Biol Pharm Bull. 2004 Nov;27(11):1779-83.

Effects of morin on blood pressure and metabolic changes in fructose-induced hypertensive rats.

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Abstract

High fructose (HF) feeding induces a moderate increase in blood pressure in rats, which is associated with insulin resistance, hyperinsulinemia, and hypertriglyceridemia. In the present study, we examined the chronic effect of morin, a flavonoid isolated from medicinal plants, on blood pressure, lipid profiles, and serum insulin and glucose in HF-induced hypertensive rats. Rats were divided into control group and HF-fed group during the first three weeks of experiments. Then, rats were further divided into four groups and treated for 4 more weeks as follows: 1) control group; 2) morin-treated (intraperitoneal 5 mg/kg/d) control group; 3) HF-fed group; 4) morin-treated, HF-fed group (n=8, each group). Morin-treated HF-fed group showed lower systolic blood pressure (SBP) (132.0+/-2.5 mmHg vs. 142.8+/-2.2 mmHg, $p<0.05$), lower serum insulin level (1.21+/-0.27 vs. 2.73+/-0.30 microIU/dl, $p<0.05$), and lower plasma triglycerides (47.8+/-5.0 vs. 65.5+/-5.0 mg/dl, $p<0.05$) than those of HF-fed group. Morin treatment also suppressed mRNA expression of endothelin-1 (ET-1) in the thoracic aorta from HF-induced hypertensive rats. Moreover, decreased renal sodium excretion in HF-induced hypertensive rats was ameliorated by morin treatment. In conclusion, the results of this study demonstrate that morin has an anti-hypertensive effect in HF-induced hypertensive rats. This effect of morin may be associated with the suppression of serum insulin and plasma triglyceride level, with the down-regulation of ET-1 in the thoracic aorta, and with the partial amelioration of renal dysfunctions in HF-induced hypertensive rats.

Drug Metab Dispos. 2007 Jun;35(6):981-6. Epub 2007 Feb 26.

Morin (3,5,7,2',4'-pentahydroxyflavone) exhibits potent inhibitory actions on urate transport by the human urate anion transporter (hURAT1) expressed in human embryonic kidney cells.

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Source: Department of Biochemistry, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, China.

Abstract

In allopurinol-allergic patients, uricosuric agents are often used in the treatment of hyperuricemia. The existing uricosuric agents are not without problems and the availability of better and safer alternatives is highly desirable. Our previous study (J Pharmacol Exp Ther (2006) 316:169-175) has demonstrated that morin (3,5,7,2',4'-pentahydroxyflavone), which occurs in the twigs of Morus alba L. documented in traditional Chinese medicinal literature for treatment of conditions akin to gout, is a potent inhibitor of urate uptake in rat renal brush-border membrane vesicles. It is also effective in lowering uric acid level in a hyperuricemic rat model in vivo. Whether morin is an equally effective uricosuric agent in human requires verification. The human urate anion transporter (hURAT1) has recently been cloned and identified to be the organic anion transporter that mediates renal urate reabsorption in the human kidney. In the present investigation, human embryonic kidney cells were transfected with hURAT1 and the expression was validated by reverse transcription-polymerase chain reaction and subcellular distribution of the exogenously introduced transporter by confocal microscopy. The inhibitory actions of morin on human renal urate reabsorption were demonstrated using this system. The IC50 value of the inhibition by morin was determined to be 2.0 microM, compared with 50 microM for probenecid, 100 microM for sulfinpyrazone, and 0.3 microM for benzbromarone. Kinetic analysis of the uptake inhibition by morin indicates that this compound is a competitive inhibitor of urate uptake on the human urate transporter with a K(i) value of 5.74 microM.

J Pharmacol Exp Ther. 2006 Jan;316(1):169-75. Epub 2005 Sep 16.

The dual actions of morin (3,5,7,2',4'-pentahydroxyflavone) as a hypouricemic agent: uricosuric effect and xanthine oxidase inhibitory activity.

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Abstract

Hyperuricemia is associated with a number of pathological conditions such as gout. Lowering of elevated uric acid level in the blood could be achieved by xanthine oxidase inhibitors and inhibitors of renal urate reabsorption. Some natural compounds isolated from herbs used in traditional Chinese medicine have been previously demonstrated to possess xanthine oxidase inhibitory activities. In the present investigation, morin (3,5,7,2',4'-pentahydroxyflavone), which occurs in the twigs of Morus alba L. documented in traditional Chinese medicinal literature to treat conditions akin to gout, was demonstrated to exert potent inhibitory action on urate uptake in rat renal brush-border membrane vesicles, indicating that this compound acts on the kidney to inhibit urate reabsorption. Lineweaver-Burk transformation of the inhibition kinetics data demonstrated that the inhibition of urate uptake was of a competitive type, with a K(i) value of 17.4 microM. In addition, morin was also demonstrated to be an inhibitor of xanthine oxidase. Lineweaver-Burk analysis of the enzyme kinetics indicated that the mode of inhibition was of a mixed type, with K(i) and K(ies) values being 7.9 and 35.1 microM, respectively. Using an oxonate-induced hyperuricemic rat model, morin was indeed shown to exhibit an in vivo uricosuric action, which could explain, in part at least, the observed hypouricemic effect of morin in these rats. The potential application of this compound in the treatment of conditions associated with hyperuricemia was discussed.

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Hypouricemic action of selected flavonoids in mice: structure-activity relationships.

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Abstract

Hyperuricemia and gout appear to be rapidly increasing worldwide and frequently cause symptoms of metabolic syndrome. Dietary flavonoids have their potential beneficial effects on human health. In the present study, 15 flavonoids (quercetin, morin, myricetin, kaempferol, icariin, apigenin, luteolin, baicalin, silibinin, naringenin, formonoetin, genistein, puerarin, daidzin and naringin dihydrochalcone) were selected to investigate for their hypouricemic action in mice. Oral administration of quercetin, morin, myricetin, kaempferol, apigenin and puerarin at 50 and 100 mg/kg for 3 d was able to elicit hypouricemic actions in hyperuricemic mice induced by potassium oxonate. Luteolin, formonoetin and naringenin showed the significant effects only at 100 mg/kg. Quercetin, puerarin, myricetin, morin and kaempferol significantly reduced liver uric acid level in hyperuricemic animals. In addition, quercetin, morin, myricetin, kaempferol and puerarin exhibited significant inhibition on the liver xanthine oxidase (XOD) activities. It seems to be likely that these flavonoids reduce serum urate levels by mainly inhibiting XOD activity. However, the hypouricemic effect of apigenin observed seemed not to parallel with the changes in liver uric acid level and liver XOD activity, implying that apigenin might act via other mechanisms apart from inhibiting enzyme activity simply. Analysis of the chemical structure showed that a planar structure with the hydroxyl groups played a crucial role in hypouricemic activity of flavonoids. The exact mechanism of the hypouricemic action of flavonoids in vivo should be investigated in the future.