Laboratoire d'Electrochimie Moléculaire
Université de Paris – UMR CNRS 7591

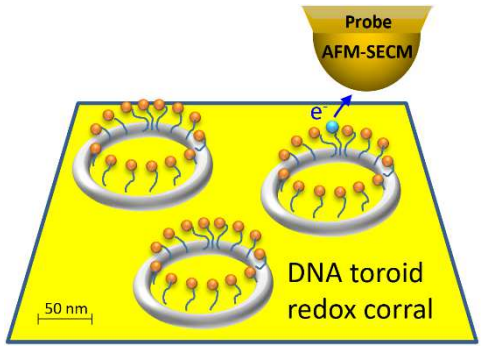
MASTER 2 INTERNSHIP OFFER

(OFFRE DE STAGE DE MASTER 2)

2021-2022

ASSEMBLY AND NANOSCALE INTERROGATION OF A DNA ORIGAMI-BASED REDOX NANO-CORRAL

DESCRIPTION :



DNA origamis are a new class of nano-objects, formed by the programmed folding of long DNA strands into 2D or 3D structures. These DNA nanostructures can be used as scaffolds to display functional macromolecules, arranged as pre-defined motifs on their surface with nanoscale accuracy. They notably enable the controlled assembly of complex multi-enzymatic systems, mimicking those found in nature. Studying the catalytic activity of such artificial assemblies is key to understanding how the unsurpassed performances of natural biochemical pathways is linked to their spatial organization. Of particular interest is the cellular respiration and photosynthetic pathways, which feature complex electron transfer chains where redox molecules shuttle electrons between enzymes. The aim of the present M2 project is to walk the very first steps toward the assembly of a model electron transfer chain onto a DNA origami scaffold. As a proof of principle experiment, multiple redox entities (ferrocene moieties) will be displayed radially around the inner region of a toroid-shaped DNA origami to form a redox nano-corral. Interrogation of such an entirely novel functional nano-object will be carried out at the nanoscale by a local probe technique combining atomic force and electrochemical microscopies (AFM-SECM). This project is conducted in collaboration with Nesrine Aissaoui (MCF Université de Paris, Faculté de Santé) and Gaëtan Bellot (INSERM - Université de Montpellier).

MOTS-CLÉS / KEY WORDS : NANO-BIO-ELECTROCHEMISTRY, DNA ORIGAMI, AFM, SECM

DATES - DURATION : 5 MONTH (FROM FEBRUARY TO JUNE 2022)

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