TREMENDO

Etiology, Prevention and Treatment of Metabolic, Endocrine and Developmental Disorders

TREMENDO program brings together research groups in BioCity Turku that are working in the fields of endocrinology, metabolism, growth and development in both physiological and disease conditions.

FOCUS AREAS

The function of different endocrine tissues and hormone-regulated diseases, obesity, metabolic and cardiovascular disorders, effects of nutrition and other environmental factors on health and disease, and requirements of early development and growth. In addition to adult organism, the focus is also on early determinants of disease development during fetal period or childhood, and even earlier in the parental germline, which is enabled by the multigenerational human and mouse study designs.

AIM OF RESEARCH

To understand the mechanisms and etiology of the diseases and conditions of interest to allow development of better means for their treatment and prevention.

GENERAL GOAL

To enhance the interaction and collaboration within the program to promote excellence in research and allow problem-oriented, translational approaches.

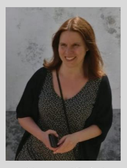
Basic and preclinical research

Research groups use modern cell and molecular biology methods, mouse models, *in vitro* approaches and computational biology for functional studies. Turku Center for Disease Modeling (TCDM) operates within the program, which provides strong framework for preclinical *in vivo* experimentation.

Reproductive and endocrine research

Matti Poutanen
Institute of Biomedicine, TCDM
Enzymatic regulation of the amount and type of ligands for nuclear receptor action

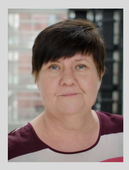
Petra Sipilä
Institute of Biomedicine, TCDM
Androgen regulation of male reproductive health



Noora Kotaja
Institute of Biomedicine
RNA regulation in male germ cells

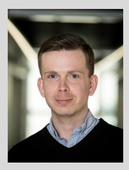
Nafis Rahman
Institute of Biomedicine
Molecular mechanisms and treatment of reproductive endocrine disorders

Emilia Peuhu (associate)
Inst. Biomedicine, Turku Bioscience
Breast development and cancer



Pia Rantakari (associate)
Insti. Biomedicine, Turku Bioscience
Macrophage ontology group

Cardiovascular, metabolic and skeletal research



Petteri Rinne
Institute of Biomedicine, TCDM
Melanocortins in cardiovascular health and disease

Eriika Savontaus
Institute of Biomedicine, TYKS, TCDM
Neuroendocrine mechanisms in pathogenesis and therapeutics of cardiometabolic diseases

Ullamari Pesonen
Institute of Biomedicine
Alzheimer's disease and metabolic disturbances in brain

Terhi Heino
Institute of Biomedicine
Stem cells in bone and vascular biology

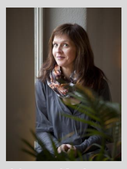
Kaisa Ivaska
Institute of Biomedicine
Bone and energy metabolism

Jorma Määttä
Institute of Biomedicine, TCDM
Sex receptors in regulation of myeloid cells

Epidemiological and clinical studies

Include well-established human cohort studies in the Centre for Population Health Research (POPC), whose goal is to promote health and well-being by enhancing research and development work on clinic-epidemiological population research. Clinical and translational studies on various hormone-dependent and metabolic diseases are also well presented.

Olli Raitakari
POPC
YFS study: Determinants of cardiovascular disease risk
STRIP study



Linnea Karlsson
POPC
FinnBrain study: Influence of early life stress on development and health

Hasse Karlsson
POPC
FinnBrain study: Influence of early life stress on development and health

Katja Pahkala
POPC
STRIP study: Prevention and early development of cardiometabolic diseases

Sari Stenholm
POPC
FIREA study: Determinants of healthy aging.

Jorma Toppari
Institute of Biomedicine, POPC
DIPP/TEDDY study: Type 1 diabetes prediction and prevention
Boy cohort: determinants of male reproductive health

Antti Perheentupa
Department of Obstetrics and Gynecology
Diagnostic tools and treatments for reproductive disorders

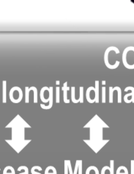
Kirsi Laitinen
Institute of Biomedicine, FFF
Early Nutrition and Health

Pirjo Nuutila
Turku PET centre
Metabolic Research using PET

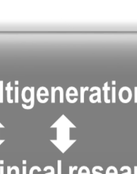
Kirsi Virtanen (associate)
Turku PET centre
Human brown fat (BAT) function

Drug research and analytical services

Include computer and experimental molecular discovery, and different pharmacogenetics and -kinetics approaches as well as novel approaches for computational histopathology and image analysis to support both preclinical and clinical studies.

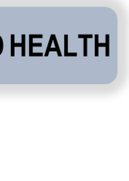


Alex Dickens
Turku Bioscience Centre
Development of metabolomics methodologies for both pre-clinical and clinical cohorts

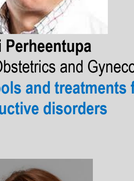


Olli Pentikäinen
Institute of Biomedicine
Identification of tool compounds for endocrine, metabolic, and developmental disorders

Aleksi Tornio
Institute of Biomedicine, Unit of Clinical Pharmacoloty
Individualized drug therapy: Role of drug-drug interactions and pharmacogenetics



Ulla Pentikäinen
Institute of Biomedicine, Turku Bioscience Centre
Underlying molecular and structural mechanisms behind various diseases



Riikka Lund (associate)
Turku Bioscience Centre
Biomedical Epigenomics and Finnish Functional Genomics Centre

Matej Oresic (associate)
Turku Bioscience Centre
Systems Medicine

Pekka Ruusuvuori (associate)
Institute of Biomedicine
Bioimage informatics

Methods and key expertise

- Genetically modified and experimental mouse models (xenografts, gonadectomy, atherosclerosis, heart failure, diet-induced obesity etc.), and characterization of reproductive, thyroid and adrenal gland, skeletal, cardiovascular, metabolic, hormonal etc. phenotypes
- Cell culture (2D, 3D), transfections, silencing, cell-biomaterial interactions, immortalization of cell lines, primary cell culture, organoid culture and imaging, 3D bioprinting
- Histology, immunostaining, *in situ* hybridisation, DNA/RNA/protein analyses, various molecular biology methods
- Computational molecular discovery and bioimage informatics
- RNA sequencing (bulk, single-cell, spatial), proteomics, FACS, mass cytometry, metabolomics
- Experimental molecular discovery: protein expression and purification, protein-ligand interaction measurements, structural biology
- Human: cohorts (also multigenerational); vascular, cardiac, liver, retinal and brain imaging; blood, fecal, semen and hair sampling; testing of cognitive and physical function; assessment of growth and pubertal development; reproductive health; physical activity behaviour; sleep; neuropsychological performance

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