UNIVERSITÀ DEGLI STUDI DI ROMA "TOR VERGATA"
DOTTORATO DI RICERCA IN BIOLOGIA EVOLUZIONISTICA ED ECOLOGIA
PhD PROGRAM IN EVOLUTIONARY BIOLOGY AND ECOLOGY

UNDERSTANDING THE IMPACT OF ENDOCRINE DISRUPTORS ON ADIPOSE TISSUE INFLAMMATION AND ITS METABOLIC AND NEUROLOGICAL CONSEQUENCES

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Environmental pollution, encompassing both natural and predominantly anthropogenic sources, significantly impacts the entire ecosystem. This pollution includes various chemical pollutants such as lead and mercury, as well as Endocrine Disrupting Chemicals (EDCs). EDCs, persistent in the environment, are encountered daily through various sources including food containers, cosmetics, pesticides, and paints, with microplastics also being a notable contributor. EDCs, mimicking hormonal effects, are known to disrupt the adipose system, leading to metabolic disorders like obesity and diabetes, and affecting the neuroendocrine system, particularly the brain, which is another fat enriched tissue. Their ability to cross the blood-brain barrier and influence brain function is well-documented, potentially resulting in cognitive disorders, especially when exposure occurs during critical developmental stages such as gestation, neonatal, and childhood phases. Accumulation of EDCs in adipose tissues can initiate inflammatory processes, releasing cytokines and adipokines that impact both metabolic and brain functions. This thesis aims to replicate the environmental impact of EDCs on humans through *in vivo* experiments using *Mus musculus* and *in vitro* studies. It will explore the role of inflammation in regulating metabolic and neurodegenerative diseases. A key focus will be studying the changes in immune cell populations in adipose tissue following EDC exposure and identifying and managing defects in inflammation resolution. By inhibiting the inflammatory processes in adipose tissue, we aim to investigate potential neurological and metabolic benefits. Additionally, the study will extend to the central nervous system, aiming to regulate and potentially mitigate inflammatory responses through targeted interventions. Behavioral analyses will be employed to correlate any cognitive changes with molecular and cellular findings, providing a comprehensive understanding of the multifaceted impacts of EDCs on both metabolic and neurological health.

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