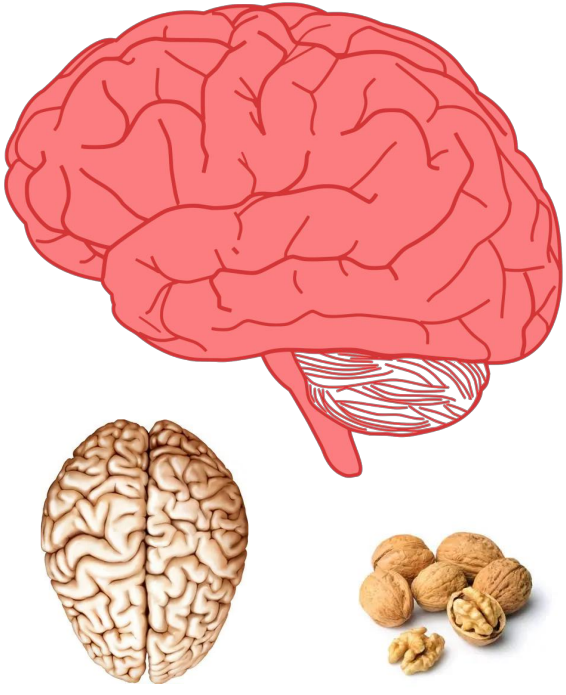
Lecture 6

Mechanism of Salivary Secretion

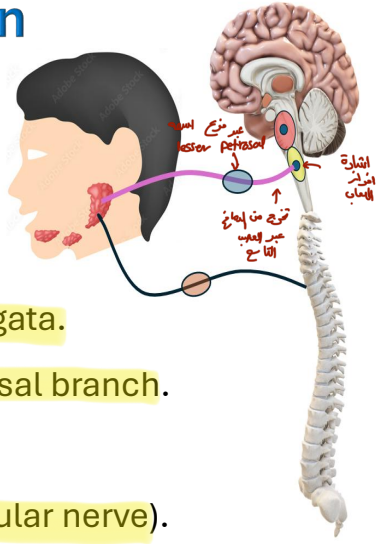
Dr. Sherif Al-Masry

2025



Mechanism of Salivary Secretion

Parotid Glands



1. Parasympathetic Nerve Supply: (Secretomotor)

- **Nerve pathway:**

هي الغدة بالصورة منها اعلى افراز اللعاب

a) **Origin inside the brain:** Inferior salivary nucleus in the medulla oblongata.

b) **Preganglionic fibers:** Glossopharyngeal nerve (CN IX) via lesser petrosal branch.

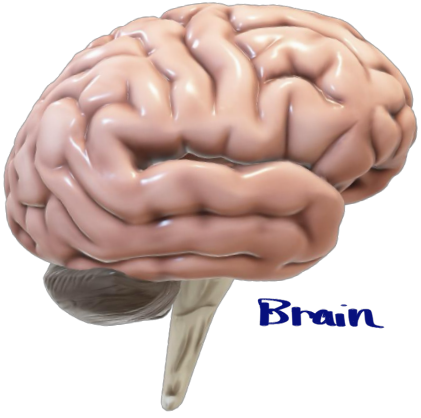
c) **Ganglion relay:** Otic ganglion (located just below the foramen oval).

