UNIVERSITÀ
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DELLE MARCHE

The Impact of Early Life Stress on the Vulnerability to Obesity

Antonio Giordano's group

UNIVERSITÀ POLITECNICA DELLE MARCHE

Supervisor: Prof. Antonio Giordano

Research Group Description: the Supervisor

Antonio Giordano MD, PhD

MD specialized in Psychiatry, with a PhD in Neuroscience.
Full Professor of Human Anatomy,
Section of Neuroscience and Cell Biology -Anatomy Unit-
Department of Experimental and Clinical Medicine, UNIVPM, Italy.

Author of over **90** research articles

H index: **36** (Google Scholar) or **32** (Scopus)

Citations: **5042** (Google Scholar) or **3545** (Scopus)

Mean IF/publication **>7**

Since 1996, Antonio Giordano's main research area has been the functional anatomy of mammalian white and brown adipose tissue in normal and pathological conditions (obesity, diabetes). Over the past years, Antonio Giordano's research work has also involved the central nervous system control of energy balance and metabolism by leptin and other neuropeptides, in adults and in postnatal developing animals, and the role of energy balance neurocircuits in the regulation of several complex behaviours including endocrine secretion, reproduction, sleep, cortical arousal, reward and social interactions.

Current grants

- 2019-2024 Cariverona, PI: The ciliary neurotrophic factor: a possible novel regulator of body weight and energy balance in mammals.
- 2022-2023 Molecular Medicine and Cellular Therapy Fundation, PI: Role of oxytocin and leptin on proneness to develop obesity after early post-natal stress.
- 2022-2026, Cariplo, Local Coordinator: Role of the adipokine Gremlin-1 in the adipocyte-myofibroblast transition in obesity.

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Research Group Description

Anatomy Unit

STAFF

1 Full Professor, 2 Assistant Professors, 1 post-doc, 1 PhD student, 1 Lab technician.

RESEARCH ACTIVITY

Expertise in the conduction of morphological studies exploiting microscopic techniques.

Studies in experimental animals and humans, on transgenic mouse models and in *in vitro* settings.

Application of high-fat diet and early life stress protocols in mice; study of eating behavior, glucose homeostasis and body composition during metabolic diseases and early development.

PUBLICATIONS

https://orcid.org/0000-0003-1401-5855
https://orcid.org/0000-0002-3985-1131
https://orcid.org/0000-0002-6718-4815
https://orcid.org/0000-0002-4908-9873

The Anatomy Unit is part of the Center for the Study of Obesity (CIO) which includes the units of bariatric surgery, endocrinology and dietetics.

The research group has strong experience in morphological techniques – in particular, unbiased stereology, morphometry, immunohistochemistry, immunofluorescence, confocal microscopy, fluorescent *in situ* hybridization, transmission electron microscopy and high-resolution scanning electron microscopy – applied to tissue specimens from both brain and peripheral organs and to cell cultures.

EQUIPMENT and FACILITY

Transmission electron microscope, confocal microscope, scanning electron microscope, plate reader, hybridizer, cell culture room, mouse facility.

Section of Neuroscience and Cell Biology,
Department of Experimental and Clinical Medicine
UNIVPM, Italy

