Chitosan – a promising biomaterial in veterinary medicine

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Abstract

Biomaterials originate from natural substances and are widely used in medicine. Although they have to satisfy many conditions to be useful for treatment, more and more research is carried out with new types of biomaterials that can help replace various tissues such as tendons and bones. Chitosan is a very promising material, revealing unique features, which makes it useful for veterinary medicine – antimicrobial activity, biocompatibility, biodegradability. It is also known as good scaffold material, especially when combined with other polymers. This article describes chitosan as a biomaterial and tissue engineering scaffold with possible applications in veterinary medicine.

Key words: chitosan, scaffolds, biomaterials, tissue engineering

Biomaterials – definition

Biomaterials are defined as active substances capable of interaction with the surrounding tissues, without causing an immune response (Shigemasa et al. 1996). Research on the development of bioengineering (the branch of science dealing with the design of biomaterials) has been developing for decades and are still in progress – there is no perfect material yet, mainly because of the multitude of conditions that must be complied with by such a material, in order to be used in the medical field.

Biomaterials – characteristics

An ideal biomaterial has to be biocompatible with the surrounding tissue and cause no allergenic response. Other important aspects are its antimicrobial activity, the ability to inhibit inflammation and stimulate healing; it should also relieve pain. There are also features which are important from the technical point of view, especially for the field of veterinary practice – the ability to be used in non-hospital conditions, ease of application and low price increases the possibility of its application. These features are designed to reduce the time of treatment, the frequency and the amount of drugs used (bearing in mind their side effects) (Shigemasa et al. 1996). Moreover, they create new possibilities of application and multiply treatment options, better suited to particular cases.

During researches, it was quickly noticed that the materials derived from natural compounds are better accepted by the organism than those synthesized synthetically (Shigemasa et al. 1996), because they are built from the same material as tissues and cells,