

INSTITUTE OF PHYSICS IPHYS

Seminar in Biological and Statistical Physics

Tuesday, February 7th 2017 at 11h00

Room BSP 727 EPFL

Prof. Tommaso Bellini

(University of Milan)

Liquid crystal ordering of RNA: a route for the origin of life?

Abstract:

We recently discovered that concentrated solutions of short oligonucleotides (down to 4 base long) and even solutions of single bases spontaneously develop liquid crystal ordering.

In such supramolecular assemblies, duplex-forming oligomers and paired bases are held in continuous mutual contact to form chemically discontinuous but physically continuous double helices.

We found that this spontaneous order can serve as a mechanism for molecular selection and as a template to guide abiotic ligation of the oligomers in long chains.

Specifically, we studied the influence of liquid crystal ordering on the efficiency of nonenzymatic ligation reaction induced by water-soluble carbodiimide EDC as condensing agent.

We find that the liquid crystal ordering markedly enhances the ligation efficacy, thus suggesting such spontaneous ordering may have been the key feature in the emerging of nucleic acids from the primordial molecular noise.

Was the RNA World prepared by an even more ancient "Liquid Crystal World"?

Host: Prof. De Los Rios Institute of Physics and Institute of Bioengineering