74) Effects of DOCA and Salt Overloading on the Content of α -Rat Atrial Natriuretic Polypeptide-like Immunoreactivity in Rat Atrium. Makoto Sakamoto¹, Kazuwa Nakao^{1,2}, Akira Sugawara¹, Narito Morii¹, Mitsuaki Suda¹, Masanori Shimokura³, Yoshiaki Kiso³, Masahiro Kihara⁴, Yukio Yamori⁴, and Hiroo Imura¹. ¹Second Division, Department of Medicine, Kyoto University School of Medicine, ²Radioisotope Research Center, Kyoto University, ³Department of Medicinal Chemistry, Kyoto Pharmaceutical University, Kyoto and ⁴Department of Pathology, Shimane Medical University, Izumo.

Mammalian atrial cardiocytes have specific granules which show morphological resemblance to secretory granules observed in endocrine cells. de Bold (Proc Soc Exp Biol Med 161: 508, 1979) and Marie et al (Pathol Biol 24: 594, 1976) reported that atrial granularity changed in some experiments that modified salt and water balance, suggesting these specific atrial granules may be involved in salt and water balance.

Recently, accumulating evidence indicates that mammalian atria contain multiple forms of natriuretic factors of peptide nature which cause natriuresis and diuresis.

α -rat atrial natriuretic polypeptide (α -rANP) is one of bioactive peptide purified from rat atrium. α -rANP consists of 28 amino acids and is a counterpart of α -human atrial natriuretic polypeptide (α -hANP) isolated from human atria by Kangawa and Matsuo (Biochem Biophys Res Commun 118: 131, 1984) and corresponds to the C-terminal 28 amino acids of β -rANP(5K) and γ -rANP (13K). Currently, using a common C-terminal fragment of α -hANP and α -rANP, we have set up a sensitive and specific radioimmunoassay (RIA) for α -ANP which can recognize common C-terminal 5 amino acids of α -hANP and α -rANP. (Nakao et al: Biochem Biophys Res Commun in press, 1984, Sugawara et al: This Meeting, 1984). In order to elucidate the possible physiological role of these atrial natriuretic polypeptides in fluid and electrolyte balance, we have studied the effects of DOCA and salt loading on the content of α -rANP-like immunoreactivity (α -rANP-LI) in the rat atrium using the RIA for α -ANP.

Male Wistar rats (B.W. 200 g) were divided into 4 groups, I: control, II: DOCA and tap water for drinking fluid, III: DOCA and 1% NaCl for drinking fluid, IV: DOCA and 2% NaCl for drinking fluid. DOCA (at a concentration 2.5 mg/100 g/day) was administered subcutaneously for 3 weeks. Right and left auricles, non-auricle part of the atrium and ventricle were dissected immediately after killing. Tissue extraction was performed in 50 volumes of 1 M acetic acid containing 20 mM HCl after boiling for 5 minutes.

The total contents and concentrations of α -rANP-LI in atria of four groups of rats are depicted in the table. The total contents of α -rANP-LI in atria of group II, III and IV were significantly lower than that of group I. From group I to IV, the total α -rANP-LI contents decreased progressively. The concentration of α -rANP-LI in the atrium of group III was significantly lower than that of group I and the similar decrease in the α -rANP-LI concentration was observed in each three part of the atrium of group III.

These observations are consistent with the previous finding that DOCA and salt loading led to hypogranularity in the rat atrium, suggesting that atrial natriuretic polypeptides may play an important physiological role in body fluid and volume homeostasis.

Group	Content $\mu\text{g/atrium}$	Concentration ng/mg
I Control	8.67 ± 0.68 (100 %)	93.1 ± 9.80 (100 %)
II DOCA	$6.80 \pm 0.33^*$ (78.4%)	73.0 ± 3.96 (78.4%)
III DOCA + 1% NaCl	$5.21 \pm 0.22^{**}$ (60.1%)	$45.7 \pm 6.07^{**}$ (49.1%)
IV DOCA + 2% NaCl	$3.47 \pm 0.70^{**}$ (40.4%)	57.6 ± 16.9 (61.9%)

* $p < 0.05$, ** $p < 0.01$

Mean $\pm$ SE