University of Naples Federico II

Department of Pharmacy

PhD course

Nutraceuticals, Functional Foods and Human Health

XXXLX cycle

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Plant-derived ligands of acylethanolamides degrading enzymes in inflammatory bowel disease

Acylethanolamides (AEs), such as palmitoylethanolamide, and oleoylethanolamide, are endogenous bioactive lipids affecting many pathophysiological functions including pain and inflammation (Bottemanne et al., 2018). Endogenous augmentation of AEs through the inhibition of their degradative enzyme (i.e. FAAH and NAAA) are beneficial in the context of preclinical and clinical inflammatory bowel disease (IBD). Many plant-derived active molecules (often present in many food sources) may inhibit FAAH and NAAA (Butini et al., 2020). These include: i) isoflavones (biochanin A, genistein, daidzein and formononetin); ii) flavones (kaemperol); iii) nutmeg compounds (aslicarin A, methoxylicarin A and malabaricone C); iv) anthraquinone found in Rumex crispus (diacerein). None of these active compounds have been demonstrated to exert gut anti-inflammatory effects. The general aim of this PhD project is to identify the anti-inflammatory properties of NAAA and FAAH natural inhibitors in the context of IBD experimental preclinical models. The essential methodology will include:

1. in vitro studies by using CD45+, F4/80+ primary sorted cells isolated from murine bone marrow of wild type mice in which the inflammatory response will be assessed by molecular biology techniques.
2. the most promising anti-inflammatory active compounds will be tested in in vivo studies by using the genetic model of IL-10 KO mice (spontaneously developing colitis) and/or in DSS-model of IBD. The immune profiling of the colonic lamina propria will be performed by FACS analysis and gut microbiome will be also analysed. This research project is in line with the PNNR theme (mission 4).

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