Axon → postganglionic ← preganglionic من الاشارة تجوا

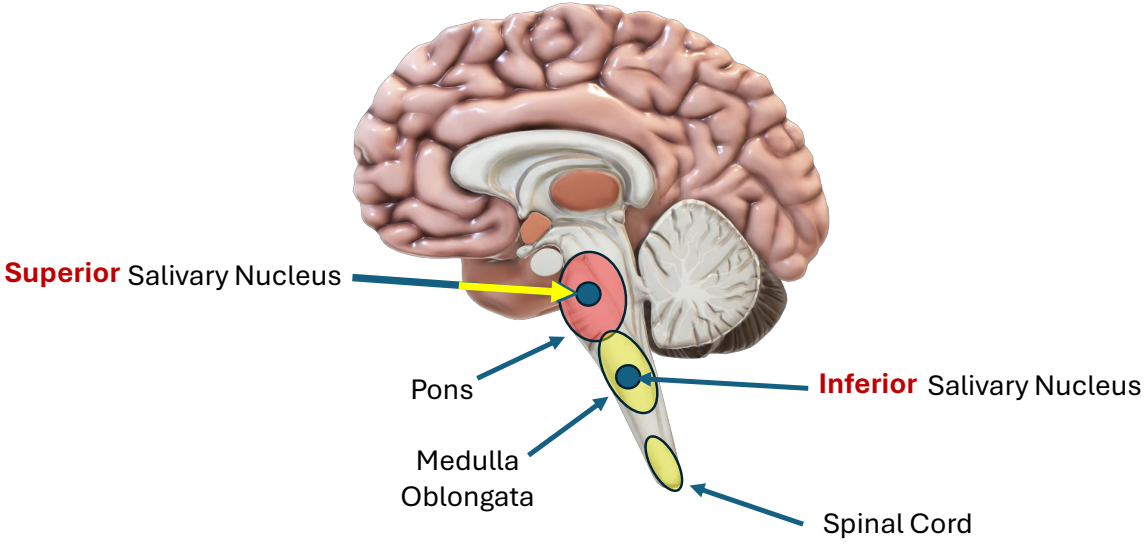
d) **Postganglionic fibers:** Auriculotemporal nerve (branch of the mandibular nerve).

e) **Enter the parotid gland.** → تدخل الاشارة مفرزها على افراز اللعاب

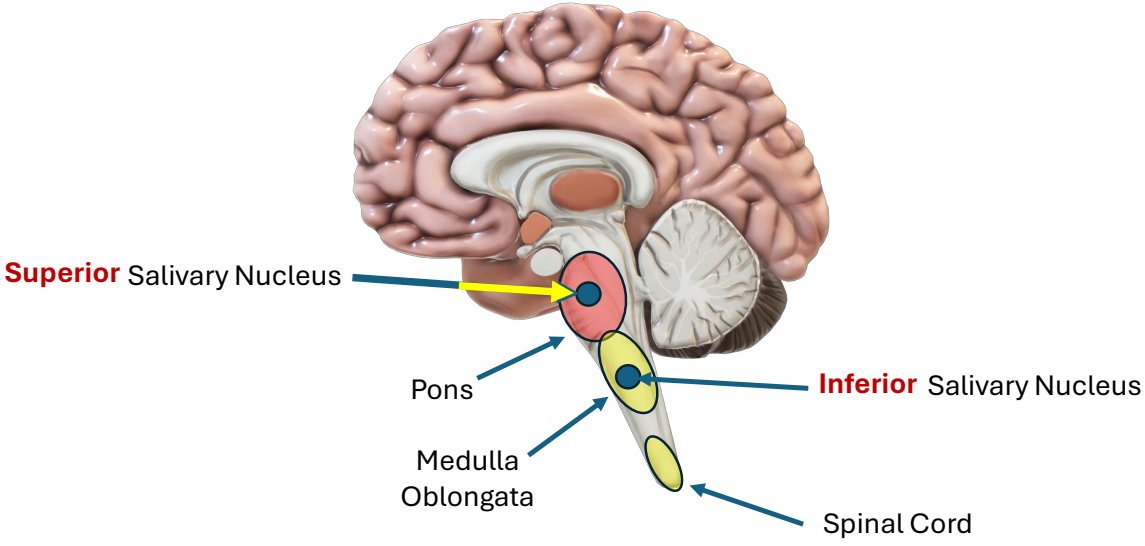
- **Reaction:**
  - Saliva is copious, watery, and rich enzymatic.
  - Vasodilated blood vessels within the glands.


Brain

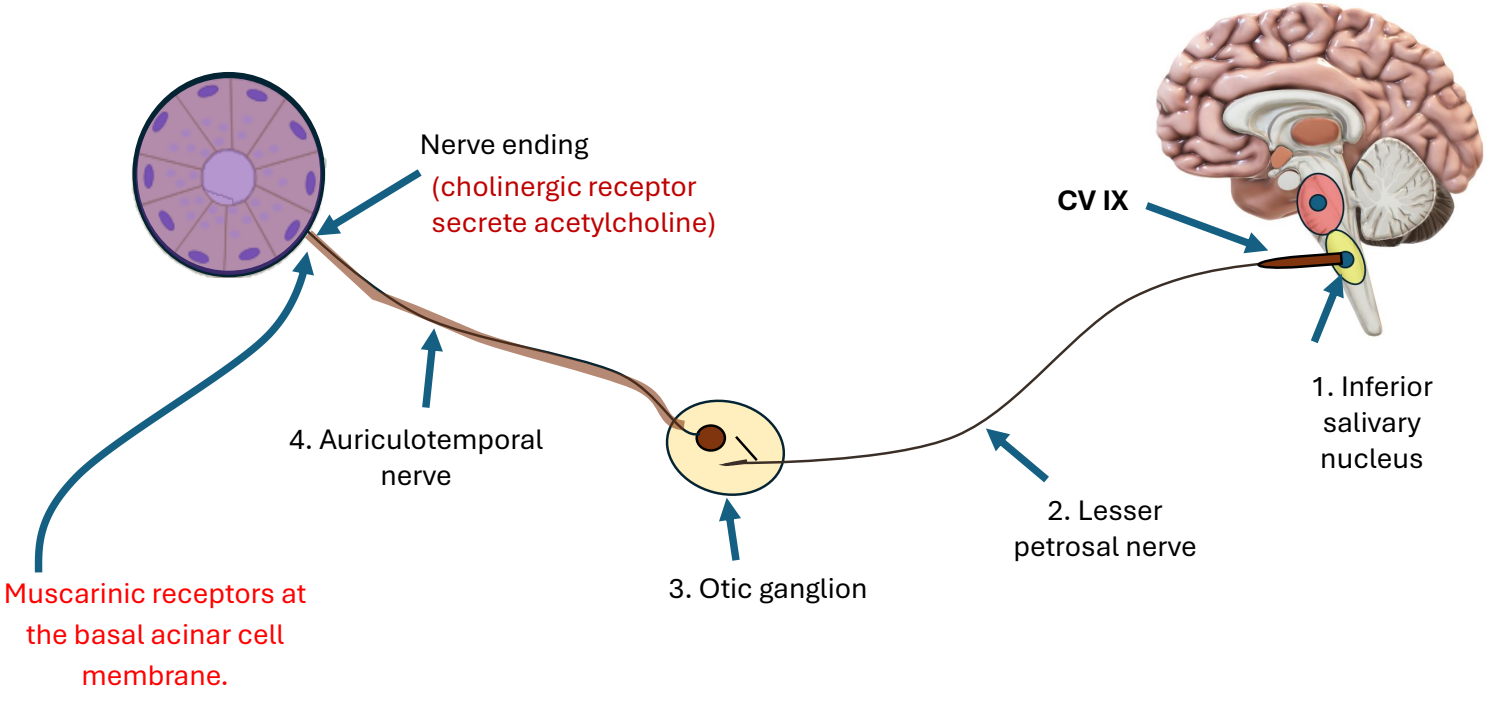
Structures of the Brain



Structures of the Brain



Parasympathetic pathway



Mechanism of Salivary Secretion

Parotid Glands

2. Sympathetic Nerve Supply: (Emergency)

المسؤول عن ردات الفعل في حالات الطوارئ مثل الخوف , التوتر , الهجوم

يقلل افراز اللعاب حتى الجسم يركز طاقته على امور اهم

- **Nerve pathway:**

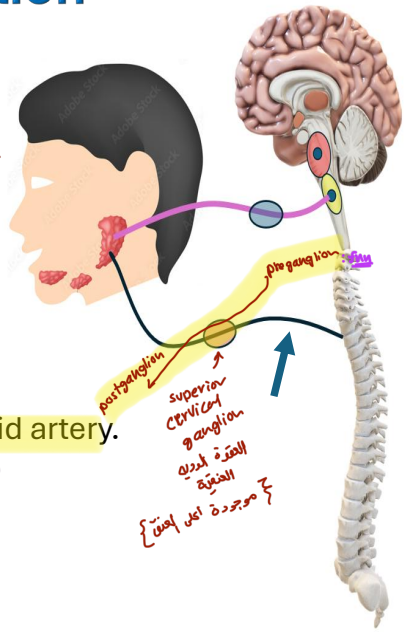
a) **Thoracic spinal cord:** Via (T1–T3).

b) **Ganglion relay:** Superior cervical ganglion.

c) **Postganglionic fibers:** External carotid plexus around the external carotid artery.

