Coded to connect

Neurocenter Finland

Who are we?

Neurocenter Finland is a unique collaboration network of neuroscience expertise. Established in 2021, we are part of the governmental Growth Programme for Health and Wellbeing in Finland.

Our member organizations comprise 7 universities and 5 wellbeing services counties including university hospitals, which form the 6 operational Brain & Mind networks in Oulu, Kuopio, Jyväskylä, Tampere, Turku, and Helsinki.

The Coordinating unit, located in Kuopio, acts as the central point of contact for our national and international operations, coordinating activities and collaborations between the regional Brain & Mind networks.

Brain diseases directly or indirectly affect most of Finns, and billions of people are also affected on a global scale.

How do we operate?

Neurocenter Finland facilitates the development of better brain health and personalized medicine by strengthening research collaboration and promoting innovation in neuroscience.
In response to global challenges in brain and mental health, we seek to increase cross-boundary cooperation among the wellbeing services counties, businesses, researchers in academia, and patients, as well as the public, to enable more impactful neuroscience research, development and innovation (RDI).

We strive to improve the prerequisites for RDI by advocating for more facilitative legislation and its interpretation, as well as enhancing the accessibility and sharing of data for research. To increase the success of the Finnish future in RDI, we are committed to working in close collaboration with other national Cluster of Excellence centers: the Finnish Biobank Cooperative, Finnish Drug Discovery Center, and the Finnish Cancer Center.

We envision achieving better brain health in the future by expediting the development and availability of the best possible preservative, preventive, diagnostic and therapeutic practices and technology, based on high-quality research.

We are here to promote brain health and improve the quality of life of patients and their loved ones.

The Coordinating unit

The Coordinating Unit of Neurocenter Finland is based in Kuopio. We coordinate our network's actions and services with a one-stop service principle, representing our network nationally and internationally, and providing a link for our Brain & Mind networks.

Our goal is to foster an innovative and productive scientific culture in neuroscience by engaging stakeholders such as research organizations, patient advocacy groups, and companies. We provide a national platform for networking and scientific events, as well as identifying special expertise and know-how to support cross-boundary RDI collaboration.

To improve the prerequisites for RDI in neuroscience on a national platform, we are committed to collaborate closely with the Ministries of Social Affairs and Health, Education and Culture, Economic Affairs and Employment, the Research Council of Finland, the Finnish Innovation Fund Sitra, and Business Finland. We are enthusiastic about showcasing Finnish neuroscience to attract new investment partnerships and expert immigration to enhance our global competitiveness in neuroscience.

Don't hesitate to reach out – we are coded to connect!

Coded to connect – together we are stronger!

Helsinki Brain & Mind

Helsinki Brain & Mind neuroscience network in the Capital region is formed by the multidisciplinary basic research at **University of Helsinki**, the technology and neuroscience research at **Aalto University**, and the clinical research at **Helsinki University Hospital (HUS)**.

It is estimated that over half of Finnish neuroscience research takes place in the capital region. In addition, HUS is the largest hospital district in Finland, and the HUS catchment area serves over 2.2 million residents, thus being a major organization also on a Europe-wide level.

