Development of Early Ovarian Cancer Screening Via Identification of Early Biomarkers from Fallopian Tube Exosomes

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Ovarian cancer (OC) is the fifth leading cause of cancer-related death in women. Ovarian cancer is difficult to diagnose due to its asymptomatic nature until late stages of development. The 5-year survival rate for patients diagnosed with OC at a late stage is 21%, compared to around 90% if diagnosed at stage 1. Because 67% of OC cases are diagnosed at an advanced stage, there is a need for the development of an early detection screening method[1]. We propose to the use of a liquid biopsy, a non-invasive technique that may be used to probe body fluids for the presence of early OC biomarkers[2].

Exosomes have been shown to be a promising species for use in liquid biopsies. These small membrane-bound cargo vesicles are released by nearly all cells and are secreted at higher numbers by diseased cells. Additionally, they have highly specific outer membrane biomarker proteins, which indicate their cell of origin[3]. Recent studies into OC pathogenesis have shown that lesions and serous tubal intraepithelial carcinoma (STIC) tumors in the fallopian tubes may be key initiators of OC[1].Their exosomal biomarkers may hold the key to early OC detection.

The **objective** of this project is to identify potential early OC biomarkers from fallopian tube exosomes to aid in the development of an OC screening platform.

Aim 1: Develop primary cell lines from BRCA1 prophylactic surgical tissue. Primary cell culture protocol optimization will be conducted from tissue samples from 1-3 patients. Once optimization is completed, 12-15 patient samples will be used to produce primary fallopian tube cell lines. A subset of these lines will also be immortalized for future studies.

Aim 2: Generate exosomes from primary cells lines. Initial exosome studies will be conducted using exosomes isolated from 2D primary cell cultures. Proteomics, sequencing, and bioinformatics will be conducted for the identification of potential OC exosomal biomarkers.

References:

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