506 DISTRIBUTION OF NITRIC OXIDE SYNTHASE IMMUNOREACTIVE NERVE FIBERS IN THE RAT NASAL MUCOSA.

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In our previous report, we have demonstrated a dense distribution of nicotinamide adenine dinucleotide phosphate diaphorase (NADPH-d) active nerve fibers in the rat nasal mucosa with a histochemical procedure. Recent studies have revealed that nitric oxide (NO) has many significant biological roles, such as relaxation of smooth muscles of the blood vessels, mediating the cytotoxic action of macrophages and neurotransmission.

The present study utilized an antibody to nitric oxide synthase (NOS) to identify NO neurons in the rat nasal mucosa at light and electron microscopic level. NOS immunoreactive nerve fibers were distributed around blood vessels, acini of seromucous glands and in the subepithelial layer of the nasal mucosa. Many neurons in the pterygopalatine ganglion were labeled, and a few smaller neurons were stained in the trigeminal ganglion. By electron microscopy, NOS immunoreactive varicosities were in close contact with both the acinar and duct epithelial cells in seromucous glands and the smooth muscle of the arterioles, the pericyte of venules and capillaries. Thus, NOS immunoreactive nerves may have a major role in the nervous control of exocrine function, microcirculation and probably in the sensory mechanism of the nasal mucosa.

507 LOCALIZATION OF NITRIC SYNTHASE IMMUNOREACTIVITY IN GUINEA PIG HEART

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Nitric oxide (NO) has recently been identified as a novel messenger molecule in a number of neuronal and non-neuronal tissues. Our previous studies demonstrated the existence of NO synthase (NOS) in guinea pig heart using NADPH-diaphorase activiy (Cell Tissue Res. in press). However, whether or not NOS containing neurons have direct synaptic contacts with other ganglionic neurons in the cardiac ganglia is unknown. The present immunocytochemical study utilized an antibody to NOS to investigate the localization of NOS in the guinea pig heart at light and electron microscopic level. Intracardiac ganglia containing NOS-immunoreactive neuronal cell bodies were located in four main regions: In association with the superior and inferior vena cavae, the points of entry of the pulmonary veins and within the interatrial septum. By electron microscopy, ganglionic neurons in the left atrium, near the openings of the pulmonary veins, were round in shape and had a few spine-like processes. NOS immunoreactive axons with varicosities were found surrounding non-immunoreactive perikarya forming axo-somatic or axo-spinic synapses. Postsynaptic density was clearly observed in the spine-like processes of the ganglionic neurons. The present results raise the possibility that nitric oxide plays a role in the neural control of the heart through synapses in the cardiac ganglia.

508 IMMUNOHISTOCHEMICAL DEMONSTRATION OF SENSORY RECEPTORS IN MYENTERIC GANGLIA OF THE RAT ESOPHAGUS.

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Immunohistochemistry using an antiserum to spot 35-calbindin has been used in the rat esophagus. Immunoreactivity for spot 35-calbindin was found in the laminar or pleomorphic nerve endings which were located surrounding the myenteric ganglia. The ganglia containing the nerve endings were abundant in the upper portion of the esophagus. In order to determine the origin of the laminar nerve endings, retrograde tracing experiments were carried out. After Fast Blue (FB) was injected into the cervical portion of the esophageal wall, some FB-labelled neurons were detected in the nodose ganglia, but very few or none in the spinal ganglia(C1-T13). In addition, more than 80% of FB-labelled neurons found in the nodose ganglia showed spot 35-calbindin immunoreactivity. These results show that the majority of the nerve fibers forming the laminar endings immunoreactive for spot 35-calbindin were derived from the nodose ganglia and suggest that the laminar nerve endings may serve as sensory receptors in the control of esophageal motility.