venous system
of the head and neck
And
cranial nerves

Lec. 4

Dr.Farqad Salih

The venous system of the head and neck

collect deoxygenated blood and return it to the heart.

The venous drainage can be divided into **three parts**:

- **Venous drainage of the brain and meninges** – drained by the dural venous sinuses.

- **Venous drainage of the scalp and face** – drained by veins synonymous with the arteries of the face and scalp. These empty into the internal and external jugular veins.

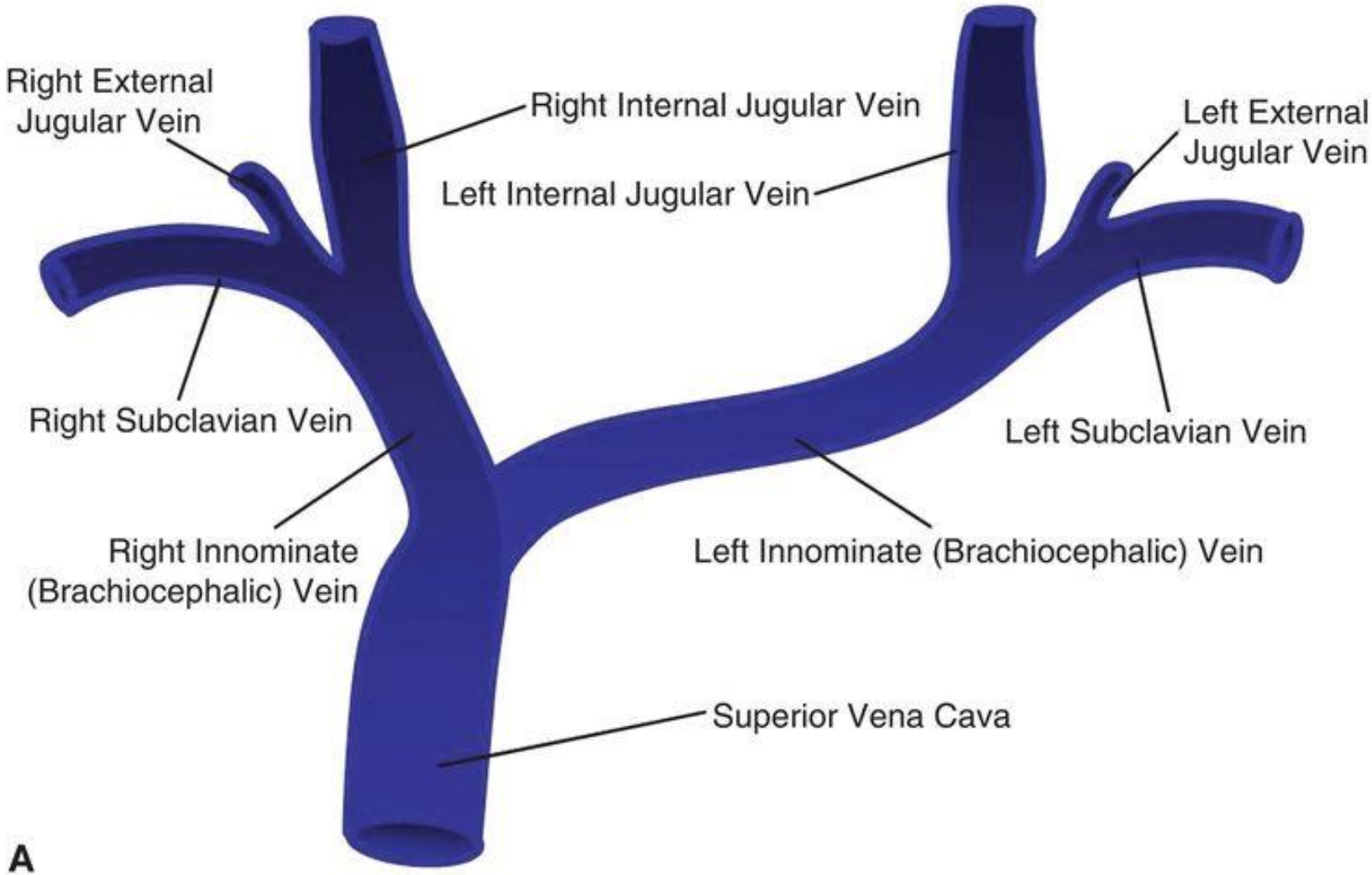
- **Venous drainage of the neck** – drained by the jugular veins.

