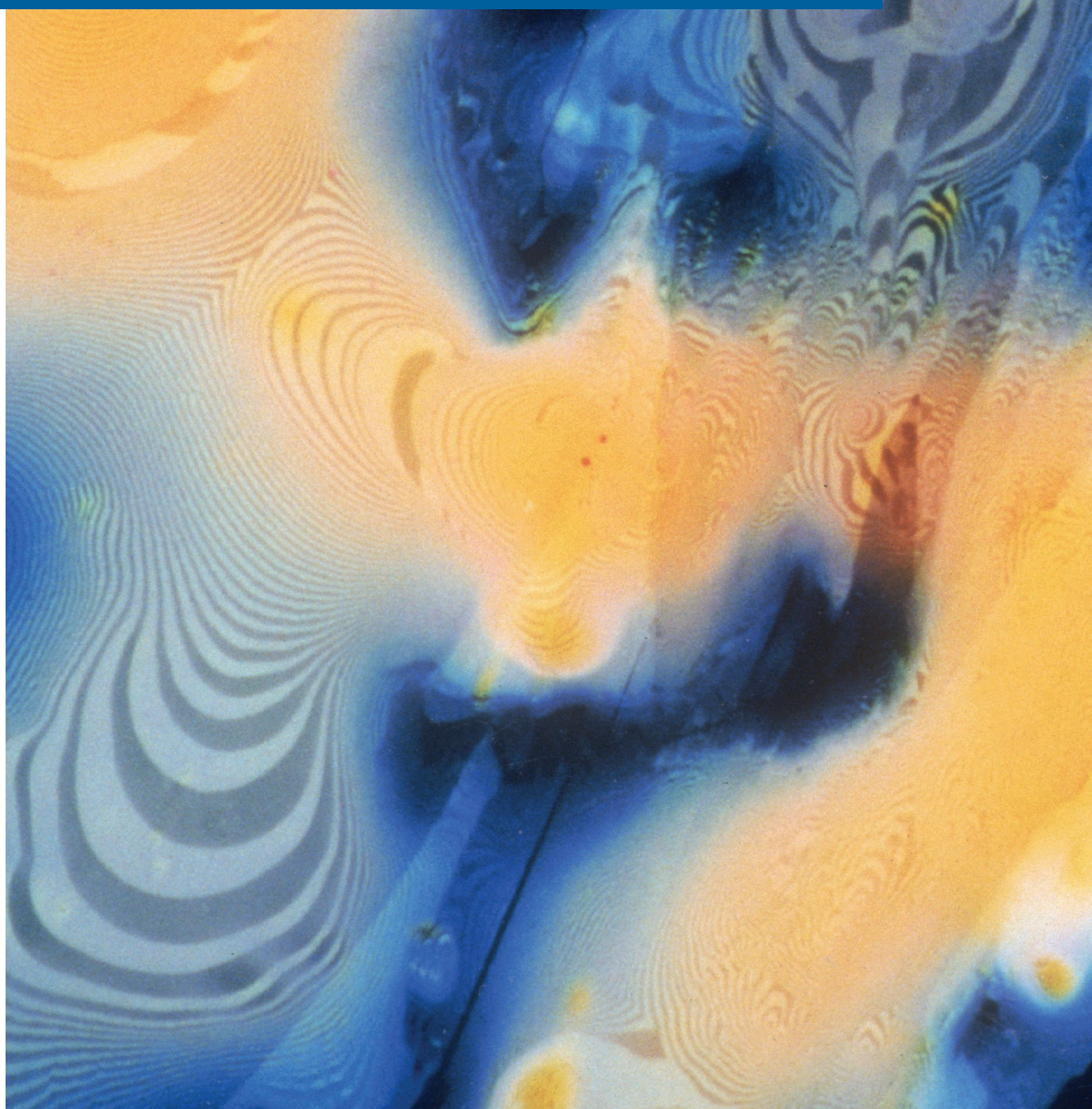
INC

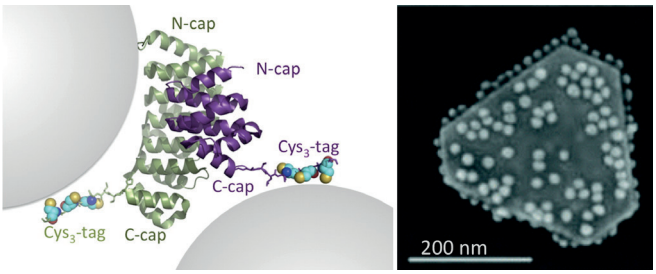
FRENCH RESEARCH NETWORKS IN CHEMISTRY



GDR MEDYNA

Assembly mechanisms and dynamics of self-organised protein-based complexes

OBJECTIVES

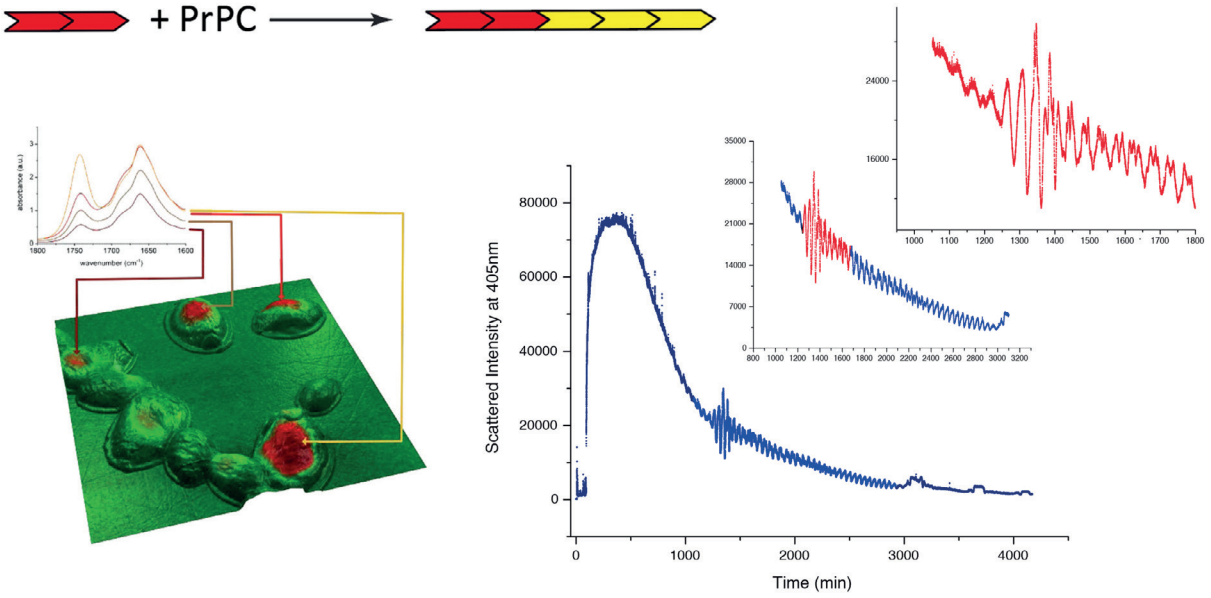


Artifical proteins obtained through combinatory biology followed by directed evolution to create specific molecular recogniton. Right panel, application to the morphosynthesis of nanocrystals.

The objectives of the GDR MéDynA are to:
– bring together French labs studying by diverse means the dynamical pathways by which self-organised protein assemblies or protein-based assemblies form (incl. peptidomimetics);
– forge a common language so as to benefit from the multiple expertise stemming from biology, biophysics, chemistry, physics and mathematics to understand and master mechanisms of protein assembly;
– foster emergence of novel interdisciplinary research projects and
– set up a nationwide interdisciplinary network useful to all researchers, whether at an early career stage (such as graduate students and postdocs) or well established.

THEMATICS

- Biochemistry, biophysics and physico-chemistry of protein assemblies
- Mathematical modeling of assembly processes
- Biomaterials (proteinaceous or proteo-inspired), biomimetic self-assembled systems
- Structural biology, molecular modeling and biomolecular simulations



Fibers of prion protein (PrPC) characterised by AFM coupled to infrared spectroscopy (left panel). The fibers' disassembly kinetics (right panel).

160 RESEARCHERS
INVOLVED IN
35 LABORATORIES

PROSPECTS

MéDynA brings together researchers from multiple disciplines to reach a global understanding of this kind of nonlinear processes, where products do not necessarily stem from an unique preceding state. Each discipline brings unique expertise:

BIOLOGISTS bring protein systems and their wealth of possibilities for self-assembly as well as relevant biological questions.

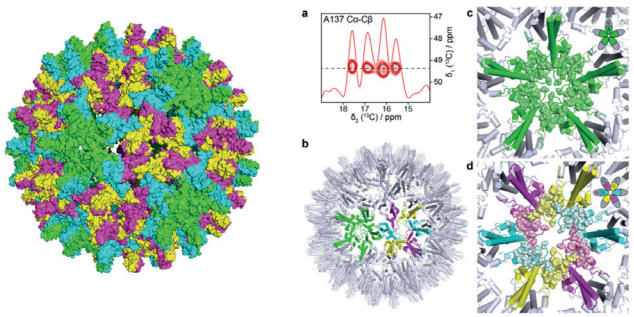
