

PhD Project Description

School/Department:	Department of Neuroscience, Erasmus MC
Supervisor information:	<ul style="list-style-type: none"> • Prof. Dr. MA Frens, full professor in Neuroscience • Email: m.frens@erasmusmc.nl • Website: www.neuro.nl • Personal Grants, (examples): <ul style="list-style-type: none"> ➤ NWO-SGW research talent (2018; PhD student) ➤ 3 ESA grants (2017/2018) ➤ NWO IMDI Grant (2012; 3 yr postdoc) ➤ European FP7 ITN grant (2009; 2 AIO's) ➤ Human Frontier grant (2008; 750 k\$) ➤ NWO-VIDI grant (2003; 600 k€) • Most important publications: <ul style="list-style-type: none"> ➤ Nature Neurosci, PMID: 16568098 ➤ Neuron, PMID: 11430812. ➤ Ann Neurol. PMID 31925838 ➤ PLoS One, PMID: 25894396 ➤ eNeuro, PMID: 30073197 ➤ Front Neurosci, PMID: 28824366 ➤ J Physiol, PMID: 12949226 ➤ IOVS, PMID: 27379580. ➤ Spine, PMID: 26418634
Project Title:	Liquid biopsy in neurological disorders
Abstract:	<p>Many neurological disorders are difficult to diagnose and monitor because no blood or imaging biomarker exists to prove disease presence or quantify its severity. Instead, the neurologist relies much more on clinical history and neurological examination. Even though this clinical evaluation often leads to a reliable diagnosis as time progresses and symptoms become more clear, an accurate biomarker could decrease initial diagnostic uncertainty and help monitor the clinical effect of new or existing drugs. For neurological disorders characterized by specific brain damage (for example: the temporal lobe in Alzheimer's, the substantia nigra in Parkinson's, and white matter in multiple sclerosis), such a biomarker would need to sensitively measure specific neuronal cell death, preferably in an easily accessible place such as the blood stream. But does such a biomarker exist? What makes a neuron different from others is its methylation pattern: the epigenetic control mechanism for transcription. Given that genetic fragments are released into the blood stream following neuronal death, it should be possible to quantify brain damage from a serum sample using next-generation sequencing: a liquid biopsy. In this project, you will determine the neural correlates of circulating cell-free DNA and have the opportunity to work towards clinical implementation of cell-free DNA in a multidisciplinary team of geneticists, neurologists and radiologists.</p> <p>Research questions</p> <ul style="list-style-type: none"> • Can we diagnose and monitor neurological disorders with circulating cell-free DNA? • Is circulating cell-free DNA related to brain atrophy determined from MRI scans? • How do other intrinsic or extrinsic factors influence levels of neuronal cell-free DNA?
Requirements of candidate:	<ul style="list-style-type: none"> ○ We are looking for a highly motivated, hardworking student to join our very international team. Our strength is in using team work to tackle large scientific questions and thus requires a student with good communication skills. ○ Master degree or MD ○ Scholarship that will, at least, cover subsistence allowance and international air plane ticket (we could help with the scientific part of your scholarship proposal) ○ English language requirement: ○ <i>English speaking countries & Netherlands:</i> no requirement ○ <i>Other countries:</i> IELTS 7.0 (<i>min 6.0 for all subs</i>), TOEFL 100 (<i>min 20 for all subs</i>)

Erasmus MC, ranked world no. 32 for [Clinical Medicine US News 2020](#) no. 30 [Nature Index for Biomedical Sciences 2019](#)

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Application requirements & Deadlines:

<https://www.eur.nl/en/about-eur/erasmus-university-china-centre/csc-scholarship>

Erasmus MC, ranked world

** No.32 for Clinical Medicine US News 2020:*

<https://www.usnews.com/education/best-global-universities/clinical-medicine?page=3>

** No. 30 Nature Index for Biomedical Sciences 2019:*

<https://www.natureindex.com/supplements/nature-index-2019-biomedical-sciences/tables/healthcare>