

**Master 2 internship project
Year 2024-2025**

Laboratory/Institute: IAB, Grenoble

Director: Pierre Hainaut

Team: Physiology and Pathophysiology of sperm cells

Head of the team: Aminata Touré

<https://tourelab.fr/>

Name and status of the scientist in charge of the project:

HDR: yes

Aminata TOURE, Directrice de Recherche CNRS (HDR since 2008)

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Program of the Master's degree in Biology:

Physiology, Epigenetics, Differentiation, Cancer

Title of the project: Sperm physiology and pathophysiology

Objectives (up to 3 lines):

The Master 2 internship will focus on defining the signaling pathways activating sperm motility and fertilization potential with emphasis on the involvement of protein phosphatase 2A in the control of sperm protein phosphorylation.

Abstract (up to 10 lines):

Infertility is a major public health issue currently affecting an estimated 7–12 % of couples worldwide. Among the sperm defects that are responsible for male infertility, asthenozoospermia, defined by the absence or the reduction of sperm motility, is predominant and detected in nearly 80% of cases. Despite this high prevalence, the genetic causes and physio-pathological mechanisms underlying asthenozoospermia are still poorly defined and, apart from assisted reproduction technologies, no treatment is currently available. Our laboratory is involved in the definition of the molecular and cellular mechanisms governing sperm flagellum assembly together with the signalling pathways activating sperm motility and fertilization potential. To this end, we are studying mouse and human sperm in both physiological and pathophysiological contexts, and we have been intensively involved in the characterization of several candidate proteins in order to define their functions and pathophysiological mechanisms. Ultimately, our work aims at proposing potential therapeutic and contraceptive strategies by modulating sperm physiological environment.

Methods (up to 3 lines):

The program will involve a broad range of technics: immunofluorescence analyses, super resolution microscopy, molecular biology, biochemistry, sperm parameters and functional analyses.

Up to 3 relevant publications of the team:

- 1- Cavarocchi E, et al., *Identification of IQCH as a calmodulin-associated protein required for sperm motility in humans*. **iScience**. **2023**. PMID: 37520705
- 2- Cavarocchi E et al., *Sperm Ion Transporters and Channels in Human Asthenozoospermia: Genetic Etiology, Lessons from Animal Models, and Clinical Perspectives*. **Int J Mol Sci**. **2022**. PMID: 35409285
- 3- Cavarocchi E et al., *The sodium/proton exchanger SLC9C1 (sNHE) is essential for human sperm motility and fertility*. **Clin Genet**. **2021**. PMID: 33462806

Requested domains of expertise (up to 5 keywords):

Reproductive biology, physiology, physiopathology, cellular biology, signalling.