

Developing high-quality research...

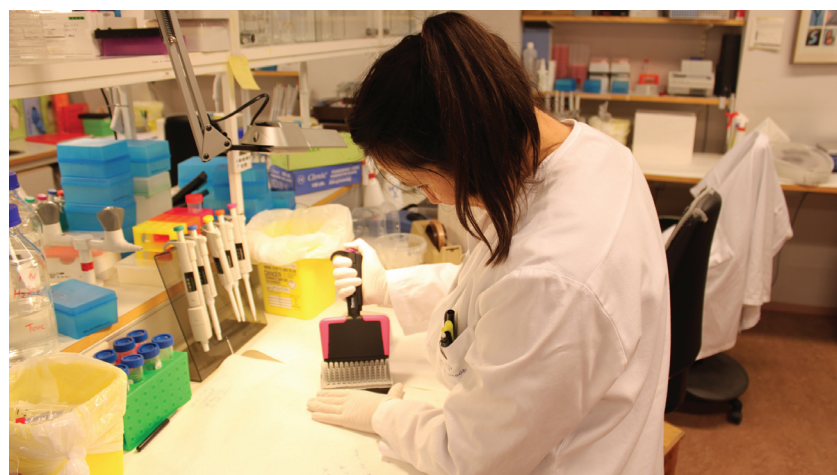
...to improve care for all persons with multiple sclerosis...

The Norwegian Multiple Sclerosis Competence Centre is located at the Department of Neurology, Haukeland University Hospital, in the city of Bergen, Western Norway. Promotion of research, supervision and counselling of healthcare professionals and patients are the main responsibilities of the centre.

Background

Multiple sclerosis (MS) is the leading non-traumatic cause of nervous system disability in young adults, and represents a major burden to individuals and society. In order to reduce the consequences of the disease, research effort is forwarded aiming for increased understanding of the aetiology of MS and developing tools for early diagnosis and treatment.

MS is a chronic immune-mediated disease, causing multifocal inflammatory damage and loss of nerve fibre isolation (myelin) in the central nervous system (CNS) with secondary nerve fibre (axon) destruction. The disease develops from a complex interplay between environmental and genetic factors in genetic susceptible individuals. The onset of the disease is usually between 20 and 40 years of age. Most patients (80-90%) experience a relapsing-remitting course (RRMS) and fewer (10-20%) develop insidious progression from onset, primary progressive course (PPMS). No curative treatment is available for MS, but corticosteroid treatment for relapses and immunomodulatory therapies are important to modify the disease course. No single clinical feature or diagnostic test is sufficient for diagnosing MS. The diagnosis is therefore based on careful evaluation of the disease history of the patient and clinical neurological examination, supported by magnetic resonance imaging (MRI) of the brain and the



spinal cord, as well as cerebrospinal fluid (CSF) analysis.

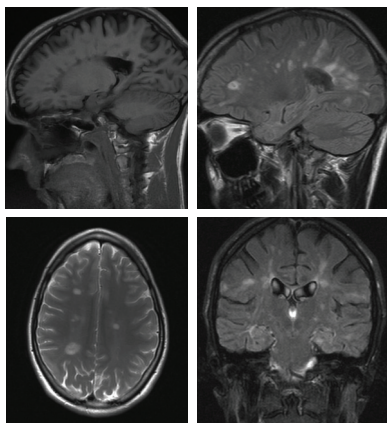
Norway is a high prevalence area of MS with about 8,000 patients. The number of patients is challenging to clinical care, but represents also a unique possibility and responsibility to establish high-quality MS research. Based on this background, a proposal from the Norwegian Neurological Association and financing from the Ministry of Health and Social Affairs, The Norwegian Multiple Sclerosis Competence Centre was established in 1996 at the Department of Neurology, Haukeland University Hospital (www.ms-kompetansesenter.no).

A broad research strategy

Research is one of the main activities at the competence centre, and MS has been one of the main research topics at the Department of Neurology, Haukeland University Hospital since the early 1950s. Epidemiology and natural history studies have contributed to descriptions of MS incidence and prevalence in Norway, in addition to clinical course and prognosis of the disease. Researchers from the centre have also contributed with essential knowledge of benign MS, life expectancy and survival of MS, as well as pregnancy, delivery and birth

outcome in women with MS. Disabling non-motor symptoms of the disease, bladder dysfunction, neuropsychiatric co-morbidity, quality of life, patients stigma and coping and as well as cost of illness, are also important research topics at the centre. In recent years, researchers at the centre have chaired a large international case-control study on environmental factors in MS – the EnvIMS study, including patients from Norway, Sweden, Italy, Serbia, Canada and Cuba. The study aims at identifying the importance of environmental factors for developing the disease and the interaction between such factors and susceptibility genes.

