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**12. Kongress für Pferdemedizin und -chirurgie
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**12th Congress on Equine Medicine and Surgery
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NEW TREATMENT OPTION IN THE THERAPY OF TENDON INJURIES

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Summary: *A new therapy as a treatment for tendon injuries is discussed. The special production process prepares a soft tissue adapted Hyaluronic acid (STABHA) with the name TendoPlus. The regeneration of tendon lesions is improved due to a suspected trigger function on stem cells and a positive effect to fibrin polymer formation. Alternative therapeutic options in tendon repair (Surgery-shockwaves-injections with PEP- ACP-and others) are presented and their results are compared with the TendoPlus treatment. Different cases are shown and the results by sonographic examination confirm the positive effect of this therapy.*

A hyaluronic acid developed specifically for application in soft tissue has been on the market of human medicine for some time. The preparation, which was developed here in Switzerland, promised a large range of uses also for the horse. Thus, it was no surprise that first attempts for administration in the horse quickly followed. The surprisingly positive results led to the intensification of treatment attempts and to further development of an equine preparation, i.e. the well-known TendoPlus.

Due to the special production process, the affinity of TendoPlus for soft tissue has been increased so that the effect on tendons and ligaments was optimised. The active substance of TendoPlus is not conventional hyaluronic acid but was especially developed for soft tissue, with the protected name STABHA (Soft Tissue Adapted Biocompatible Hyaluronic Acid). STABHA is produced in a patent-protected production process and has an extremely high degree of purity.

This purity profile is essential for the effect in soft tissue, since only this can achieve biocompatibility with the soft tissue and thereby, a long retention time in the tissue. This long retention time is a precondition for the positive effect on wound healing. The exogenous administration of hyaluronic acid into the freshly traumatised tissue leads to a faster formation of the fibrin matrix with stronger cross-linking, resulting in a more stable fibrin matrix.

The production process, among other things, uses special procedures that effect targeted elimination of nucleic acids and endotoxins. This

is a further crucial difference to the production process of conventional hyaluronic acid, since not only the impurities but the macromolecules themselves are precipitated there. By this inverted production reaction, i.e. the precipitation of impurities, a clearly higher degree of purity is obtained. This in turn leads then to substantially higher receptor binding and prevents the degradation by the body's own reactions.

The basis for the development of TendoPlus was the work of a team around Prof. Rinaudo of the University in Grenoble. This team has been working for years, actually even for decades, on the biochemical behaviour of the most diverse aminoglycan macromolecules.

Among other things, a direct chemical reaction of hyaluronic acid (HA) with fibrin could be demonstrated, leading to a cross-linking and thus a stabilisation of this structure beyond the physiological extent (LeBoef et al. 1986, LeBoef et al. 1987, Weigel et al. 1988). This reaction, in connection with results of other teams (Weiss et al., 1995) who could demonstrate an elevation of the body's own HA concentration in fresh soft tissue traumas, led to the rationale for developing TendoPlus.

At our hospital, we have performed all new forms of therapy for the treatment of tendon injuries, and over the course of the time, we were able to gain a lot of experience with the effectiveness of the various procedures. Aside from the surgical approaches such as tendon splitting, use of carbon fibre or PDS ligaments and physical procedures such as therapeutic ultrasound,

laser or shock waves, conservative therapies with various injections have proven themselves above all others.

Already in 2001, I had the privilege to present my work on tendon therapy with the so-called Müller-Wohlfahrt-Therapy (a combination of homoeopathic preparations with heparin, Medivitan and a calf blood derivative) in comparison to shock wave therapy here in Geneva at the CEMS. Ever since then, we have taken up the newly developed therapy forms for tendon damage again and again and have compared their effectiveness with our experiences.

Particularly the development of stem cell therapy with cultured stem cells from autologous bone marrow has shown a great many successful courses of therapy. Also the use of stem cells cultured from fatty tissue was intensively tested.

