

CD4+ T-cells promote the survival of prostate cancer cells in culture.

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Abstract

Prostate cancer (PCa), particularly metastatic, castration-resistant PCa, poses significant therapeutic challenges due to its immunosuppressive microenvironment and resistance to hormone-based therapies. Here we examined the interactions between PCa cells and CD4+ T cells by direct co-culture of various PCa cell-lines with Jurkat cells and with primary CD4+ T-lymphocytes from healthy donors. Flow cytometry analyses revealed that CD4+ cells enhanced PCa survival in suspension and contributed to distinct adherent cell populations. Activation of CD4+ cells with PMA and Ionomycin sustained the pro-survival effects but with slightly decreased PCa survival.

Quantitative PCR (qPCR) analysis demonstrated downregulation of AR, PSA and SNAI2(slug) alongside upregulation of, PD-1 and VIM(Vimentin) in co-culture suspension. TGF- β 1 expression was significantly elevated in both suspension and adherent fractions.

Colony formation assays indicated significantly enhanced clonogenic potential in PCa cells exposed to CD4+ cells. These findings highlight the critical role of CD4+ cells in supporting PCa survival, immune modulation, epithelial-mesenchymal transition and metastasis. The co-culture system developed here can be adapted to mimic the prostate tumor microenvironment (TME), offering a versatile model for further mechanistic studies and drug testing.

Keywords: Prostate cancer, mCRPC, CD4+ T cells, AR, TGF- β 1, PD-1, SNAI2, VIM, tumor microenvironment, EMT, cell survival, metastasis, co-culture, immunotherapy.