Jugular Veins

There are **three main jugular veins** –

(external, internal and anterior).

They are ultimately responsible for the venous drainage of the whole head and neck.


Right External Jugular Vein
Right Internal Jugular Vein
Left External Jugular Vein
Left Internal Jugular Vein
Right Subclavian Vein
Left Subclavian Vein
Right Innominate (Brachiocephalic) Vein
Left Innominate (Brachiocephalic) Vein
Superior Vena Cava
A

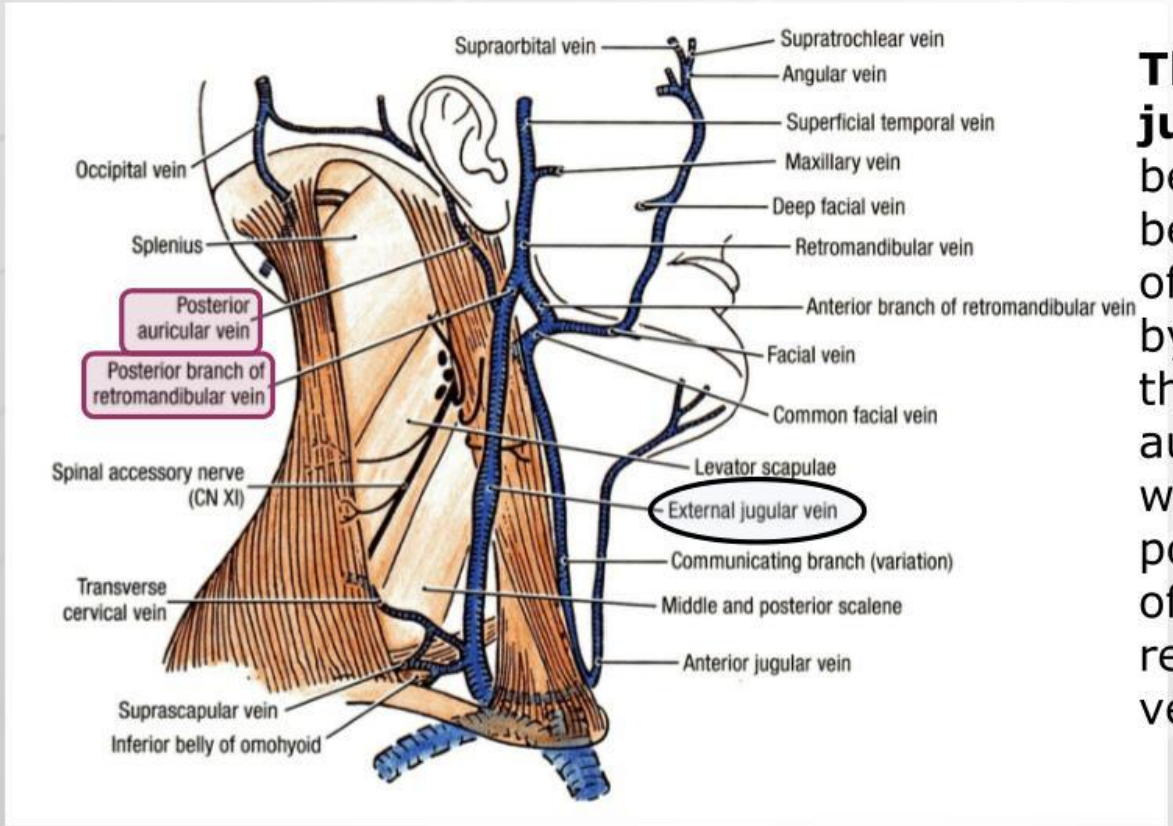
1- External Jugular Vein

The external jugular vein and its tributaries supply the majority of the **external face**.

It is formed by the union of two veins:

- **A-Posterior auricular vein –**
  drains the area of scalp superior and posterior to the outer ear.