Nearly in parallel, various systems for obtaining growth factors from the blood of patients were introduced to the market. Aside from the Orthokin system, the company Arthrex presented a practice-friendly system with which the growth factors could be isolated. A system of the most recent generation promises an up to 10times higher concentration of growth factors.

Figure 1. PDGF-A/B Comparison in PRP releasate

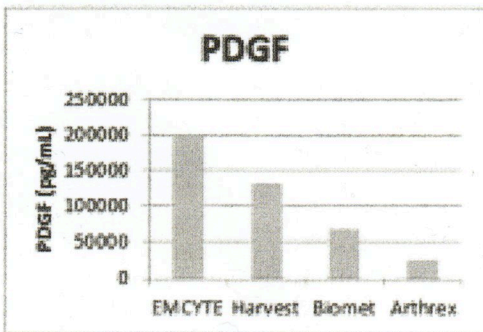


Figure 2. TGF-beta 1 Comparison in PRP releasate

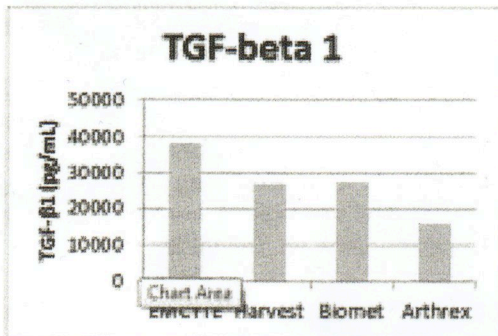


Figure 3. VEGF Comparison in PRP releasate

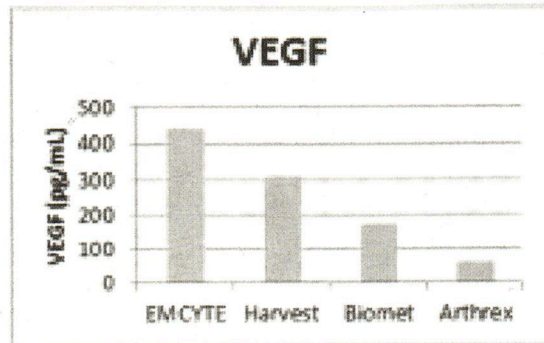
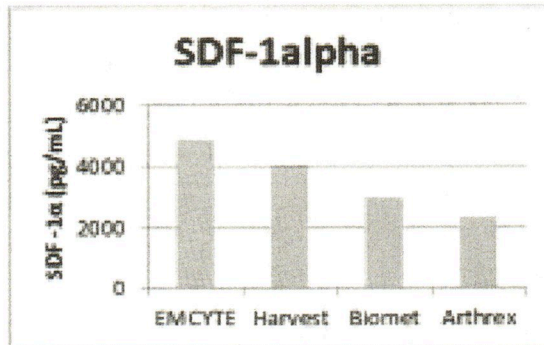


Figure 4. SDF-1α Comparison in PRP releasate



Completely new and not yet published is the use of trigger substances for the development of stem cells, which are in part administered but are also in part made available by the body itself.

This opens a new possibility for therapy, because crucial for the healing process is not just the availability of the substances necessary for healing but also the possibility to provide the body with the correct information to produce the right cell once more. Not inelastic scar tissue but elastic connective tissue with the ability to withstand stress prevents the feared recurrence.

Even if no scientific studies have been finalised yet, the work of Marguerite Rinaudo still shows that the special hyaluronic acid (STABHA) contained in TendoPlus fulfils a trigger function in the healing process and thus, explains its convincing effect. We work on the development of further trigger substances under the leadership of Professor Augustinus Bader of the University of Leipzig or the Bionethos Innovation Institute, respectively, in order to further optimise the healing process. Aside from the trigger function, the soft tissue adapted hyaluronic acid also possesses improved properties for a matrix formation that supports the healing process.