Characterisation of immune responses related to the disease and treatment responses are also important projects at the centre. The competence centre holds the responsibility for the national service for analysis of neutralising antibodies to immunomodulatory drugs (interferon beta and natalizumab) and offer several other neuroimmunological analysis such as isoelectric focusing of the spinal fluid and aquaporin-4 antibodies for the diagnosis of neuromyelitis optica. Other projects include characterisation of brain pathology in MS. Researchers have, through international collaboration, contributed with important descriptions



of axonal transaction, cortical demyelination and MS-lesion classification. Animal models including cuprizone and experimental autoimmune encephalomyelitis are established at the centre for studies of the influence of diet lipids and vitamin D.

KG Jebsen Centre for MS Research

Biomarker research has, during recent years, been one of the main activities at the centre. Thanks to a generous donation from the K.G. Jebsen Foundation (<http://www.stiftkgj.no>) and support from the University of Bergen, the K.G. Jebsen Centre for MS Research was established in 2011 at the competence centre and the Department of Clinical Medicine, University of Bergen. This project is an integrated activity at the centre with an object in defining specific MS-biomarkers by comparing CSF from MS patients to other neurological diseases and healthy persons by means of proteomics based on mass-spectrometry. Similar biomarker investigations will also be performed on tissue from MS brains as well as in more easily available body fluids, preferable blood (serum/plasma) using large numbers of samples from the Norwegian MS Registry and Biobank. Verified biomarkers will further be analysed for diagnostic sensitivity and specificity, as well as for prognostic and treatment response properties in larger patient samples. Successfully identified biomarker candidates will then be analysed in animal models of multiple sclerosis to explore the pathogenesis of the disease.

Clinical guidelines, supervision and counselling

The Norwegian Multiple Sclerosis Competence Centre also have a large activity in contributing and organising symposia and teaching courses to health professionals, and establishing clinical guidelines for diagnosis and treatment of MS. The most recent updates have been done in collaboration with both the Norwegian Neurological Association (www.nevrologi.no) and the Norwegian Directorate of Health (www.helsedirektoratet.no). Neuroimmunological laboratory services for diagnosis and treatment evaluation (neutralising antibodies) are offered in collaboration with the Department of Neurology, Haukeland University Hospital. The competence centre has also an extensive collaboration with the Norwegian MS Society (www.ms.no) and contributes to a website for patients' questions.

The Norwegian Multiple Sclerosis Registry and Biobank

The Norwegian Multiple Sclerosis Registry and Biobank was established at the competence centre in 1998 and has since 2001 subsequently registered Norwegian patients. In 2005 the registry was extended to include biological samples of blood (DNA and serum), CSF, and brain tissue (autopsies) from MS patients. The registry and biobank is a national collaboration with contribution from all departments of neurology in Norway as well as the Norwegian Institute of Public Health (www.fhi.no). Registry data and biological samples are available for researchers by application, which are evaluated by a steering committee with representatives from all regional health authorities, the Norwegian MS Society and the Norwegian Institute of Public Health. In 2011 the registry and biobank approaches 5,000 patients, 2,500 blood samples, 300 CSF samples and tissue from about 80 MS brains. During 2012 the medical quality registry is established and adapted for online registration

including quality control of diagnosis and treatment of the patients. The registry is also participating in the EUREMS project aiming for establishing a European MS Registry organised by the European MS Platform (EMSP – www.emsp.org).

National and international collaboration

Collaboration is essential for all activities at the Norwegian Multiple Sclerosis Competence Centre. Nationally, the competence centre has an extensive collaboration locally within the Haukeland University Hospital (www.helse-bergen.no), the University of Bergen (www.uib.no) and the Norwegian School of Economics (www.nhh.no), and with all departments of neurology and researchers at the other Norwegian Faculties of Medicine at the Universities in Tromsø, Trondheim and Oslo. Internationally, researchers at the centre have extensive collaboration with researchers from Scandinavia, Europe, USA, Canada and Cuba.

Assignment

The overall aim of all initiatives at the competence centre is to integrate all research and clinical activities in order to develop high quality research to improve care for all persons with multiple sclerosis.



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