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Precision MRX®: A versatile iron oxide nanoparticle platform for targeted *in vivo* detection of cancer

Iron oxide nanoparticles (NPs) have been used for a variety of *in vivo* and ex vivo applications within the biomedical sciences. When intended for clinical *in vivo* applications, NPs need to meet rigorous requirements to ensure safety as well as bio functionality including blood circulation time and specificity for cellular targets. Precision MRX® NPs are extensively characterized as super paramagnetic NPs composed of a 25 nm magnetite cores that are currently employed in a variety of *in vivo* applications including non-invasive/*in vivo* diagnosis of cancer; magnetic particle imaging, MRI and magnetic hyperthermia. This talk will review the extensive pre-clinical development and functionality of PEGylated and antibody conjugated NPs for *in vivo* and ex vivo detection of HER2+ tumor cells by Magnetic Relaxometry (MRX). We observed: Specific binding and detection of HER2 positive tumor cells *in vitro* (5000 cells); Specific detection of HER2+ tumors in mice; Binding and amplitude of magnetic signal to be proportional to the level of HER2 expression *in vitro* and *in vivo*; The nano construct remains stable in circulation; The particles do not induce a pro-inflammatory response nor activate complement; The particles are biodegradable and do not induce acute or delayed signs of morbidity *in vivo*. Precision MRX® nanoparticles offer great clinical promise including the *in vivo* detection of tumor cells by magnetic relaxometry. Given the stability and safety of these NPs, further development for use in MRX, MPI, MRI and hyperthermia applications as well as expansion into therapeutic drug delivery and disease monitoring in response to treatment will be discussed.

Biography

Farideh Bischoff received her PhD in Cancer Biology from University of Texas, followed by Post-doctoral training at MD Anderson Cancer Center and Baylor College of Medicine. She is clinically trained in human molecular genetics and cytogenetic and has served as a Fulltime Professor in the Department of Obstetrics and Gynecology at Baylor College of Medicine. She has made significant contributions to the fields of prenatal diagnosis, oncology, infertility and pre implantation genetic diagnosis. Having worked in the area of rare circulating (tumor and fetal) cells for more than 25 years, she had led the design, development and launch of several commercial CLIA - based circulating tumor cell diagnostic tests. She is currently Vice President of Imagion Biosystems; published over 300 papers/chapters/articles and lectured globally.

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