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KSP and MPS1 kinases as potential therapeutic targets for ovarian cancer

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Abstract

Background: Ovarian cancer ranks among the top causes of cancer-related deaths in women worldwide [1]. The conventional treatment for ovarian cancer involves surgery and chemotherapy, typically using a combination of paclitaxel and carboplatin [2]. However, despite the initial positive response to this treatment regimen, the development of treatment resistance has emerged as a significant challenge in managing the disease [3]. This scenario underscores the need for the discovery of new biomarkers and potential therapeutic targets and alternative therapeutic strategies for ovarian cancer. **Objective:** The main goal of this study is to explore the potential of targeting mitotic kinases KSP and MPS1 for ovarian cancer treatment. The specific objectives are to analyze the expression of KSP and MPS1 in (i) ovarian cancer cell lines, OVCAR 8 wt and OVCAR 8 R (double resistant to paclitaxel and carboplatin [4]), and (ii) using bioinformatic analyses. **Methods:** The expression of KSP and MPS1 in ovarian cancer cells was evaluated at both mRNA transcript and protein levels using qReal-Time PCR and Western Blotting, respectively. The UALCAN cancer database was used to analyze KSP and MPS1 expression and correlate it with clinicopathologic indicators. **Results:** We found that KSP and MPS1 were overexpressed both at mRNA (OVCAR 8 wt: 4.34±0.61 and 7.64±0.49, respectively; OVCAR 8 R: 4.65±0.43 and 6.69±1.03, respectively) and protein (OVCAR 8 wt: 1.74 and 1.97±0.12, respectively; OVCAR 8 R: 2.30 and 2.55±0.05, respectively) levels in ovarian cancer cell lines compared to their non-cancer cell line counterpart (HOSE 6.3, normalized as 1). Similar results were obtained from UALCAN analysis for KSP at the protein level. Regarding mRNA expression levels, we found no difference between normal and tumor tissues. **Conclusions:** Our results showed that both KSP and MPS1 are overexpressed in ovarian cancer, highlighting the potential of these kinases as therapeutic targets for ovarian cancer.

Keywords: KSP; MPS1; therapeutic targets; ovarian cancer

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