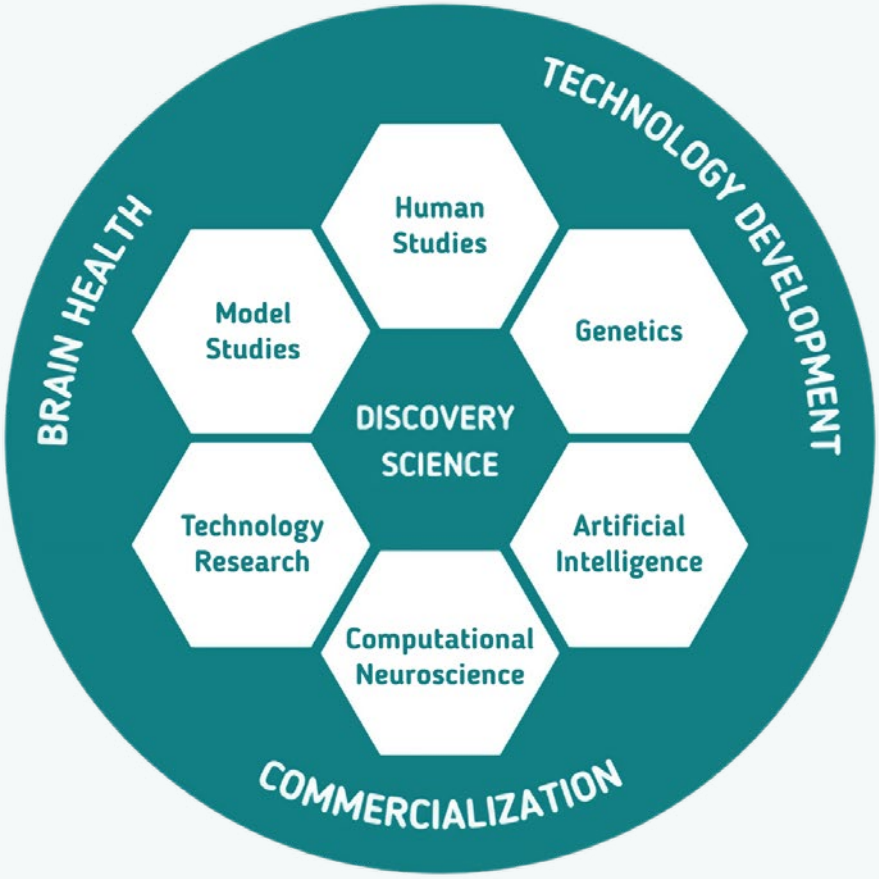
University of Helsinki

The neuroscience research at the University of Helsinki covers broad areas of neuroscience in Life Sciences, Psychology, and Medicine across faculties and in the Helsinki Institute for Life Science - the Neuroscience Center. The research is internationally highly acknowledged spanning from neurogenetics, neurobiology, circuit and systems neuroscience to human brain imaging, cognitive brain research and clinical neurosciences. At the Meilahti campus, University of Helsinki and HUS form close connections and the largest community in Finland facilitating translational and clinical research.

HUS Helsinki University Hospital

HUS Neurocenter hosts Departments of Neurology, Neurosurgery, Pain Medicine, and Neuropsychology. Departments of Neurology and Neurosurgery are the largest in Finland and are internationally acknowledged for their high-quality clinical research and care. Widely acknowledged expertise in brain diseases combined with very large hospital district and top-quality academic research offer a unique opportunity to develop both clinical treatment and applications of new technologies for brain diseases. In addition to clinical and translational research, the Neurocenter is very active in basic research to elucidate the pathophysiological mechanisms of neurological and neurosurgical diseases such as ALS and cerebrovascular aneurysms.

BioMag Laboratory has facilitated the translation of several research innovations into clinical practice, e.g., in the preoperative assessment of epilepsy and brain tumor surgery patients and treatment of chronic pain.



Aalto University

At the Department of Neuroscience and Biomedical Engineering of Aalto University School of Science, there is highly specialised research and technology development related to neuroimaging. The Aalto Neuroimaging (ANI) hosts neuroimaging facilities available available to researchers at Aalto and to external users. In addition to ANI, neuroscience research at Aalto is supported by strong expertise in analytical methods and tools as well as transcranial magnetic stimulation and sensor technology. Aalto Brain Centre (ABC) is a hub for neuroscience, neuroimaging, brain stimulation, and modelling, focused particularly on systems-level neuroscience. Aalto is the perfect place for studying topics such as neural networks, big data, digital health, and neuroscience using naturalistic settings.

