ANS

ANS

Nervous system

- Central
- Peripheral
  - Autonomic
    - Sympathetic
      - fight or flight
      - معركة — بيهرب من الشي
      - Thoraco lumber
      - مصدر ال sympatic
    - Parasympathic
      - Rest and digest
      - مرتاح — بيلشتغل الهضم
      - Crainsacral
      - مصدر ال Parasympatic
  - Somatic

(بيعطي شغلات خارجة عن الارادي)

برضو اذا انقبضت العضلة ما يطير urine واذا انبسطت يطير urine

ANS efferent paths from CNS, innervates heart, smooth muscle, glands, enteric

(smooth muscle: موجودة على الشرايين — اذا انقبضت يزيد ال blood Pressure، واذا انبسطت يقل ال blood Pressure)

(glands: وظيفتها secretion — فبتعدل ال digestion بتزيد الافراز او تقلل، وتتحكم بال intenstion motality تسرع او تبطئ حركة الأمعاء)

(enteric: حركة الأمعاء)

Functions:

1- Viseral organ regulation (hemeostasis) (ال heart وال muscle وال entric والغدة كلهم نعتبرهم الشاك (viseral) يشغلها ال ANS)

a. Heart rate

b. blood Pressure

ال smooth muscle موجودة على الشرايين
اذا انقبضت يزيد ال blood Pressure
واذا انبسطت يقل ال blood Pressure

c. digestion, secretion intestion motality + hormones

ال glands وظيفتها secretion
فبتعدل ال digestion بتزيد الافراز او تقلل
وتتحكم بال intenstion motality تسرع او تبطئ حركة الأمعاء

d. emptying urinary bladder

برضو اذا انقبضت العضلة يطير urine واذا انبسطت ما يطير urine

e. Control bronchiol dimeters

تتحكم فيها ال smooth muscle
تضيق وتوسع القصبات الهوائية

2. Response to Stimuli

a. light

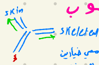
- **miosis** (constriction of pupil) — bright light — ضوء ساطع
- **mydriases** (dilation of pupil) — low light — ضوء خافت

b. Temprerture

- **Warm** (درجة حرارة عالية) — vasodilation, sweat — تعرق عشان التعرق بيقلل الحرارة
- **Cold** (برد) — vasoconstriction — يحافظ على الحرارة

c. stress — sympathic → fight or flight
اسرع وبلحق وراك ده تزيد نبضات القلب

↑ Heart rate, ↑ pupil dia, ↑ Palor (شحوب), Goose pimples (يوقف الشعر), cold sweat (تعرق) (no blood), dri month (مافي لعاب)



في أسد بلحق وراي صحي خيارين
اما بودي الدم على ال skin
ويطلع شكلي راقي وتقل حركتي
او بوديه على ال skeleton
بس تزيد حركتي ووجهي
يصير لونه شحوب.

no blood to skin

ما فيه لعاب يفرز لأنو بحالة خطر

(action potential) tone دايمًا عندي

* Features of ANS response

1. rapid — استجابة سريعة
2. Automatic — لا تعطي اوامر للجسم
3. Tonic activity (number of action potential per unit time) → basal rate → sympathic tone / parasym. tone

اذا بدي اقلل ال sympathetic برفع ال parasympathetic والعكس صحيح

CNS → Somatic effector

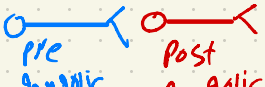
CNS → preganglionic → ganglia → postganglionic → Autonomic effector

CNS → ganglia → Parasympatic effector

CNS → $T_1 - L_3$ ganglia → Sympathtic effector

Which spinal cord level contains the entire population of preganglionic sympathetic neurons?
- A) C5-T1
- B) C3-C5
- C) S2-S4
- D) T1-L3
- E) T6-L1

notes



Para ... vertebral
Pre ...

Paravertebral near the vertebral column

Prevertebral far from the vertebral column

43. The region from where neurotransmitters cross from one neuron to another is called:
- A. Dendrite.
- B. Axon.
- C. Synapse.
- D. Neurotransmitter.

