To minimize damage to surrounding tissues, targeted delivery of therapeutics to the tumor is highly desirable, and the development of nanotechnology has shown promising results. Magnetic iron oxide nanoparticles (MIONPs) have been gaining traction over the years for applications such as drug delivery, molecular imaging and delivering hyperthermia for treatment of various cancers (1). MIONPs have great therapeutic potential as they can be produced in various sizes and shapes, with the ability to modify the surface by coating the nanoparticles. MIONPs have the ability to be activated by external magnetic field to generate heat and to cause hyperthermia (2).

Translationally, the delivery of thermal therapy offers an option for minimally invasive definitive treatment of primary aldosteronism, an endocrinopathy of aldosterone excess/dysregulation which represents the commonest secondary form of hypertension. In this study, MIONPs have been used at different concentrations to evaluate nanoparticle uptake and rate of uptake by adrenal cortical and endothelial cells, as well as gain understanding of the location of nanoparticles within the cell.

Magnetic iron oxide nanoparticles (MIONPs) were provided by Kansas University. Adrenal Cortical cell-lines (MUC1, H295R and HAC15) and Endothelial cell-line (HUVEC) were used in this study. MIONPs were added at concentrations of 0.5, 5, 10, 20 and 50 µg/ml to the cells and incubated overnight. MIONP uptake efficiency, rate of uptake and cytotoxicity was assessed by Flow Cytometry. Confocal Microscopy was used to image the cells following MIONP incubation. Cellular proliferation was assessed by Xcelligence system and alamarBlue. Cellular respiration was assessed by "Seahorse" technology. MIONP location within the cells was assessed by transmission electron microscopy (TEM).

Following overnight incubation with MIONPs, Flow Cytometry showed significant uptake by MUC1, HAC15 and HUVEC cells at 10 µg/ml MIONP concentration. Confocal Microscopy and Transmission Electron Microscopy (TEM) images revealed MIONPs in the cytoplasm and in the vesicles for all cell types. Live Confocal imaging showed MIONP phagocytosis specific uptake by the HAC15 cells.

**Presentation:** Sunday, June 12, 2022 12:30 p.m. - 2:30 p.m.