Cancer stem cells are the only cells within a tumour that can maintain (tumourigenic) and initiate new tumour growth (metastasis). They often represent a small fraction of the total number of cells within a tumour.

**IDENTIFICATION AND ISOLATION**

Prostate (cancer) stem cells can be identified and isolated by using a combination of antibodies to the cell surface markers: CD133+ α2β1 integrin and CD44.

Cross-section of the normal prostate showing rare stem cells in red (CD133+α2β1/CD44+).

**POTENTIAL OF CANCER STEM CELLS**

**In vitro**

**INVASION**

Graph showing invasive capacity of prostate cancer stem cells (red) compared to normal cells (blue). This experiment is important because it gives an indication of the cell's ability to metastasize.

**SELF-RENEWAL**

Graph showing that only cancer stem cells can self-renew. This is an important characteristic of stem cells.

**In vivo**

**COMPARISON OF PROSTATE TUMOUR HISTOLOGY**

Patient xenograft

Macroscopic image of liver metastasis from xenograft.

**TUMOURS DERIVED FROM CD133 (CANCER STEM) CELLS**

**INITIATION**

Histology of tumours derived from CD133 cancer cells, stained for the prostate cancer marker AMACR (A) and cytokeratin (B). Tumours were derived from 100 CD133+ cells. Nests of epithelial cells were observed within the surrounding prostate. AMACR stain of graft derived from 5 x 10^5 unselected tumour cells (C).