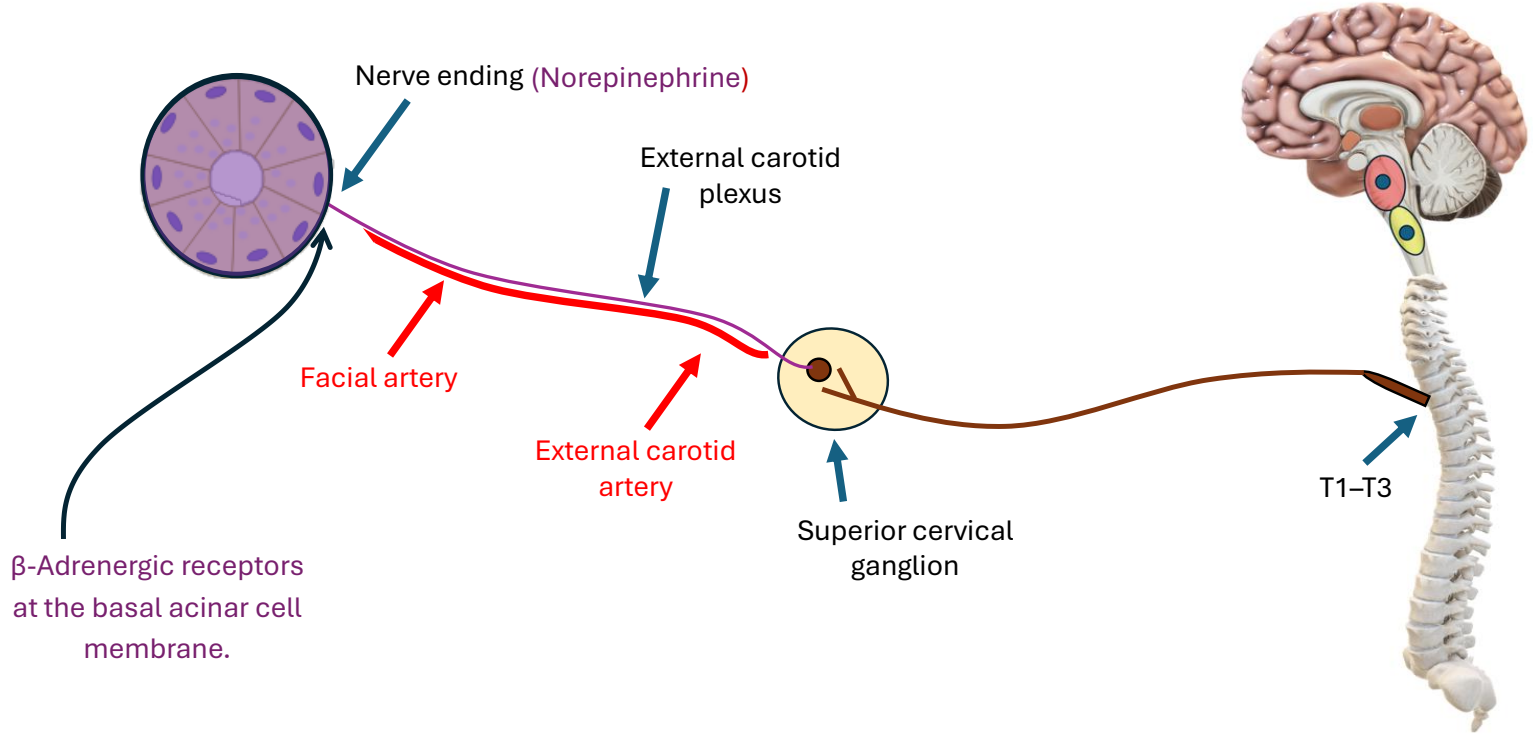
d) **Enter the parotid gland.**

لـ الاعصاب ترافق الشريان وهي راحة الغدة وتوصل معها الامر



- **Reaction:**
  - Reduced salivary secretion with only little mucous secretion.
  - Vasoconstricted blood vessels within the glands.

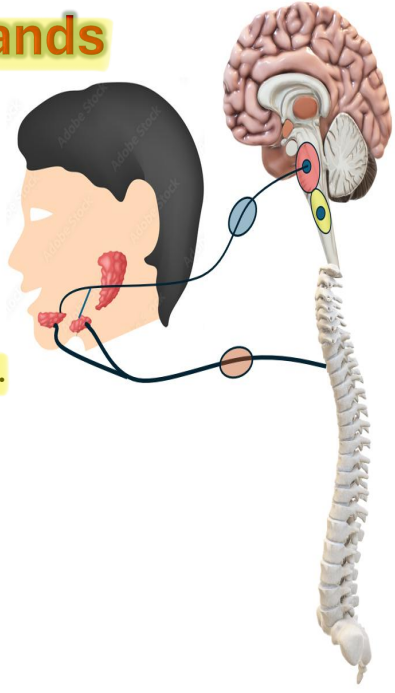
Sympathetic pathway



Parotid Gland

الجانب	Parasympathetic (Secretomotor)	Sympathetic (Emergency)
Origin (المنشأ)	Inferior salivary nucleus في الـ medulla oblongata	Thoracic spinal cord (T1–T3)
Preganglionic fibers (الألياف قبل العقدة)	Glossopharyngeal nerve (CN IX) عبر lesser petrosal nerve	من النخاع الصدري إلى sympathetic chain
Ganglion relay (العقدة العصبية)	Otic ganglion (أسفل foramen ovale)	Superior cervical ganglion
Postganglionic fibers (الألياف بعد العقدة)	Auriculotemporal تمشي مع nerve (فرع من mandibular nerve)	تشكل plexus حول external carotid artery
Target (الوجهة)	Parotid gland	Parotid gland
Effect on secretion (تأثيره على الإفراز)	لعاب غزير، مائي، غني بالإنزيمات	لعاب قليل، لزج (mucous)
Effect on blood vessels (الأوعية الدموية)	Vasodilation (توسع الأوعية)	Vasoconstriction (انقباض الأوعية)

Submandibular and Sublingual Glands



1. Parasympathetic Nerve Supply: (Secretomotor)

- **Nerve pathway:**

a) **Origin inside the brain:** superior salivary nucleus in the pons.

b) **Preganglionic fibers:** Facial nerve (CN VII) via chorda tympani nerve.

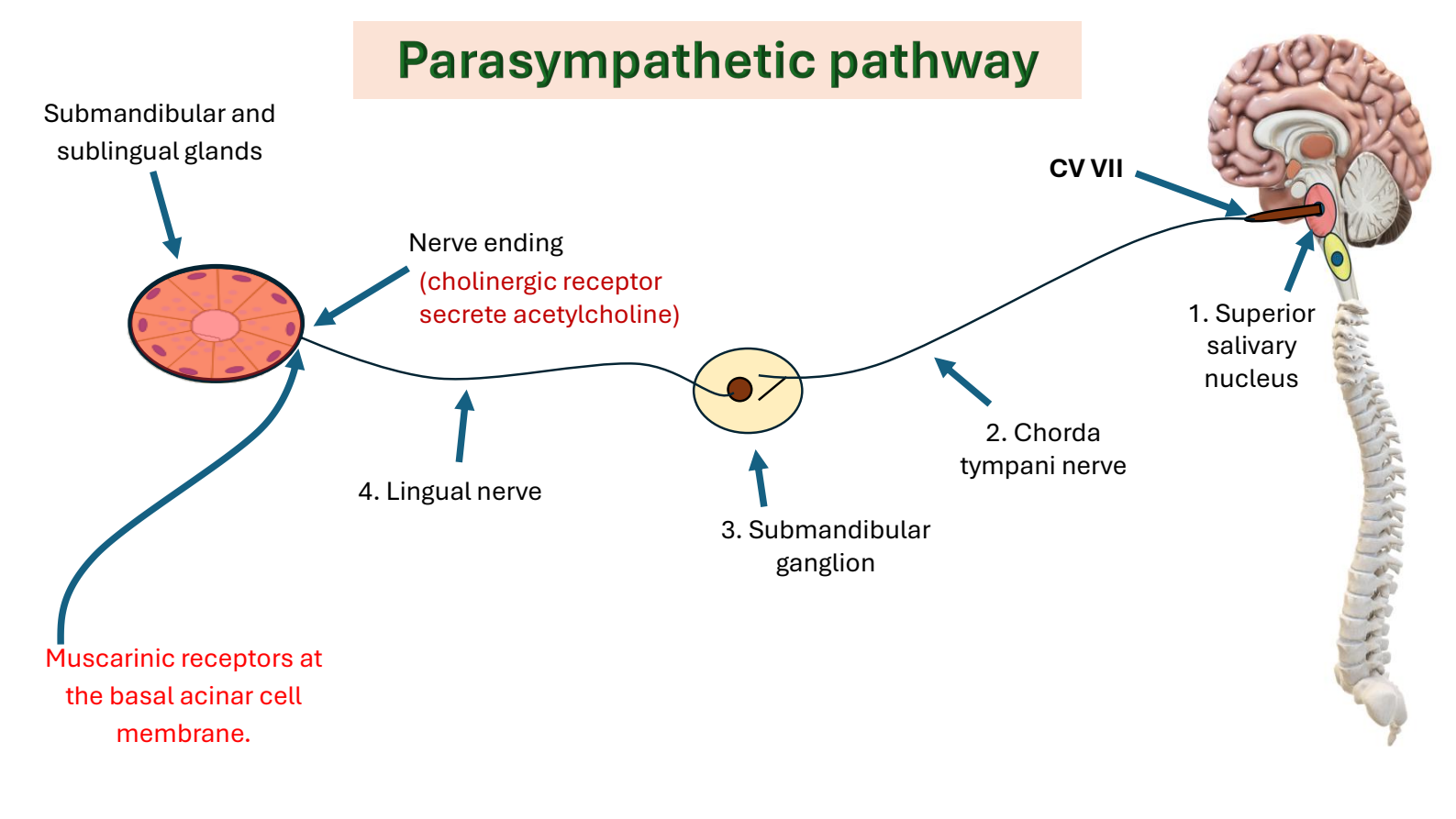
c) **Ganglion relay:** Submandibular ganglion.

