**Supplementary data:**

**Table S1: Transcription factors that can distinguish prostate cancer patient survival in GSE16560 dataset.**

**Table S2: Differentially expressed transcription factors in PDEF low and high group in GSE16560 dataset.**

**Table S3&S4: List of antibodies and primer sequence used in this study.**

**Figure S1: PDEF over-expression inhibit the transcription of EMT related gene.**

(A) Scatter plot comparing expression level of EMT related genes (pink dot) between PC3-SCR and PC3-PDEF profile. (B) Gene set enrichment analysis with PDEF target gene set. (C) Hierarchical clustering of gene expression profile comparing PC3-SCR and PC3-PDEF.

**Figure S2: PDEF inhibits prostate cancer migration and invasion.**

(A) Immunofluorescence staining of DAPI, PDEF and E-Cadherin in PC3-SCR and PC3-PDEF cells. (B) Trans-well invasion assay comparing PC3-SCR and PC3-PDEF cells. (C) Immunohistochemistry staining of SV40 T-antigen of TRAMP mouse tissues.

**Figure S3: PDEF binds to the promoter region of cytokeratin 18 independent of AR binding.**

Gene tracks view of PDEF, IgG, AR and PolII in VCap cells at KLK3 (PSA) region (A), cytokeratin 18 region (B) and Twist1 region (C).

**Figure S4: Unidirectional regulation of CK18 by PDEF.**

(A) Prostate luminal specific cytokeratin 8 and cytokeratin 18 is down regulated with increasing of Gleason score from TCGA database. Mann-Whitney-Wilcoxon Test was performed comparing Gleason Score 6-7 VS. Gleason Score 8-10 patients. (B) Representative image of immunohistochemistry staining of PDEF/Twist1 in PC3-SCR/PDEF xenograft. Scale bar is 50um.

**Figure S5-10:** **Original immunoblot figures and statistical analysis using Image Studio Lite from LI-COR.**