Increase of beta-endorphin secretion by syringin, an active principle of Eleutherococcus senticosus, to produce antihyperglycemic action in type 1-like diabetic rats.

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Abstract

We employed streptozotocin-induced diabetic rats (STZ-diabetic rats) as type 1 diabetes-like animal models to investigate the mechanism(s) of antihyperglycemic action produced by syringin, an active principle purified from the rhizome and root part S of ELEUTHEROCOCCUS SENTICOSUS (Araliaceae). Bolus intravenous (i. v.) injection of syringin dose-dependently decreased the plasma glucose of STZ-diabetic rats in 30 minutes in a way parallel to the increase of plasma beta-endorphin-like immunoreactivity (BER). Syringin enhanced BER release from the isolated adrenal medulla of STZ-diabetic rats in a concentration-dependent manner from 0.001 to 10 micromol/l. Bilateral adrenalectomy in STZ-diabetic rats eliminated the activities of syringin (1 mg/kg, i. v.) including the plasma glucose-lowering effect and the plasma BER-elevating effect. Also, syringin failed to lower plasma glucose in the presence of micro-opioid receptor antagonists and/or in the micro-opioid receptor knockout diabetic mice. In conclusion, the obtained results suggest that syringin can enhance the secretion of beta-endorphin from adrenal medulla to stimulate peripheral micro-opioid receptors resulting in a decrease of plasma glucose in diabetic rats lacking insulin.