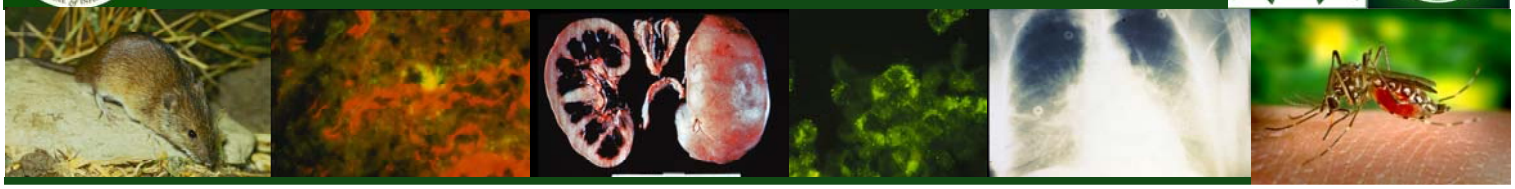
Asia-Pacific Institute of Tropical Medicine and Infectious Diseases
Pacific Center for Emerging Infectious Diseases Research



COBRE/APITMID Seminar Series

A cell-nanoparticle platform for brain delivery

Huanyu Dou, M.D.

Assistant Professor
Director, Nanomedicine Program
Department of Pharmacology and Experimental Neuroscience
The Nebraska Center for Drug Delivery and Nanomedicine
University of Nebraska Medical Center

Nanotechnology offers the means to use cell-based particulate systems for drug delivery and in so enhancing blood-brain barrier penetrance to improve bioavailability, pharmacokinetics and therapeutic efficacy. Blood-borne mononuclear phagocytes can play a decisive role both as vehicle carrying therapeutics and immune responses enters brain to specific diseased area. To test the hypothesis, bone marrow derived monocytes/macrophages (BMM) based nanoplatform delivery system was developed. We reasoned that the same inflammatory infiltration cells could be used as vehicles for nanopaticles (NP) delivery. Magnetic resonance imaging (MRI), SPECT/CT, and histological co-registration were used to track cell-drug-formats migration into the diseased area following SPIO- or NP-BMM intravenous injection. The drug levels were assessed by high performance liquid chromatography (HPLC) in the blood and the brain. SPIO- and NP-BMM migrated only to areas of active diseases but no BMM were found in the contralateral hemisphere. When compared to treatment with free NP or drugs, NP-BMM packages produced sustained drug levels and the significant therapeutic activities, respectively. These results demonstrate “proof-of-concept” for the use of BMM as vehicles delivery of nanoformulated drugs across the BBB to brain diseased site. The system supports the potential use of this novel treatment paradigm for clinic use.

Thursday, April 30, 2009 at 8:30 a.m.
John A. Burns School of Medicine, Kaka‘ako
Medical Education Building, Room 315 (Auditorium)
For further information, call 692-1668

The Center and its activities are supported by grants (P20RR018727 and G12RR003061) from the National Center for Research Resources, National Institutes of Health