Experimental study on the effects of VEGF and EGF on biological properties of gastric cancer cells

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Objective: To investigate the effects of VEGF and EGF on biological properties of gastric cancer cells, and to observe the outcomes by targeted inhibiting of these factors.

Methods: Study the survival rate under different clinicopathologic parameters from 132 patients with gastric cancer. RT-PCR was performed to semi-quantitatively detect mRNA expression of EGF and VEGF in fresh gastric cancer tissues from 80 patients suffering from serosa-infiltrated gastric cancer. The results were compared between groups according to the detected results of irrigation of peritoneal cavity (IPC). MTT assay, cell migration assay, matrical adhesion assay and reconstituted basement membrane matrix invasion assay were performed to analyze the differences in the ability of proliferation, movement, adhesion and invasion among four kinds of gastric cancer cell lines BGC823, MGC803, HGC27 and SGC7901, which were classified by their differentiation degree. The mRNA expression of EGF, EGFR, VEGF and VEGFR in these cell lines was examined for the strongest expressing one. Then we measured the mRNA expression of EGF, EGFR, VEGF and VEGFR after adding endostatin (Endostar) or cetuximab (Erbitux) to observe changes of the gastric cancer cells in proliferation, movement, adhesion and invasion.

Results: Survival rate will decrease with exfoliative cells, lymphatic node metastasis, serosa infiltrated and poorly differentiated gastric cancer. The mRNA levels of EGF and VEGF in exfoliative cytology positive group were markedly higher than negative group (P<0.05). The ability of proliferation, movement, adhesion and invasion was reduced sequentially in MGC803, HGC27, BGC823 and SGC7901(P<0.05). The mRNA expression of EGF, EGFR, VEGF and VEGFR was the strongest in MGC803, but was attenuated significantly after treatment(P<0.05). The ability of proliferation, movement, adhesion and invasion was reduced after adding endostatin (Endostar) or cetuximab (Erbitux), and the reductions were statistically significant compared with the control groups (P<0.05).

Conclusions: The expression of VEGF and EGF had close relationship with intraabdominal exfoliation of cancer cells, and also was correlated with the properties of migration, adhesion, invasion of gastric cancer cells in vitro which decreased survival rate. Therefore specific inhibition of VEGF and EGF may impair the ability of proliferation, migration, adhesion and invasion of gastric cancer cells in vitro. Targeting VEGF and EGF may be a potential therapeutic strategy for inhibiting peritoneal metastasis of gastric cancer.

Biography
Xue Ying-wei has completed his Ph.D at the age of 39 years from Harbin Medical University and postdoctoral studies from Harbin Medical University. He is the director of the faculty working office for surgical department and gastroenterology department of The Third Affiliated Hospital of Harbin Medical University. He is the assistant committee director of Chinese Anti-cancer Association Gastric Cancer Association. He has published 14 papers in journals indexed by SCI and serving as an editorial board member of Chinese journal of gastrointestinal surgery.