***DOTTORATO DI RICERCA IN BIOLOGIA CELLULARE E DELLO SVILUPPO (38° Ciclo)***

**Titolo della ricerca:**

Cross-talk between gut microbiota and brain: effect of probiotics on behavior and function

in a genetic model of autism, the R451C Neuroligin3 mouse.

**Docente guida proposto:** Prof. Antonella De Jaco

**DESCRIZIONE DELLA RICERCA**

Many health conditions have been linked to the gut microbiota which is the largest reservoir

of microbes in the human body. Autism spectrum disorder (ASD) is a neurodevelopmental

disorder characterized by social deficits, repetitive behaviors and language difficulties

(American Psychiatric Association, 2013). In addition to these core symptoms, ASD patients

are often afflicted with gastrointestinal (GI) issues. Gut microbiota has been shown to

modulate brain function and behavior and for this reason ASD has been extensively

explored in relation to gut microbiome. In this context, fermented food microbes are gaining

increasing attention for their health-promoting potential and for being genetically related to

human probiotic bacteria. Among them, *Lactiplantibacillus* (*Lpb.*) *plantarum*, a versatile and

robust dominant species in fermented foods, is considered safe for humans. A collection of

*Lbp. plantarum* strains has been demonstrated to possess anti-inflammatory and antioxidant

properties as well as the ability to modulate compromised gastrointestinal microbiota. The

endocannabinoid system (ECS) is one of the major modulators in the microbiota–gut–brain

signaling pathways. Specific strains of lactobacilli induce the expression of cannabinoid

receptors in intestinal epithelial cells and mediate analgesic functions. Recently, the role of

the microbiota in regulating the intestinal ECS and, in turn, reinforcing the gut barrier, has

been demonstrated. The ECS is also functionally linked to the inhibitory GABAergic

neurotransmitter system in the brain, impacting on the Excitatory/Inhibitory balance which is

altered in ASD. The ECS might thus represent a key pathway underlying some functional

and behavioral phenotypes altered in ASD. We will preclinically test whether *Lpb. plantarum*

supplementation ameliorates endophenotypes associated with ASD in a genetic model, the

R451C Neuroligin3 mouse.

The general aim of this project is to evaluate the suitability of food-borne Lpb. Plantarum strains as a putative strategy to ameliorate ASD-symptoms.

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