# Guest lecture

## "De.Coding Obesity - Control of brown adipose tissue function and hepatic nutrient partitioning by noncoding RNAs"

## 22 February 2017

### 10.15 AM in BMB seminar room


## Jan-Wilhelm Kornfeld, PhD

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**Abstract:** Jan-Wilhelm Kornfeld is an independent group leader at the Max-Planck Institute for Metabolism Research (MPI-MR) in Cologne, Germany. Since his postdoc training, he tried to shed light on how hepatic nutrient handling and adipose tissue homeostasis are governed by noncoding RNAs (ncRNAs) like microRNAs. Besides demonstrating that microRNAs are indeed critical regulators of liver metabolism and adipose tissue plasticity, he and his group demonstrated that *in vivo* adminstration of inhibitors against obesity-associated microRNAs represents a novel therapeutic approach which ultimately can succeed in improving metabolic disease in mice and, potentially, humans.

Beyond microRNAs, his group got interested in understanding if and how an abundant, yet poorly understood class of noncoding transcripts termed long noncoding RNAs (lncRNAs) governs energy homeostasis and metabolic flexibility during health and metabolic disease. Intriguingly, using Next-Generation Sequencing and novel systems -OMICS approaches, he observed that glucose intolerance and insulin resistance in two independent mouse models of obesity are coupled to global repression of lncRNAs in liver, whereas protein-coding genes are not affected. The same was found in liver biopsies from diabetic human patients. Analyses of *in vivo* transcriptomic datasets and computational DNA motif prediction algorithms revealed that lncRNAs, in contrast to coding genes, harbour conceptually different promoter

regions that serve as specific docking platform for an inhibitory class of transcription factors termed smallMaf proteins. In line with this, an obesity-associated rise in smallMaf signaling is seemingly involved in the global demise of lncRNAs during metabolic disease. Crucially, his group could delineate that this newly identified smallMaf-lncRNome signaling axis also controls glucose and lipid homeostasis, suggesting for the first time that system-wide energy states (fasting, refeeding, obesity) are coupled to noncoding transcription, presumably via distinct signaling cascades like the smallMaf pathway.

**Host:** Head of Department Peder Thusgaard Ruhoff, Department of Biochemistry and Molecular Biology, SDU.