Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Nonspecific targeting of iron oxide nanoparticles to the liver, kidney and spleen: A novel approach to achieving specificity MAHESHIKA PALIHAWADANA ARACHCHIGE, AMANDA FLACK, XUEQUN CHEN, JING LI, DAVID OUPICKY, Y.-C. NORMAN CHENG, YIMIN SHEN, BHANU JENA, GAVIN LAWES, Wayne State University — Recently, there has been significant interest in developing Fe_3O_4 nanoparticles for biomedical applications including targeted drug delivery and magnetic resonance imaging. One of the major problems in these applications is the undesirable filtration of these materials by the mononuclear phagocyte system. Preliminary magnetic resonance imaging and magnetization studies on hyaluronic acid coated nanoparticles injected intravenously into mice confirm that the nanoparticles accumulate in the liver, spleen, and kidneys. To identify whether certain specific proteins are responsible for nanoparticle accumulation in these organs, we exposed hyaluronic acid coated nanoparticles to proteins extracted from the liver, spleen, and kidneys, together with blood plasma proteins, then subsequently used gel electrophoresis and mass spectroscopy to identify the proteins binding to the nanoparticles. We find that the unwanted accumulation of nanoparticles in these organs can potentially be attributed to specific binding by a small number of proteins. By appropriately functionalizing the iron oxide nanoparticles, we expect that the nanoparticles uptake in the liver, spleen, and kidneys will be reduced.

Maheshika Palihawadana Arachchige
Wayne State University

Date submitted: 17 Nov 2012 Electronic form version 1.4