The Chemistry Department

The Department of Chemistry is sponsoring a seminar featuring **Winfried Möller,PhD**, who is from Helmholtz Zentrum München – German Research Center for Environmental Health Clinical Cooperation Group Inflammatory Lung Diseases Robert Koch Allee 29, 82131 Gauting. Dr. Möller will discuss *Relaxation and twisting of ingested magnetic micro- and nanoparticles - an assay for cell function and cytoskeleton mechanics*. The presentation is scheduled for Thursday, October 8, at 4:00pm in Hunter 100 Auditorium. An abstract follows. Refreshments will be served beginning at 3:30 in Hunter Lobby.

Möller abstract: The lung macrophages form the major defence barrier against inhaled foreign substances, such as particles, bacteria or viruses. The initial step of this defence is ingestion (phagocytosis), followed by intracellular digestion and/or triggering of immune responses. The cytoskeleton plays a crucial role in this defence, since the cells have to be mobile, moving to the site of the invader. Magnetic micro- and nanoparticles provide novel assays for studying these cytoskeleton dependent cell functions, in vitro and in vitro, and cytoskeletal dysfunctions have been monitored, as for example by co-culture with environmental nanoparticles and fibres.

The magnetic tracers are ingested rapidly by macrophages, either in culture or after voluntary inhalation. In a strong magnetic field remanent magnetic dipoles are formed all being oriented parallel to the magnetizing field, allowing to detect them by sensitive magnetic field sensors (fluxgate or SQUID). Intracellular vesicle transport disturbs this order. This process, called relaxation, requires energy (ATP) and an intact cytoskeleton and is therefore a monitor for cell viability and function. In addition application of twisting forces allows studying cytoskeletal mechanical properties, such as viscosity and elasticity.

Experimental in vitro and in vivo data on relaxation and magnetic particles twisting are presented together with interpretation by mathematical models. In addition the influence of cytoskeletal drugs and cytotoxic nanoparticles are presented and discussed.

All these studies are recorded on a cell ensemble. Single cell based studies, such as possible by magnetic moons, will allow understanding the basic mechanisms of vesicle transport and toxicology.