d) **Postganglionic fibers:** Comes with lingual nerve.

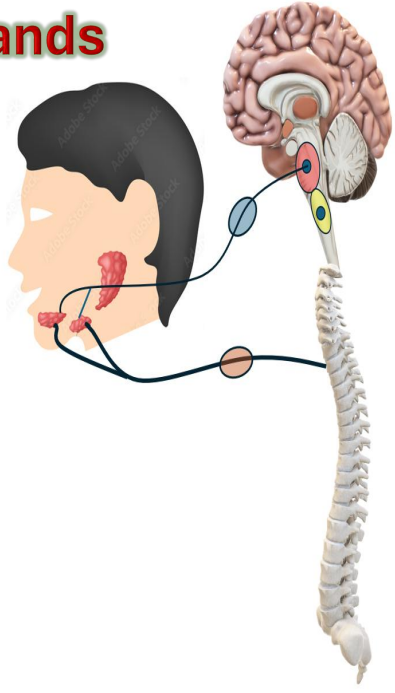
e) **Enter the** submandibular and sublingual glands.

- **Reaction:**
  - Saliva is copious, watery, and rich enzymatic.
  - Vasodilated blood vessels within the glands.

Parasympathetic pathway



Submandibular and Sublingual Glands



2. Sympathetic Nerve Supply: (Emergency)

- **Nerve pathway:**

a) **Thoracic spinal cord:** Via (T1–T3).

