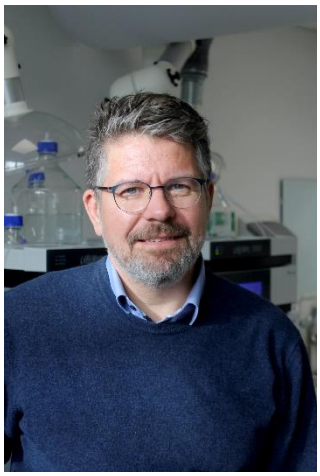
NeuroCampus – Inside Out:

Gregers Wegener

Group Leader and Center Leader at TNU (Translational Neuropsychiatry Unit) at Dept. of Clinical Medicine

Gregers Wegener's group investigates new pharmacology and the contributions to and possible treatments of mood disorders. Using animal models, they study the relation between diet, obesity, exercise, metabolic diseases and mood disorders.



Gregers Wegener. Photo: Karoline Klitgaard

Can you describe your research in a nutshell?
Our research is primarily centered on mood disorders. We conduct research in different domains, examining aspects such as genetic contributions, environmental contributions as well as possible pharmacological, dietary and physical treatments and interventions.

We primarily use rodent models in our research, and at TNU, we have many years of experience with advanced phenotyping and the modelling of psychiatric disorders. We usually study the disorders in light of potential co-morbid conditions, such as co-existence of depression with anxiety or cognitive problems. Important aspects are behavior, diet, genetic makeup and brain function/morphology. Our usual models are based on selective genetic manipulation, selective breeding, or bodily induction such as poor diet and obesity.

Our current research is largely focused on the connection between mood disorders and diet and obesity – also in a transgenerational perspective. We induce obesity in the pregnant rat mother and follow the offspring to examine the effects. For instance, obesity in a rat increases the risk of anxiety generations later. We determine the underlying mechanisms, such as altered protein coding or epigenetic processes and subsequently try to identify possible points where treatment can be effective. In line with these topics, we also examine the relation between diet, exercise and depression, with metabolic mechanisms as a mediating factor. We have especially been interested in the role of probiotics and the connection between brain and gut.

Another long-standing line of our research focuses on rapid-acting antidepressant treatments of mood disorders, such as ketamine or cannabidiol (CBD) which we investigate in-depth together with collaborators at the Dept. of Biomedicine.

How did you end up where you are today?
As a medical student, I believed that I would become a psychiatrist or a clinical pharmacologist. I began research as a pregraduate student and was in a very nice research environment. After a short clinical career, I received funding for research and never looked back.

I find my current field of research very attractive, as it brings the opportunity of looking at the individual not just as a brain, a gut, or a body separately, but as a whole functional organism.

What is the potential translational impact of your research?
Doing research of human disorders using model systems such as rats and mice inevitably brings some challenges. How can we model disorders in another species that we do not completely understand in humans? While we can examine features such as anhedonic behavior, risk behavior and so on, we can never know if the relations that we discover are translatable to humans unless validated with studies in actual patients. Therefore, we also always include this aspect in our research.
Our research has multiple interesting potential implications. Understanding new drugs may with time result in new available medicine, and understanding the interplay between the brain and the body/gut opens a wealth of new health actions.

It has a lot of potential for bringing cross-disciplinary action and intervention. As a society, we can, relatively manageably, work together to reduce the risk of some psychiatric disorders as well as somatic diseases via factors such as diet and exercise. Moreover, if we understand potential shared pathophysiology, we can improve diagnostics.

What does a (local) strong neuroscience research network mean for you and your research?
Interdisciplinary collaboration across different areas of neuroscience is an essential part of research. At TNU we comprise areas such as behavioral neuroscience, neurochemistry, gene expression and structure. However, we need many more disciplines. The strong network here at AU makes it easy to discuss and get someone else involved in your project with a method, technique or different perspective. Moreover, AU has a great range of different experimental facilities allowing us to do all sorts of studies. In our current research, we collaborate broadly with people from other areas of HEALTH (e.g. Biomedicine and Public Health), but also AUH and the Faculties of NAT and TECH.

If you had unlimited resources to conduct a big, multidisciplinary neuroscience project, what would you like to do?
We want to establish Centre for Metabolic Mood Disorder (metaMOOD) where we would conduct research in the differentiation between mood disorders alone and mood disorders with a comorbid metabolic disorder. This will involve preclinical studies and in patients in collaboration with e.g. the Steno Diabetes Center at AUH who have much patient expertise.
There is a huge overlap between mood disorders and metabolic disorders, and a better understanding of this connection will bring new clinical approaches to the diagnostic and treatment of both disorders.

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NeuroCampus – Inside out is a new initiative at Neuro-Campus Aarhus: Each month we present interviews with group leaders and head clinicians from all corners of the NCA network. Stay tuned in our monthly newsletter or on our website: neurocampus.au.dk.