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Questions of the segregated transmission of information of different modalities and the related segregation of function in the striatum have been of significant interest in recent anatomical and neurophysiological studies [6, 11, 22]. Determination of the topographical organization of projections of the basal ganglia in monkeys led to the identification of a series of functional circuits, which start in the regions of the cortical fields, pass through various regions of the basal ganglia, then through the thalamic nuclei, and finally return to the cortex [6].

The interactions of these circuits have also attracted considerable attention, with an ever-increasing body of data obtained from electron microscopic, electrophysiological, and biochemical studies [4, 5, 13, 21-23]. Of particular importance are studies of the interaction of information flows in the basal ganglia, these starting from structures related to the limbic and motor systems; this interaction is required for production of adaptive behavior [17]. The basolateral nucleus of the amygdaloid body, where different types of sensory information converge, plays an important role in motivational and emotional behavior, and represents a connection between the sensory and executive systems [23]. Morphological and electrophysiological experiments have established that many behavioral responses involving motor, cognitive, and emotional functions depend on interactions of the amygdaloid body with the striatum, which can be regulated by midbrain dopaminergic neurons, and occurs in the ventral striatum [17, 19]. Understanding of the function of the basal ganglia requires detailed knowledge of the organization of the projections at all levels of these circuits and of the morphological basis of their interaction. Anatomical data in rats and cats have demonstrated that it is possible to resolve functionally distinct circuits and their interactions [2, 7]. Although dogs are generally used in complex behavioral experiments, they are rarely used in neuroanatomical studies, with the result that there are few data on the connections of the basal ganglia with the amygdaloid body and midbrain dopaminergic structures in the dog, and little is known of the spatial organization of these connections. Only the projections of these structures to the caudate nucleus have been studied in dogs [1]. The organization of the projections of these structures to another striatum formation, the putamen, which is heterogeneous in terms of morphology, neurochemistry, and functional characteristics [1, 12, 18, 21], have not been studied in carnivores.

The aim of the present work was to use retrograde axon transport of horseradish peroxidase (HRP) to study the organization of the projections of the amygdaloid body, ventral tegmental area (VTA), and substantia nigra (SN) to different segments of the putamen in dogs.

MATERIALS AND METHODS

Studies were carried out using 12 adult mongrel dogs. Animals were premedicated with Promedol (0.5 ml/kg) and were anesthetized with hexenal and, in sterile conditions, a Hamilton microsyringe was used according to stereotaxic atlas coordinates [9] to inject 0.15-0.23 μl of 40% aqueous HRP (Boehringer, Federal Republic of Germany) into the dorsal and ventral segments of the rostral (atlas frontal levels 30.5-26.5), intermediate (26.0-21.0), and caudal (20.5-15.5) parts of the putamen.
RESULTS AND DISCUSSION

Results on the distribution of marked neurons in structures of the VTA-SN complex following administration of HRP into different parts of the putamen are shown in Table 1 and Fig. 1. Since the distribution of labeled cells in subcortical structures of dogs was generally similar when marker was given into the intermediate and caudal segments of the putamen, the results were combined to form groups 3 and 4.