



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP150720

Project Title:
Integrated on-chip networks for investigating exosome-mediated drug
expulsion

Award Mechanism:
High Impact/High Risk

Principal Investigator:
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Entity:
Texas Tech University

Lay Summary:

Chemotherapy resistant tumors present a significant challenge to cancer treatments, particularly in the case of aggressive or more advanced forms of cancer (i.e. triple negative breast cancer). Recent studies have demonstrated that a subpopulation of resistant cancer cells expel chemotherapeutic drugs in extracellular compartments using specialized transporters system called "exosome". The use of exosome-mediated transport in anti-cancer drug expulsion, however, is still unclear due to a lack of systematic and quantitative determination of specific molecule contents inside or attached to the exosomes. Current exosome research has been severely constrained by technical difficulties remain in isolation and molecular analysis of exosomes, lengthy processes, large sample volumes, and the use of simplified models that cannot fully recapitulate the complex network arises in tumors. In this proposal, we seek to develop a microchip that is comprised multiple cascading modules (e.g. on-chip culture of cancer cells, drug challenge, exosome isolation, drug-content analysis, etc.) for the investigation of the mechanism of cellular drug-exclusion and find solutions why the combination of chemotherapeutics and gene-targeting therapies is more effective than traditional approaches. Our approach is expect to dramatically increase the sensitivity and accuracy on testing drug resistance while reducing the assay time, sample preparation and cost.