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Expression of Prorenin Receptor and Central Mechanism of Salt Metabolism

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Summary

(Pro)renin receptor ((P)RR), a specific receptor for renin and prorenin, is a 350 amino-acid protein with a single transmembrane domain. The aim of the present study is to clarify expression of (P)RR in human brain and pituitary, and brain tissues of spontaneous hypertensive rats (SHR). The study was approved by the Ethics Committee of the Tohoku University Graduate School of Medicine. Human brain and pituitary tissues were obtained at autopsy. Brain tissues were obtained from 8-week-old and 16-week-old SHR and age-matched Wistar-Kyoto rats (WKY) (n = 5 per each). Quantitative RT-PCR showed that (P)RR mRNA was expressed in every region of human brain examined and pituitaries, with the highest expression levels found in the frontal lobe and pituitary. Immunocytochemistry showed that (P)RR was expressed in the paraventricular and supraoptic nuclei of human hypothalami, and co-localized with arginine vasopressin or oxytocin in the magnocellular neurons of these nuclei. Almost all cell types of anterior pituitary cells were positively immunostained for (P)RR, whereas expression of (P)RR was very low in the posterior lobe. Expression levels of (P)RR mRNA and renin mRNA in the brain were significantly elevated in SHR when compared with WKY at both 8 weeks and 16 weeks. These findings raised the possibility that (P)RR may play important (patho)physiological roles in the central control of water-electrolyte metabolism, blood pressure and pituitary hormone secretion.