

Summer Research Program 2025 – Projects

Project #3

Title: Exosome biomarkers for Autism Spectrum Disorder (ASD)

Description: ASD is a complex, multi-faceted neurodevelopmental disorder mainly characterized by core symptoms that include social interaction deficits, language difficulties, and restricted repetitive behavior. According to our QBRI study on ASD, the prevalence of ASD in Qatar is 1.14% (one in every 87 children), leading to the financial burden and stress on parents and families. Early intervention through medication, or behavioral therapy, can eliminate some of the ASD-related symptoms and significantly improve the life quality of the affected individuals. Currently, early detection and intervention of ASD are highly limited, because ASD signs and symptoms including avoiding eye contact and repetitive movements are so subjective that ASD is usually diagnosed based on personal opinions. Exosome RNA/proteins are considered good biomarkers for different types of diseases including cancer, cardiovascular diseases, Alzheimer's disease, and Parkinson's disease. Exosomes are small vesicles with 40–100 nm in diameter and are considered as the carriers of signaling macromolecules and RNAs for cell-cell communication, however, the function of exosomes remains poorly understood. The goal of this project is to identify and validate a list of exosome biomarkers for early diagnosis of ASD.

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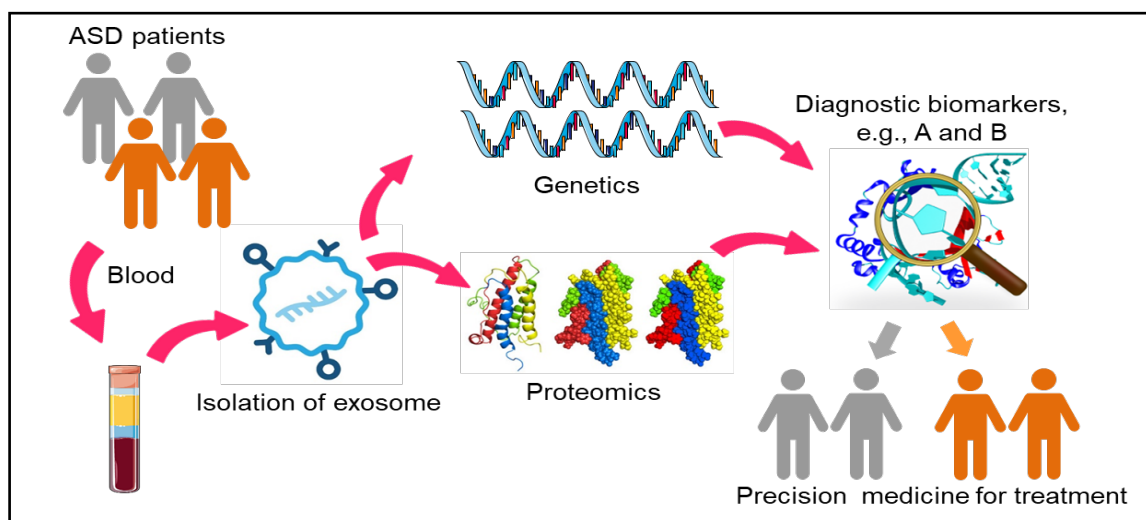


Figure. Schematic representation to explain our research goals. Exosome isolation from plasma or hiPSCs-derived neurons. Exosomes will be analyzed using dynamic light scattering, nanoparticle tracking analysis, and FACS flow cytometry.