BRIDGING BASIC, CLINICAL AND TECHNOLOGY RESEARCH IN NEUROSCIENCE

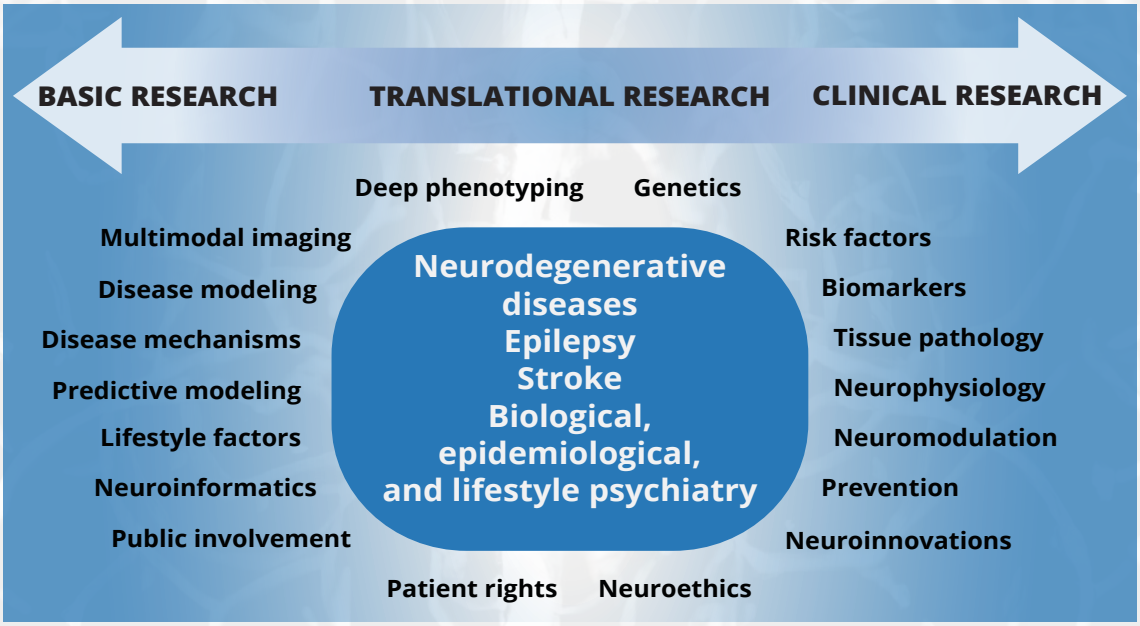
The neuroscience research in the capital region is supported by a cutting-edge research infrastructures for human brain imaging, animal brain research and stem cell research. The research also benefits from HUS data lake, Helsinki Biobank and FinnGen data.

The annual costs of the brain disorders in Finland has been approximated to be 11 Billion €. The aim of the increased collaboration in neuroscience research via the Helsinki Brain & Mind network is to improve our understanding of the brain function in health and disease and to translate research findings into more effective diagnostics, treatments, and interventions for brain disorders leading to decreased societal and economic costs. The interdisciplinary research carried out in the Helsinki Brain & Mind networks also facilitates the generation of new innovations and commercialisation of results promoting health capital.

Kuopio Brain & Mind

Kuopio Brain & Mind is a regional neuroscience collaboration network in Eastern Finland, bringing together **University of Eastern Finland (UEF)**, Wellbeing Services County of North Savo, including **Kuopio University Hospital (KUH)** and hospitals in its collaborative area, various enterprises, CROs, and other ecosystem actors, including patient associations.

Under the umbrella of Neurocenter Finland, our mission is to promote brain health through life by improved understanding of disease mechanisms, better early diagnostics, and development of personalized medicine approaches for brain disorders. We strive to realize our mission through actions that foster multidisciplinary research collaborations and innovations, taking into account patient involvement and patient rights.



Kuopio Brain & Mind brings together a large community of different career-stage basic and clinical researchers, health care professionals, and experts in law, ethics, business, and innovations. We have a decades' long expertise in clinical, basic, and translational research in different brain disorders and utilize unique, well-characterized patient cohorts, which include biological samples and detailed clinical, genetic, and biomarker data, as well as a wide variety of different in vitro and in vivo model systems. Kuopio Brain & Mind researchers also have outstanding national and international research networks.

As part of the Wellbeing Services County of North Savo, KUH houses KUH NeuroCenter, consisting of Neurology and Neurosurgery, and KUH Epilepsy Center, which is a full member of the European Reference Network (ERN) for Rare and Complex Epilepsies EpiCARE as well as modern facilities for psychiatry and Niuvanniemi Hospital for forensic psychiatry. KUH also provides services in clinical neurophysiology, neuropathology, and brain imaging. UEF hosts the Brain Research Unit for clinical trials and research, including UEF Biomarker Laboratory. Essential key infrastructures for biomedical research at UEF are provided by Kuopio Biomedical Imaging Unit, which is part of the European-level infrastructure EuroBioimaging, Genome Center of Eastern Finland, Single Cell Genomics Core Facility, UEF Bioinformatics Center, Stem Cell Core Facility of Biocenter Kuopio, Phenotyping Center of model organisms, Cell and Tissue Imaging Core Facility, National Virus Vector Laboratory, and In Vitro and Ex Vivo Electrophysiology Core Facility.

Jyväskylä Brain & Mind

The distinguishing feature of Jyväskylä is tight interdisciplinary collaboration and a wide concept of well-being. Jyväskylä showcases internationally acclaimed, high-level sport science. Thus, our focus in health sciences lies on protective factors such as physical activity.

