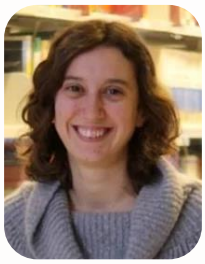
SCIENTIFIC SEMINAR



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Synthetic carbohydrate-based materials

Polysaccharides are the most abundant organic materials in nature, yet correlations between their three-dimensional structures and macroscopic properties have not been established. With automated glycan assembly (AGA), we prepared well-defined oligo- and polysaccharides resembling natural as well as unnatural structures.[1] These synthetic glycans are ideal probes for the fundamental study of polysaccharides, shedding light on how the primary sequence affects the polysaccharide properties (i.e. solubility and crystallinity). Molecular dynamics simulations, NMR spectroscopy, and single molecule imaging allowed for the visualization of polysaccharides' conformation and revealed that some polymers form helices while others adopt rod-like structures.[2] Modifications in specific positions of the oligosaccharide chains permitted to tune the three-dimensional structures and solubility of such compounds.[3] These synthetic oligosaccharides self-assembled into nanostructures of varying morphologies.[4] Differences in chain length, monomer modification, and aggregation methods yielded glycomaterials with distinct shapes and chirality, offering valuable models to study the aggregation of natural polysaccharides.[5]

References:

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Thursday

September 8

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