Comparison of isolation platforms for detection of circulating renal cell carcinoma cells.

Analysis of circulating tumor cells (CTCs) has progressed in several tumor entities. However, little is known about CTCs in clear cell renal cell carcinoma (ccRCC) patients. Aim of our studies was to build a stable in vitro fundament for isolation of CTCs in ccRCC. We compared the analytical performance of different CTC isolation methods with regard to yield and purity: EpCAM based enrichment, leukocyte depletion and size based enrichment. EpCAM and cytokeratin 8 (KRT8) as biomarker for CTCs expression were evaluated in ccRCC cell lines as well as clinical samples. While the EpCAM based approach failed to successfully isolate tumor cells, CD45 based approaches showed intermediate recovery rates. The cell-size based Parsortix system showed highest recovery rates. EpCAM expression was low or absent in most cell lines as well as in clinical samples, whereas KRT8 was detected as a potential biomarker in ccRCC. EpCAM based approaches might miss a high number of CTCs due to low or absent expression of EpCAM in ccRCC, as shown in cell lines as well as in patient samples. We identified the cell-sized based, label independent Parsortix system to be the most effective recovery system for ccRCC CTCs.