

Molecular bases of collagen-based compounds' action mechanisms

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In the field of functional tissue engineering collagen represents an interesting option when site-specifically injected since it acts as a bio-scaffold replacing, supporting, reinforcing, protecting connective tissues but also stimulating the neo-synthesis of collagen.

Given these characteristics, the use of injectable collagen for the clinical management of musculo-skeletal disorders due to overuse, aging, injuries can be recommended to:

- speed up of functional recovery timing,
- induction of repair, remodelling, and regeneration processes,
- secondary pain control.

The main action mechanism of injectable collagen is related to mechanotrasduction properties: Injections of tropocollagen improve tensile characteristics of the extracellular matrix which surround fibroblasts and improves fibroblasts' mechanical response speeding up the neosynthesis of collagen and inducing the prolifera-

tion of fibroblasts themselves. This mechanism of action has been studied and verified through studies, on *ex vivo* cellular models which provided data on the ability of swine type 1 tropocollagen to control tissue degeneration and improve the structural characteristics of the tissue.

References

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