(P 120) Development of Biomimetic and Smart Coatings Based on Elastin-Like Polymers Containing RGD Cell Attachment Sequences

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Elastin-like polymers (ELPs) are based on repeating sequences found in the natural elastin. They show remarkable combination of properties, such as a large range of mechanical properties, excellent biocompatibility, and smart behaviour and self-assembly towards temperature, pH and often different stimuli. Around a certain temperature, known as inverse transition temperature (ITT) these polymers show phase transitions aqueous solutions: under the ITT, the polymer chains are disordered and in a relatively extended state, remaining soluble; above the ITT, the chains suffer a transition to a helical ordered state and aggregate. Nowadays, through recombinant genetic engineering it is possible to construct and produce recombinant ELPs with specific cell attachment sequences from human fibronectin and elastin.

In this study, an ELP containing six monomers of RGD sequence was obtained by fermentation of a genetically modified Escherichi coli (E. coli) stock. After purification, the final bioproduction yield was over 120 mg/L. Electrophoreris and mass spectroscopy were performed for assessment of RGD purity. Molecular weight was of about 60 kDa as expected. Differential scanning calorimetry (DSC) tests were done to evaluate the variations of ITT as a function of pH.

The objective is to use the properties of recombinant ELPs containing RGD in the development of coatings for medical implants with improved biocompatibility and biomimetic behaviour regarding cell attachment, through technologies such as layer-by-layer and spin-coating.