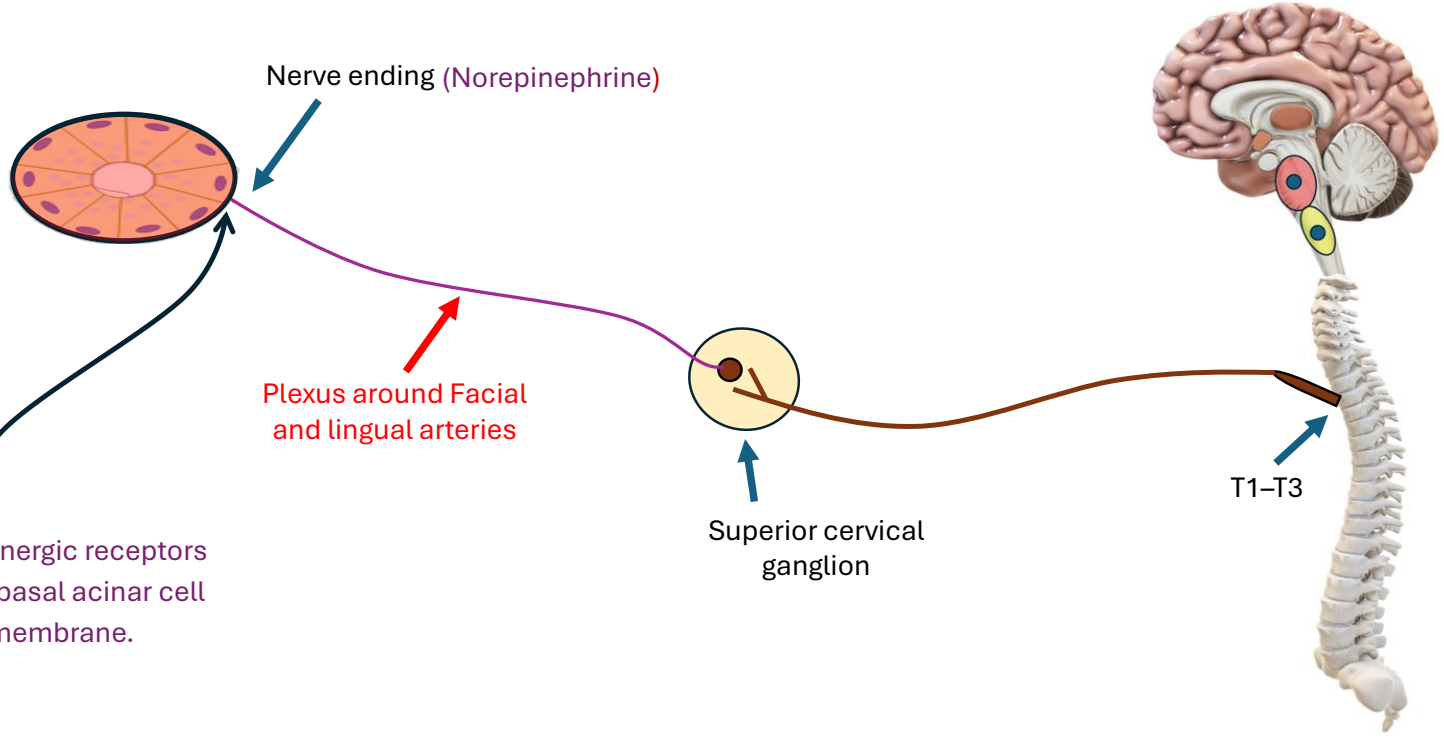
b) **Ganglion relay:** Superior cervical ganglion.

c) **Postganglionic fibers:** Postganglionic fibers form a plexus around the facial and lingual arteries.

d) **Enter both glands.**

- **Reaction:**
  - Reduced salivary secretion with only little mucous secretion.
  - Vasoconstricted blood vessels within the glands.

Sympathetic pathway



Submandibular & sublingual gland

الجانب	Parasympathetic (Secretomotor)	Sympathetic (Emergency)
Origin (المنشأ)	Superior salivary nucleus في الـ pons	Thoracic spinal cord (T1–T3)
Preganglionic fibers (الألياف قبل العقدة)	Facial nerve (CN VII) عبر chorda tympani nerve	من النخاع الصدري إلى sympathetic chain
Ganglion relay (العقدة العصبية)	Submandibular ganglion	Superior cervical ganglion
Postganglionic fibers (الألياف بعد العقدة)	تمشي مع lingual nerve	تشكل plexus حول facial & lingual arteries
Target (الوجهة)	Submandibular & Sublingual glands	Submandibular & Sublingual glands
Effect on secretion (تأثيره على الإفراز)	لعاب غزير، مائي، غني بالإنزيمات	لعاب قليل وسميك (mucous)
Effect on blood vessels (الأوعية الدموية)	Vasodilation (توسع)	Vasoconstriction (انقباض)

Stages of saliva formation

- Saliva production occurs in two stages: first, the acini secrete the primary saliva, and second, as it flows through the ducts, its composition is modified.

Stage I (Acinar Secretion):

- **Location**: Acini (serous, mucous, or mixed).
- **Processes**:

a) Active transport of **Cl^- and HCO_3^- ions** into the lumen through the junctional complexes.
b) Passive transport of **Na^+** and **water** through the junctional complexes.
c) Formation and secretion of **Proteins and enzymes** inside the acinar cells.

- **Result**: Isotonic, Primary Saliva.

Stage II (Ductal modification):

- **Location:** Duct system
- **Processes:**

1. Reabsorption of Na^+ and Cl^- ions.
2. Secretion of K^+ and HCO_3^- ions into the lumen.

- **Result:** Hypotonic, saliva comes to oral cavity.

أشكركم على اجتهادكم معي

وأراكم قريبا على خير