

Fiche de proposition de stage de L3 et M1 UFR Chimie et Biologie

Cochez la spécialité correspondant à ce stage:

M1CV

L3C L3CB

Adresse et appartenance du laboratoire :

Institute of Structural Biology, Viral Infection and Cancer Group, 71 Avenue des Martyrs, CS 10090, 38044 Grenoble cedex 9

Thématique générale du laboratoire ou du groupe de recherche (par mots clés)

Biochemistry, analytical chemistry, Mass spectrometry, RNA-protein interactions

Thème du stage proposé (en 10 lignes, si possible)

TITRE : Probing the structure of RNA by mass spectrometry

DESCRIPTION :

Ribonucleic acid (RNA) is an essential biomolecule which plays a key role in protein synthesis (as mRNA, tRNA and rRNA) and in other cellular events [e.g. functioning as an enzymes (i.e. ribozyme)]. However, we know very little about its structure and only a few crystal structure of long RNA are available.

We intend to develop simple mass spectrometry (MS)-based methods to probe primary, secondary and tertiary structure of RNA. Initially, he/she will evaluate the primary sequence of the RNA, assessing the mass and homogeneity of the sample. She/he will examine distinct sample preparations and evaluate their effect on the mass spectrometric resolution and mass accuracy. Then the student will probe the secondary and tertiary structure of the RNA. In particular, she/he will analyse the RNA in absence and presence of metals (e.g., K^+ or Mg^{2+}) and other folding cofactors (e.g., RNA chaperone) utilising native MS.

Méthodologies et/ou techniques qui seront utilisées

(i) Using Matrix Assisted Laser Desorption Ionisation time-of flight (MALDI-TOF) MS (denaturing MS), the student will assess the primary sequence of the RNA. She/he will also test different types of sample preparation.

(ii) Using nano-electrospray-quadrupole (ESI-Q)-TOF MS (native MS), she/he will probe the secondary and tertiary structure of RNA.

Personne à contacter (préciser si nécessaire les créneaux horaires) :

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Complément d'information

1) Boeri Erba E, Petosa C .

The emerging role of native mass spectrometry in characterising the structure and dynamics of macromolecular complexes. Protein Science, 2015, doi: 10.1002/pro.2661

2) Signor L, Boeri Erba E.

Matrix-assisted laser desorption/ionization time of flight (MALDI-TOF) mass spectrometric analysis of intact proteins larger than 100 kDa. J Vis Exp. 2013, (79). doi: 10.3791/50635