

2<sup>nd</sup> World Congress on

# Biopolymers

August 04-05, 2016 Manchester, UK

*Rachel Auzely-Velty*

University Grenoble Alpes, France

## Novel approaches in hydrogel design from chemically-modified polysaccharides

Polysaccharides constitute an important class of biopolymers. They usually display biocompatibility and biodegradability, which are the basic characteristics for polymers used as biomaterials, and some of them exhibit unique physical and/or biological properties. We would like to report here new strategies for the chemical modification of water-soluble polysaccharides, such as hyaluronic acid (HA) and carboxymethylcellulose (CMC), providing access to smart hydrogels and nanogels (hydrogels confined to submicrometric dimensions) for drug/cell delivery. Using thiol-ene reactions, we successfully grafted thermosensitive ethylene-glycol based copolymers on HA, allowing temperature-triggered assembly of the polysaccharide into nanogels with diameters < 200 nm. These gel particles possess many interesting features for drug delivery, like: facile formation, tunable size and stability, easy loading of hydrophobic molecules, high selectivity and binding affinity for cancer cells expressing the CD44 receptor of HA, degradation behavior due to the inherent biodegradability of HA. In addition, after intravenous injection in mice, they were shown to enter the blood circulation. Thiol-ene reactions were also applied to engineer macrogels of HA and CMC. We showed the ability to obtain self-healing hydrogels in physiological conditions by the careful design of HA modified with phenylboronic acid and sugar derivatives. Moreover, by combining lipid nanoparticles (LNPs) and carboxymethylcellulose (CMC) hydrogels, we developed original hybrid biomaterials that are able to provide local delivery of hydrophobic therapeutic agents in a predictable and sustained manner. These new delivery systems offer promising platforms for the controlled release of various drugs under certain external stimuli (mechanical stress, light irradiation, etc.).

## Biography

Rachel Auzély-Velty has completed her PhD from the University of Rennes (Rennes, France) in 1997 and Post-doctoral studies at the Commissariat à l'Energie Atomique (CEA, Saclay) in 1998-1999. After being a CNRS researcher in the CNRS Research Laboratory, CERMAV (Grenoble) from 1999 to 2005, she became full Professor at the University Grenoble Alpes (Grenoble). She has published more than 80 papers related to polysaccharide chemistry in reputed journals. She was a junior member of the Institut Universitaire de France (IUF) (2009-14) and named "Knight of the National Order of Merit" by the French Minister for Research (2014).

[rachel.auzely@cermav.cnrs.fr](mailto:rachel.auzely@cermav.cnrs.fr)

Notes: