Liquid biopsy for early detection of pancreatic cancer: Isolation and analysis of tumor-derived exosomes

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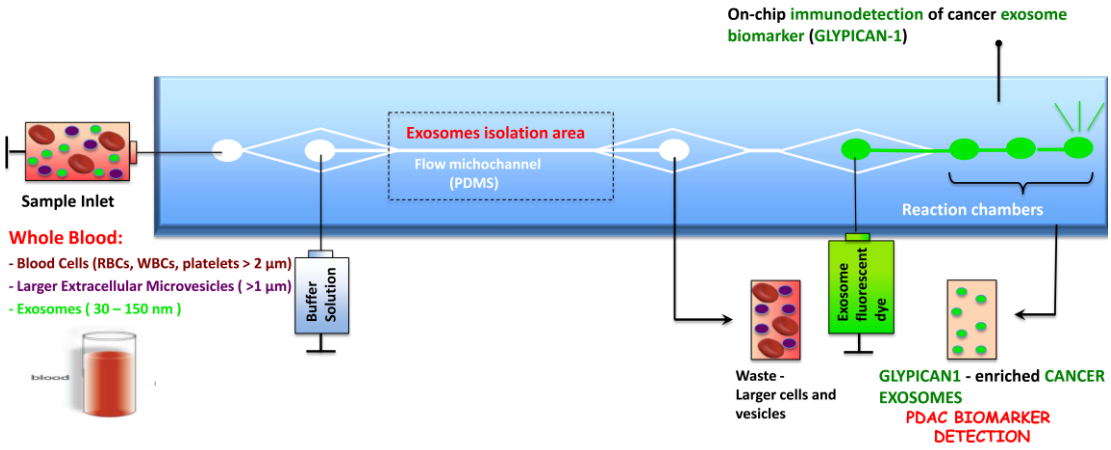

Exosomes, cell-derived vesicles ranging in size from 30 to 150 nm, are emerging as key players in intercellular communication between cancer cells and their microenvironment through horizontal transfer of information via their cargo, which includes proteins, DNAs, messenger RNAs and microRNAs. Tumour-derived exosomes are believed to play a critical role in cancer progression and metastasis and are present in many biological fluids, including blood plasma as well as culture medium of cell cultures. Recently, it was discovered that tumor-derived exosomal protein, glypican-1 (GPC1) can serve as a powerful prognostic marker to distinguish patients with benign disease from those with early or late-stage pancreatic cancer (1). At the moment, exosome isolation and analysis is expensive, labour intensive and time consuming at the moment and invariably requires serial ultra-centifugation steps.

The aim of this project is to develop a microfluidic platform for the on-chip isolation of tumour exosomes (e.g. from blood plasma) and analysis of exosomal markers for rapid, non-invasive early detection of pancreatic cancer, akin to a liquid biopsy. This is a very unique and exciting opportunity to create a liquid biopsy device that can eventually move to the point-of-care setting for pre-symptomatic detection of a disease that holds one of the lowest survival rates.

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