IRAMIS : Institut Rayonnement Matlère de Saclay

Saclay

Analyse de la compaction de l'ADN par des peptides amyloides bactériens

Spécialité Biophysique

Niveau d'étude Bac+4/5

Formation Master 2

Unité d'accueil

Candidature avant le 28/02/2018

Durée 6 mois

Poursuite possible en thèse oui

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Résumé

Sujet détaillé

Hfq is a bacterial pleiotropic regulator that mediates several aspects of nucleic acids metabolism. The protein notably influences translation and turnover of cellular RNAs. Although most previous contributions concentrated on Hfq's interaction with RNA, its association to DNA has also been observed. With this project, we want to focus on DNA-compacting properties of Hfq. Various experimental technologies, including fluorescence microscopy imaging, atomic force microscopy, small angle neutron scattering and IR Nanospectroscopy will be used to follow the assembly of Hfq on DNA. In particular, we would like to evaluate how Hfq amyloid region helps to form a nucleoprotein complex in order to compact DNA into a condensed form and how it changes the mechanical properties of the double helix. The conclusions will be paramount to understand the implications of this protein in gene regulation.
Further reading:
K. Jiang, C. Zhang, D. Guttula, F. Liu, J. A. van Kan, C. Lavelle, K. Kubiak, A. Malabirade, A. Lapp, V. Arluison, and J. R. C. van der Maarel, Effects of Hfq on the conformation and compaction of DNA, Nucleic Acids Research 43, 4332-4341 (2015).
J. R. C. van der Maarel, D. Guttula, V. Arluison, S. U. Egelhaaf, I. Grillo, and V. T. Forsyth. Structure of the H-NS-DNA nucleoprotein complex, Soft Matter 12, 3636-4220 (2016)
A. Malabirade, K. Jiang, K. Kubiak, A. Diaz-Mendoza, F. Liu, J. A. van Kan, J. F. Berret, V. Arluison and J. R.C. van der Maarel (2017). "Compaction and condensation of DNA mediated by the C-terminal domain of Hfq." Nucleic Acids Res in press (2017)

Mots clés

compaction de l'ADN; structuration du genome

Compétences

Logiciels

Understanding DNA condensation induced by bacterial Amyloids

Summary

Nucleoid associated proteins NAPs are regulators of bacterial gene expression. As architectural proteins, they change the mechanical properties of DNA. We aim to understand how bacterial amyloid self-assemblies can influence DNA compaction.

Full description

Keywords

Molecular Biology, Biochemistry

Skills

Molecular Biology, Biophysics, Biochemistry Circular Dichroism/Synchrotron radiation Circular Dichroism

Softwares