

Engineering mucin interactions

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Abstract:

My group at KTH works with biopolymers-based biomaterials, both in their native environment (as constituents of tissues) and as engineered materials. We are particularly interested in mucus and the mucin biopolymers that confer mucus with its most fascinating properties. Mucus is a hydrogel that covers our wet epithelium, including our eyes, nose, respiratory tract, gastrointestinal tract, and female reproductive tract. This thin layer covers the epithelium to protect it from dehydration, shear stress, and infections from the millions of viruses and bacteria that hit these surfaces every day. In addition to being an essential part of our physiology, mucus is also a fascinating material, simultaneously able to hydrate and lubricate surface, to self-heal when sheared, to selectively filter potentially harmful molecules and particles, and to signal to a number of cell types, including bacteria and eukaryotic cells. In this talk, I will focus on ongoing projects dealing with the interaction of molecules, cells, and materials with mucin molecules and mucin gels. In particular, I will mention a mucus engineering approach to reinforce our mucosal barrier, the compaction of mucin molecules into nano-sized objects, and the design of new muco-adhesive materials.

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