Finanziato dall'Unione europea NextGenerationEU | Ministero dell'Università e della Ricerca | Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA | Consiglio Nazionale delle Ricerche

## Project title Biomaterials from peptide self-assembling generated by mimicking protein amyloid-like structures

**Acronym:** BioPepMA

**Partners:**

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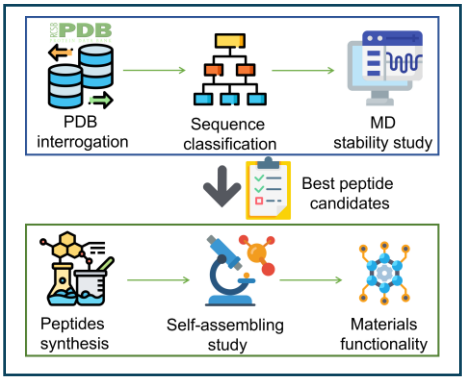


**Description**:

Non-covalent interactions are essential in determining the three-dimensional structure of biomolecules, allowing proteins/peptides to form stable supramolecular assemblies, characterized by a well-defined motif denoted as cross-beta. Initially linked to neurodegenerative conditions (amyloid-like states), these assemblies stimulated extensive research into their structural and physico-chemical properties, revealing that even ultrashort peptides and single amino acids can self-assemble into complex architectures rich in beta structures. These aggregates also show potential for technological applications. This project aims to develop novel bioinspired, self-assembling peptides and evaluate their potential in technological and biomedical fields.

**Aims**:

The project aims to (a) elucidate the physico-chemical basis of protein/peptide aggregation in amyloid-like structures, and (b) develop biomaterials for technological/biomedical applications. Understanding the protein aggregation process and identifying self-assembling peptides could lead to the development of innovative materials with functional properties for use in diverse fields (bioimaging, biosensing, drug delivery, tissue engineering, etc) and methods to inhibit harmful protein aggregation.

**Expected results**:

The expected outcomes include the design and development of new biomaterials for technological/biomedical applications by mimicking the interfaces that stabilize large amyloid-like assemblies reported in the Protein Data Bank. Additionally, the structural/functional characterization of self-assembling peptides and single amino acids will provide valuable insights into the physico-chemical and structural determinants of protein/peptide aggregation in beta-structure-rich assemblies.

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