Jyväskylä has a long history in the study of learning difficulties. Our neuroscience is spearheaded by the study of learning and other cognitive functions, development, and physical activity. The Faculty of Sport and Health Sciences at the University of Jyväskylä is the only one of its kind in Finland. At the time of writing, two Centers of Excellence – InterLearn and Music, Mind, Body and Brain – operate from Jyväskylä. At the intersection between neuroscience, psychology, sport science, education and computational sciences our unique approach is to acknowledge the bidirectional interaction between body and brain systems underlying human mind in health and disease.

As an organization, the core mission of **Jyväskylä Brain and Mind** is to unify and offer infrastructure, education and training for neuroscientists over faculty boundaries. We offer education from undergraduate studies to a doctoral degree in cognitive neuroscience. The University of Jyväskylä houses state-of-the-art neuroimaging equipment, particularly powerful in following neural activation over time. Our infrastructure encompasses EEG, MEG, TMS, eye tracking and motion capture. We collaborate with Niilo Mäki Institute and Hospital Nova, whose MRI laboratory is available also for research use, and also conduct neurophysiological studies. Our overall goal is to produce cutting-edge research in our fields of specialty.

Oulu Brain & Mind

Significant research on rare neurological and psychiatric diseases has been conducted in Oulu for decades. Under the leadership of Oulu-based researchers and in collaboration with partners, four new, previously unknown neurological and multisystem diseases have been identified in recent years, making them the first to be described in the world. Additionally, new diseases of the Finnish disease heritage have been discovered, such as PEPCK-C deficiency, which is associated with severe drops in blood sugar. Also, by utilizing internationally significant cohorts from Northern Finland, additional information has been obtained on the etiological factors of severe psychiatric disorders.

The medical expertise in Northern Finland is concentrated at the **Oulu University Hospital** and the **University of Oulu**, along with their research organizations, the **Medical Research Center (MRC)** Oulu and **Biocenter Oulu (BCO)**. BCO's strategic research focus is on "Human Health and Wellbeing." BCO advances neurosciences and Oulu Brain & Mind research themes by promoting active networking between different research fields, proving cutting-edge research infrastructure services and through spearhead projects selected by outside international evaluation.

The strength of the Oulu region lies in its multidisciplinary approach, with expertise in areas relevant to neuroscience, such as diagnostics, information and communication technology, and mobile and gaming industries. The region also boasts a robust health technology sector and research-supporting infrastructures, including biobanks, a forthcoming genome center, patient registries, the Northern Finland Birth Cohorts and other population cohorts, as well as imaging infrastructure and disease modeling methods.

The development of gene technology, cell and molecular biology methods, and animal models has aided in the diagnosis and treatment of previously unknown diseases. We use modern gene editing techniques, such as CRISPR-Cas9, to create precise in vivo and in vitro disease models. Knock-in mice, patient-derived fibroblasts, and induced pluripotent stem cell-derived models are employed to understand the molecular mechanisms of neurological diseases and to develop disease-specific treatments.

Oulu has also acquired the first FUS LiFU device in the Nordic countries, which uses low-intensity focused ultrasound, opening entirely new possibilities for brain disease research.

We are committed to helping people with neurodegenerative disorders through innovative research and development.

BioArctic's goal is to develop new treatments that attack the causes of neurodegenerative disorders. Our research and development focuses on targeting the misfolded and aggregated proteins that are the underlying cause for these diseases.

Based on unique drug discovery technology, we are developing new treatments for both common and rare neurodegenerative diseases such as; Alzheimer's disease, Parkinson's disease and Amyotrophic Lateral Sclerosis (ALS). We have a variety of projects in different stages of development that are well placed to create value for patients, families and society.

