Società Nazionale di Scienze, Lettere e Arti in Napoli
Accademia di Scienze fisiche e matematiche

Presidente Giuseppe Marrucci *Vice-Presidente* Carlo Sbordone
Segretario Carmine Colella *Tesoriere* Luciano Carbone

INVITO

In occasione dell'adunanza dell'Accademia di Scienze Fisiche e Matematiche
del 17 maggio 2019

il

Prof. Antonio Molinaro

Professore Ordinario di Chimica Organica presso l'Università Federico II di Napoli

terrà una conversazione dal titolo

I glicani, molecole a base di carboidrati, responsabili della socialità delle cellule

I glicani ricoprono ogni cellula vivente e sono alla base di qualsiasi comunicazione molecolare tra cellule di qualsiasi regno. La Glicoscienza include la biologia cellulare e strutturale dei glicani e dei loro derivati e gioca un ruolo cruciale nella biologia, biotecnologia e medicina moderne, estendendosi all'agricoltura e alle scienze veterinarie. I glicani di superficie cellulare giocano un ruolo fondamentale nella interazione cellula-cellula in ogni forma vivente. I glicani di ospiti e microbi partecipano nelle patologie, nella simbiosi e nei meccanismi di difesa cellulare procariotica ed eucariotica. Infatti, il riconoscimento dei glicani microbici o eucariotici, la sintesi di loro analoghi da parte dei microbi porta ad esiti benefici o letali; alcuni vaccini antimicrobici sono infatti basati su glicani. Glicani e loro derivati pertanto giocano un ruolo fondamentale nell'interazione dinamica tra ospite e microbo anche se i dettagli molecolari di tale interazione non sono ancora completamente chiari precludendo perciò un loro ampio utilizzo per scopi benefici.

Note curricolari

Date of birth: 1964, July, 6th

Current Position:
Full Professor of Organic Chemistry at University of Napoli Federico II
Special Appointed Professor of Organic Chemistry at School of Science of University of Osaka

Positions and Employment

- (1997-2002) Guest Scientist in laboratories of Prof. O. Holst, Research Centre Borstel, Division of Structural Biochemistry, supported by DAAD (Deutscher Akademischer Austauschdienst).

- 2009 Visiting Professor in laboratories of Prof. A. De Soyza at Institute of Cellular Medicine, University of Newcastle upon Tyne, UK
- 2010 Visiting Professor in laboratories of Prof. J. Jimenez-Barbero at Centro de Investigacione Biologica , CSIC, Madrid, Spain.
- 2014-2020 Special Appointed Professor at University of Osaka, School of Chemistry in laboratories of Prof. K. Fukase

Other Experience, Professional Memberships and Service

- Associate Editor of Glycoconjugate Journal
- Member of the editorial board of the following journals: ChemBioChem, Carbohydrate Research, Glycobiology, Marine Drugs and Innate Immunity, the journal of the International Endotoxin Society.
- Chairman in several regional, national and international projects on structure and function of microbial glyco-conjugates.
- Chairman of a EU project (COST Action) involving 22 countries and 52 research groups on "Microbial cell surface determinants of virulence as targets for new therapeutics in Cystic Fibrosis".
- Recipient of EU FP7 and H2020 scientific grants
- Chairman of 16th European Carbohydrate Congress in 2011, www.eurocarb2011.org.
- He is past president of European Carbohydrate Organisation.

The research of prof. Antonio Molinaro is focused on the isolation and structural determination of carbohydrate-containing molecules publishing over than 250 papers in peer review journals. His laboratories and his group are internationally recognised as leader in GLYCOMICS research. In particular, in last years his interest has been in the study of structure and role of cell wall elements of microorganisms in the elicitation of innate immune response in mammals and plants.

Within this frame his laboratory has a worldwide recognised experience in isolation and structural determination of glycoconjugates from Gram-negative bacteria using state of art methodologies such as 2D NMR spectroscopy and MS spectrometry.

In particular, the investigation of the structure and the mechanisms of action of lipopolysaccharides (LPS) and peptidoglycan (PGN) from plant-pathogen bacteria are still at a descriptive stage. Little is known about the mechanisms of perception of these molecules by plants and about the associated signal transduction pathways that trigger plant immunity. Prof. Molinaro research group has significantly contributed to the understanding of the molecular basis of elicitation of plant defenses and to the examination of the effects of LPS, PGN and their fragments, obtained by chemical treatments and chemical synthesis, on the immune response in model plants.

As for mammals innate immunity, recently, the analysis of the structure and pro-inflammatory activity of the lipopolysaccharides of the epidemic and virulent strains belonging to the B. cepacia complex have been evaluated. In this frame, the LPS modification in pre- and post-transplantation strains are analyzed in order to clarify the mechanisms by which bacteria adapt and attenuate the host response.

Recently, the interaction all bacterial virulence glycoconjugate factors that interact with the host glycocalix are analyzed by NMR and molecular mechanics and dynamics approaches, i.e., to study the conformational behaviour of the ligand alone and when interacting with a protein in order to determine its bioactive conformation and the epitope mapping.

In Prof. Molinaro's laboratory chemical and spectroscopic approaches toward the primary and secondary structure of glycoconjugates are routinely used, such as GC-MS, Gel-filtration Chromatography, SDS-PAGE, HPLC, Mass Spectrometry, NMR spectroscopy (NOE-based techniques, STD, RDC, DOSY).

La conversazione avrà luogo alle ore 16 nella sede dell'Accademia
in via Mezzocannone 8, Napoli