Translational Nanomedicines for the Treatment of Triple Negative Breast Cancer

Andrew Sulaiman,1 Sara El-Sahli,1 Sarah McGarry,1 Li Li,1 Lisheng Wang,1* Suresh Gadde1*

1Department of Biochemistry Microbiology and Immunology, University of Ottawa, Ottawa, ON K1H 8M5, Canada, Lisheng.Wang@uottawa.ca, Sgadde@uottawa.ca

Triple negative breast cancer (TNBC) is the most refractory subtype of breast cancer, and it disproportionately accounts for the majority of breast cancer-related deaths. This is largely attributed to the lack of specific therapies capable of targeting both bulk tumor mass and cancer stem cells (CSC); appropriate animal models to accurately evaluate treatment efficacy for the clinical translation [1]. Thus, the development of effective and clinically translatable targeted therapies for TNBC is an unmet medical need. The growing interest in cancer nanotechnology is attributed to its uniquely appealing features for drug delivery, diagnosis, and imaging. In this context, we developed nanotherapeutic strategies capable of targeting both bulk tumor mass and CSC; and studied their effects in clinically relevant patient-derived xenograft models. PDX models retain the patient’s tumour heterogeneity, vasculature, and three-dimensional architecture, and showed a strong correlation between the PDX and actual patient response [1, 2]. Our studies showed that nanoparticles selectively accumulated in TNBC PDX tumors, retarded tumor growth, inhibited chemotherapy-induced cancer stem cell enrichment, and tumorigenicity [1, 2]. These studies highlight the clinical potential of our nanotherapies for TNBC.
