

The aim of the project is to obtain materials based on natural polymers (collagen and chitosan) with the addition of glycosaminoglycans isolated from food industry wastes such as eyeballs and skin of two freshwater fish species. Glycosaminoglycans are compounds, which could find the potential application in biomaterials science.

Demographic research shows the systematic tendency to aging the society, and as a result it is provide that people with bones and cartilage defects will be more and more numerous [Biuletyn statystyczny wydany przez Komitet Redakcyjny Głównego Urzędu Statystycznego, 9, 2015, 695]. It causes that reconstructive medicine is a dynamically developing science field. Bone and cartilage tissue have very pure ability to the self regeneration. Due to this it is necessary to incorporate the material in the defect place, which can act as tissue. These materials will be modified to observe the simulation of cells proliferation and tissue reconstruction. Especially valuable are compounds with the high compatibility with osteoblasts (bone cells) and chondrocytes (cartilage cells). They can be used to obtain biomaterials with the biomedical application, as for example implant production. Besides the biological properties, materials have to have proper mechanical parameters and be porous to allow for the new cells growth in the whole volume of material. Moreover, these materials should be elastic in order to be resistant to the damage. This is important parameter if we consider the cartilage implants. The most known and widely used in biomaterials science are biopolymers such as collagen and chitosan. They may be isolated from the natural sources so they are biocompatible, biodegradable and non-toxic for human body. All of these features are very important in the field of biomaterials. Nevertheless, materials based on both polymers have poor mechanical properties and are not stable in aqueous environment. As a result it is necessary to cross-link the materials by physical and chemical methods. The addition of commercially available glycosaminoglycans improves material elasticity and they become to be more resistant for any deformations. Furthermore, glycosaminoglycans, such as hyaluronic acid, have high affinity for chondrocytes and fibroblasts. Because of that it is expected that faster growth of new cells thus reconstruction of the tissue will be observed on materials with addition of glycosaminoglycans. Commercially available glycosaminoglycans are expensive. As a result the use of food industry wastes will be economically advantageous and would reduce the cost of obtained biomaterial.