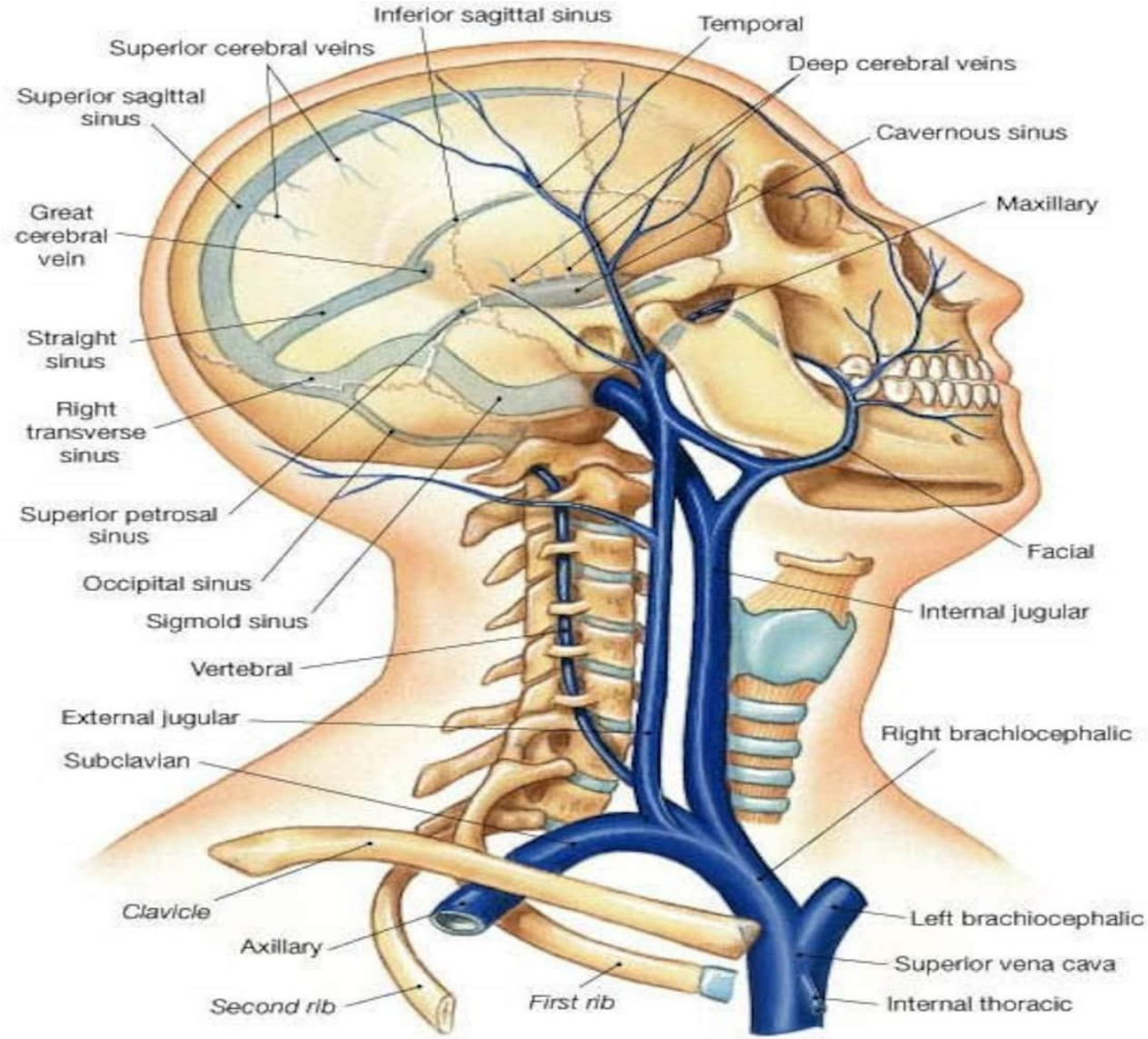
EXTERNAL JUGULAR VEIN



The External jugular vein begins just behind the angle of the mandible by the union of the posterior auricular vein with the posterior division of the retromandibular vein.

- **B-Retromandibular vein** (posterior branch) – itself formed by the maxillary and superficial temporal veins, which drain the face.

These two veins combine immediately posterior to the angle of mandible, and inferior to the outer ear, forming the external jugular vein.



