Inhibitor of signal transducer and activator of transcription 3 (STAT3) suppresses ovarian cancer growth, migration and invasion and enhances the effect of cisplatin \textit{in vitro}

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Received August 29, 2013
Accepted October 8, 2014
Published March 30, 2015
DOI http://dx.doi.org/10.4238/2015.March.30.3

\textbf{ABSTRACT.} The aim of the present study was to investigate the anti-ovarian cancer effect of the inhibitor of signal transducer and activator of transcription 3 (STAT3), WP1066. Western blot was used to detect the phosphorylation of STAT3 in ovarian cancer cell line SKOV3 and cisplatin-resistant ovarian cancer cell line SKOV3/DDP. MTT and colony-forming assays were performed to evaluate the viability and growth of ovarian cancer cells. The apoptosis of ovarian cancer cells was determined by flow cytometry. The wound healing assay and Transwell assay were performed to examine the migration and invasion of ovarian cancer cells. WP1066 significantly inhibited the phosphorylation of STAT3 in SKOV3 and SKOV3/DDP cells. WP1066 treatment inhibited the proliferation and clonogenicity of both SKOV3 and SKOV3/DDP cells. After WP1066 treatment for 24 h, the apoptosis rates of SKOV3 and SKOV3/DDP cells were significantly increased compared with the control cells. After treatment with WP1066, the reduction of the wound gaps was significantly less in both SKOV3 and...
SKOV3/DDP cells. WP1066 also significantly inhibited the invasion capacity of SKOV3 and SKOV3/DDP cells compared with the control group. Treatment with WP1066 combined with cisplatin significantly increased proliferation inhibition and apoptosis in SKOV3 and SKOV3/DDP cells compared with treatment with cisplatin alone. A synergistic action between WP1066 and cisplatin on the proliferation and apoptosis of ovarian cancer cells was determined. In conclusion, inhibition of STAT3 may suppress the proliferation, migration and invasion, induce apoptosis and enhance the chemosensitivity of ovarian cancer cells, indicating that STAT3 is a new therapeutic target of ovarian cancer.

**Key words:** Signal transducer and activator of transcription 3 (STAT3); Inhibitory effect; Ovarian cancer; Cisplatin