Distribution of somatostatin in the rat central nervous system. I. Ontogenical aspects.

Kenichi TAKATSUKI, Sadao SHIOSAKA, Masahiro SAKANAKA, Shinobu INAGAKI, Hiroshi TAKAGI, Emiko SENBA and Masaya TOHYAMA
Dep. of Neuroanat. Inst.of Higher Nerv. Act. Osaka Univ. Med. School. Osaka

Ontogenical development of rat central somatostatin(SRIF) neuron system was investigated by immunohistochmistry. I. Lower brain stem; A number of SRIF cells were found in the various areas at neonatal rat, such as n.prep. hypoglossi, n.ret.lat., cochlear nuclei, n.lemn.lat., n.cuneuform., n.ret.teg.pontis., n. laterodorsalis teg., n.parabrachi. colliculi posterioris, n. tr. solitarii (nts)and locus coeruleus(LC) etc. Majority of them could be seen during fetus. In addition to these nuclei, a significant number of SRIF neurons were found in inferior colliculus, n.supragen fasc., etc. up till 12 th days. From that time, most of them except nts and LC lost their immunoreactivity as they grew. II. Forebrainand upper brain stem; In the fetus, some SRIF cell were found in n.amyg., olfactory bulb, etc. Between 0 and 12 days, a number of SRIF cells occurred in the various cortical and subcortical areas. Afterward, although it seems that their immunoreactivity decrease slightly, they maintain their immunoreactivity even in the adult rat.

Experimental analysis of the fiber connection of the peptidergic systems in the central nervous system of the rat. I.

Masahiro SAKANAKA, Sadao SHIOSAKA, Shinobu INAGAKI, Kenichi TAKATSUKI, Emiko SENBA, Hiroshi TAKAGI and Masaya TOHYAMA
Department of Neuroanatomy, Osaka University Medical School, Osaka

Recent our immunohistochemical studies demonstrated that stria terminalis(ST) contains a number of somatostatin(SRIF) and substance P(SP) fibers. In this study, we have attempted to elucidate the origins and terminal fields of these peptidergic fibers in ST of the rat. After transection of ST between corpus amygdaloideus(AM) and hypothalamus(HP), the fluorescent fibers disappeared on HP side, while on AM side, a number of peptide accumulating fibers were found. These facts suggest that these peptides might be supplied by AM. Subsequent to destruction of n. amygdaloideus centralis (AC), remarkable changes occuured. As to SP, SP fibers in the bed nucleus of ST (STB) and lateral hypothalamus (LH) decrease remarkably on the operated side. On the other hand, the destraction of AC resulted in remarkable decrease of SRIF positive fibers in LH and ventro-lateral part of anterior hypothalamic nucleus (LAH), but no reduction of SRIF fibers in STB was identified. These facts indicate that (1) SRIF neurons in AC mainly innervate LH and LAH via ST, and (2) SP neurons in AC, ATB and LH via ST.

Correlative Ontogenic Development of Catecholaminergic Terminals and Somatostatin Terminals in the Rat Median Eminence

Y. IBATA, N. TANI, H.L.OBATA, S. KUBO, H. KINOSHITA, Y. SANO, *K. FUKUI, **M. FUJIMOTO,***K. WATANABE
Dept. Anat., *Dept. Psychiatry, **Dept. Neurosurgery, Kyoto Pref. Univ. Med., ***Dept. Anat., Fukui Medical School.

Time lapse studies on the correlative appearance of catecholamine and somatostatin nerve endings in the rat median eminence were carried out by combined application of fluorescence histochemistry and immunohistochemistry on the same tissue sections. Immunoreactive substances for somatostatin were already detected on 1st postnatal day in the lateral part of the external layer of the median eminence(ME). They gradually increased their density according to the maturation and remarkable amount of them were found on 7th postnatal day.

On the other hand, catecholamine terminals first appeared on 7th postnatal day in the lateral part of the external layer of the ME where somatostatin terminals were also distributed. Therefore it was at this stage that these two kinds of nerve terminals showed first evidence of correlative distribution, although their densities were still low. Both of them became to show closely correlative distribution in the whole external layer of the ME at 14th postnatal day.

Comparative anatomy of somatostatin cells in the retina of various vertebrate from teleosts to mammals

Ichiro ISHIMOTO, Masakatsu FUKUDA, Yasuaki KUWAYAMA, Yoshiki SHIMIZU*
Sadao SHIOSAKA, Shinobu INAGAKI, Kenichi TAKATSUKI, Masahiro SAKANAKA, Hiroshi TAKAGI, Emiko SENBA and Masaya TOHYAMA
Dep. Ophthal*, and Neuroanat. Osaka Univ. Medical School, Osaka

Development of somatostatin(SRIF) cells in the retina from fish to rat was investigated by immunohistochemistry.

In the fish, some SRIF cells were seen in the innermost part of the inner granular layer(IG). Most of them were medium to large in size. The fibers from these cells ascend vertically innerplexiform layer(IP) to reach the border zone between IP and IG layers. In the amphibia and reptile, as well as teleosts, the development of SRIF cells remains immature.

In the birds and mammals, SRIF system in retina developed much more developed than those of lower vertebrates. SRIF cells and fibers increase remarkably in number. SRIF cells are mainly seen in middle part of IG. SRIF fibers in the IP compose three fiber band.

Thus, the present study clearly demonstrated that SRIF cell system in higher vertebrates are much more developed than that of lower vertebrate, suggesting that SRIF cells in retina might have close relationship with phylogenetical development of vertebrate retina.