(a) Veins of the head and neck, lateral view

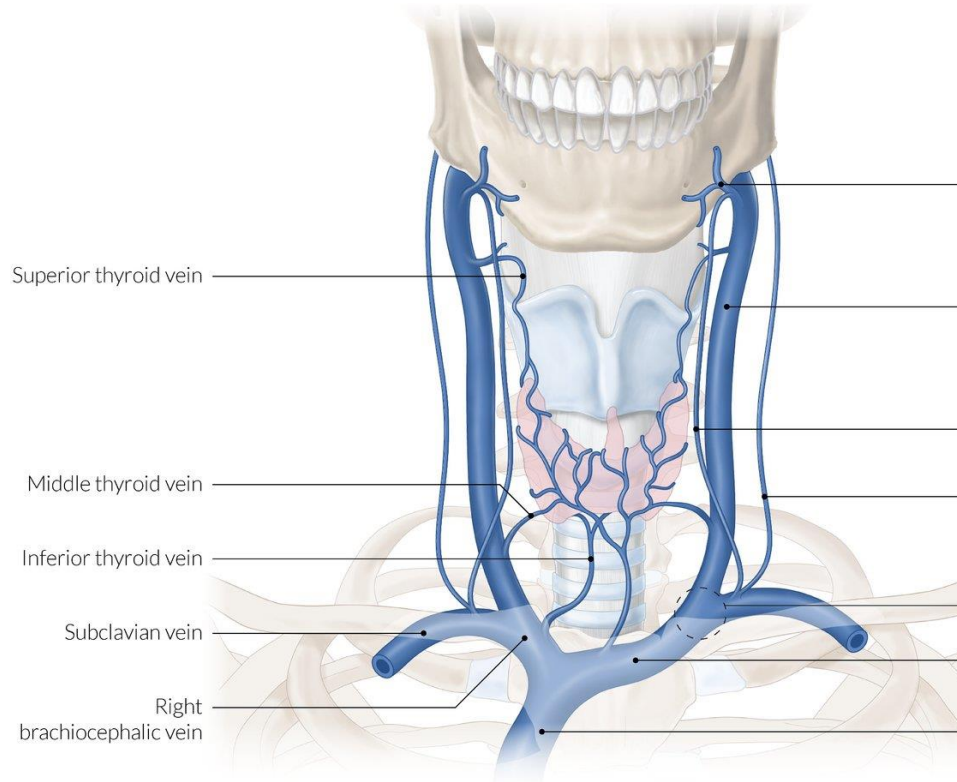
After formation, the external jugular vein descends down the neck within the superficial fascia. It runs anteriorly to the **sternocleidomastoid** muscle, crossing it in an oblique, posterior and inferior direction.

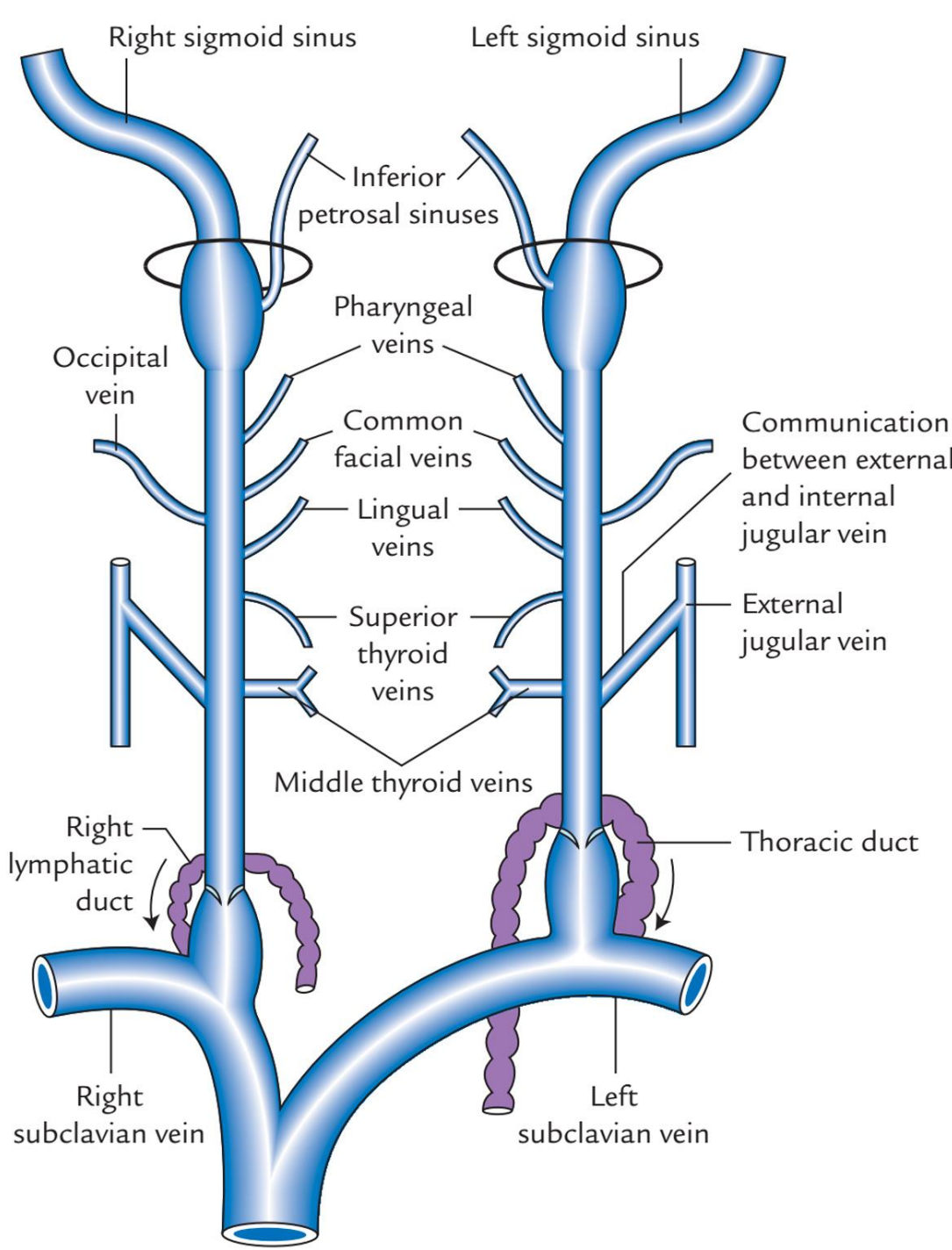
In the root of the neck, the vein passes underneath the **clavicle**, and terminates by draining into the **subclavian** vein. Along its route down the neck, the external jugular vein receives tributaries – posterior external jugular, transverse cervical and suprascapular veins.

