

MEDICAL PHYSICS SEMINAR

MONDAY FEBRUARY 20, 2017

1325 HSLC ~ 4:00 P.M.



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Physiological Measurements Using Magnetic Nanoparticles

In vivo nanoparticles detection and monitoring remains a challenge, opening the possibility for many approaches ranging from simple and low cost to more sophisticated and expensive. The AC Biosusceptometry (ACB) system has been extensively employed to monitor gastrointestinal tract physiological properties with magnetic microparticles and has been recently applied to monitor magnetic nanoparticles (MNPs) in animal models. ACB is based upon a magnetic flux transformer, which allows us to detect and quantify magnetic samples based on the variation in magnetic inductance from an excitation pickup coil to a detection coil. The time resolution is high and the spatial resolution is limited by the coils size and sensitivity. Here we describe in vivo applications of the ACB system to measure physiological parameters and as an imaging probe for magnetic nanoparticles. Citrate-coated, manganese doped, superparamagnetic iron oxide nanoparticles were used due to their strong magnetic susceptibility. Five male Wistar rats, anesthetized by urethane, were submitted to MNP intravenous injection through their femoral vein while monitored by a single and a multichannel ACB system. After in vivo procedures, ex vivo measurements of the heart, lungs, liver, spleen and kidneys were performed. These three measurements will allow us to perform a biodistribution analysis.

1325 HEALTH SCIENCES LEARNING CENTER
4:00 P.M. TO 5:00 P.M.