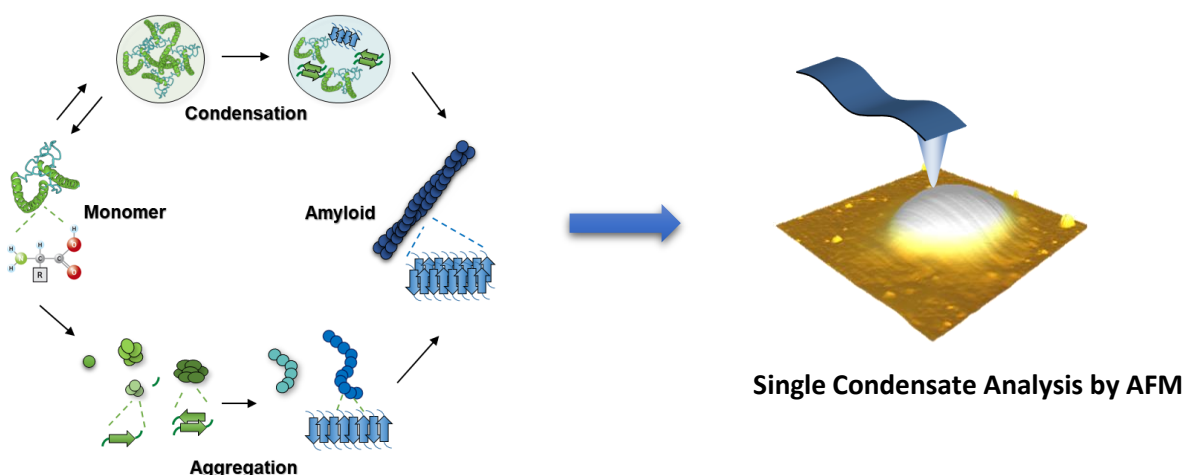

Group: Laboratory of Organic Chemistry/Nanoscale Microscopy and Spectroscopy Group

Project: Protein Condensation in Life and Cell Function

Supervisors: Francesco Simone Ruggeri

Keywords: Liquid-Liquid Phase Separation, Condensates, Nanoscale Imaging, Atomic Force Microscopy, Vibrational Spectroscopy

Introduction: In the last decades it has been discovered that protein self-assembly and liquid-liquid phase separation of protein into condensates has a key role for cellular function, serving crucial role in biomolecule compartmentalization, signaling and transport. However, this phenomenon happens at the nanoscale and yet requires advanced investigation. Methods such as Atomic Force Microscopy (AFM) allows to image at the single condensate level the mechanisms of protein condensation and the properties of these protein self-assemblies.



Aim

- Elucidate the properties and formation of protein condensates in health vs. disease states.

Objective

- Unravel at the nanoscale properties of protein condensates by AFM.
- Unravel by infrared spectroscopy the stability of the condensates.

What will you learn

- ✓ Handle protein condensates.
- ✓ Nanoscale imaging using AFM.
- ✓ Quantitative analysis of AFM data.
- ✓ Acquire and Analysis of Spectroscopy data.

Contact Dr. Francesco Simone Ruggeri, simone.ruggeri@wur.nl for more details.

[1] Nat. Nanotechnol. 15, 841–847 (2020)

[2] Cell 173, 720–734 (2018)

[3] Bio-protocol 11(16), e4122 (2021)