Mandrup Group

Functional Genomics and Tissue Plasticity In Obesity and Diabetes

Functional Genomics & Metabolism

Forskningsleder Susanne Mandrup

Main research topics

In the Mandrup Group we are interested in how changes in gene expression at the genome-wide level regulate **cellular differentiation and plasticity** and how this plays a role in disease development of **obesity** and **type II diabetes**. These topics are at the core of ***Center of Excellence in Functional Genomics and Tissue Plasticity (ATLAS)*** and ***Center for Adipocyte Signaling (ADIPOSIGN),*** both directed by Susanne Mandrup.

We are particularly interested in the following research themes :

1. Fundamental understanding of **lineage determination of stem cells** and the mechanisms of transcriptional enhancers.
2. **Adipose tissue plasticity** in obesity and the role of individual cell types.
3. Systems understanding of how **adipocyte signaling states** change in obesity depending on gender, depot and genotype.
4. **Plasticity of the endocrine pancreas** in type II diabetes.

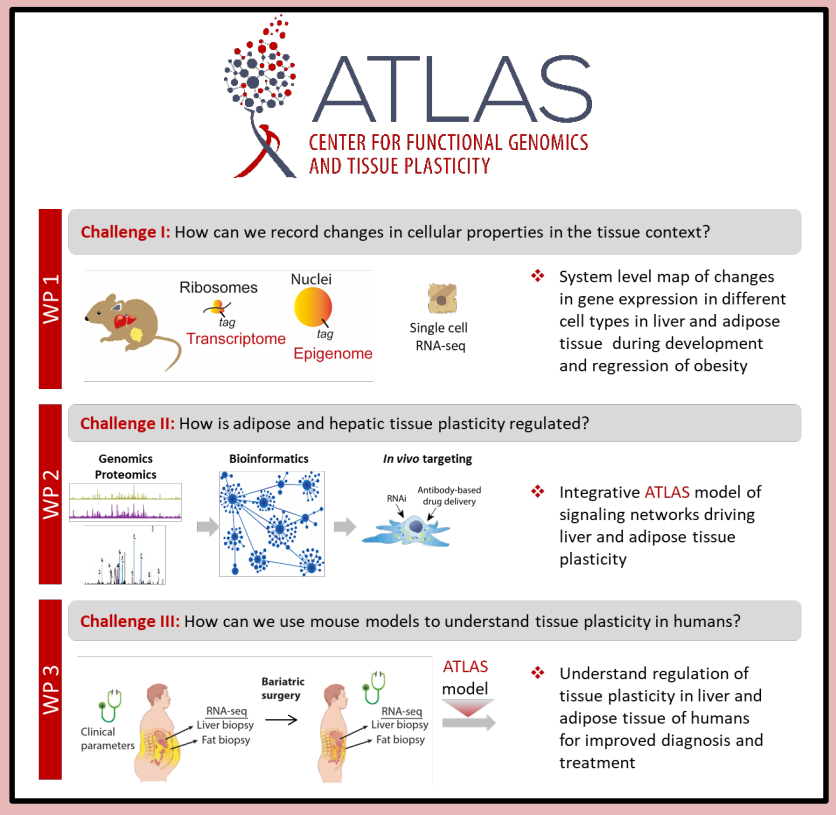
We apply a wide range of technologies including:

