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HUMANITAS UNIVERSITY

RESEARCH TOPIC MEM 20

Functional role of Postbiotics in gut-brain axis dysfunctions
Curriculum MEM

Laboratory name
Immunology Lab

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Abstract
Our well-being depends on the interaction of our body with the community of microorganisms – microbiota - that co-habit with us. Many pathologies are associated with an unbalance of the microbiota and disequilibrium of its metabolites, called postbiotics.
Inflammatory bowel disease (IBD) can be associated with anxiety and depression. We recently described (Carloni et al.Science 2021), a vascular barrier, located in the choroid plexus of the brain ventricle (termed the plexus vascular barrier (PVB)), that decreases in permeability in response to intestinal inflammation and by circulating bacteria-derived lipopolysaccharide suggesting that an unbalance of the microbiota and disequilibrium of postbiotics could play a role in this gut-brain axis dysregulation.
Postbiotica is the owner of an innovative technology platform - PBtech® - which allows the production of a 'pure' mixture of postbiotics with different functional properties. Postbiotics can be used to re-establish host-microbe interactions and intestinal barriers homeostasis. The aims of the project refer to the study of the functional role of postbiotics in the regulation of gut–brain vascular axis dysfunction and their mechanism of action.

Main technical approaches
In vivo mouse model, tissue processing, cell culture and molecular biology, flow cytometry and fluorescent microscopy

Scientific references
Mileti, E., Matteoli, G., Iliev, I.D. & Rescigno, M. Comparison of the immunomodulatory properties of three probiotic strains of Lactobacilli using complex culture systems: prediction for in vivo efficacy. PLoS One 4, e7056 (2009).

Tsilingiri, K., et al. Probiotic and postbiotic activity in health and disease: comparison on a novel polarised ex-vivo organ culture model. Gut 61, 1007-1015 (2012).

Zagato E, Pozzi C, Bertocchi A, Schioppa T, Saccheri F, Guglietta S, Fosso B, Melocchi L, Nizzoli G, Troisi J, Marzano M, Oresta B, Spadoni I, Atarashi K, Carloni S, Arioli S, Fornasa G, Asnicar F, Segata N, Guglielmetti S, Honda K, Pesole G, Vermi W, Penna G, Rescigno M. 2020. Endogenous murine

microbiota member Faecalibaculum rodentium and its human homologue protect from intestinal tumour growth. Nat Microbiol 5: 511-24

Mouries J, Brescia P, Silvestri A, Spadoni I, Sorribas M, Wiest R, Mileti E, Galbiati M, Invernizzi P, Adorini L, Penna G, Rescigno M. 2019. Microbiota-driven gut vascular barrier disruption is a prerequisite for non-alcoholic steatohepatitis development. J Hepatol 71: 1216-28
Carloni, S. et al. Identification of a choroid plexus vascular barrier closing during intestinal inflammation. Science 374, 439–448 (2021)

N. of months abroad
6 months, at a Company to be defined

N. of months at the cofounding company
6 months, at Postbiotica

Type of contract
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