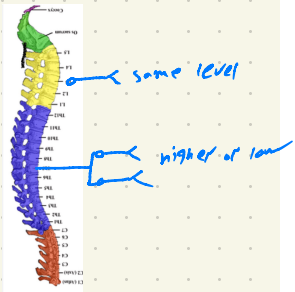
Para neuron → pre neuron → adrenal gland neuron

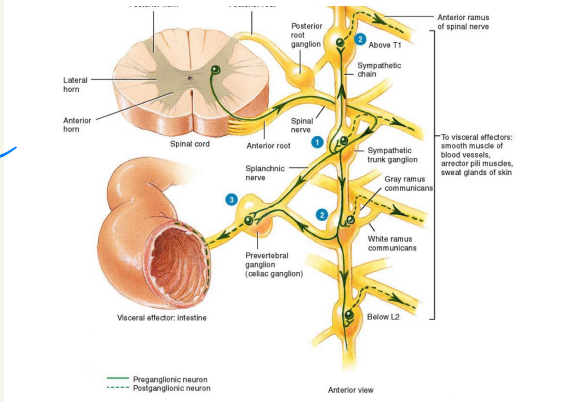
Synapse

1 same level

2- higher or lower segmental level

3- leave Paravertebral and continue to the Prevertebral يترك الفقري ويشبك بالبعيد





4- leave prevertebral ganglia and continue to the Adrenal glands Adrenaline = epinephrine

sympathetic

حل عضو بجسم الإنسان يا إلو ليلؤمن
ال sympathtic و إما من ال para sympathtic
بس في شغلات Exception تاخذ فقط
ال sympathtic

org: divergence

1- sweet glands

2- smooth muscle of vesseles to skeletal muscles

3- smooth muscles of hair follicels

بصيلات الشعر

→ pressure

→ Temprature

سطحي
Cutanous blood vessels
- vasdiotions → loose heat (اذا الدنيا حر)
- vasoconstriction → reduce loose heat (اذا الدنيا برد)

glands (sweating)

ال sympathtic يعني بمعركة الطاقة للskeletal muscle عشان يدي طاقة واقدر اقاتل مش وقت المنظر الحلو
الطبيعي اني اقتل ولا أعطي

C.VS
- skin
- skilltal muscle

system effects

Cardio vascular system: blood
- ↑ skeletal muscles
- ↓ skin, mesentry

Respiratory system: ↑ bronchodilation بدنا هوا فوسع القصبات الهوائية

نزيد تكسير الغلوكوز ونكسر lipids لأنو بدي طاقة انا بمعركة

metabolic: ↑ gloucose, lipolysis, ...

Heart: ↑ rate

Digestive system: ↓ secretion, motality

في امعركة انا مش وقت الأكل

Parasmpathtic

org: Pre 1 : Post 1

1 : 2

diverg

So discrete and confined

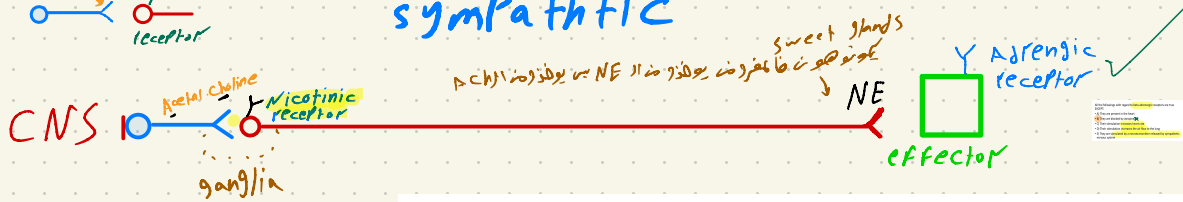
Parasystem functions

1. **GI** : ↑ secretion, motality
2. **Glands** : ↑ secretion,
3. **Heart**: ↓ rate
4. **Pupil**: miosis , Accomdation of the lens
5. **urinary bladder**: voiding

pupil myosis

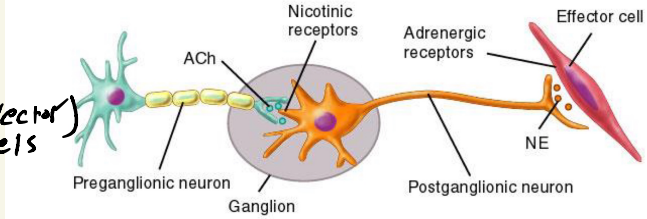
parasympathtic

sympathtic



exceptions

→ sweet gland (ACh, piloerector muscels)

