Characterization of hTERT-immortalized Prostate-derived Stromal and Epithelial Cells: an Authentic in vitro Model for Tumour Microenvironment Studies

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Tumour development begins with mutational changes to the genetic makeup of a cell; tumour progression is not solely determined by the mutated cell, but also by the tumour’s microenvironment. Prostate cancer, a leading cancer diagnosed in men, has been determined to be highly influenced by its surrounding stroma, particularly fibroblasts. It has been demonstrated that cancer-associated prostate fibroblasts (CAFs) differ from normal-associated prostate fibroblasts (NAFs). However, human prostate cancer model systems have focused largely on prostate cancer epithelial cells. Currently, a need exists for a more physiologically relevant human cell model system to study prostate cancer progression within the context of its tumour microenvironment. In this study, we characterized three prostate-derived cells: CAFs, NAFs, and prostate epithelial cells (PrEs); all three lines were immortalized by human telomerase reverse transcriptase (hTERT) alone, and have been continuously passaged for more than 40 PDL in our hands. Our data shows that the hTERT-immortalized CAFs proliferate faster than the NAFs; in addition, both CAFs and NAFs express fibroblast markers such as TE7 and alpha smooth muscle actin (α-SMA), while neither cell line expresses epithelial markers such as CK14. Both CAFs and NAFs also express elevated levels of α-SMA upon TGF-β stimulation. All three prostate-derived cells weakly express the prostate specific marker AR, and show similar markers staining after long time passaging. Importantly, conditioned media collected from CAFs promotes tumour cell growth better than NAF conditioned media. In conclusion, CAFs, NAFs, and immortalized PrEs may provide a very valuable model system for the study of prostate cancer cell progression and tumour microenvironment studies.