

Lycium barbarum polysaccharides inhibit proliferation and migration of bladder cancer cell lines BIU87 by suppressing Pi3K/AKT pathway

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ABSTRACT

The aim of this study was to verify whether *Lycium barbarum polysaccharides* inhibits proliferation and migration of BIU87 cells through Pi3K/AKT pathway. Different concentrations of *Lycium barbarum polysaccharides* were used to incubate with BIU87 cells. LY-294002 and IGF-1 were used to inhibit and activate Pi3K/AKT pathway respectively. MTT were used to investigate the proliferation of BIU87 cells. Transwell chambers and wound healing were used to test the migratory ability of BIU87 cells. Western blotting were used to investigate the expressions of P21, P27, MMP-2, MMP-9, AKT and p-AKT in BIU87 cells. Compared with the control group, the proliferation and migration of BIU87 cells and the expression of p-AKT were significantly decreased in the study group; the inhibitory effect of the downregulation of p-AKT by LY-294002 on the induction of BIU87 cells proliferation and migration was identical to that of *Lycium barbarum polysaccharides*; upregulation of p-AKT by IGF-1 reversed the *Lycium barbarum polysaccharides*-induced inhibition of BIU87 cells dedifferentiation. In conclusion, LBP inhibits the proliferation and migration of BIU87 cells by suppressing Pi3K/AKT signaling pathway.

INTRODUCTION

Bladder cancer (BC), is among the fifth most common malignancies in the world [1]. The majority of BC is represented by urothelial carcinoma (UC), or named transitional cell carcinoma (TCC), while squamous and adenocarcinomas are diffused in a small percentage [1]. Although BC is considered to be responsive to the chemotherapy regiments, only few patients respond to single-agent therapy. Because of this, the finding of innovative anti-cancer combinations and new anti-neoplastic drugs is necessary. At present, many researchers are committed to antineoplastic drugs with high activity and low toxicity from nature. Traditional Chinese herbs, with anticancer properties, have drawn a great deal of attention in recent years.

Lycium barbarum polysaccharides (LBP), is the major functional component of the fruit of *L. barbarum* (comprising 5%–8% of *L. barbarum* fruits), which is a well-known Chinese herb. Its molecular weight ranges from 24 kDa to 241 kDa and consists of a complex

mixture of highly branched and only partly characterized polysaccharides and proteoglycans. LBP shows antitumor activities against various types of cancer cells and inhibit tumor growth in nude mice through induction of apoptosis and cell cycle arrest [2–4]. Mang et al reported that LBP could inhibit the growth of human bladder carcinoma cell line BIU87 and induce BIU87 apoptosis [3]. However, the mechanism of LBP inducing apoptosis of BIU87 cells has yet been unclear.

The PI3K/AKT signaling is a critical pathway in cell proliferation, survival, neovascularization and tumor growth [5–6]. As a bridge molecule combining extracellular signal and response effector of cells, PI3K acts on the downstream signaling molecules under the influence of a series of bypass or upstream signaling molecules, and play a very important role in regulating cell apoptosis. Akt/PKB is an important downstream target kinase of PI3K signaling pathway. Activated Akt can inhibit the release of cytochrome c and apoptosis factor, thereby inhibiting apoptosis, and promote the growth of cancer cells. Researches about PI3K/AKT signaling

