

Peptides which are possibly related to the non-cholinergic, non-adrenergic division of the autonomic nervous system have been identified by immunofluorescence in the digestive system of mature sheep. Vasoactive intestinal polypeptide-, substance P-, and bombesin-like immunoreactivity were localized in neural elements throughout the ovine gastrointestinal tract (g.i.t.). Vasoactive intestinal polypeptide-like immunoreactivity (VIP-l.i.) was demonstrable in the submaxillary, parotid and the sublingual salivary glands close to small blood vessels and the acini. VIP-l.i. was also demonstrable in the upper oesophagus in connective tissue near small blood vessels. In the forestomachs, abomasum, and small and large intestines reactive fibres were present in the mucosa, submucosa, smooth muscle layers and the plexuses. The plexuses also contained reactive nerve cell bodies. VIP-reactive fibres were found in the pancreas, the gall bladder and the common bile and pancreatic duct but were not found in the intestinal mesentery, portal vein, and liver tissue. Substance P-like immunoreactivity (SP-l.i.) was demonstrable in nerve fibres in all the layers of the g.i.t. and in nerve cell bodies in the gut plexuses. The pancreas and the gall bladder also contained a few scattered fibres. Additionally, SP-l.i. was present in open-type endocrine cells throughout the mucosa of the small and large intestines but no SP-l.i. was found in the salivary glands or the oesophagus. Bombesin-like immunoreactivity (B-l.i.) was associated with nerve fibres and was demonstrable in the mucosa and myenteric plexuses throughout the g.i.t. B-l.i. in the smooth muscle appeared to be restricted to nerve fibres in the forestomachs, the abomasum, and the upper small intestine. No B-l.i. was found in the salivary glands, oesophagus, liver tissue, pancreas, gall bladder or intestinal mesentery.