Molecular impact of [C16Pyr][Amp] treatment on breast and prostate cancer cell lines

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Abstract

Prostate Cancer (PCa) and Breast Cancer (BCa) are the leading causes of cancer morbidity and mortality, worldwide, when diagnosed in advanced stages of the disease. Currently available therapies have limited curative effect, leading to the progression to highly aggressive hormone-resistant phenotypes. Thus, the development of new anti-tumor agents becomes imperative. Ionic liquids are organic salts with anti-neoplastic activity and have been studied in the pharmaceutical industry. Previous work of our team demonstrated that the ionic liquid [C16Pyr][Amp] has significant anti-tumor properties in PCa and BCa cell lines. However, the main cellular pathways affected were not characterized. Therefore, the aim of this work was to explore the molecular impact of [C16Pyr][Amp] treatment in order to identify relevant genes that have altered expression upon treatment and that can justify the anti-cancer effect observed in the *in vitro* assays.

The treatment effect was evaluated by using a custom expression array panel including several genes involved in cell cycle, apoptosis, DNA repair and mTOR or MAPK/ERK pathways. The comparative Ct method was used to calculate fold-difference in gene expression between cell line with and without treatment and genes with a fold change above 1 or below -1 were considered.

We were able to identify a panel of differentially expressed genes upon treatment with [C16Pyr][Amp] that will be subsequently explored by proteomic studies in human PCa and BCa tissues.

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Keywords

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