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Evaluation of the antitumor effect of auranofin in ovarian cancer cell lines

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Abstract

Background: Ovarian cancer is one of the deadliest gynecologic malignancies, largely due to late-stage diagnosis and the frequent emergence of resistance to standard chemotherapy. First-line treatment typically combines platinum-based agents, such as carboplatin, with taxanes, such as paclitaxel; however, many patients eventually develop chemoresistance, limiting therapeutic options and worsening outcomes [1]. Drug repurposing has emerged as a promising strategy to identify new anticancer therapies among compounds with established safety profiles [2]. Auranofin, an FDA-approved drug initially used to treat rheumatoid arthritis, has recently gained attention for its anticancer potential. Its main mechanism involves inhibition of thioredoxin reductase, leading to redox imbalance and oxidative stress in cancer cells [3]. **Methods:** In this study, we evaluated the effect of auranofin on cell viability in ovarian cancer models using the OVCAR8 cell line, which presents resistance to carboplatin, and the OVCAR8 PTX RC cell line, which is resistant to both carboplatin and paclitaxel [1]. Cells were cultured under 2D conditions and exposed to increasing concentrations of auranofin. Cell viability was assessed using the Presto Blue metabolic assay, which measures cellular metabolic activity as an indicator of viable cells. **Results:** Auranofin treatment resulted in a pronounced dose-dependent reduction in cell viability in both cell lines. The estimated IC_{50} values were 1.06 ± 0.08 µM for OVCAR8 and 1.42 ± 1.16 µM for OVCAR8 PTX RC, indicating a high sensitivity to this compound across both models. Importantly, both cell lines exhibited a steep decline in viability at concentrations around 1–3 µM, highlighting a narrow transition window and potent biological effect. **Conclusions:** In conclusion, these findings highlight the potential of auranofin as a repurposed therapeutic agent for ovarian cancer, particularly in the context of platino-resistance. The observed efficacy in two carboplatin-resistant cellular models, including one also resistant to paclitaxel, supports further investigation of this compound. Future studies, including the use of three-dimensional models, patient-derived systems, and combination approaches with standard chemotherapeutic agents, will be important to better elucidate its mechanisms of action and evaluate its translational potential.

Keywords: ovarian cancer; auranofin; drug repurposing

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