BioArctic Finland Oy
www.bioarctic.fi

BA - 0040 June 2024

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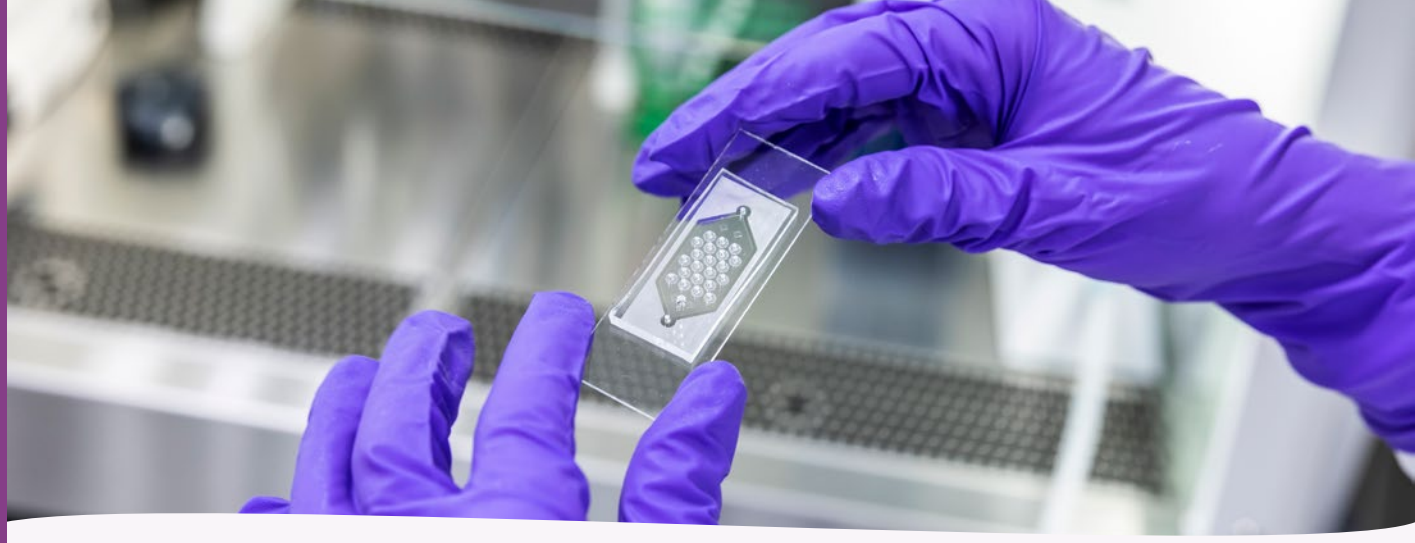

Tampere Brain & Mind

A FORERUNNER IN HEALTH TECHNOLOGY AND INNOVATION

To enhance and promote improved brain health, backed by Neurocenter Finland, **Tampere Brain & Mind** brings together the **Wellbeing Services County of Pirkanmaa**, **Tampere University Hospital** and **Tampere University**, as well as the local start up ecosystem. With a unique concentration of a wide variety of neuroscience research fields and plenty of multidisciplinary neuroscience research collaborations across organizational borders, there is an emphasis on health technologies within the region. Combining basic science, computational imaging and mathematical modeling methods, in addition to inverse solutions provided by involvement in the Research Council of Finland's **FAME Flagship Program**, Tampere is a stronghold for those looking to invest, participate or collaborate in new innovations, research and start ups, including simulation and neuromodulation methods and body-on-chip models.

The region is especially known for its research in

Tampere showcases a broad knowledge-base, coupled with a strong innovation-supporting ecosystem in the region, ensuring new research ideas are readily being transformed into new innovations and start ups.

Turku Brain & Mind

The regional node of Neurocenter Finland in Western Finland operates under **Turku Brain and Mind Center**. Turku Brain and Mind Center (TBMC) is a multidisciplinary research community that was founded in 2011 and is formed by the **University of Turku**, **Turku University Hospital**, and Åbo Akademi University. Today, the Center gathers more than 20 research groups from various fields of neuroscience from the University of Turku and Åbo Akademi University.

What do we do at TBMC?

Firstly, education:
TBMC organizes Neuroscience education at the University of Turku, including a two-year Master's Degree program in Human Neuroscience and a Minor in Neuroscience program open to University of Turku students.

Secondly, multidisciplinary field of research:
One of our main strengths is the multidisciplinary research work, combining several traditional fields and creating a real research community from students to top clinicians and leading international researchers. The Neuroscience field in Turku covers a wide range of disciplines. See the research topics at TBMC from our website.

Thirdly, infrastructure:
Turku hosts an exceptional infrastructure of research tools from state-of-the-art neuroimaging methods to the most recent cutting-edge neuromodulation techniques including MRI, PET, EEG, fNIRS, TMS, DBS, and MR-guided focused ultrasound. Turku is one of the leading research centres in Biomedical Imaging in Europe. Turku PET Center is a Finnish National Research Institute for PET imaging that hosts a radiochemistry department dedicated to radiotracer development and production, and several state-of-the-art PET scanners, including a PET-MRI and a whole-body PET scanner (Quadra). Turku University Hospital and the University of Turku host several MRI scanners, transcranial magnetic stimulation (TMS) devices, and the only navigated TMS device with a robotic targeting system in the Nordic countries. In addition, a High-Intensity Focused Ultrasound device for Neurological indications (Neuro-HIFU) was installed in 2022 – the first in Scandinavia and Baltic countries. TBMC will have a BrainBreak webinar about Neuro-HIFU in the autumn semester of 2024.

