# DSV Seminars 2017

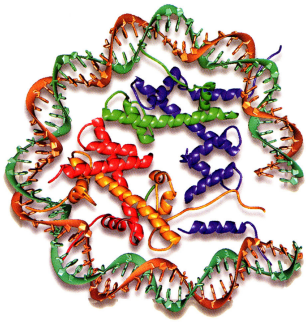
UNIVERSITÀ DEGLI STUDI DI TRIESTE

DIPARTIMENTO DI SCIENZE DELLA VITA

## *PhD Program in Molecular Biomedicine*

Tuesday, April 11, 2017 - 16:30

Seminar Room, First floor, Q Building – Via Giorgieri, 5




# Prof. Luigi Lay

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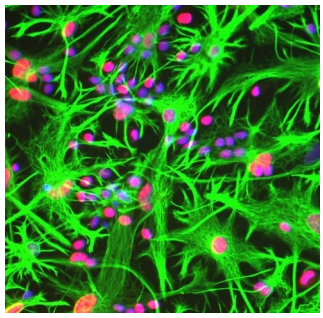
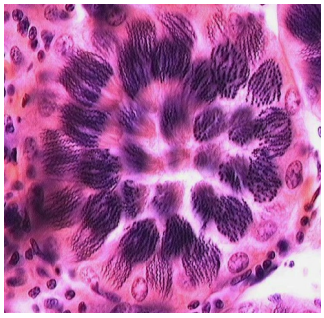


## Design of Antibacterial Glycoconjugate Vaccines




Diverse pathogens expose on their surface a dense, often highly conserved array of glycan structures that exert a protective function against the host's immune defence and are essential for their pathogenicity. All these glycoforms are capable of interacting with the immune system as epitopes inducing the production of carbohydrate-specific antibodies. They, therefore, represent attractive targets for vaccine design.

A major drawback of polysaccharide-based vaccines is their limited clinical efficacy. They raise T cell-independent immune responses, featured by poor immunogenicity in infants and young children, and fail to generate conventional B cell-mediated immunological memory. Polysaccharide immunogenicity can be strongly enhanced by conjugation to an immunogenic carrier protein. Glycoconjugate antigens enable memory B cells proliferation, ensuring long-lasting protection of the host. Glycoconjugate vaccines are among the safest and most efficacious vaccines developed so far. The carbohydrate antigens needed for inclusion in a vaccine, however, are not readily available from natural sources, and their manipulation for protein conjugation is a challenging task that increase the manufacturing cost, and often leads to difficult characterization and low batch-to-batch reproducibility. A possible solution is the recourse to fully synthetic carbohydrate antigens with well-defined composition, affording highly reproducible biological properties and better safety profile. Moreover, synthetic oligosaccharides can help to elucidate the structural moieties of the microbial polysaccharide that are essential to raise protective antibodies (glycotopes). This step is crucial for the design of a new generation of improved and safer glycoconjugate vaccines obtained either from chemical synthesis or bacterial source.

In this seminar, some significant examples of the contribution of synthetic organic chemistry to the design of new and more efficacious vaccines against infectious diseases will be illustrated and discussed.