Antihypertensive effects of tannins isolated from traditional Chinese herbs as non-specific inhibitors of angiontensin converting enzyme

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摘要

Abstract

The tannins are natural polyphenols, able to precipitate water-soluble alkaloids and possess an inhibitory action on the angiotensin converting enzyme (ACE). We identified 18 polyphenolic compounds (tannins) from Chinese herbs and examined the in vitro effects of these tannins on ACE activity, including determination of the 50% inhibitory concentrations (IC 50), specificity and mode of inhibition. We also assessed the in vivo inhibitory effect of the tannins on angiotensin I-induced blood pressure elevation in spontaneously hypertensive rats (SHR). Nine tannins with an IC50 < 200 μM for ACE inhibitors were identified belonging to three tannin classes: caffeoylquinates, flavan-3-ols and gallotannins. In vitro, we. found caffeoylquinates chelate the ACE zinc cofactor. Two of the flavan-3-ols: epigallocatechin-3-O-gallate and epigallocatechin-3-O- methylgallate, and one of gallotannin: 1, 2, 3, 4, 6-penta-O -galloyl-β-D -glucose were non-specific inhibitors because also reduced the activity of trypsin and chymotrypsin. The ACE inhibition of 1, 2, 3, 4, 6-penta-O-galloyl-β-D-glucose was also reduced after addition of bovine serum albumin, suggesting a non-specific mode of action. In vivo, 1,2,3,6- tetra -O-galloyl-β-D-glucose and epigallocatechin-3-O- methylgallate had a strong dose-dependent hypotensive effect reducing the blood pressure significantly in the SHR with infusion of the angiotensin I. These findings indicate that some of the tannins isolated from herbs inhibit ACE activity non-specifically. The ACE inhibitory effect of these tannins may explain the hypotensive effects of some traditional Chinese herbs