Master program: Pharmaceutical sciences

Master 2 Course: Development of Drugs and Health Products

Firm/Laboratory/public body: Institut de Chimie-Physique

Address: Université Paris-Saclay, Campus d’Orsay, batiment 350

Hopital Rothschild, Hopital Tenon, Paris

*Trainee supervision:*

Tutor’s name: Dr Deniset-Besseau & Dr Colboc

Position: Physical chemist & Dermatologist

Email: ariane.deniset@université-paris-saclay.fr

Phone:

Internship period: mid-January/mid-July

**Title of the project: Multiscale Analysis of Skin - The Case of Pathological Skin Aging**

The term "dermatoporosis," by analogy to osteoporosis, was introduced by Professors Saurat and Kaya in 2007 to define the set of manifestations related to pathological skin aging, leading to extreme fragility and cutaneous insufficiency. During dermatoporosis, the skin becomes thin and fragile, losing its elasticity and barrier function. While well-described clinically, this condition is only partially understood from a pathophysiological perspective. Histologically, patients with dermatoporosis exhibit epidermal thinning, horizontalization of elastic and collagen fibers, and flattening of the dermo-epidermal junction. These changes result from multiple structural alterations of dermal fibers and are also observed in the course of physiological skin aging. To our knowledge, no study has specifically examined the structural alterations of dermal fibers in dermatoporosis.

We hypothesize that the alterations of dermal elastic and collagen fibers occurring during dermatoporosis are specific and distinguishable from the alterations observed in physiological skin aging. We also suspect the role of chemical factors associated with aging, such as dermal and vascular calcifications, in the development of dermatoporosis. The objective of our project is to characterize the structural alterations of elastic and collagen fibers during dermatoporosis and describe any associated cutaneous calcifications.

**Missions**

To explore these hypotheses, the student will study human skin biopsies using the following characterization tools:

* Optical microscopy in the anatomopathology department of Tenon Hospital
* Scanning electron microscopy coupled with EDX (Energy Dispersive X-ray Spectroscopy)
* Micro and nanoscale infrared spectroscopies

Depending on the course of the internship and collaborations, analyses with multiphoton microscopy and at the Synchrotron Soleil may be possible.

The internship will include:

• A bibliographic review.

• Sample preparation and their multiscale-multimodal analysis

• The intern will also work on data processing using Orange and Python.

**Profiles:**

Master 2 student in physics/physical-chemistry/chemistry. Desirable knowledge in spectroscopy. Aptitude for data processing, taste for experimentation. Initiative, curiosity, autonomy.

**The topic can be adapted for M1 students**

**Language:** French & English.

**Duration:** 5-6 months

**Location:**

AFMIR Lab, ICP, Building 350 - Faculty of Sciences of Orsay, University of Paris Saclay

15, avenue Jean Perrin 91405 Orsay, FRANCE.

Hopital Rothschild, Paris

**Contact:**

Please send your CV, course transcript and cover letter to Ariane DENISET-BESSEAU (ariane.deniset@universite-paris-saclay.fr) and Hester Colboc (hester.colboc@aphp.fr) with the subject: InternAFMIR2025dermatology - Last name.