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Involvement of serotonergic, noradrenergic and dopaminergic systems in the antidepressant-like effect of ginsenoside Rb1, a major active ingredient of *Panax ginseng* C.A. Meyer

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A B S T R A C T

Ethnopharmacology relevance

Ginsenoside Rb1, a 20 (S)-protopanaxadiol, is a major active ingredient of *Panax ginseng* C.A. Meyer, which as the King of Chinese herbs, has been wildly used for the treatment of central nervous system diseases. Previous studies have shown that 20 (S)-protopanaxadiol possesses a novel antidepressant-like effect in the treatment of depression, whereas ginsenoside Rb1 in depression has been rarely reported.

Aim of the review

The present study was to investigate the antidepressant-like effect of ginsenoside Rb1 and its relevant mechanisms.

Materials and methods

The whole experiment was divided into two parts: one part we examined the antidepressant-like effect of ginsenoside Rb1 with open-field test (OFT), tail suspension test (TST), forced swim test (FST), 5-HTP induced head-twitch and reserpine response in mice, another part we used chronic unpredicted mild stress (CUMS) model to further explore the antidepressant-like effect of ginsenoside Rb1 with caffeine, fluoxetine and *p*-Chlorophenylalanine (PCPA) in rats. Furthermore, the levels of monoamine neurotransmitters of NE, 5-HT, DA and their metabolites 5-HIAA, DOPAC, HVA were all measured by ELISA kits after the CUMS protocol.

Results

Our data indicated that 7 days treatment with ginsenoside Rb1 (4, 8, 10 mg/kg, p.o.) significantly decreased immobility time in the FST and TST in mice, and played important roles in mice which were induced by 5-HTP (200 mg/kg, i.p.) and reserpine (4 mg/kg, i.p.). On the basis of CUMS model, 21 days treatment with ginsenoside Rb1 not only had effective interactions with caffeine (5 mg/kg, i.p.), fluoxetine (1 mg/kg, i.p.) and PCPA (100 mg/kg, i.p.), but also significantly up-regulated the 5-HT, 5-HIAA, NE and DA levels in CUMS rats' brain, whereas HVA and DOPAC had no significant difference. Moreover, there was no alteration in spontaneous locomotion in any experimental group.

Conclusions