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- Master thesis for 6 months -

Characterization of newly developed magnetic nanoparticles

Magnetic nanoparticles (MN) have a tremendous potential in diagnostics and therapeutics because of their low toxicity, superparamagnetic properties and simple separation.[1,2] We have recently synthesized MN in microfluidics *via* continuous and segmented flow modes. The synthesized MN exhibited a higher quality as compared with batch synthesis. The particles of different sizes functionalized with various polymers have been investigated. However, more efforts are required to clarify biocompatibility of these particles. We have previously characterized binding pathways of particles during labeling of blood platelets.[3] Platelets are smallest blood cells which are most sensitive to surrounding environment as they activate immediately when contacting with any non-physiological surfaces.

Aim: This study focuses on identification of biocompatibility and binding pathways of our synthesized particles when interacting with human blood platelets.

Work packages: The master student will coat the synthesized particles with several identified plasma proteins and determine binding pathways of particles when interacting with human blood platelets by atomic force microscopy (AFM). Biocompatibility of particles in human platelets will be tested by Atomic absorption spectroscopy (AAS), confocal laser scanning microscopy, and flow cytometry.

Profile of qualification: Students of chemistry, biology, biochemistry or biotechnology with a strong tendency to work with biophysics platform are encouraged to apply. We expect to start the project as soon as possible. Application deadline: **31.03.2021**. The student is financially supported by iba.

Contact

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Reference

[1]Ali A. et al, Synthesis, characterization, applications, and challenges of iron oxide nanoparticles. *Nanotechnology, science and applications* 2016, *9*, 49.

[2]Ling D et al, Chemical synthesis and assembly of uniformly sized iron oxide nanoparticles for medical applications. *Accounts of chemical research* 2015, *48* (5), 1276.

[3]Nguyen T-H. et al, *Appl. Mater. Interfaces* 2018, 10, 34, 28314.