflammatory cytokines is simulated and the serum is also enriched with growth factors. This “conditioned” serum from the patient’s blood is injected into the affected joints or, for example, into mechanically compressed spinal roots, where it can have a correspondingly positive effect. The body’s own protective proteins can have an inflammation-relieving, pain-relieving and cartilage-protecting effect.

### Pathophysiology of osteoarthritis



### Aim of ACS therapy:

Relieve inflammation and pain

Indication examples with an inflammatory component

- Osteoarthritis, especially activated osteoarthritis, (e.g. in knee joints)
- Degenerative spinal diseases (e.g. spondylarthrosis, osteochondrosis, spondylosis, degenerative spinal stenosis)
- Nerve compression syndrome (e.g. intervertebral disc protrusion, intervertebral disc prolapse, degenerative neuroforaminal stenosis)
- Back pain

### LITERATURE SELECTION on ACS therapy with various ACS products

- Godek P (2016): Use of Autologous Serum in Treatment of Lumbar Radiculopathy Pain. Pilot Study. Orthop. Traumatol. Rehabil. 2016 Jan -Feb; 18(1):11-20
- Robinson W et al (2016): Low-grade inflammation as a key mediator of the pathogenesis of osteoarthritis; Nat Rev Rheumatol. 2016 Oct; 12(10): 580-592
- Gomi VG et al (2015): Efficacy of Epidural Perineural Injection of Autologous Conditioned Serum in Unilateral Cervical Radiculopathy: A Pilot Study. Spine (Phila Pa 1976) Aug2015; 15;40(16): E915-21
- Baselga GEJ, Hernández Trillos PM (2015): Treatment of Osteoarthritis of the Knee with a Combination of Autologous Conditioned Serum and Physiotherapy: A Two-Year Observational Study. PLOS One Dec2015; 28:10(12)
- Frisbie DD (2015): Autologous-conditioned serum: evidence for use in the knee; J Knee Surg. Feb2015; 28(1): 63-66.
- Baltzer A et al (2013): A new treatment for hip osteoarthritis: clinical evidence for the efficacy of autologous conditioned serum; Orthopedic Reviews 52013;:e13:59-64
- Baltzer A et al (2009): Autologous conditioned serum (Orthokine) is an effective treatment for knee osteoarthritis. Osteoarthritis Cartilage 2009; (172): 152-60
- Tobolski O (2020): Osteoarthritis of the facet joints. Orthobiologics as a treatment option. Sp Z 02/20

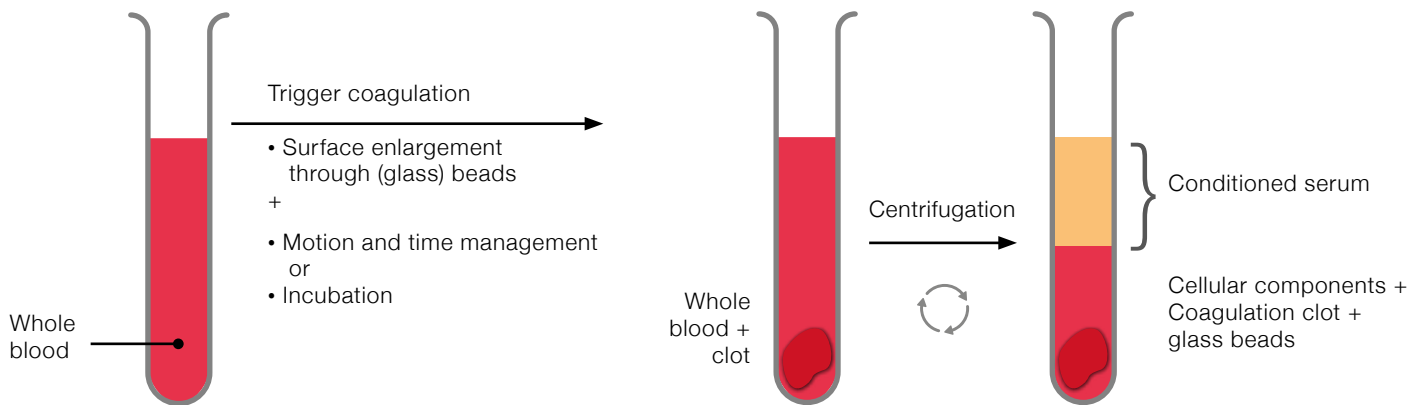
## IMPACT – ONE PLATFORM FOR NUMEROUS THERAPY OPTIONS

The innovative IMPACT platform is a CE-certified medical device that allows its user to prepare various orthobiologics, separating the fractions of the blood that are to be used for a specific therapy. The preparation process is very simple and fully automated. Ready-to-use IMPACT sets are available for the preparation of different orthobiologics.

### IMPACT ACS Set for the preparation of an autologous conditioned serum

The IMPACT ACS set contains a specially developed syringe for blood collection. This so-called IMPACT ACS sterile single-use syringe contains glass beads which accelerate the coagulation cascade on contact with the blood and thus favour the stimulation of the white blood cells, whereby more inflammation-solving, regenerating cytokines (such as IL1-RA, IL-10) are released. The coagulation process is accelerated in a controlled manner through motion and time management. Subsequently, a serum free of cellular components is automatically isolated and separated by centrifugation on the IMPACT platform.

### Preparation of autologous conditioned serum



#### IMPACT ACS<sup>1</sup>

Oversupply of IL-1Ra versus IL-1 $\beta$   
IL-1 $\beta$  : IL-1Ra > 1 : 10

No significant increase of TNF $\alpha$   
TNF $\alpha$  (Whole blood) = TNF $\alpha$  (ACS)

L-1Ra > 500 pg/ml

Growth factors and cytokines like  
for example IL-10, IGF, PDGF

(1) Serum concentrations: TU Munich, Chair of Medical Technology