CHEMISTS AND BIOCHEMISTS bring their expertise in experimental characterization of assemblies that can be isolated and stabilised: endpoints of assemblies as well as intermediates with a long lifetime, possibly extended by fine-tuning.

STRUCTURAL BIOLOGISTS bring their expertise in the atomic-scale characterization of equilibrium assemblies and intermediates with a long lifetime.

PHYSICISTS, PHYSICO-CHEMISTS AND BIOPHYSICISTS bring their expertise in rigorous characterization of underlying physical phenomena and generation of physical models accounting for them.

MATHEMATICIANS bring modeling of processes based on assimilation of all data generated by the other disciplines, but also molecular modeling at the interface between chemistry and structural biology.

MéDynA creates a multidisciplinary scientific community for young researchers, but also for senior researchers. It is a starting point for creating a French network where all will discover the importance of working with researchers from other disciplines on this common problem. Confronting other fields and debates in plenary meetings will serve to foster ties between researchers who do not normally meet one another and hopefully allow maturing collaborations. The added value of these exchanges will mainly depend on the will to go towards fields unknown to the researchers participating in these meetings.



Self-assembled viral capsids. Molecular details ruling assembly can be monitored down to the atomic scale, notably by NMR spectroscopy, X-ray crystallography and cryo-electron microscopy.

DEFINING A COMMON LANGUAGE BETWEEN SCIENTISTS FROM SEPARATE FIELDS

One of the essential goals of MéDynA will be to forge a common language, without which our discussions will remain shallow. Forging this common language will allow us to benefit from all expertise to tackle the principal challenge in the field: advancing towards control of the mechanisms of protein assembly.

CONTACT

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cnrs GDR Groupement de recherche

MéDynA Assembly mechanisms and dynamics of self-organised protein-based complexes