2-Anterior Jugular Veins

The anterior jugular veins vary from person to person. They are **paired** veins, which drain the anterior aspect of the neck. Often they will communicate via a jugular venous **arch**.

The anterior jugular veins descend down the midline of the neck, emptying into the subclavian vein.


Facial vein
Superior thyroid vein
Internal jugular vein
Anterior jugular vein
Middle thyroid vein
External jugular vein
Inferior thyroid vein
Venous angle
Subclavian vein
Left brachiocephalic vein
Right
brachiocephalic vein
Superior vena cava


Right sigmoid sinus
Left sigmoid sinus
Inferior petrosal sinuses
Pharyngeal veins
Occipital vein
Common facial veins
Communication between external and internal jugular vein
Lingual veins
External jugular vein
Superior thyroid veins
Middle thyroid veins
Right lymphatic duct
Thoracic duct
Right subclavian vein
Left subclavian vein

3- Internal Jugular Vein

-The **internal jugular vein** (IJV) begins in the cranial cavity as a continuation of the sigmoid sinus.

-The initial part of the internal jugular vein is dilated and is known as the superior bulb.

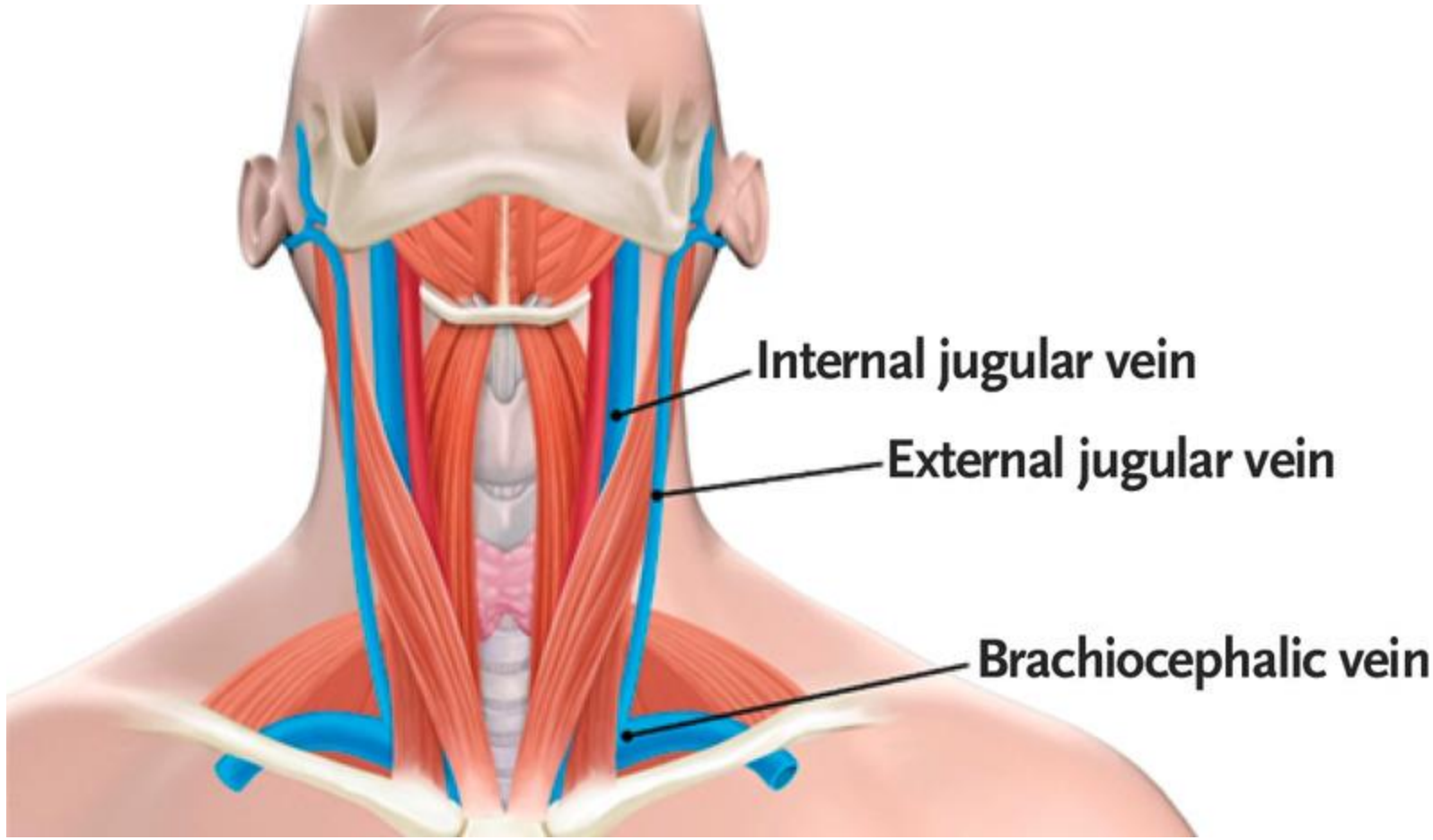
-It exits the skull via the jugular foramen.

-In the neck, the internal jugular vein descends within the **carotid sheath**, deep to the sternocleidomastoid muscle and lateral to the common carotid artery.

