

# Pedunculopontine nucleus

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## Brain: Pedunculopontine nucleus

*pedunculopontinus*

*ininfo.rprc.washington.edu/Scripts/hiercentraldirectory.aspx?ID=495)*

*Tegmental+Nucleus (http://www.nlm.nih.gov/cgi/mesh/2007/MB\_cgi?mode=&term=Pedunculopontine+Tegmental+Nucleus)*

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The **pedunculopontine nucleus (PPN)** (or **pedunculopontine tegmental nucleus, PPTN** or **PPTg**) is located in the brainstem, caudal to the substantia nigra and adjacent to the superior cerebellar peduncle. It has two divisions, one containing cholinergic neurons, the pars compacta, and one containing mostly glutamatergic neurons, the pars dissipata. The PPN is one of the main components of the reticular activating system.<sup>[1][2]</sup>

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## Projections

PPN neurons project axons to a wide range of areas in the brain [1]

(<http://www.frontiersin.org/neuroanatomy/10.3389/fnana.2011.00022/full>), particularly parts of the basal ganglia such as the subthalamic nucleus, substantia nigra pars compacta, and globus pallidus internus. It also send them to targets in the thalamus, cerebellum, basal forebrain, and lower brainstem, and in the cerebral cortex, the supplementary motor area and somatosensory and motor cortices.<sup>[1][2][3]</sup>

It receives inputs from many areas of the brain [2]

(<http://www.frontiersin.org/neuroanatomy/10.3389/fnana.2011.00022/full>), including the basal ganglia to which it projects with the exception of the substantia nigra pars compacta to which it projects but does not receive, while it receives but does not project to the substantia nigra pars reticulata.<sup>[1][2]</sup>

## Functions

The PPN is involved in many functions, including arousal, attention, learning, reward, and voluntary limb movements and locomotion.<sup>[4]</sup> While once thought important to the initiation of movement, recent research suggests a role in providing sensory feedback to the cerebral cortex.<sup>[4]</sup> It is also implicated in the generation and maintenance of REM

sleep.

[3] (<http://www.frontiersin.org/neuroanatomy/10.3389/fnana.2011.00022/full>)

## Parkinson disease

Research is being done on whether deep brain stimulation of the PPN might be used to improve the gait and postural difficulties found in Parkinson disease.<sup>[4]</sup>

## References

- <sup>^</sup> <sup>*a b c*</sup> Garcia-Rill E. (1991). The pedunculo pontine nucleus. *Prog Neurobiol.* 36(5):363-89. PMID 1887068
- <sup>^</sup> <sup>*a b c*</sup> Winn P. (2006). How best to consider the structure and function of the pedunculo pontine tegmental nucleus: evidence from animal studies. *J Neurol Sci.* 25;248(1-2):234-50. PMID 16765383
- <sup>^</sup> Aravamuthan BR, Muthusamy KA, Stein JF, Aziz TZ, Johansen-Berg H. (2007). Topography of cortical and subcortical connections of the human pedunculo pontine and subthalamic nuclei. *Neuroimage.* 37(3):694-705. PMID 17644361
- <sup>^</sup> <sup>*a b c*</sup> Tsang EW, Hamani C, Moro E, Mazzella F, Poon YY, Lozano AM, Chen R. (2010). Involvement of the human pedunculo pontine nucleus region in voluntary movements. *Neurology.* 14;75(11):950-9. doi:10.1212/WNL.0b013e3181f25b35 (<http://dx.doi.org/10.1212%2FWNL.0b013e3181f25b35>) PMID 20702790

[4] (<http://www.frontiersin.org/neuroanatomy/10.3389/fnana.2011.00022/full>)

## External links

- BrainMaps at UC Davis *pedunculo pontine%20nucleus* (<http://brainmaps.org/index.php?q=pedunculo pontine%20nucleus>)
- [5] (<http://www.frontiersin.org/neuroanatomy/10.3389/fnana.2011.00022/full>)

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Categories: Midbrain

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