Results
So far, solely the outermost layer of the skin is modelized as a microfluidic device (Fig. 1). The diffusion behavior and permeation coefficients obtained for different molecules (caffeine in Fig. 2, fluorouracyl, etc) is close to those reported in the literature with human skin biopsies. The inter-device reproducibility is also found to be good.

Reference

Context
With the inability to conduct cosmetic tests on animals, and the scarce availability and great variability of human skin biopsies, there is a strong need for cosmetics companies to get fast, reproducible, and low cost tests to evaluate the diffusion of new molecules through the human skin.

Objectives
The goal of this project is to provide a microfluidic tool to model the skin and perform those diffusion tests.

Methods
The idea is to mimic three main layers of the skin (the outermost layer, the stratum corneum; the middle layer, the epidermis; the innermost layer, the dermis) and combine it with on-line monitoring of the diffusing species.

Collaboration with Nihon L’Oréal