- At the base of the neck, posteriorly to the sternal end of the clavicle, the IJV combines with the **subclavian vein** to form the brachiocephalic vein. Immediately prior to this, the inferior end of internal jugular vein dilates to form the inferior bulb.
- It has a valve that stops back-flow of blood.
- During its descent down the neck,

the internal jugular vein receives blood from:-

the **facial**, **lingual**, **occipital**, **superior** and **middle** thyroid veins. These veins drain blood from the anterior face, trachea, thyroid, oesophagus, larynx, and muscles of the neck.


Internal jugular vein
External jugular vein
Brachiocephalic vein

Jugular Venous Pressure(JVP)

- In clinical practice, the internal jugular vein can be observed for **pulsations** – the nature of which provide an estimation of right atrial **pressure**.

When the heart contracts, a pressure wave passes upwards, which can be observed.
-There are ***no valves*** in the brachiocephalic or subclavian veins – so the pulsations are a fairly accurate indication of right atrial pressure

Nerves system

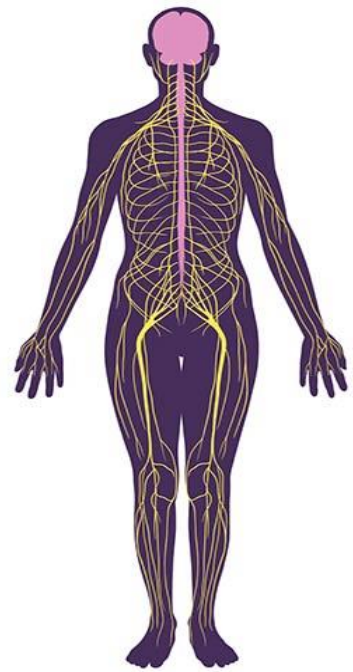
consist of two parts:

1-Central Nerves System (CNS):- Which include brain and spinal cord.

2- Peripheral Nerves System (PNS).

as that shown in last lecture.

