28) Enterochromaffin Cell in SHR
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SUMMARY For the purpose of comparing the number of enterochromaffin cell (EC cell) between the prehypertensive stage of SHR and normotensive WKY, the EC cell of the intestine was examined under the light and electron microscopy. The number of argyrophil cells of SHR were higher than that of WKY at each age of 3, 10, 30 days old. Moreover, the number of endocrine cell and the percentage of EC cells among endocrine cells of the intestine increased gradually after birth in SHR.

INTRODUCTION It has been considered that the dysfunction of the central nervous system should be a cause of essential hypertension. The possibilities of participation of the noradrenergic and serotonergic neurons in the brain have been proposed for the reason under the basis of experimental evidence. Although the number of papers concerning noradrenergic neurons the central and peripheral nervous system have been reported, the studies for serotonergic neurons were few. Enterochromaffin cells of the gastrointestinal tract, possessing 90% of total amount of serotonin produced in the body, are one of the APUD (Amine and Amine precursor Uptake Decarboxylation) series which enclose pituitary, adrenal medulla, sympathetic ganglion, etc. Dysfunction and or hyperfunction of the APUD series have been pointed out for the pathogenesis of hypertension in SHR. The present study concerns the number and the classification of endocrine cells in the intestine of SHR and WKY investigated by light and electron microscopic procedures.

METHOD Animals were used at the age of 3, 10, 30 days each. Each groups consist of 5 animals. Doudenum, jejenum (oral, mid, anal), ileum (oral, mid anal), cecum and transverse colon were briefly observed. Tissue sections of those organs were stained with Grimmelius' method and counted the number of argyrophil cells per 0.25mm² each. A hundred of high-power field (×400) which were chosen at random from each specimen were examined and the number of argyrophil cells were composed from that of each portions. The distributions of EC cells were studied of each portion of SHR and WKY at the same age. Electron microscopically, the proportion of EC cells among endocrine cells in the doudenum and the transverse colon was examined on 4 animals of SHR and WKY each at the age of 10 and 30 days old.

RESULTS The number of argyrophil cells increased with age in SHR, whereas that increased by 10 days old but thereafter decreased until 30 days old in WKY. The distribution of argyrophil cells in SHR was more than that in WKY at the anal position of the jejunum, oral side of the ileum and the transverse colon at 3 days old, the doudenum and the oral side of the jejunum at 10 days old, the cecum and the transverse colon at 30 days old, respectively. Classifying the endocrine cells by electron microscopy, the percentage of EC cells of the doudenum in SHR was smaller than in WKY at 10 days old, although that in SHR was higher than in WKY at 30 days old. The percentage of the transverse colon in SHR was not different from in WKY at 10 and 30 days old each.

DISCUSSION This study provided that SHR at the prehypertensive stage revealed much more EC cells than in WKY. It is well known that plasma 5-HT concentration increase in patient of carcinoid tumor. Five-HT uptake by the platelets in patients or animals with essential hypertension was significantly lower in comparison with that in control, so that the activation of platelet or others to release of 5-HT must be accelerated. Thus it is suggested that the volume of free 5-HT in SHR may be greater than in WKY. Also it was proposed that in several models of chronic hypertension the responsiveness of the blood vessel wall to the vasoconstictor properties of 5-HT and a delayed tachyphylaxis to the monoamine might be partially increased. These results indicate that abnormal increase of the number of EC cell may provide and maintain so-called essential hypertension in SHR.