



Proliferative and differentiative effects of the *Panax vietnamensis* ethanol fraction on murine neural stem cells

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Abstract

Background:

Ginseng has been known since ancient time for its unique pharmaceutical effects on human health. Modern studies indicated that extracts of ginseng could improve a broad range of pathological conditions including neurodegenerative diseases such as Alzheimer's or Parkinson's disease. *Panax vietnamensis*, a new ginseng species recently discovered in Vietnam, has received much interest due to its high composition of both known and new saponins whose therapeutic effects have not yet fully evaluated. In this study, the proliferative and differentiative effects of different fractions of the extract of *Panax vietnamensis* on cultured neural stem cells would be assessed.

Materials and methods:

Fractions from the *Panax vietnamensis* were prepared following a successive extraction of the raw material using ethanol, n-butanol, ether ethylic, and water, respectively. Potential toxicity and proliferative effects of each fraction were assessed based on the increase in the sphere diameter in before further analyses. The percentage of cells in active phases, cell cycle- or differentiation-associated genes were analyzed using flow cytometry and real-time RT-PCR.

Results:

Our results revealed that supplementing media with 200 µg/ml of ethanol *Panax vietnamensis* fraction significantly increased diameters of neurospheres, also maintained the growth rate of the neurospheres compared with the control within the five-day period. Moreover, the results also demonstrated that the ginseng ethanol fraction and a known neurotrophic protein, NGF, affected the differentiation of the neural stem cells.

Conclusion:

200 µg/ml ethanol fraction from the extract of *Panax vietnamensis* most significantly induced the proliferation of cultured neural stem cells. However, the higher concentration of the fraction seemed not to maintain the growth of neurospheres. Regarding differentiation, the ethanol fraction of Vietnamese ginseng possibly shared similar mechanisms with the neurotrophic growth factor.

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Keywords

Ethanol fraction, ginseng, neural stem cells, neurosphere, *Panax vietnamensis*.

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