Regulation of IGF-I production and proliferation of human leiomyomal smooth muscle cells by Scutellaria barbata D. Don in vitro: isolation of flavonoids of apigenin and luteolin as acting compounds.

Kim DI, Lee TK, Lim IS, Kim H, Lee YC, Kim CH. 

Source

Department of Biochemistry, Molecular Biology and Gynecology, Dongguk University School of Oriental Medicine and National Research Laboratory for Glycobiology, Sukjang-Dong 707, Kyungju City, Kyungbuk 780-714, Korea.

Abstract

Scutellaria barbata D. Don (Lamiaceae) (SB) is a perennial herb, which is natively distributed throughout Korea and southern China. This herb is known in traditional Chinese Medicine as Ban-Zhi-Lian and traditional Korean medicine as Banjiryun, respectively. SB has been used as an anti-inflammatory and antitumor agent. We aimed to determine the expression of growth factor molecules for growth inhibition after treatment of SB in two different human myometrial smooth muscle cell (SMC)s and leiomyomal SMCs. Water-soluble ingredients of SB, myometrial SMCs, and the leiomyomal cell lines were used in vitro. SB significantly reduced cell numbers in culture and arrested cell proliferation, and also induced apoptosis, indicating that the presence of an intact apoptotic pathway was demonstrated in these cells by SB. Uterine leiomyoma is the most common benign smooth muscle cell tumor of the myometrium. The expression of insulin-like growth factor-I (IGF-I) was measured at the mRNA and protein level in myometrium and leiomyomal cells with and without treatment with a water extract of SB for 3 days. IGF-I mRNA expression was significantly higher in leiomyomal cells than in myometrium cells. The IGF-I protein was more abundant in leiomyomal cells than in myometrium. When SB was treated to the cells, the IGF-I protein concentrations in myometrial and leiomyomal cells from the SB-treated cells were similar. The results indicated that IGF-I expression is probably associated with a proliferation of leiomyomal cells than myometrium. However, SB down-regulated the IGF-I expression where IGF-I contributes to the selective growth of the leiomyoma. Therefore, growth modulation of LMs by SB occurs via mechanisms dependent of apoptosis. The raw materials were extracted and subjected to functional isolation for the active molecules in the present assay systems. The five flavonoids were isolated and the chemical structures of resveratrol, baicalin, berberine, apigenin, and luteolin were determined. The effects of resveratrol, baicalin, and berberine on the above parameters have not been significantly evidenced, whereas apigenin and luteolin were effective. The anti-proliferative compounds apigenin and luteolin belong to the flavones, a class of flavonoids and are characterized as selectively inhibitors of the growth of LM cells. Our findings suggest that flavonoids of apigenin and luteolin are potentially useful for the development of therapeutical treatments of cancer. These data also suggest that SB reduces tumor volume with inducing a concomitant increase in the rate of apoptosis.

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