Angiotensin II type 1 receptor antagonist restores dysfunction of vascular reactivity independent of perivascular adipose tissue-mediated mechanisms in rats with metabolic syndrome

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Perivascular adipose tissue (PVAT) regulates vascular tone. We demonstrated that PVAT masks impaired vasodilation in the mesenteric arteries of SHRSP.Z-*Lepr*^{fa}/IzmDmcr rats (SHRSP.ZF) with metabolic syndrome (MetS); however, this enhanced vasodilation caused by PVAT disappears at around 23 weeks (wks) of age. Therefore, we investigated whether an angiotensin II type 1 receptor antagonist, azilsartan, protects against the deterioration in PVAT compensatory vasodilator function that occurs with aging in MetS.

SHRSP.ZF rats at 13 wks were orally administered azilsartan once daily for 10 wks. The vasodilation response in the superior-mesenteric arteries was determined in the presence or absence of PVAT, using organ bath methods. Azilsartan preserved both acetylcholine- and sodium nitroprusside-induced vasodilation independent of the presence or absence of PVAT, and did not improve the dysfunction in PVAT-mediated modulation of vascular tone in SHRSP.ZF rats.

This study demonstrated that the protective effect of azilsartan is mediated by restoring the endothelium- and vascular smooth muscle-mediated mechanisms, and not by improving PVAT dysfunction in MetS.