Effect of Cisplatin on Gene Expression Over Time in Lung Cancer Cells

Thornburg, Alexis

Lung cancer affects the lives of many people with over 200,000 new cases diagnosed every year. Cisplatin is one drug that has been used to combat the cancer. A major hurdle in cisplatin's effectiveness is cellular resistance. Understanding that resistance is key for developing more effective treatment. By contrasting gene expression signatures of over 400 genes in cisplatin sensitive and resistant non-cancer lymphoblastoid cell lines, 5 genes were identified to have decreased expression in the sensitive cells, but increased expression in the resistant cells. The genes STAT3, ELF4, ZNF238, PTP1B, and ZNF77 were measured in lung cancer cells 2, 4, and 6 hours after treatment with 5 μM cisplatin hypothesizing that the trend of expression will decrease confirming the role of the genes in cisplatin sensitivity. Each gene was analyzed for fold change with standard error and found that ZNF238 and ZNF77 support the hypothesis while ELF4 does not and STAT3 and PTP1B could not be fully evaluated due to evidence of both up and down regulation. Future actions will involve testing more replicates of STAT3, ELF4, and PTP1B to reduce standard error and gain more confidence, though they do suggest a difference in the tumor cell biology from the lymphoblastoid cells. This research suggests that these modulations of these genes have the potential to increase the effectiveness of cisplatin treatment in lung cancer patients.

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