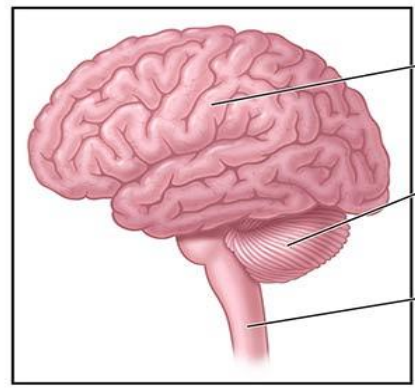
Central nervous system



Central nervous system

Peripheral nervous system

Brain (side view)

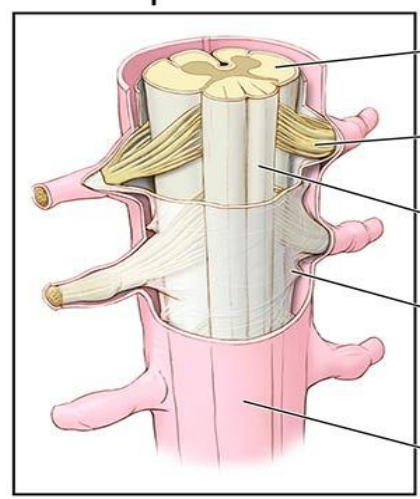


Cerebrum

Cerebellum

Spinal cord

Spinal cord



Cord

Nerves

Pia mater

Arachnoid mater

Dura mater

What are cranial nerves?

- Cranial nerves are pairs of nerves that connect your brain to different parts of your head, neck, and trunk.
- There are 12 of them, each named for their function or structure.

-**Cranial nerves can transmit two types of information**:

Sensory information includes details about smells, sights, tastes, touch, and sounds to the brain.

Motor information refers to signals that affect the movement or activity of muscles and glands

cranial nerves are:

I. Olfactory nerve
II. Optic nerve

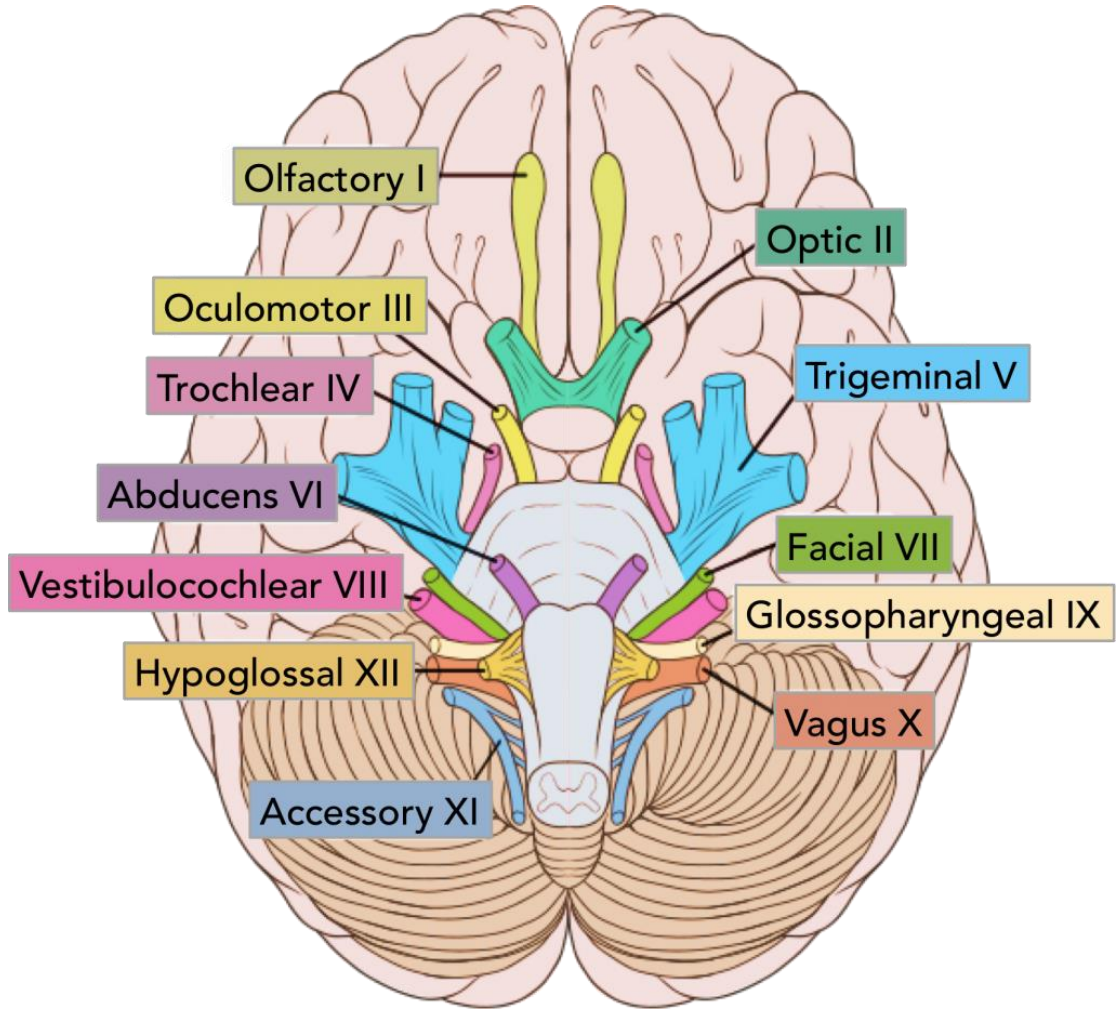
III. Oculomotor nerve
IV. Trochlear nerve

