Editorial Comment

Renin-Angiotensin System in the Brain as a New Target of Antihypertensive Therapy

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(*Hypertens Res* 2008; 31: 1487–1488)

***Key Words*: renin-angiotensin system of the brain, angiotensin II type 1 receptor, rostral ventrolateral medulla, sympathetic nerve activity, blood pressure**

An important role for the peripheral renin-angiotensin system in hypertension has previously been recognized. Research on the renin-angiotensin system of the brain in the first half of the 1990s performed by Sasaki and Dampney (*1*) and Muratani *et al*. (*2*) indicated that the angiotensin II receptors in the medulla oblongata, especially in the rostral ventrolateral medulla (RVLM), play an important role in the central blood pressure regulation. For this reason, it is now possible to study the connection to hypertension. We also reported that angiotensin II type 1 receptors (AT1R) in the RVLM may have an important role in the onset and maintenance of essential hypertension and salt-induced hypertension (*3*, *4*). Moreover, the connection between the renin-angiotensin system in the hypothalamus and RVLM and the activities of sympathetic nerves and oxidant stress has recently drawn attention not only for its relationship to essential hypertension but also to insulin-resistant hypertension and obesity. In the clinic, AT1R blockers have recently been reported to be an effective treatment for patients with impaired cognitive functions (*5*), and may suppress the onset of Alzheimer's disease in such patients (*6*). It is possible that ATIR blockers have a suppressive effect on the brain's renin-angiotensin system. Administration of AT1R blockers may decrease peripheral sympathetic nerve activity through suppression of the renin-angiotensin system in both the periphery and brain. These drugs also have a suppressive effect on cardiac events (*7*, *8*), and may have a preventative effect on the onset and progression of hypertension through the suppression of the renin-angiotensin system in both the periphery and brain.

In the Oshima *et al*. paper (*9*) in the previous issue of *Hypertension Research*, the existence of a simple neuronal connection between the RVLM and pre-synaptic neurons of the sympathetic nervous system was proven from the RVLM-triggered spikes and the spike-triggered average occurrence while simultaneously performing extracellular and whole-cell patch clamp recordings. Recording performed following perfusion of angiotensin in the same region as this connection suggested that, through this channel, angiotensin II in the RVLM is involved in peripheral sympathetic nerve activity and blood pressure regulation. The importance of the renin-angiotensin system in the brain has been proven anew with the recognition of an important role for angiotensin II in the blood pressure regulatory system through the output of peripheral sympathetic nerves from the RVLM. It can be said that a new road for future studies in this region and methods for the treatment of hypertension have been opened.

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Received July 25, 2008.

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