Effects of tuber storage protein of yam (Dioscorea alata cv. Tainong No.1) and its peptic hydrolysates on spontaneously hypertensive rats

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Abstract

Yam storage protein (YSP) was purified from tubers of Dioscorea alata L. Tainong No. 1 (TN1) to homogeneity by DE-52 ion-exchange chromatography. The short-term (24 h) and long-term (25 days) antihypertensive effects of YSP-TN1 and its peptic hydrolyzates (PH-TN1) were measured in spontaneously hypertensive rats (SHRs). For 24-h antihypertensive measurements, SHRs (age 10 weeks, body weight from 240 to 250 g) were administered orally once (YSP-TN1 and PH-TN1, 40 mg kg-1 SHR) to measure the mean blood pressure (MBP), systolic blood pressure (SBP) and diastolic blood pressure (DBP). For a long-term antihypertensive measurement, SHRs (age 12 weeks, body weight from 250 to 270 g) were administered orally once a day for 25 days (YSP-TN1, 40 mg kg-1 SHR) to measure SBP, DBP and MBP. Captopril (10 or 15 mg kg-1 SHR) was used as a positive control. It was found that short-term administration of 40 mg kg-1 SHR of YSP-TN1 and PH-TN1 effectively lowered SHRs' MBP, SBP and DBP (For YSP-TN1, the lowest blood pressure was reached in the fourth hour and for PH-TN1 in the eighth hour). The lasting effects of PH-TN1 on reduced SHRs' BP were better than those of YSP-TN1 for one oral administration. For oral administration of 40 mg YSP-TN1 kg-1 SHR, the reduced MBP was 21.5 mmHg, which was comparable to 25.2 mmHg (the fourth hour) of 10 mg captopril kg-1 SHR oral administration. For oral administration of 40 mg PH-TN1 kg-1 SHR, the reduced MBP was 33.7 mmHg, comparable to 38.4 mmHg (the fourth hour) of 15 mg captopril kg-1 SHR. For long-term 25-day oral administration of 40 mg YSP-TN1 kg-1 SHR once a day, it was found that a feeding trial of YSP-TN1 effectively lowered SHRs' SBP, DBP and MBP. The greatest reduction in SHRs' blood pressure was reached on the ninth day, for the reduced SBP, 27.7 mmHg; for the reduced DBP, 28.3 mmHg; and for the reduced MBP, 27.5 mmHg..