



Research Doctorate (Ph.D.) in Chemical Sciences
34rd Cycle – Academic Year 2018/2019

Tutor: Antonio Molinaro

Project Information

1 - Title

NMR and computational studies between eukaryotic N-glycans and receptor proteins

2 - Key words

NMR spectroscopy, molecular modeling, computational techniques, N-glycans, chemical biology

3 - Abstract

Glycans cover the membrane of almost every living cell and display incredible structural diversity (the Glycomes); they are involved in fundamental molecular and biological processes occurring in human diseases, including beneficial and pathogenic host-microbial cross-talk as well as cancer and inflammation. Sialic acids represent a family of about 50 naturally occurring members sharing a nine-carbon backbone that can be enzymatically modified. Sialic acids are usually found at the terminal position of complex and diversified glycans via α -(2→3), α -(2→6), α -(2→8) linkages. They are involved in many physiological processes (protein folding, neural developments, cell-cell interactions) as well as in immunoregulation and pathological processes (autoimmunity, cancer). , Cancer cells produce increased levels of sialylated glycans; the hyper-sialylation can influence cancer progression, signaling platforms, enhance immune evasion, change the physical properties of the tumor cell as promote cell detachment from the tumor mass (the electrostatic repulsion of negative charges physically inhibits and disrupts cell-cell adhesion). The predominant sialic acid found in mammalian cells, including humans, is N-acetylneuraminic acid (Neu5Ac). Glycans regulate various aspects of the immune response; such regulation is mediated by various lectins, such as galectins, C-type lectins and Siglecs.