V. Trigeminal nerve
VI. Abducens nerve

VII. Facial nerve
VIII. Vestibulocochlear nerve

IX. Glossopharyngeal nerve
X. Vagus nerve

XI. Accessory nerve
XII. Hypoglossal nerve

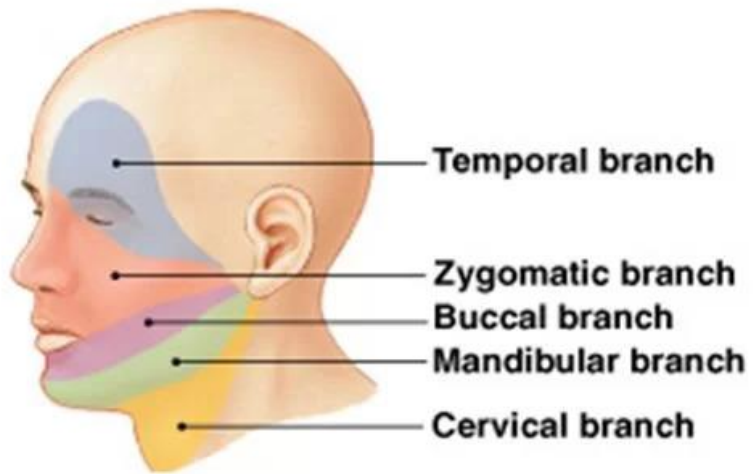

Olfactory I
Optic II
Oculomotor III
Trochlear IV
Trigeminal V
Abducens VI
Facial VII
Vestibulocochlear VIII
Glossopharyngeal IX
Hypoglossal XII
Vagus X
Accessory XI

Originates in the pons

CN VII: Facial Nerve

5 Branches

1. Temporal
2. Zygomatic
3. Buccal
4. Mandibular
5. Cervical



- Function:
  - **Somatic Motor** to muscles of facial expression
  - **Parasympathetic (motor)** to lacrimal and salivary glands
  - **Sensory** taste to anterior 2/3 tongue

Cranial Nerve Screening
Oral Peripheral Mechanism Examination

Cranial Nerve	Function	Screening Task
I – Olfactory	**Sensory** – Smell	odors
II – Optic	**Sensory** – Vision	vision chart/acuity
III– Oculomotor	**Motor** – Eye movement	"follow the moving finger"
IV – Trochlear	**Motor** – Eye movement (superior oblique)	look at the nose
V – Trigeminal	**Sensory** – facial sensation/anterior tongue	Have the individual close their eyes: touch the face
	Motor – muscles of mastication	Palpate muscles that clench the teeth
VI – Abducens	**Motor** – lateral rectus	look to the side
VII – Facial	**Sensory** – taste	sweet, sour, bitter, salt
	Motor – facial expression	smile, raise the eyebrows

VIII – Vestibulocochlear	**Sensory** – hearing	a tuning fork
	balance	look for vertigo
IX – Glossopharyngeal	**Sensory** – pharynx sensation	gag reflex
	Motor – pharyngeal muscles	gag reflex
X – Vagus	**Sensory** –pharynx, larynx, esophagus **Motor** – muscles of palate, pharynx, and larynx	Check phonation Assess vocal quality
XI– Spinal Accessory	**Motor** – Shoulder, head movement	shoulder shrug and/or turning the head to resistance
XII – Hypoglossal	**Motor** – tongue movement	Assess tongue movement