Virologi og immunologi

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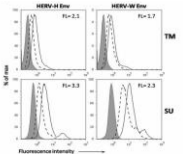
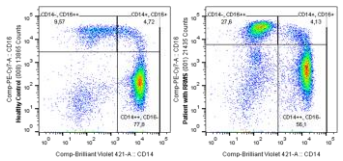
Background

The cause of the immune-mediated, neurological disease multiple sclerosis (MS) remains unknown.
We focus on the MS-specific complex interplay of essential immunological pathways and the potential involvement of viruses in determining disease activity and progression in MS.
We also have a specific interest in neuromyelitis optica spectrum disorders (NMOSD) and the anti-AQP4-response.
We are very interested in human endogenous retroviruses (HERVs):



Flow cytometric analysis of surface expression of HERV-H Env and HERV-W Env TM and SU epitopes on cells from MS long-term lymphoblastoid cell cultures.
Brudek *et al. 2009*

… and in the inflammatory response is patients with MS:



Expression of CD14 and CD16 on PBMCs from a healthy control (left) and a patient with RRMS (right). Activation status of monocytes in the peripheral blood is reflected by their expression of CD14 and CD16. Patients with CIS and RRMS have a higher proportion of activated monocytes (CD14-,CD16++) indicating an ongoing inflammatory condition. (Gjelstrup *et al. 2018*)

Currently, all investigations are performed on primary samples from patients and controls.
Our main goal is to gain sufficient insight into the cause and the pathogenesis of the diseases to create the basis for novel treatments.

Projects and techniques

Close collaborators:
Chief Physician (neurology)Thor Petersen, DrMedSci, Head of MS Clinic, Department of Neurology, AUH, and Intern, (neurology) Morten Stilund, PhD, MS clinic, RHWJ: Clinical work, diagnostic work-ups, epidemiology.
Professor Holger Jon Møller, Clinical Biochemistry, AUH: biomarkers.
Professor Christian Muchardt, PhD, Dept. of Developmental and Stem Cell Biology, Institut Pasteur, Paris, France: epigenetic analysis, next-generation sequencing.

Project elements:
Inflammation and biomarkers in MS: Cell culture, flow cytometry (incl. ImageStream), fluorescence-activated cell sorting, RT-qPCR for a detailed characterization of monocyte and B cell populations in peripheral blood and CSF. ELISAs (or variations thereof) for biomarkers for inflammation and axonal degeneration.

NMOSD and the anti-AQP4-response: Cell culture, flow cytometry, ELISAs/TRIFMAs, cell-based assays (CBA).

HERVs in MS: Cell culture, PCR, cloning, analysis of expression, confocal microscopy, flow cytometry, cell based functional assays, ELISAs/TRIFMAs

MS epigenetics: Cell culture, RNA and DNA specific methods including chromatin immunoprecipitation, ChIP-seq, RT-qPCR, high depth RNA sequencing. Use and interpretation of next-generation sequencing data.

Recent publications:
Christensen T & Muchardt C. The epigenetics of multiple sclerosis. The epigenetics of autoimmunity, Vol 5, 2018 (Tollefsbol and Zhang, eds), Elsevier *in press*
Gjelstrup MC *et al*. Subsets of activated monocytes and markers of inflammation in incipient and progressed multiple sclerosis. Journal of Immunology and Cell Biology 2018; 96:160-174
Hansen DT *et al*. Retroviral envelope proteins: Involvement in neuropathogenesis J Neurol Sci 2017, 380: 151-163