Increased systemic level of angiotensin II promotes adult hippocampal neurogenesis

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Running exercise enhances adult hippocampal neurogenesis in rodents. The enhancement is known to be blocked by administration of an angiotensin II (AII) type I receptor antagonist, losartan, suggesting that AII is somehow involved in the exercise-induced neurogenesis. To clarify whether circulating AII promotes adult hippocampal neurogenesis, we examined bromodeoxyuridine (BrdU) labeled cells in the rat hippocampus following the intravenous administration of AII. Compared to the control animals which received only the saline injection, the AII-injected animals showed 1.5 times more BrdU-immunopositive cells in the hippocampus. To examine the change of circulating AII level, we employed ELISA of blood samples drawn from animals before and after the running exercise, and found that systemic AII level after the exercise was about two times as much as before. Endothelial cell growth factor (VEGF) is another factor which stimulates the hippocampal neurogenesis. Because AII is known to stimulate VEGF release, we also measured the systemic VEGF as well but it was not noticeably changed. Taken together, these results suggest that circulating AII is a key factor for the exercise-induced hippocampal neurogenesis.