

**M1-Molecular and Cellular Biology (MCB)  
Internship Proposal Form  
Chemistry-Biology Department**

**(Deadline Friday 15<sup>th</sup> December 2023)**

**Laboratory Address and Affiliation:**

Institut de Biologie Structurale, CNRS, CEA, UGA  
71 avenue des Martyrs – CS 10090  
38044 Grenoble

**Laboratory/Team Research area (Keyword)**

Bacterial pathogenesis

**Summary of the Proposed Internship Project (10 lines)**

Title: Structural characterization of the megacomplex involved in the biosynthesis of the genotoxin colibactin in *E. coli*.

**DESCRIPTION:**

Escherichia coli strains that are members of the human intestinal flora have been shown to be involved in the development of colorectal tumors in animal models of cancer. E. coli strains responsible for this effect express a multi-protein machinery, a nonribosomal peptide synthase-polyketide synthase (NRPS-PKS) assembly line. NRPS-PKS assemblies, whose masses can reach up to 2 megadaltons, catalyze linear reactions leading to the synthesis of chemically diverse natural products. In this case, the machinery synthesizes colibactin, a small molecule that, when secreted, leads to targeted DNA destruction and apoptosis, genomic instability and colorectal tumor progression.

The objective of this project is to provide mechanistic insight into colibactin synthesis through the structural characterization of NRPS-PKS assemblies.

**Methodologies and/or Techniques to be used**

Molecular biology, Biochemistry, X-ray crystallography and electron microscopy

**Person to contact:**

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**Additional information**

Proposal Form send as a PDF file to: [sabrina.boulet@univ-grenoble-alpes.fr](mailto:sabrina.boulet@univ-grenoble-alpes.fr)

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