



Contribution ID: 9

Type: Oral

## Hyaluronic – Pluronic mixed system: depletion interaction between micelles triggered by the polyelectrolyte chain conformation

In the medical field and especially for cancer treatment, intensive researches are performed to deliver the drug at the right position allowing to reduce the dose and side effects. The poor solubility in biological fluids of most of the approved drugs obliges to encapsulate them into carriers. The triblock copolymers Pluronics are biocompatible and are stealth carriers [1]. Hyaluronic acid (HA) is a natural polyelectrolyte largely found in the body and currently investigated as a target-specific material because many malignant cancer cells overexpress HA receptors [2]. The aim of the study is to characterize the structure of HA – Pluronic (F127) assemblies as a function of different parameters such as concentration, ionic strength and temperature. Small angle neutron scattering experiment demonstrate that HA does not modify the size and shape of the individual micelles. In pure water, the spatial distribution of micelles is not affected by the polyelectrolyte. By increasing the ionic strength, the formation of small micellar clusters which crystallize into a fcc crystal liquid phase at high ionic strength is observed. This behavior is reinforced by increasing the HA concentration or the molecular weight of the chain. The nature of the salt plays also a role following the Hofmeister series and divalent cations such as  $\text{Ca}^{2+}$  have drastic effects on the micellar collapse. The origin of the behavior is the change of the HA chain conformation - from stretched to coil- by addition of salt which induces an excluded volume around the micelles. Consequently, the formation of micellar clusters and their collapse can be understood through a depletion mechanism.

1. M. Valero et al., *J. Phys. Chem. B* 116 (2012), 1273-1281.
2. U. Richter et al., *Histochemistry and Cell Biology* 137 (2012), 687-695.

### Preferred topic

Conformation of polymers in solvents

**Primary authors:** GRILLO, Isabelle (Institut Laue-Langevin); COMBET, Jérôme (Institut Charles Sadron); Dr MORFIN, Isabelle (Laboratoire Interdisciplinaire de Physique)

**Presenter:** GRILLO, Isabelle (Institut Laue-Langevin)