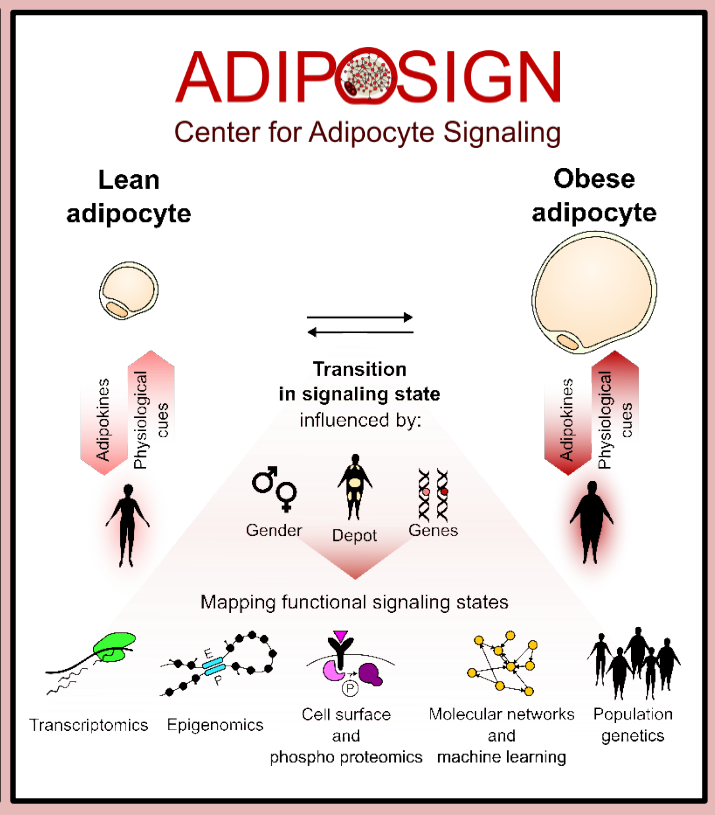
- next generation sequencing-based techniques, single cell sequencing
- CRISPR/Cas9-mediated genome editing, microscopy
- cell culture, mouse models, human biopsies

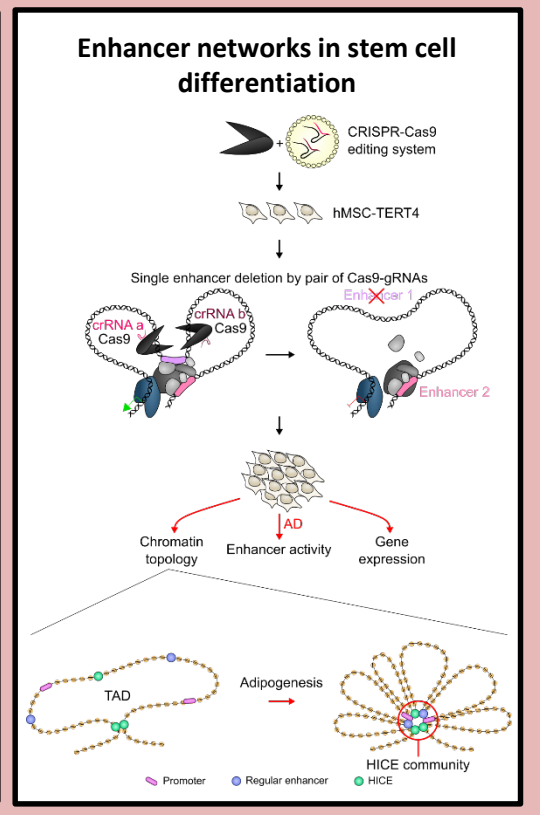
If you are interested in conducting a project in the group, please contact: s.mandrup@bmb.sdu.dk; Tlf: 6550 2340
www.sdu.dk/mandrupgroup

Examples of student alumni

Anne Bugge, Senior Scientist, Novo Nordisk
Lars Grøntved, Assoc. Prof., BMB, SDU
Ronni Nielsen, Lab Manager, BMB, SDU
Simon Halbo, High School teacher
Isabel Forss, Molecular Biologist, Rigshospitalet







Projects	Description
Lineage determination of stem cells	We investigate the basic mechanisms of how **transcriptional networks control the development of mesenchymal stem cells and adipocyte progenitor cells.** We study the transcription factors that drive this process and investigate how transcriptional enhancers cooperate to program the genome.
Adipose tissue plasticity	We employ single cell sequencing to investigate and cell type specific tagging to uncover the transcriptional reprogramming of different adipose tissue-resident cell populations (e.g. adipocytes, macrophages and endothelial cells) contribute to **adipose tissue plasticity during development of obesity**.
Signals controlling adipocyte function	We combine experimental and computational systems approaches to obtain unprecedented insights into how fat cells receive and respond to signals at the level of the (epi)-genome and the cell membrane. Our goal is to understand how the **signaling states of adipocytes** depend on depot, gender and genetic variation, and how changes in these signaling states during development of obesity contribute to the pathophysiological consequences of obesity.
Plasticity of the endocrine pancreas	We investigate the transcriptional mechanisms underlying the **adaptive responses of β- and α-cells in response to development of insulin resistance and diabetes** using mouse models with cell type specific tagging of ribosomes, and human and rodent cell culture models.