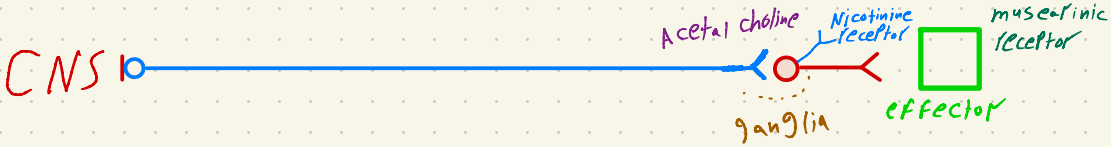


(a) Sympathetic division–innervation to most effector tissues

Which type of cholinergic receptor is found at synapses between preganglionic and postganglionic neurons of the sympathetic system?
- A) Muscarinic
- B) Nicotinic
- C) Alpha
- D) Beta-1
- E) Beta-2

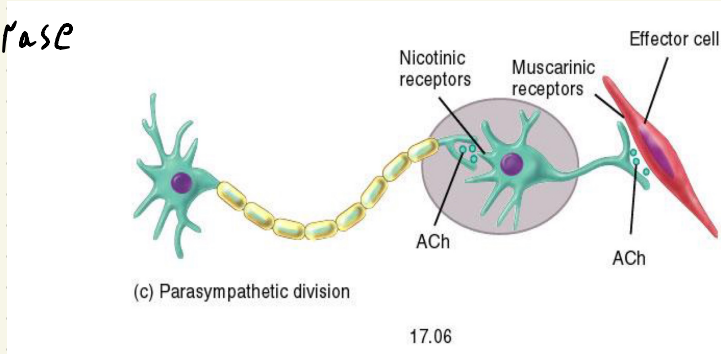
synaptic بال beta NE ال

parasymphathtic



→ Acetal choline estrase

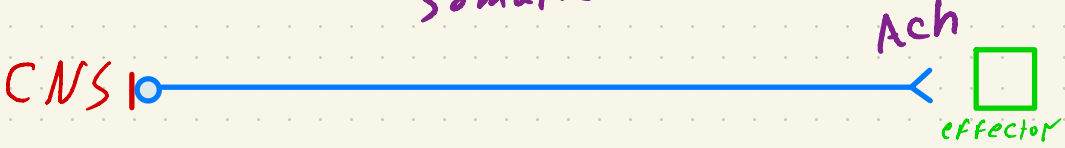
Ach بكسر ال

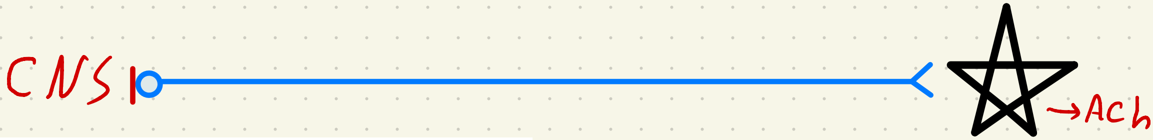


(c) Parasympathetic division

17.06

somatic





Adrenal medula
(preganglonic only)

Cells of the adrenal medulla receive synaptic input from which type of neuron?

- A) Preganglionic sympathetic
- B) Postganglionic sympathetic ✗
- C) Preganglionic parasympathetic
- D) Postsynaptic parasympathetic ✗
- E) Presynaptic parasympathetic

ما عندو ACh اصلا

والـ Adrenal medull خصها
اذن الـ sympathetic

endocrine glands
↓
epinphrin, Norepinphrin
(catecolamines)

* ↑ Acetal choline, ↑ muscarine — Y muscarinic receptor (الـ Atropine يثبطو) — ↓Atropine

↑ Acetal choline, ↑ nicotine — Y Nicotinic receptor

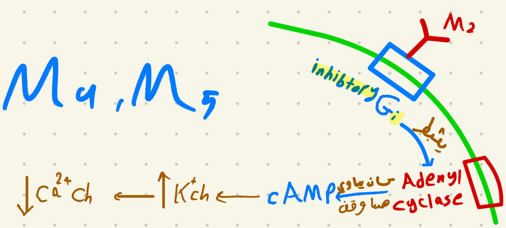
↑ EP, ↑ NE — Y Adrenergic receptor

27 Which substance activates muscarinic receptors?

- A. Acetylcholine (ACh)
- B. Atropine
- C. Norepinephrine (NEpi)
- D. