

Synthesis of flexible cavitands as efficient drug discovery and delivery agents and sensors

Summary

The PhD research includes synthesis of macrocycles and cavitands that are able to tune their structure in response to external stimuli. The project will aim to synthesize compounds that can make advances in the fields of drug discovery and delivery and sensors.

Research field:	Chemistry and biotechnology
Supervisor:	Jasper Adamson
Availability:	This position is available.
Offered by:	National Institute Of Chemical Physics And Biophysics
Application deadline:	Applications are accepted between May 03, 2021 00:00 and May 31, 2021 23:59 (Europe/Zurich)

Description

There is currently a lot of interest in designing more efficient macrocyclic molecules that can be used as vehicles in drug delivery, as more optimal sensors and for drug discovery. Nevertheless, to date, only cyclodextrin macrocycles are FDA approved in drug formulae. This presents a wide interest in the synthesis of cavitands that can address challenges related to solubility and stability of the drug, drug encapsulation and controlled release, targeted release and thereby finely controlled therapy. In this project, we aim to synthesize cavitands that in specific conditions can capture a drug molecule and in response to external biological stimuli release the drug molecule at certain conditions. The project will start by the synthesis of new cavitands. Any successful products' structures from synthesis will be analyzed by XRD and NMR. The second half of the project includes binding studies with potentially interesting drug molecules by NMR, UV-Vis and crystallography techniques. New cavitands, their assemblies and supramolecular structures will be aimed to be synthesized in accord with the aims of the project.

The project includes organic synthesis in collaboration with other members in the group, data analysis and eliciting results. Firstly jointly with other group members and then independently writing results in form of journal publications. Communication results at conferences with poster and at a later stage, oral presentations.

The applicant should hold or be in the process of defending a Master's degree in Organic Synthesis. Some understanding of Supramolecular Chemistry is an advantage. The applicant should have good written and spoken English skills. We expect friendliness, respect and willingness to contribute to a novel research idea in a young dynamic group environment.

M.Sc. level of understanding of Organic Chemistry is required. Knowledge of Supramolecular Chemistry and NMR are an advantage.



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