

The feline "peripulvinar" nucleus

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The mammalian thalamus is embraced rostrally and laterally by a thin sheath of neurons, the thalamic reticular nucleus (TRN). The TRN is perfectly suited to monitor the entire thalamo-cortico-thalamic information exchange through the axon collaterals given off by the crossing ascending and descending fibers. In addition, the TRN can modulate the function of the thalamus through its powerful inhibitory projections to thalamic cells.

In the cat's TRN, an internal and an external tier can be discerned. It has been recently discovered that both tiers form modality specific sectors (e.g. visual, somatosensory etc.) and innervate selectively their thalamic counterparts. Furthermore, a well-established functional difference is known between the two layers of the TRN around the dorsal lateral geniculate nucleus (dLGN). The response of TRN cells in the outer tier depends more on cortical innervation, than on thalamic one, whereas the inner tier (or perigeniculate nucleus; PGN) responds better to optic nerve stimulation. It would be quite interesting to learn whether other sectors of TRN belonging to other thalamic nuclei show similar duality. In order to examine this problem, the visual sector of the feline TRN has been stained with various chemoanatomical markers and then the pulvinar (PUL) has been injected with neuroanatomical tracers.

Histochemical reactions against an intracellular cytoskeletal protein (SMI-32) and an extracellular matrix component (Wisteria floribunda agglutinin, WFA) were used to detect the layers of the TRN around the PUL. Whereas the WFA-binding labeled the perineuronal net around reticular perikarya and major dendrites, the SMI-32-immunoreaction stained quite intensely the perikarya and their dendrites till the distal portion providing a state-of-the-art morphological stain. Both markers, however, could visualize the typical fusiform reticular neurons. Curiously, the WFA-labeled neurons in the outer tier were larger than those in the inner tier, moreover the outer tier proved to be thicker than a rather slim inner one attaching really closely to the thalamus. These findings resulted in an apparent stronger WFA-staining in the outer layer around both the PUL and the dLGN. The SMI-32-immunoreaction detected this size difference of reticular neurons, as well.

Following a retrograde tracer injection into the PUL, two streaks of neurons were labeled in the TRN exclusively aside the PUL revealing a previously unknown reticular sector. Similarly to the dLGN, it seems that two TRN tiers exist laterally from the PUL specifically dealing with this thalamic nucleus. The location, chemoanatomy, and connections of this bilaminar TRN sector around the PUL resembled closely to the dLGN's one. Therefore, we propose to distinguish the outer tier around the PUL as TRN 'proper' and the inner tier as "peripulvinar" nucleus.

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Developmental redistribution of phototransduction proteins and modulating molecules in the hamster retina

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The Syrian hamster (*Mesocricetus auratus*) is born blind. The newborn hamster retina is immature and exhibits a special structure. Following continuous maturation of the retina its structure becomes similar to that of the adult by day 14, when the eyes open. Our study aims at the distribution changes of the phototransduction cascade participants and modulators during the retinal development. During the lifetime of the rod cell, the supplement of rhodopsin is achieved by a continuous vesicular transport, from the cell body to the connecting cilium. The synthesis takes place in the cell body and the proteins are transported to the site of phototransduction, the outer segment. Caveolin-1 is a well-known organizer protein of polarized transport, which may suggest a role for detergent-resistant lipid rafts in the recruitment and formation of signaling complexes within photoreceptor outer segments. Our observations show that the distribution of these molecules changes in parallel