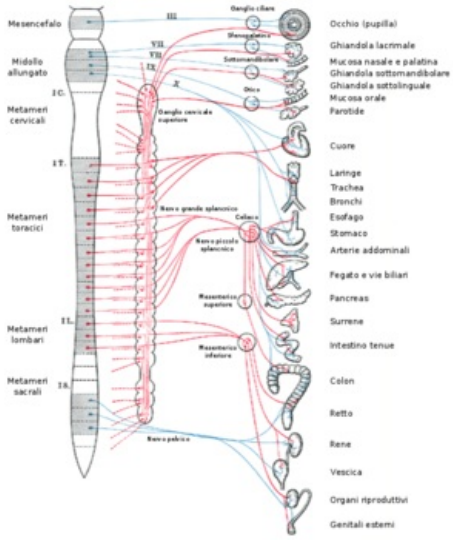
Head parasympathetic

The cranial parasympathetic is part of the parasympathetic autonomic nervous system. The system contains **visceromotor** and **viscerosensitive** fibers, ensures the perception of visceral pain and is an important afferent pathway for some reflexes (coughing, voiding, etc.). The mediator is **acetylcholine**.



Sympathetic (red) and parasympathetic (green)

Nuclei and functions

The parasympathetic in the head region originates from several nuclei in the brainstem, mesencephalon and rhombencephalon:

Nucleus oculomotorius accessorius

- ((Edinger-Westphal) – parasympathetic nucleus of the n. oculomotorius
- stored in the mesencephalon
- **preganglionic** vfibers *ramus ad ganglion ciliare* to ***ganglion ciliare*** *(Schacheri)* via *r. inferior nervi oculomotorii*
- **postganglionic** fibers conduct as *nn. ciliares breves* to the eyeball, where they innervate the*m. sphincter pupillae* together with **m. ciliaris**
- **function:** parasympathetic fibers cause miosis (narrowing) and near lens accommodation, sympathetic fibers mydriasis (dilatation)
- ***ggl. ciliare*** also receives sensitive fibers from the eyeball that innervate the cornea

Nucleus salivatorius superior

- the dorsal nucleus of the ***n. facialis*** located in the rhombencephalon in the center of the *fossa rhomboidea*
- **preganglionic** parasympathetic fibers follow the path of:

- **ganglion pterygopalatinum** in the *fossa pterygopalatina* below the *basis cranii externa*

1. ***n. petrosus major***, which reaches the *ganglion pterygopalatinum (Meckeli)*, connects here and continues **postganglionic** through *n. zygomaticus* and a connector to *n. lacrimalis*. It innervates the lacrimal glands, the mucous membranes of the nasal cavity and the mucous glands and vessels of the hard and soft palate.
2. *n. petrosus profundus* – sympathetic fibers from the plexus caroticus internus

the connection creates the *n. canalis pterygoidei*, which through the *canalis pterygoidei* directs to the *ggl. pterygopalatinum*

Viscerosensitive taste fibers from the *isthmus faucium*, so enter it, but they just pass through the ganglion and go to the *n. facialis* and through it to the *ncl. tractus solitarii*

1. ***chorda tympani***, together with the parasympathetic, sensory fibers of taste also lead, enter *n. lingualis* (branch of n. V) and the *ganglion submandibulare*, **postganglionic** innervation includes the sublingual and submandibular salivary glands

- **ganglion submandibulare** – 2–3mm, at the upper edge of *gl. submandibulare* under the *n. lingualis*, the *rami ganglionares ad ganglion submandibulare* separates from *n. lingualis*

- **function:** parasympathetic stimulates the secretion of the mucous glands of the nasal cavity, palate, oral cavity and salivary glands *(sublingual* and *submandibular)*

Nucleus salivatorius inferior

- nucleus of the *n. glossopharyngeus* nerve in the brainstem below the base of the 4th cerebral ventricle at the interface of the *medulla oblogata* and pons
- **preganglionic** fibers go in the *n. tympanicus* passing through the middle ear cavity, it receives sympathetic fibers *nn. caroticotympanici*, continues as *n. petrosus minor* up to *ganglion oticum (Arnoldi)* at *n. mandibularis*
- **Postganglionic** to the *n. auriculotemporalis* for the **glandula parotis** and to the *n. buccalis* for the facial mucous glands

- **ganglion oticum** - under the *basis cranii externa* at the *foramen ovale*, medially from the *n. mandibularis*

from *n. trigeminus*
- **function:** stimulation of saliva secretion in the glands

Nucleus posterior nervi vagi

- Nucleus **n. vagi** nucleus in the lower part of the *fossa rhomboidea*
- **preganglionic** fibers run with the *n. vagus* to the target organs, in the wall of which they connect to **postganglionic** fibres
    - thus includes *rr. pharyngei, rr.cardiaci, rr. oesophagei, rr. tracheales, rr. bronchiales, rr. pulmonales, rr. gastrici, rr. coeliaci, rr. hepatici and rr. renales*
    - sthey go to the respiratory tract and to the lungs – *n. laryngeus superior* and *reccurrens*
    - *rr. coeliaci* go together with the sympathetic in a mixed plexus around the vessels (*plexus aorticus abdominalis* etc.)
    - *n. vagus* and its parasympathetic fibers end at the level of the*flexura coli sinistra* – the so-called. **Cannonův-Boehm point**, where the sacral parasympaticus connetcs
    - separate parasympathetic fibers go to the heart – *rr. cardiaci cervicales superiores et inferiores* and *rr. cardiaci thoracici*, ends in the *plexus cardiacus*
    - **function:** parasympathetically affects the activity of innervated organs, i.e. mainly increases the activity of the digestive tract and slows down the heart activity
    - it also guides the viscerosensitivity of the heart and the beginning of the aorta, where it perceives the receptor level of blood pressure

Links

Related articles

- Sacral parasympathetic
- Paraganglia
- Truncus sympaticus

References

- ČIHÁK, Radomír – GRIM, Miloš. *Anatomie 3.* 2., upr. a dopl edition. Praha : Grada, 2004. 673 pp. pp. 559-560. ISBN 80-247-1132-X.

- KACHLÍK, David. *Autonomní nervy : Přednáška* [online]. ©2012. [cit. 2012-02-01]. <http://old.lf3.cuni.cz/anatomie/Autonomninervy.zip>.