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Characterisation of cancer cell response to CXCL8

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Introduction: Chemokines such as CXCL8 (IL-8), are defined by their ability to induce directed cell migration of responsive cells. Studies have suggested that CXCL8 and its cognate receptors (CXCR1 and CXCR2), mediate the initiation and development of various cancers including breast cancer, prostate cancer, lung cancer, colorectal carcinoma and melanoma [1][1]. The aim of this study is to analyse the effect of CXCL8 on different cancer cell lines; MCF-7 (breast), MDA-MB231 (breast), THP-1 (monocyte leukaemia) and Jurkat (leukemic T-cell lymphoblast).

Methodology: Chemotaxis assay was performed to quantify the number of cells migrating upon stimulation with CXCL8. Suspension THP-1 and Jurkat cells ($25x10^4$/mL) were loaded into a microchemotaxis chamber and stimulated with 1 nM CXCL8 for 4 hours. Migrated cells were counted and analysed using GraphPad Prism. Boyden chamber migration assay was used for MDA-MB231 cells ($1x10^6$/mL), which were loaded on the chamber and stimulated with 10 nM CXCL8 overnight, migratory cells pass through a semi-permeable membrane and are stained with Calcein and quantified using a fluorescence plate reader. The migratory potential of CXCL8 was also investigated by wound healing assay. A scratch was introduced in an MCF-7 cells monolayer and cells were incubated with 10 nM CXCL8. Wound closure was quantified after 24 hours. Calcium flux dose-response assay to test the response of cells when induced with CXCL8 was performed on MCF-7, THP-1 and Jurkat cells. Cells were suspended in calcium flux buffer, dyed with Fura-2AM, and incubated at 37° C for 30 minutes. Calcium was measured using a BMG Labtech Fluorostar optima plate reader.

Results: In MCF-7 cells CXCL8 stimulation significantly promotes cell migration in wound healing assays ($P \leq 0.05$, n=4) as well as stimulating calcium release (EC_{50}= 364 nM). THP-1 cells migrate towards CXCL8. CXCL8 also leads to the release of calcium in THP-1 cells (EC_{50}= 271 nM). Additionally, CXCL8 induced a high level of migration in MDA-MB231 cells. However, Jurkat cells do not react towards CXCL8. **Conclusion:** Two breast cancer cells lines MCF-7 and MDA-MB231 along with monocyte leukemic THP-1 cells were activated upon their stimulation with CXCL8 while leukemic T-cell Jurkat did not respond to CXCL8 stimulation.

References

[1] Q. Liu, A. Li, Y. Tian, J. D. Wu, Y. Liu, T. Li, Y. Chen, X. Han, and K. Wu, "The CXCL8-CXCR1/2 pathways in cancer," *Cytokine Growth Factor Rev.*, vol. 31, pp. 61–71, 2016.