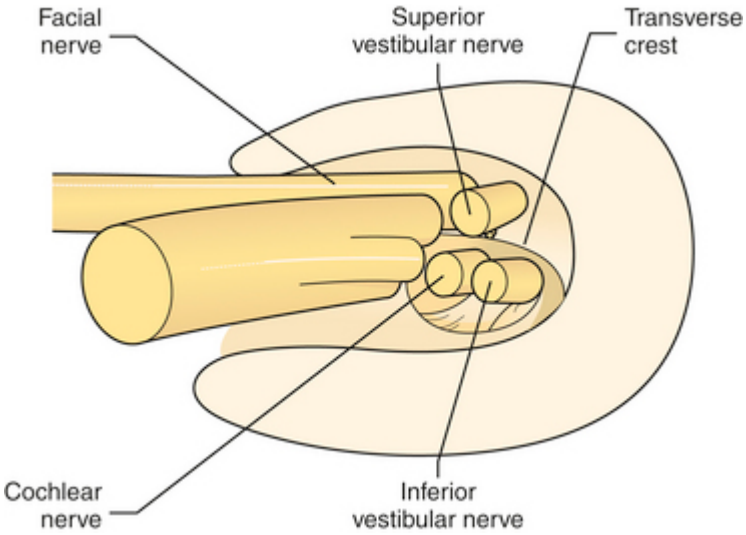
Vestibular nerve



The vestibular nerve is one of the two branches of the Vestibulocochlear nerve (the cochlear nerve being the other).

The vestibular nerve transmits sensory information transmitted by vestibular hair cells located in the two otolith organs (the utricle and the saccule) and the three semicircular canals via the vestibular ganglion. Information from the otolith organs reflects the gravity and linear accelerations of the head. Information from the semicircular canals reflects the rotational movement of the head. Both are necessary for the sensation of body position and gaze stability in relation to a moving environment.

Axons of the vestibular nerve synapse in the vestibular nucleus on the lateral floor and wall of the fourth ventricle in the pons and medulla.

It arises from bipolar cells in the vestibular ganglion, the ganglion of Scarpa, which is situated in the upper part of the outer end of the internal auditory meatus.

Structure The peripheral fibers divide into three branches (some sources list two):

the superior branch passes through the foramina in the area vestibularis superior and ends in the utricle and in the ampullae of the superior and lateral semicircular ducts; the fibers of the inferior branch traverse the foramina in the area vestibularis inferior and end in the saccule; the posterior branch runs through the foramen singulare and supplies the ampulla of the posterior semicircular duct.

Most Vestibular schwannoma tumors arise from one of two vestibular branches: the superior or inferior vestibular nerve. Determining the specific nerve of origin could improve patient management in terms of preoperative counseling, treatment selection, surgical decision-making, and planning. The aim of the study was to introduce a preoperative testing protocol with high accuracy to determine the nerve branch of origin. The nerve of origin was predicted on the basis of preoperative vestibular evoked myogenic potentials (VEMPs), caloric stimulation test, and pure tone audiometry on 26 recipients. The acquired data were entered into a statistical scoring system developed to allocate the tumor origin. Finally, the nerve of origin was definitively determined intraoperatively. Receiver operating characteristic (ROC) curves analysis of preoperative testing data showed the possibility of

predicting the branch of origin. In particular, the ROC curve of combined VEMPs absence, nystagmus detectable at caloric stimulation, and PTA < 75 dB HL allowed to obtain high accuracy for inferior vestibular nerve implant of the tumor (area under the curve-AUC = 0.8788, p = 0.012). In 24 of 26 cases, the preoperatively predicted tumor origin was the same as the origin determined during surgery. Preoperative audiological and vestibular evaluation can predict the vestibular tumor branch of origin with high accuracy. Despite the necessity of larger prospective cohort studies, these findings may change the preoperative approach, possible functional aspects, and counseling with the patients [1].

1)

Cianfrone F, Cantore I, Roperto R, Tauro F, Bianco F, Mastronardi L, Ruscito P. Preoperative vestibular evoked myogenic potentials (VEMPs), caloric test, and pure tone audiometry to identify the vestibular nerve branch of schwannoma origin: preliminary results in a series of 26 cases. Neurosurg Rev. 2022 Jul 12. doi: 10.1007/s10143-022-01834-z. Epub ahead of print. PMID: 35819734.