

## **Bachelor/Master internship: Development of biomarkers for blood-brain barrier dysfunction in dementias.**

### **Background**

The blood-brain barrier (BBB) is recognized as an important semi-permeable barrier protecting the central nervous system and regulating transport of nutrients to the brain and waste products out of the brain. Impairment of this barrier is hypothesized to play a crucial role in the development and progression of several neurodegenerative diseases such as Alzheimer's disease (AD) and cerebral amyloid angiopathy (CAA). Currently, fluid biomarkers to estimate the degree of BBB (dys)function in a living individual with high accuracy are not yet available. Early detection and assessment of BBB (dys)function could play a role in treatments targeting the central nervous system and contribute to a better understanding of neurodegenerative diseases.

### **Objective**

To develop robust assay for quantification of novel cerebrospinal fluid (CSF) and blood biomarkers of BBB impairment.

Research questions:

1. What are potential biomarkers indicating BBB-dysfunction?
2. Are these proteins present in CSF/blood and detectable with immunoassays?
3. Can these proteins in CSF/blood function as biomarkers of BBB (dys)function?

### **Tasks**

1. Select potential protein biomarkers based on literature that might function as biomarkers for BBB (dys)function
2. Develop and optimize immunoassays in CSF and/or blood for BBB biomarker candidates
  - a. Design experiments
  - b. Perform immunoassays
  - c. Assess results
3. Present your data in a written report and oral presentations

### **Contact**

If you have questions about the project and/or would like to send an application, please contact me by mail; arno.stellingwerf@radboudumc.nl.

### **Time period**

Full-time project of 4-6 months, starting date: in discussion

### **Supervision**

MSc. Arno Stellingwerf (PhD candidate, daily supervisor), dr. Bea Kuiperij (postdoctoral researcher), prof. Marcel Verbeek (principal investigator).  
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