Our group has been committed to characterise the immune response and the cytokine network at play primarily in Multiple Sclerosis (MS) but also in other neurological disorders. Our data originate from our expanding biobank of peripheral blood mononuclear cells (PBMC) from MS patients as well as cerebrospinal fluid (CSF) and serum from patients of the Neurology Department at the Cliniques Universitaires Saint-Luc. We have characterised the Th17/Treg balance and the involvement of their cytokines during MS relapses and remission or following MS treatments. Recently, the group has broadened its investigation of MS pathogenesis by studying microRNAs (miRNA), bioactive lipids and their putative carriers (extracellular vesicles: EVs) for their roles in MS neuroinflammation as well as on the development of oligodendrocytes producing myelin, a privileged target in MS.

**Group members**

Vincent VAN PESCH, Principal Investigator

Ludovic D’AURIA, Postdoctoral Fellow

Oceane PERDAENS, PhD Student

Anthony DA SILVA PEREIRA, Undergraduate Student

Melody PAUL, Undergraduate Student

Anh DANG, Msc, Research Technician

Zakia NASR, Bsc, Research Technician
Expression of Th17-related cytokines during MS relapses and remission

**Team:**
V. van Pesch  
N. Muls, Z. Nasr, A. Dang, C. Sindic

**Funding sources:**
Fonds National de la Recherche Scientifique  
Belgian Charcot Foundation

**Challenges:**
The pathogenicity of IL-17 in MS is controversial. We thus characterised the levels of IL-22 and GM-CSF during relapse and remission of the disease and upon corticosteroid treatment of MS relapses. We observed that the proportion of specific T helper (Th) Th22 and ThGM-CSF cells varied according to disease activity and was differentially affected by corticosteroids.

*This work was recently peer-reviewed published (Muls et al, 2017).*

MicroRNA analysis in MS patients according to disease and phenotype

**Team:**
L. D’auria, V. van Pesch  
O. Perdaens, A. Dang

**Funding sources:**
Fondation Louvain  
Fonds Spéciaux de Recherche (FSR, UCL)  
Belgian Charcot Foundation

**Challenges:**
In order to find new disease-related biomarkers for MS and other neurological disorders, we have screened for over 140 different inflammation-related microRNAs (miRNAs). We have discovered that some miRNAs were dysregulated in the CSF of MS patient according to disease activity, with certain also expressed during infectious neurological disorders. We are currently analyzing miRNAs in PBMC and sera of MS patient to determine whether the miRNA levels are correlated with the levels found in the CSF. The functional role of the miRNA in MS will be investigated (see Projects 4 & 5, next page).

*Manuscript in preparation*

Extracellular vesicles as carrier of miRNA and lipids: Involvement in MS pathogenesis

**Team:**
L. D’auria, V. van Pesch  

**Funding sources:**
Fondation Louvain  
Fonds Spéciaux de Recherche (FSR, UCL)  
Belgian Charcot Foundation

**Challenges:**
Extracellular vesicles (EVs) are circulating structures increasingly recognized for their roles in intercellular communication by carrying proteins, bioactive lipids and microRNAs. We are investigating the exact nature of the lipids and miRNAs in EVs and the extent to which EVs loaded with specific lipid and miRNAs are correlated with MS-related inflammation (PhD of Miss Perdaens) and oligodendrocyte biology (Project e).

*Work in progress.*
The role of EVs and their content in oligodendrocyte development, myelin integrity and myelination

**Team:**
- L. D’auria, V. van Pesch
- A. da Silva Pereira, Z. Nasr

**Funding sources:**
- Fondation Louvain
- Belgian Charcot Foundation

**Challenges:**
MS is a chronic inflammatory disease characterized by the disruption of the lipid membrane myelin produced by oligodendrocytes, although the myelin pathogenesis is poorly understood. This project will assess the functional role of lipid/miRNA-EV in oligodendrocyte and myelin biology in order to discover putative novel therapeutic strategies to treat MS.

*Work in progress.*

**Selected publications**


**Equipment**

- MSD instrument (Mesoscale): multi-array technology to measured biomarkers or cytokines in high sensitivity and through a large range
- Two Rotor-Gene (Qiagen) for qPCR measurements