

Polymer coatings on titanium alloys for application in surgery

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Metals and their alloys have played a significant role as structural biomaterials in reconstructive surgery, especially orthopedics. Different coatings are widely used for such alloys to increase their biocompatibility and improve other properties essential in viewpoint of potential biomedical application. Therefore the main purpose of the research was to obtain polymer coating on titanium alloy to receive multifunctional biocompatible materials useful in bone surgery.

Polymer materials that can be used as the afore-mentioned coatings may be prepared using polymer of natural origin such as proteins (e.g. albumin) or synthetic origin, i.e. polyvinylpyrrolidone. Synthesis is carried out in the presence of the adequate crosslinking agents and photoinitiators to create crosslinked polymer material with favourable mechanical and physicochemical properties.

Additionally, such polymer coating may be modified with various active substances that enriches the material with healing properties.

Described innovative modern titanium alloys dedicated mainly to the bone surgery are characterized by a composition guaranteeing their multidirectional operation and by the favorable properties from the viewpoint of the medical use. Proposed alloys with polymer coatings will support the integration of the implant with the patient's tissue, reducing the risk of post-operative infection. Moreover, due to the good mechanical properties of titanium alloys, the materials obtained will meet the requirements for implants exposed to loads. In addition, due to the possibility of the modification of such material with the active substance it will also act as a carrier for such a substance that prevents the formation of postoperative infections during implant placement.

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