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In Vitro Assessment of Bee Venom Effects on Matrix Metalloproteinase Activity and Interferon Production

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Abstract:

Controversial immunomodulatory properties of bee venom (BV) have provided an appropriate field for more investigation. The aim of present research was to verify the effects of honeybee venom on matrix metalloproteinase activity and interferon production as well as cell proliferation in monocyte and fibroblast cell lines.

The monocyte and fibroblast cell lines (K562, HT-1080, WEHI-164) were used in order to assess proliferative response, interferon-1 production and matrix metalloproteinase-2 (MMP-2) activity. Australian BV (ABV) and Iranian BV (IBV) preparations at concentrations of 0.025, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, and 1µg/ml were added to each overnight cultured cell. In time course study, cells were treated with each ABV and IBV. In all cases supernatants were collected 24 hours after treatment. A sample of the each medium was used for zymography and interferons assay. Non-treated cells were used as controls.

The production of IFN- α and IFN- β in supernatant of cell culture was assessed using enzyme linked immunoassay procedure. MMP-2 activity, as an inflammatory index, was evaluated using zymoanalysis method.

The results of this study showed that, there were no significant difference between two sources of honey bee venoms when they were added to an identical cell line, whereas, the responses of various cell lines against bee venom were different. The increasing amounts of bee venom to human monocyte cell line (K562) revealed a significant increase in proliferative response. Our findings showed that the bee venom had no influence on IFN- α production in cell culture media, whereas, adding the BV to K562 cell line could significantly increase the production level of IFN- β only on day 8 post-treatment. In addition the effect of bee venom on MMP-2 activity in both cell culture media, WEHI-164 and K562 was similar. The stimulatory effect of bee venom on MMP-2 activity occurred at low doses. In contrast, its inhibitory effect was seen at high concentrations.

It is concluded that, honeybee venom affects on MMP-2 activity and interferon beta production as well as cell proliferation in a time and dose-dependent manner.

Keywords:

[Bee venom](#) . [Interferon](#) . [Matrix Metalloproteinase](#) . [Monocyte](#)

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