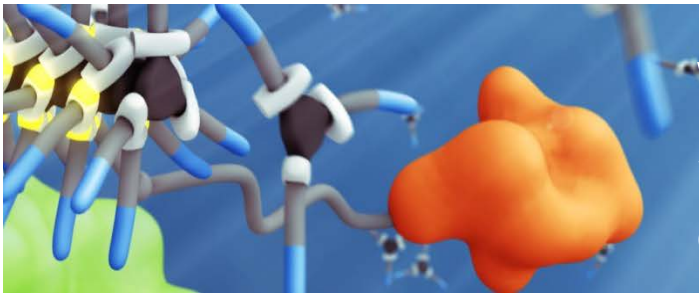
Technische Universiteit Eindhoven University of Technology



Water-soluble Supramolecular polymers

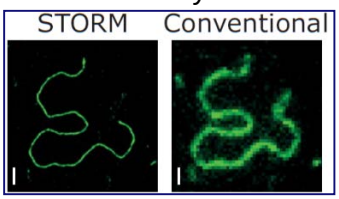
Group Prof. Dr. E.W. Meijer

Benzene-1,3,5-tricarboxamides

Supramolecular polymers based on the benzene-1,3,5-tricarboxamide (BTA) unit provide a conceptually novel approach for mimicking the extracellular matrix. In addition, they are excellent model systems to study the dynamics of one-dimensional, well-ordered aggregates in water. A variety of modified BTA molecules has been prepared. Peptides, proteins, dyes, charges, DNA-sequences, catalytic groups are just some of the "functionality" options that we can introduce and they illustrate the wealth of synthetic opportunities that this "design chemistry" approach offers. Our ultimate aim is to create novel biomaterials and targeted approaches to drug delivery.

Self-assembly of BTAs in water

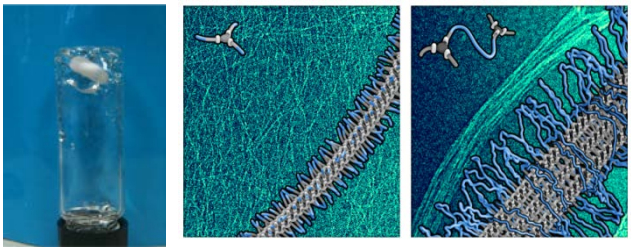
BTAs with a sufficiently large hydrophobic core form long, 1D self-assembled structures in water as visualised with cryo-TEM and STORM.



Recently, we follow with mass spectrometry the hydrogen-deuterium exchange of the amides to elucidate the diversity in structural order. These insights are crucial to use these systems to arrive at effects like signal-transduction, multivalent interactions with biological cues and the formation of rafts.

BTA-based hydrogels

Telechelic BTA-endcapped polymers form elastic hydrogels in water. Using different BTA-based structures, we can tune the dynamics at the molecular level and thus the macroscopic properties of the hydrogels. These hydrogels are compared with hydrogels based on ureidopyrimidine (UPy) units.



Mimicking the extracellular matrix

BTA-based hydrogels can be mixed with functional BTAs that contain cues for cell growth and differentiation. Herewith, we aim to mimic the extracellular matrix, an important first step for stem cell expansion to organoids in close collaboration with the group of Hans Clevers in Utrecht. Also carbohydrate based BTA and UP-based structures are studied for this application. Finally, we designed supramolecular dual networks to mimic even better the ECM.

Master projects

Our BTA team is looking for eager master students interested in working at the interface of biology and chemistry. Interest in synthesis and affinity for working with cells are highly desired.

More information: *www.meijerlab.nl* & *e.w.meijer@tue.nl*