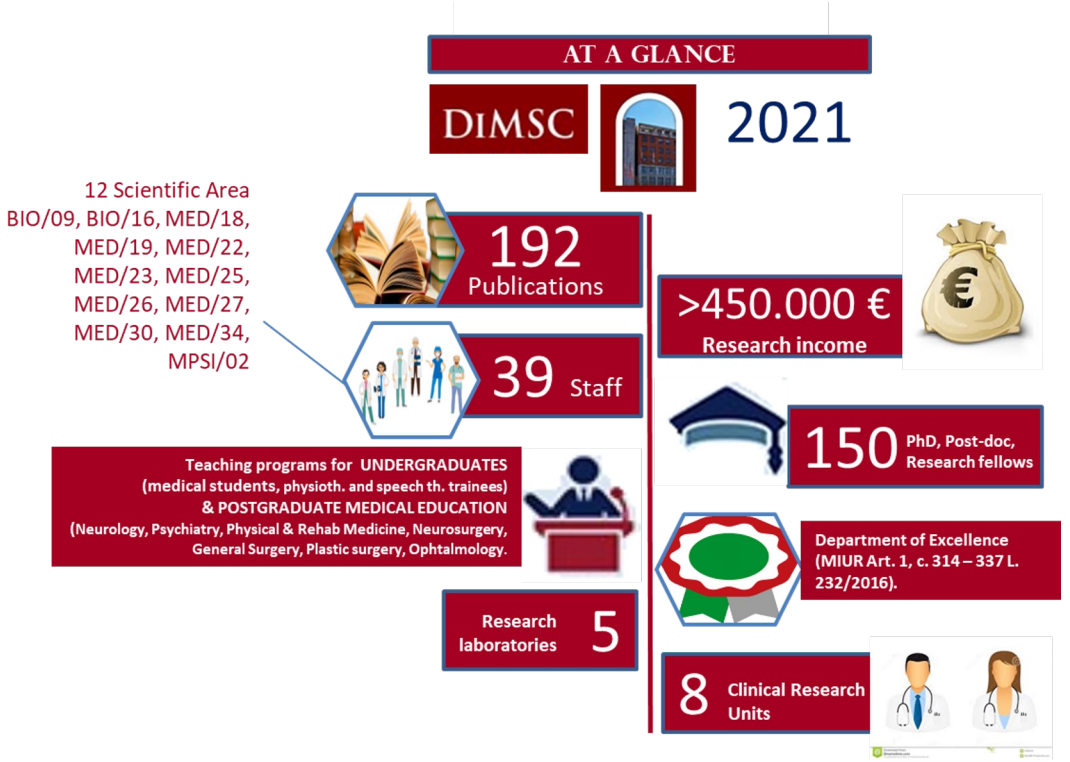
UNIVERSITÀ POLITECNICA DELLE MARCHE

Supervisor: Prof. Maria Gabriella Ceravolo

The Department of Experimental and Clinical Medicine DiMSC

The Department of Experimental and Clinical Medicine was established on the 1st July 2011 following a process of reorganization of the University, from a merging of groups which came from the deactivated departments of Medical and Surgical Sciences, Neuroscience and Molecular Pathology and Innovative Therapies.
The Department is a self-managing organizational branch of the university which is dedicated to scientific research, teaching, and contributing to the so called Third Mission of the Higher Education Institution through the dissemination of scientific research findings amongst the community.
Its main aims are to plan, organize and regularly assess the quality of the research activity carried out in the scientific sectors and disciplines under its jurisdiction; to plan, organize and manage first level and master courses of the Faculty of Medicine and, last but not least, to provide cultural and educational activities and contribute to training and guidance activities according to the students needs in collaboration with the medical association.

https://www.dimsc.univpm.it/



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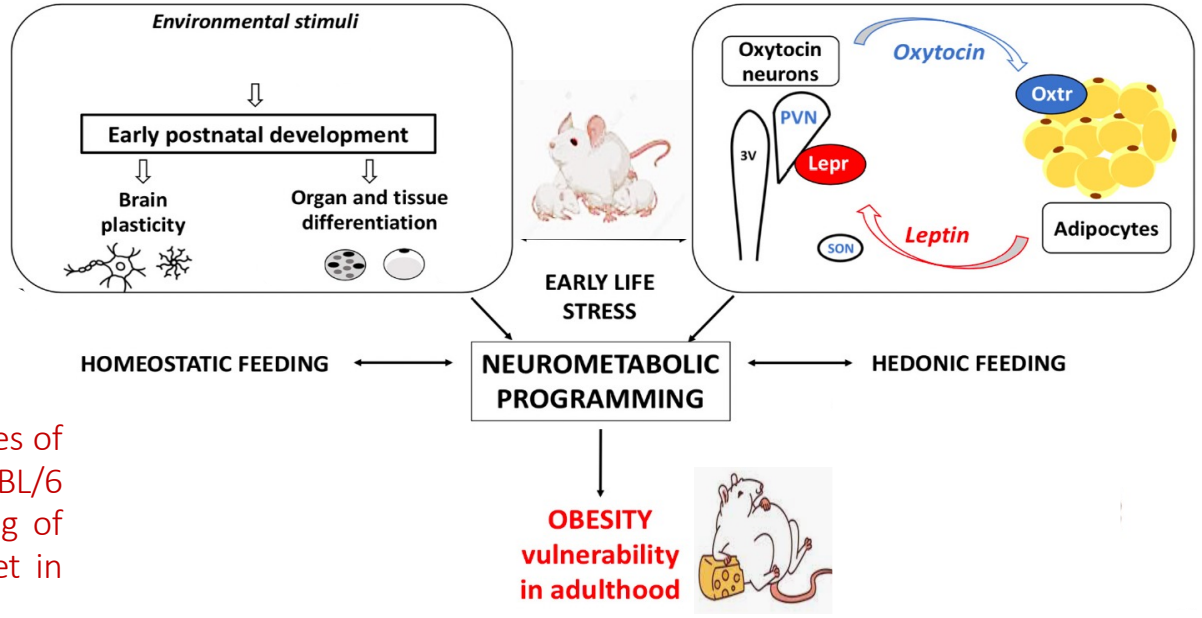
Project Idea: The Impact of Early Life Stress on the Vulnerability to Obesity

Background: Environmental stimuli acting during critical periods of postnatal development permanently shape individual behavior and metabolism. Early life stress (ELS) is associated with overweight and obesity in humans and animal models, however, how it impacts the development of white and brown adipose tissues and the neurocircuitries regulating energy balance needs to be elucidated. ELS reduces plasma levels of two important energy balance modulators: oxytocin (Oxt), released by hypothalamic nuclei, and leptin (Lep), the fat-derived hormone. Both peptides induce satiety and hold central and peripheral differentiative functions during early post-natal life.

Study hypothesis: ELS increases the vulnerability to obesity in adulthood permanently shaping the development of:
i) adipose tissues;
ii) neural circuitries regulating eating behavior;
iii) the Lep and Oxt systems and their reciprocal interaction.



Objective and study design: to unravel the biological bases of ELS-induced vulnerability to obesity in adulthood, C57BL/6 male and female mice will be exposed to ELS, consisting of limited bedding and nesting, or to ELS plus high fat diet in adulthood.

Modified from Colleluori et al., *Cells* 2022