





SKIOME project: lead skin microbiome research towards interdisciplinary approaches

Fumagalli S.¹, Agostinetto G.¹, Casiraghi M.¹, Labra M.¹, Bruno A.¹ *E-mail: s.fumagalli66@campus.unimib.it* ¹ Department of Biotechnology and Biosciences, University of Milano-Bicocca, Milan (Italy)

Keywords: skin microbiome, metagenomics, multi-omics, data integration

Abstract:

The skin is like a forest: it has diverse layers and ecological niches in which its components, that are microorganisms, host cells, and immunity system, interact sustaining ecosystem homeostasis. Therefore, microbial responsibility of both health and disease status is one of the reasons why human microbial collection, namely microbiota, and its genomic content, namely microbiome, have received great interest from the scientific community in the last fifteen years. However, notwithstanding recent technological advances in multi-omic sciences, we are far from deeply understanding the human microbiome complexity.

Here, we present the SKIOME project, which has the ambitious aims of disentangling intricate human skin microbiome patterns, defining the impact of host-microbial interactions, and reconstructing the functional properties that drive the microbiome. The novelty of this project is the adoption of an interdisciplinary approach through the integration of different techniques, even the not conventional ones, to face the challenge of microbiome study from new perspectives.

In the first phase of my doctorate, I will conduct *in silico* analyses on human skin microbiome data that have been collected in the last decade. Analyses will allow me to 1) estimate microbiome biodiversity, 2) determine relationships among species, 3) define interactions between host and microbiome, 4) detect metabolic pathways and chemical metabolites. In the second phase of the project, I will validate the data-driven hypotheses with wet experiments, including microbiological tests and high-throughput DNA sequencing analyses.

Thus, the main goal of SKIOME is to reach a more comprehensive knowledge of what happens on our skin, aiming to contribute in developing microbiome-based cosmetic products and personalized medicine strategies.