ORGANIC SYNTHESIS IN THE STUDY OF MICROBIOTA METABOLITES

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Background:

The gut microbiota is an important source of bioactive metabolites, some of which can interact with host receptors thanks to their structural similarity with endogenous signal molecules, such as those belonging to the endocannabinoidome.[1] Therefore, their identification is crucial and can also be useful for the development of new drugs since these scaffolds are often well tolerated because biosynthesized by bacteria that live in symbiosis with the host.

Methods and Results:

Organic synthesis represents a powerful tool for unequivocal structural identification of bioactive metabolites, but also to have greater amounts of the product, to be tested *in vitro* and *in vivo*. All this considered, some simple and versatile synthetic strategies, useful for the synthesis of the products in deuterated form (necessary for the development of LC-MS quantitative analysis methods) or to introduce structural modifications to the initial target scaffold (for SAR studies), have been elaborated. Several fatty acid-derived lipid mediators, including commendamide and its analogues, have been synthesized in normal and deuterated form (small and medium scale)[2,3] for the chemical and biomolecular study of the microbiome.

Conclusions and Significance:

The human microbiome presents a fascinating challenge for researchers. Characterization and identification of microbiota metabolites, but also understanding their interaction with the host, have important implications for human health and require a multidisciplinary approach. In this context, the organic synthesis of microbial metabolites plays an important role.

Keywords:

Organic synthesis, N-acyl aminoacids, commendamide, microbiota, endocannabinoidome

References:

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Thematic Area:

- Frontiers in Microbiome Research

Infrastructures:

UMI MicroMeNu (www.umilaval.cnr.it) - ICB