



18th Annual Meeting of Young Researchers in Physiology

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Effects of chronic low-dose exposure to a mixture of sicilian anthropogenic pollutants on gut homeostasis and on susceptibility to inflammation

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Gut homeostasis is particularly vulnerable to a variety of stressors, including persistent environmental contaminants, which can contribute in the rising global incidence of non-communicable diseases (NCDs), such as inflammatory bowel diseases (IBDs). Despite to the numerous studies investigating the effects of acute exposure to chemicals, in this study, designed to mimic real-life conditions, we investigated the effects of chronic low-dose exposure to mixture of Sicilian anthropogenic pollutants 2,2',4,4'-tetrabromodiphenyl ether (BDE-47), a flame retardant and Estrone (E1), a bioaccumulative estrogen, on gut health and their potential role in the development of IBD, using a murine model of colitis.

Wistar rats were randomly subjected to daily oral gavage of mixture of BDE-47 and E1 at low doses for 30 or 60 days before the colitis induction by intrarectal injection of 2,4-dinitrobenzene sulfonic acid (DNBS); using a combined approach, analyses of gut tissue and quantification of main markers of inflammation were performed.

Chronic exposure to the mixtures unaffected gut structure of control rats, but increased susceptibility to colitis in a concentration- and time-dependent manner.

30 days-exposure to pollutants resulted in reduced food consumption and in an increase in weight loss and in the levels of inflammatory markers, as myeloperoxidase activity (MPO) compared to the DNBS group.

After 60 days, the trend was confirmed. Mixture-pretreatment further increased weight loss, MPO activity and worsened also macroscopic colonic damage, in colitis animals.

Although no direct effects on gut health were observed, further functional and microscopic evaluations are needed for a more comprehensive assessment.

These preliminary results suggest that chronic exposure to environmental contaminants may exacerbate inflammatory responses in colitis, highlighting the need to consider dose in assessment of environmental risk factors for NCDs.

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