

# **Sensorimotor integration underlying prey-catching behavior of the frog**

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**Klinikai orvostudományok: Fogorvostudományi program**

Applying different neuronal labeling techniques we have studied the morphological background of the sensorimotor system underlying the control of prey-catching behaviour in the frog.

We have mapped the dye-coupled granule cells related to the nerves of individual labyrinthine organs and of dorsal root fibers of limb-innervating segments of spinal cord. The difference in the extension of territories of the vertical and horizontal canals may reflect their different involvement in the vestibuloocular and vestibulospinal reflexes. We could demonstrate only slight overlap between dye-coupled cells related to the lagena and saccule and the termination area of the utricular fibers in rostrocaudal direction. This separation is supportive of the dual function of the lagena and the saccule. We have described that the territories of granule cells related to the cervical and lumbar segments of the spinal cord were almost completely separated along the rostrocaudal axis of the cerebellum. In spite of the partial segregation we demonstrated a significant overlap in the related areas of termination that suggests a remarkable convergence of the afferent input of the vestibular and proprioceptive fibers on the cerebellar granule cells.

Applying BDA injection into the dorsomedial and ventrolateral subnucleus of the hypoglossal nerve we have examined the distribution and morphological features of the last-order premotor interneurons related to the protractor and retractor muscles of the tongue. We have described that the majority of them were distributed ipsilateral to the site of injection and extended in rostral and caudal directions. Labeled neurons related to the protractor muscles were found mainly in the rhombencephalic reticular formation, whereas labeled neurons related to the retractor muscles were located mainly in the intermediar gray matter of the caudal brainstem and cervical spinal cord. We could demonstrate morphologically heterogenous populations of the last-order premotor interneurons that suggest the different origin of their afferent inputs. These results strengthen the earlier studies that suggest indirect transmission between the tectum opticum and the hypoglossal motor neurons.

Our experiments revealed that the convergence of sensory modalities related to the tectum opticum, vestibular system, proprioceptors and cerebellum has a significant importance during the coordination of the prey-catching and feeding behaviour. These results can help to understand the underlying sensory and motor processes of different behavioural reactions.

**Key words:** sensorimotor integration, neuronal labeling, brainstem, vestibular system cerebellum, hypoglossal nucleus