And fourth, spotlight:
We bring the research and clinical communities together, facilitate networking and promote your work to maximize the impact of the research. Have a look at our recently published **online magazine** to learn more about what we do at TBMC.

What are our goals?
TBMC's main goal is to increase the visibility of brain research and expertise in Southwest Finland, which promotes the discovery of new solutions to long-term problems and new challenges in brain research.

What does brain health mean?

The World Health Organization defines brain health as “the state of brain functioning across cognitive, sensory, social-emotional, behavioural and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders”. Influenced by factors such as physical health, environment, safety, life-long learning, social connections and access to quality services, optimizing brain health contributes to overall wellbeing and societal advancement by promoting mental and physical health in the population.

Neurocenter Finland enhances brain health by fostering research collaboration and innovation in neuroscience. It supports researchers, promotes personalized healthcare solutions, and coordinates national and international efforts to advance brain research. By creating a robust network of experts, it facilitates the development of new treatments and technologies aimed at preventing and managing brain diseases. Neurocenter Finland also acts as a central contact point, helping to streamline and amplify the impact of Finnish neuroscience on a global scale.

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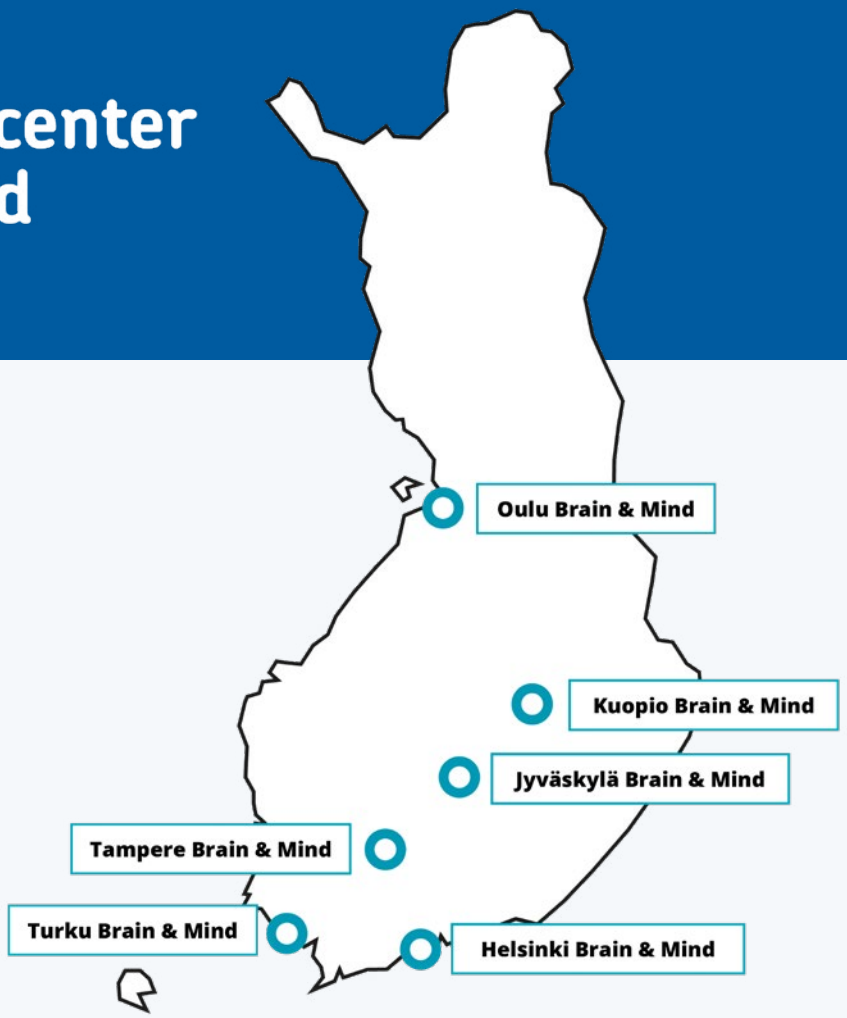
Neurocenter Finland



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