



Editorial

Biopolymers in Regenerative Medicine

Bio, what? Biopolymers is the name given to those macromolecules that exist in living organisms and that are characterized by being widely used in Tissue Engineering and Regenerative Medicine; we can mention polysaccharides and proteins as those that are most used in current strategies in the field of design and preparation of bio-functional dressings that are essential and auxiliary to treat wounds and burns. The use of these biopolymers provides the possibility to modulate and control their chemical, physical and biological properties under mild reaction conditions due to their nature, which allows to obtain the most benefit and performance from them.

Among the biopolymers most used in these areas, we can mention Chitosan. This is a natural polymer derived from the deacetylation of chitin and is considered to be the second most abundant polysaccharide in nature. This is a natural polymer derived from the deacetylation of chitin and is considered to be the second most abundant polysaccharide in nature. It has unique properties that position it as one of the most important for the manufacture of dressings because it is biodegradable, biocompatible and antimicrobial.

Another clear example is cellulose, which is a natural material that can be found in wood, cotton and other plant materials. It is important to mention that within this biopolymer is bacterial cellulose, also known as microbial cellulose, which can be obtained through the biosynthesis of some bacteria as its name indicates. It has unique mechanical and biocompatible structural

properties unlike cellulose obtained from plants, so that when combined with other polymers can be manufactured scaffolds that will have great potential for biomedical applications.

Likewise, a natural polymer obtained mainly from brown algae and from the biosynthesis of some bacteria is Alginate, which is characterized as a linear polysaccharide that has properties such as high hydrophilicity, biocompatibility, biodegradability and an attractive capacity to form hydrogels and films, also standing out for having a great use since it is relatively inexpensive to obtain. Collagen, which is a macromolecule rich in proline, lysine and glycine, is also recognized as a major component of the extracellular matrix of various tissues and plays an active role in cell migration and adhesion due to its specific cell recognition properties, being one of the most widely used biopolymers for the manufacture of various biomaterials for skin regeneration because it increases the proliferation of fibroblasts and keratinocytes. It has also been shown to aid in the synthesis of proteins in the outer membranes of skin cells, thus improving regeneration and healing processes; however, its poor mechanical properties and rapid degradation rate greatly limit its application in tissue engineering.

Finally, we will mention one of the best known natural polymers in Biomaterials Science, gelatin, a polypeptide usually derived from the hydrolysis of collagen with a triple helix structure that helps to improve wound healing in the skin due to its adhesive and prolifera-



tive properties in fibroblasts and keratinocytes; It has potential applications in the synthesis of drug delivery materials, organic molecules and nanoparticles, and its good water solubility and affinity for various polymers have led researchers to make gelatin one of the most widely used ingredients in Regenerative Medicine.

It is important to emphasize that technological advances have allowed the synthesis and combination of these biopolymers for the development of three-dimensional biomaterials, such as films, hydrogels, microspheres and sponges, which have the purpose of acting as dressings, with the main purpose of protecting the wound or burn bed as mentioned at the beginning; Thanks to their biocompatibility, biodegradability as well as their combination and functionalization with some drugs or other compounds, they acquire properties that allow them to avoid dehydration of the injured area, pathogenic invasion as well as the imitation of the extracellular matrix due to the similarity of the molecules that comprise it, providing and favoring the interaction, growth and proliferation of the cells involved in these processes, which also facilitates a faster healing.

Due to the above, the use of biopolymers for the creation of dressings draws attention and ensures a promising future in Regenerative Medicine, since they possess several of the desirable properties in wound healing, which makes them good candidates for the replacement of traditional healing materials, so it is important not to lose sight of them and always be aware of the new proposals and innovations that are generated every day of them.

MC. Laura Vázquez-Ayala 

Postgrado en Ciencias en Bioprocesos. Facultad de Ciencias Químicas. Universidad Autónoma de San Luis Potosí. México

Correo-e: A236485@alumnos.uaslp.mx