Development of circulating tumor cell (CTC) detection platforms is a rapidly advancing field. The CellSearch® technique relies on cell surface expression of EpCAM to select for rare tumor cells in whole blood specimens. Consequently, the use of EpCAM-based enrichment platforms to recover CTCs is limited to EpCAM expressing cells and is poorly suited for CTC analysis not limited to prostate cancer or other EpCAM positive tumors.

Methods

Two 7.5 mL blood samples were collected at a single time point for each patient who was diagnosed with Stage IV prostate cancer. One sample was analyzed by CellSearch® CTC enumeration kit, and one sample was analyzed by ApoStream™. CTCs recovered by both devices were immunophenotyped using antibodies against cytokeratin (CK), CD45 and DAPI. CTCs were defined as CK+/CD45-/DAPI+ intact cells. CTCs recovered by ApoStream™ were further analyzed by quantitative laser scanning cytometry (LSC). A paired t-test was used to compare the cell counts in the two devices.

Conclusions

The ApoStream™ DEP-FFF platform is differentiated from EpCAM dependent platforms and successfully isolates a greater number of putative CTCs than CellSearch®.

The antibody independent nature of the ApoStream™ platform is well suited for detection and recovery of CTCs in advanced stage disease where tumor cell heterogeneity is common.

Multiple modalities for second stage analysis are available for use.

ApoStream™ is well suited to advance clinical research in prostate cancer patients.

Future Directions

The Massey Cancer Center will continue to utilize the ApoStream™ device for therapeutic clinical trials in prostate cancer, breast cancer, and hepatocellular cancer. Further exploration into the epithelial mesenchymal transformation (EMT) phenotype in CTCs is also planned.