## Vestibulocochlear nerve (CN VIII)

- Function: **special sensory hearing**, **equilibrium**, and **motion** (acceleration/deceleration)
- Nuclei: vestibular nuclei located at pons-medulla junction; cochlear nuclei are in the medulla
- Emerges from **pons-medulla junction** and enters **internal acoustic meatus**, where it separates into the **vestibular and cochlear** nerves
- Within the internal acoustic meatus, the nerve is accompanied by **facial nerve** (CN VII) and **labyrinthine artery**
- Vestibular nerves go via vestibular ganglion to innervate
  - **Maculae of utricle and saccule** (sensitive to acceleration and pull of gravity relative to position of the head)
  - **Cristae of ampullae of semicircular ducts** (sensitive to rotational acceleration)
- Cochlear nerve goes via spinal ganglions, extending to **spiral organ** for sense of hearing



Taken from mskanatomy.blogspot.co.uk, Cranial Nerves Anatomy, available at <u>http://msk-anatomy.blogspot.co.uk/2014/12/cranial-nerves-anatomy.html</u>

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## Vagus nerve (CN X)

- Function: somatic sensory, special sensory (taste), visceral sensory, somatic (brachial) motor, and visceral (parasympathetic) motor
  - Somatic sensory from inferior pharynx and larynx
  - Visceral sensory from thoracic and abdominal organs
  - Taste and somatic sensory from tongue and epiglottis
    - Branches of internal laryngeal (a branch of vagus) supply a small area – mostly somatic sensory and some special sensory (taste)
  - Somatic motor to soft palate, pharynx, intrinsic laryngeal muscles (phonation), palatoglossus (external tongue muscle)
  - Proprioception to muscles above
  - Visceral (parasympathetic) motor to thoracic and abdominal viscera
- Nuclei
  - o Sensory
    - Sensory nucleus of trigeminal nerve (somatic sensory)
    - Sensory nucleus of ingenies
      Nuclei of solitary tract (taste and visceral sensory)
  - Motor 0
    - Nucleus ambiguus (somatic brace) •
    - Dorsal vagal nucleus (vs Coll parasympathetic motor)
- Vagus nerve has longest ourse and most extensive distribution of all the cranial nerves
- Arises from to the soft rootlets from mediuma; merge to leave via jugular foramen
- Ha, a superior and interior gauglions
- Course of vagi are **asymmetric** in the thorax
- Branches supplied to heart, lungs, bronchi •
- Anterior and posterior vagal trunks are formed, that are continuous with the oesophageal plexus
- Pass with the oesophagus through the diaphragm into the abdomen; breaks up into branches to innervate stomach and intestinal tract

- Can be caused by inflammatory, degenerative, demyelinating, or toxic disorders, and damage by toxic substances (methyl and ethyl alcohol, tobacco, lead, mercury)
- Optic disc is smaller and paler than normal

## Visual field defects

- There are nasal and temporal parts of the retina
  - Nasal part provides temporal visual field
  - Temporal part provides nasal visual field
- Nasal parts cross over (decussate) in the optic chiasm, while the temporal parts do not
- Optic chiasm located on top of the pituitary
- Result from lesions affecting different parts of the visual pathway
- Type of defect depends on where the pathway is interrupted



Taken from The Free Dictionary, homonymous hemianopia, available at <a href="http://medical-dictionary.thefreedictionary.com/homonymous+hemianopia">http://medical-dictionary.thefreedictionary.com/homonymous+hemianopia</a>

- Complete section of an optic nerve will result in blindness of the temporal and nasal fields of the ipsilateral eye
- Complete section of an of the optic chiasm will section the nasal parts of each eye, resulting in loss of the temporal visual field – known as bipolar hemianopia
- Complete section of an optic tract will lead to loss of the temporal part of one eye and nasal part of the other; will be contralateral to the lesion; known as homonymous hemianopia

- Motor paralysis of facial muscles involves the superior and inferior parts of the face on the ipsilateral side
- Central lesion
  - Paralysis of muscles in the inferior face on the contralateral side
  - Forehead wrinkling is not visibly impaired as it is innervated bilaterally
- Lesions between the geniculate ganglion and the origin of the chorda tympani produce same affects as to the ganglion, but lacrimal secretion is not impaired
- As the facial nerve passes through the facial canal in the temporal bone, it is vulnerable to compression when viral infection (neuritis) occurs
- Branches of CN VII are superficial they are subject to injury e.g. knifes, gunshot wounds, cuts, birth injury, facture of the temporal bone, tumours, aneurysms, meningeal infections
- Injuries cause paralysis of facial muscles, but sensation around the auricle and opening of internal acoustic meatus is usually spared
- Hearing not usually impaired, but ear may become more sensitive to low tones if the stapedius is impaired (normally dampens vibrations of the stapes)
- Bell palsy is unilateral facial paralysis due to lesion in CN VII; no forehead sparing tesale.co.uk

# Vestibulocochlear nerve

#### Injuries to vestibulocochlear nerve

- Although vestibular and cochevr es are essenting independent, peripheral lesions often a fect both due to Colle proximity
- cause tinnitur vertico, and impairment or loss of hearing Peripherol le Ro ner vestibular or cochlear division 🚰 lesions may l 11

## Deafness

- Two kinds of deafness
  - o Conductive involves external or middle ear (otitis media, inflammation in inner ear)
  - Sensorineural disease in the cochlea or pathway from cochlea to 0 brain

#### Acoustic neuroma

- Slow growing benign tumour of neurolemma
- Begins in vestibular nerve while inside the internal acoustic meatus
- Usually loss of hearing
- Disequilibrium and tinnitus also common

#### Trauma and vertigo

- Head trauma can cause headache, dizziness, vertigo etc.
- Vertigo is sensation of spinning, swaying back and forth or falling