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Synaptic marker proteins as useful tools in the study of neural control on peptidergic neurons

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Based on three-dimensional visualisation of certain peptidergic neuron populations described recently in Drosophila central nervous system, putative dendritic and axonal parts of their arborisation have been identified, but their synaptic inputs regulating their secretion activity remained mainly unknown. Using GAL4/UAS-directed gene constructions we made an effort to refine spatial characteristics of two identified peptidergic neuron populations: crustacean cardioactive peptide-containing and c929-positive cells (c929 marks the presence of a typical peptide synthesyzing enzyme in the majority of peptidergic cells). Further, driving GFP-synaptic marker gene expressions in these cells we tried to map putative pre- or postsynaptic sites. Applying confocal laser scanning microscopy, we largely improved success of documentation presenting more complete maps on labelled structures than those published before. Our results partially support earlier observations on neuronal in- and output compartmentalization. To gain direct proof of synaptic control, immune electron microscopic experiments have been started. Peptides could act both synaptically and via volume transmission also extrasynaptically, thus exploration of peptidergic receptor distribution is essential to learn exact space of peptide transmitter liberation and action. Role and rate of classical synaptic activity and extrasynaptical modulation controlling secretion activity of peptidergic neurons needs further investigation.