Research in Pharmaceutical Sciences, 2012;7(5)
School of Pharmacy and Pharmaceutical Sciences
Isfahan University of Medical Sciences
Proceeding of 13th Iranian Pharmaceutical Sciences Congress

Alteration of inflammatory markers by bee venom in human synovial fibroblastes

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Background and Aims: Based on traditional medicine bee venom toxin (BV) is a promising treatment for rheumatoid arthritis (RA), a chronic inflammatory disease. RA is characterized by proliferation of synoviocytes that produce pro-inflammatory cytokines, which are implicated in the pathogenesis of RA and fibroblast-like synoviocytes are the effectors cells leading to cartilage destruction in RA. The main aim of the study is to investigate the effects of BV on expression of inflammatory cytokine (IL-1β) and Sirtuin 1 (SIRT1), a histone deacetylase enzyme that recently defined as a pro-inflammatory protein.
Methods: RA synovial fibroblastes were cultured in DMEM medium. Cytotoxicity of different concentrations of BV was determined by the tetrazolium (MTT) assay. Total RNA from synoviocytes was extracted using Trizol method. After reverse transcription using oligo-dT and random hexamer primers, SIRT1 and IL-1β mRNA expressions were analyzed by SYBR green real-time quantitative PCR using an Applied Biosystems StepOne™ Real-Time PCR System. Differences between treated and untreated group means were assessed by t-test.
Results: Based on MTT assay, BV did not exert any significant cytotoxic effect up to 10µg/mL. At concentrations higher than 10µg/mL, BV toxicity is above the comparable threshold between treated and untreated groups. Results of gene expression showed that BV at 10µg/mL attenuates both the IL-1β and SIRT1 expressions at mRNA level.
Conclusions: Our results support the conventional views of old medicine indicating protective and anti-inflammatory effects of bee venom toxin on RA disease through IL-1β signaling.

Keywords: Bee venom; Fibroblast-like synoviocytes; Inflammatory markers; Rheumatoid Arthritis