

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

(Deadline Friday 15th December 2023)

Laboratory Address and Affiliation:

Institut de Biologie Structurale
71 Avenue des Martyrs
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38044 GRENOBLE CEDEX 9
France

CEA/CNRS/UGA

Laboratory/Team Research area (Keyword)

Methods and Electron Microscopy (MEM) Group/ Transmission electron microscopy (TEM), atomic force microscopy (AFM), method development, image analysis, Complement proteins

Summary of the Proposed Internship Project (10 lines)

Title: Optimization of Graphene Transfer onto TEM Grids for TEM observation of first complement protein complex C1

DESCRIPTION:

The C1 complex contains one C1q, two C1r, and two C1s molecules assembled in the presence of Ca²⁺. Due to the non-covalent nature of the assembly, TEM observation of C1 has only been achieved in cross-linked complex. Recent publications have contradicted the results deduced from these images, which might contain artefacts from the chemical treatment. This project aims to preserve C1 in its native condition with graphene sheets. Graphene, with its exceptional mechanical and electrical properties, makes ideal support film for TEM studies. Commercial graphene sheets grown on Cu substrate can be retrieved and transferred onto TEM grids. Nevertheless, residues of Cu or the protective polymer layer can contaminate the graphene and interfere with sample imaging. In this internship, AFM will be used to characterize the graphene layers and optimize the conditions for preserving the C1 complex to be observed by TEM.

Methodologies and/or Techniques to be used

Chemical etching, AFM, TEM

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Additional information