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### **Mucin and its methacryloyl derivative in engineering materials with biomedical applications**

**M**ucin is a high weight glycoprotein found in the mucus that covers the wet epithelia, protecting the tissue from the penetration of unwanted molecules (such as viruses or bacteria) or insuring the lubrication or hydration. Its bottle-brush structure presents long polypeptide backbone rich in proline, threonine and serine (PTS domain), on which dense brushes of carbohydrate chains are radially attached. Mucin represents an appealing macromolecule for several applications in the biomedical field, among which carriers for bioactive species, coatings with improved tribological performance and antifouling properties. Using protocols described for other natural macromolecules, the methacryloyl derivative of mucin was also synthesized and further used to obtain chemically cross-linked stable hydrogels. Our work group used both mucin and its methacryloyl derivative for several applications in the biomedical field. Taking advantage of its complex structure and multitude of functional groups available for cross-linking mucin was used as bio-activator for metallic surfaces and its ability to form stable coatings in the presence of tannic acid was investigated. Methacryloyl mucin (MuMA) from porcine stomach was also used as coating with the aim of improving the biointegration of

a polypropylene mesh for abdominal wall repair. Also, either as part of a bicomponent hydrogel, or as primary constituent of a double cross-linked network, MuMA's ability to form stable, robust networks was assessed. Presently, we are aiming the synthesis of a MuMA-based double network hydrogels with adequate mechanical properties, architectural features and bioactivity for applications in the articular cartilage tissue engineering.

#### **Biography**

Serafim completed her PhD. in 2013 at the university politehnica of bucharest, with the thesis "macromolecular compounds for tissue engineering". Her research interests span from protein modification and nanoparticles' functionalization to the synthesis and characterization of various hydrogels and hydrogel-based nanocomposites with precise biomedical applications. She specialized in different characterization techniques such as rheology, mechanical testing of hydrogels, micro- and nano- computed tomography, QCM-D, spectroscopy (FT-IR, UV-Vis). Continuously searching to improve her research skills and to enlarge her field of expertise, she is welcoming collaborations with researchers with similar or complementary background.

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