The liver is a vital organ responsible for various functions such as detoxification, metabolic processes, and the production of clotting factors. Hepatic stellate cells (HSCs) play a crucial role in liver function, particularly in the response to injury and fibrosis. Excessive scarring, or fibrosis, results in organ failure and death.

Fibrosis is a result of damage to the liver, which can be caused by various factors such as viral infections (e.g., hepatitis C), alcohol, and non-alcoholic fatty liver disease. It occurs when the liver is unable to heal properly from the damage caused by these factors.

During liver disease, a multitude of cells are damaged, leading to the production of scar tissue by the hepatic stellate cells. These cells become activated, leading to the development of fibrosis. Activated HSCs have a myofibroblast phenotype, characterized by cell proliferation and the production of extracellular matrix components such as collagen.

For many years, it has been known that HSC activation is a key step in the development of fibrosis. However, the mechanisms regulating HSC activation are not fully understood. Recent research has focused on the role of extracellular vesicles (ECVs) in liver disease.

ECVs are small membrane-bound vesicles shed by cells and released into the bloodstream. They contain various components, including genetic material and proteins, which can mediate intercellular communication.

### Proposed projects for internships @ LIVR

- **Isolation of liver cells**
  - FACS
  - 2D culture
  - 3D culture

- **RNA analysis:** QPCR
- **Protein analysis:** WB, IF, IHC

- **Functional assays:**
  - Cell viability
  - Cell proliferation
  - Collagen cross-linking

**Long non-coding RNAs in chronic liver disease**

Long non-coding RNAs (lncRNAs) are important in regulating gene expression. They can influence epigenetic modifications and regulate the expression of genes. Their role in liver fibrosis is an area of active research.

**Pro- and anti-fibrotic effects of circulating extracellular vesicles in human liver disease**

Circulating extracellular vesicles (CEVs) are small membrane-bound structures that are released by cells and can mediate intercellular communication. They play a role in fibrosis development, and their analysis can provide insights into disease mechanisms.

### CURRENT PROJECTS @ LIVR

- **Mechanisms of fibrosis development and resolution**
- **Identification of HSC-specific biomarkers for fibrosis staging**
- **Role for liver progenitor cells during liver regeneration**
- **Generation of in vitro liver disease models**

**Dr. Inge Mannaerts**
inge.mannaerts@vub.ac.be

**Masterstudent Liza Dewyse**
liza.dewyse@vub.ac.be

**Prof. Leo van Grunsven**
leo.van.grunsven@vub.ac.be

**Doctorantstudent Stefan Verhulst**
stefaan.verhulst@vub.ac.be

**For more information visit**
http://livr.vub.ac.be/