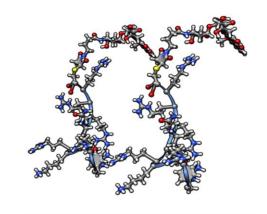
First year PhD exam Nanoscience



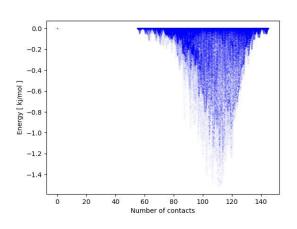
Mario Bernardi

Supervisor: Francesco Cardarelli

A.Y. 2019/2020



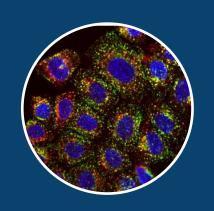






PhD first year Mario Bernardi





Exams

- Fundamentals of Biophysics at the Nanoscale
- Biophysical SciencesSeminars
- Physics of the Living Cell



Wet Laboratory

- Peptide synthesizer
- HPLC purification



Dry Laboratory

- Molecular Dynamics
- Metadynamics
- Scientific Data AnalysisSchool

Prof. Ranieri Bizzarri

Prof. Francesco Cardarelli

Prof. Stefano Luin

Prof. Gian Michele Ratto

Tutor – Claudia Boccardi

Tutor – Riccardo Nifosì



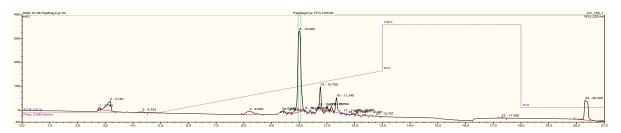


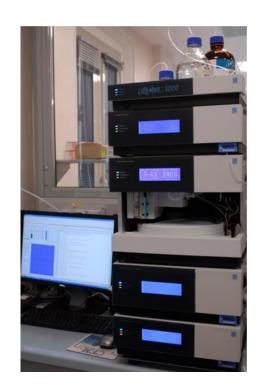
Exploring the mechanism behind the Blood-Brain Barrier crossing: a peptide-based study



Project background:

- Provide effective therapies for Neurodegenerative Disease
- Alternative route to hospitalization
- Bridge the gap between "small molecules" and "biologics"
 Aim of the project:
- Investigating novel peptides as BBB drug delivery agents
- Unveil cell penetrating peptides characteristic pathways
- Optimize the delivery agent





First year project status on promising peptides:

Synthesis

Done

Purification

Done

Characterization

Pending

Future development:

- Provide in-vitro replica of the BBB
- Delivery to the cells
- Confocal microscopy investigation



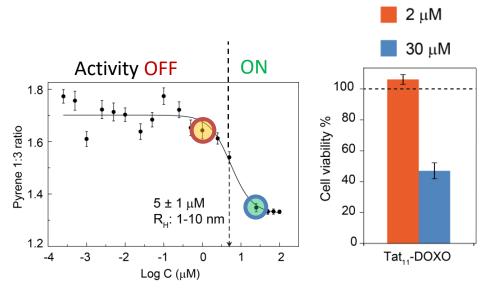


Peptide self-aggregation importance in drug delivery



Side-project goal:

- Investigate aggregate structures
- Determine activity switch concentration
- Provide permeability explanation



Work in progress:

- Dimeric stucture MD simulations
- Wrap-up of a manuscript

