Volume 51(Suppl.1) 2007
Acta Biologica Szegediensis
http://www.sci.u-szeged.hu/ABS

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.

Supported by the "Fight for Sight", NY (#03055) grant to ZBB.

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

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The Sirian 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 continous 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 organiser protein of polarised 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 that the distribution of these molecules changes in paralell with the eye opening and the initiation of vision. We present additional evidence, that the localisation of caveolin-1, src, rhodopsin-kinase and rhodopsin show a similar pattern. The arrangement is similar not only at the location of the synthesis, but also during the intracellular transport. Double-label immunocytochemistry and immunoprecipitation were used to prove the colocalization of these molecules. Since caveolin-1 and src, typical components of lipid rafts, are also associated with this complex, presumably these molecules are connected by lipid rafts and their transport to the outer segments is modulated by caveolin-1. This latter protein may also have a role in the regulation of phototransduction.

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Anatomical features of the aberrant extensors to the index finger and its clinical importance

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Independent ability to extend the index is necessary to know the existence of some variant muscles including, extensor indicis proprius (EI), extensor medii proprium (EMP) and extensor indicis medii proprium (EIMP) to the index finger. The EI, EMP and EIMP transferred for conditions such as lost function as a result of trauma, rheumatoid arthritis, ulnar nerve palsy, cervical spinal cord injury, and hypoplasia of the thenar muscle.

Fifty-four dissected hands were examined to study of the aberrant extensor tendons to the index finger. The aberrant tendons were classified the arrangements into six types from A to F.

In all 54 hands, a tendon originated from EI muscle belly and was inserted into unlar side of the extensor digitorum (EDC) tendon for the index finger at the level of the metacarpal head. In 36 specimens (66.7%), only this tendon was found, and thus this type regarded Type A. In Type B, both of the bifurcated slips were situated on the unlar side of the EDC tendon of the index finger in one case (1.85%). In four specimens (7.4%), the aberrant second tendon attached to the radial side of the dorsum of the index finger in Type C. In Type D, the radial tendon in the other case bifurcated at the middle level of the metacarpus specimens in two (3.7%) specimens. One of these sleps was inserted into the radial side of the dorsum of the index finger. The other attached to the tendon of the extensor pollicis longus. In Type E, the Type D was added the EMP in two specimens (3.7%). In Type E, the supernumerary tendon as EMP was Type A in nine specimens (16.6%). In 12 hands (22.2%), the tendons of EMP was found. The EIMP was detected in a specimen (1.85%).

The existence of the supernumerary tendons of the index fingers is more frequently encountered on the ulnar side of the extensor digitorum-index than on the radial side. Knowledge of variant muscles and tendon multiplicity has clinical importance in cases of traumatized hand requiring tendonplasty or tendon transfer operations.

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