

Media Backgrounder

Generating prostate tissue from embryonic stem cells

1. Scientists know that, like other cells in the body, stem cells need to be in close contact with other cells. They like to 'touch' and 'talk' to the cells in their microenvironment. They need the physical support from the surrounding cells, but also respond to the signals their microenvironment creates.
2. Based on this understanding of stem cells, Professor Gail Risbridger led a team which has created human prostate tissue by taking human embryonic stem cells (ES cells) and surrounding them with prostatic mesenchyme cells (specialised prostate cells), taken from rats and mice.
3. The prostatic mesenchyme is taken from the seminal vesicles adjacent to the prostate gland. The prostatic mesenchyme is isolated at a specific point in its development; when the cells start producing 'prostate-making signals' which are capable of telling the ES cells to develop into prostate tissue.
4. This usually takes up to 15 years in men, but the process can now be carried out in just 12 weeks, after which time the tissue functions as a normal, healthy prostate that produces PSA – the well-known protein used as to test for prostate cancer.

The fact that human prostate tissue can be developed from rat or mouse prostatic mesenchyme in combination with human ES cells was a significant discovery in itself, as mixing tissues from diverse species suggests that prostate signals from rodents and men are the same.

Now scientists can grow human prostate tissue, they will now investigate how a healthy prostate becomes diseased as it ages.

Next, scientists will isolate specific messenger cells from patients with prostate cancer or benign prostate disease (BPH), and investigate the effects these cells have on ES cell growth and development. Scientists believe this process could direct the ES cells into a diseased state. If this is the case, it will provide significant clues to develop new, more effective treatments for men suffering from BPH and prostate cancer.