



## Research resources

The DDRC research programs are focused on epidemiological, clinical and translational research in cognitive impairment and neurodegenerative disorders. The majority of our research is funded by grants and donations from public and private foundations. Here we describe our resources.

Our clinical research is based on important infrastructure which we have developed in order to have easy access to well structured clinical data, biosamples and national registries which may be linked and combined.

Our laboratory facilities offer opportunities for cell and molecular translational research. In addition, our research could not be done without collaboration with expertise and access to infrastructure from our national and international collaborators.

### Clinical Trial Unit and Trial Nation Denmark

The Clinical Trial Unit is staffed by two consultant neurologists (one serving as the director), three study nurses, a research administrator and a lab technician. The unit is located adjacent to the memory clinic, and has examination rooms, an infusion room, a fully equipped lab and a dedicated waiting area. In 2022 four phase 3 trials and three open label extension studies of Alzheimer's disease were ongoing. One phase 1 study of Huntington's disease was initiated.

DDRC and its Clinical Trial Unit has a leading role in the Danish Network of Memory Clinics actively involved in clinical drug trials. The network is organized by Trial Nation Denmark, a public private partnership with participation from a number of stakeholders such as pharmaceutical companies.

The dementia center in Trial Nation has five member clinics of which DDRC serves as the medical lead and coordinating center. The purpose is to improve the ability of the clinics to run trials, to attract more trials to Denmark and to assist pharmaceutical companies with easy access to centers which are able to participate in trials.

### Translational Neurogenetics Laboratory

DDRC has an in-house fully equipped laboratory to perform all aspects of cellular and molecular research. We have labs classified for working with genetically modified organisms (class I and class II conditions) in order to work with molecular cloning and viral vectors.

Furthermore, we have equipment to perform various standard molecular biological techniques e.g. PCR, quantitative PCR, Western blotting, flow cytometry and fluorescence microscopy.

We have set up standard routines for reprogramming fibroblasts into induced pluripotent stem cells and for gene editing using the CRISPR/ Cas9 technique and differentiating stem cells into e.g. neurons, microglia, astrocytes and organoids.

### Patient cohorts

Patients with a wide range of diagnostic entities and cohorts of healthy controls and gene mutation carriers serve as the foundation of many DDRC research programs:

The memory clinic receives approximately 2.000 new referrals each year. With informed consent from participants who are willing to participate, results from diagnostic investigations are stored in a research database, and they form an important basis for research with the aim of improving diagnostic evaluation, treatment and care for memory clinic patients.



Several large-scale multi center intervention studies (e.g. ADEX, BASIC and DAISY) have been coordinated by DDRC leading to large nationwide patient cohorts with follow-up data. Collaboration on dementia research in selected Danish memory clinics has been established in the ADEX consortium (coordinated by DDRC) – a multicenter Danish research network comprising eight different memory clinics from across the country. The international multi-center study PredictND which successfully terminated in 2018 acquired a cohort of 800 patients and continues in 2022 to produce research results by collaborating partners.

DDRC is a member of several international networks on familial dementia disorders, such as the European Huntington Disease Network (EHDN) and Frontotemporal Research in Jutland Association (FReJA) which provide platforms for professionals to facilitate collaboration through-out Europe. Such networks also have been instrumental in the recruitment of DDRC patients to pharmacological intervention studies.

## Danish national registries

All Danish in- and out-patients who have had contact with a Danish hospital are registered in the Danish national health registries with basic information, such as diagnostic codes and procedures. Access to the nationwide health care registries with the possibility of linking to other national registries makes it possible to carry out large population-based studies.

These unique national registries have served as the foundation for our studies in dementia including, quality of health care, validity of dementia diagnosis, pharmacoepidemiology, co-morbidity, and prevalence, incidence and mortality.

## Danish Dementia BioBank and clinical cohort research data

The Danish Dementia BioBank (DDBB) contains samples from more than 13,000 patients referred to the Copenhagen Memory Clinic at Rigshospitalet and the Zealand University Hospital Memory Clinic in Roskilde, all of whom have given informed consent for their samples to be used for future research. Whole blood, buffy coat, EDTA plasma and serum are stored for all patients, as well as CSF from approximately 25 % of the patients.

All samples are handled and stored according to international biobank recommendations. Furthermore, we collect clinical and paraclinical data to accompany the biofluids, and our database now holds more than 200,000 datapoints associated with the biological specimens.

The Danish Dementia BioBank provides support and infrastructure for a wide range of projects, and in 2022, data and samples contributed to the validation and implementation of improved routine diagnostic biomarkers for AD, investigated the potential of non-invasive saliva biomarkers, and participated in multidisciplinary projects in bipolar disease and Huntington's disease as well as basic research projects elucidating the mechanisms behind cerebrospinal fluid formation.

Latest update: 03. September 2020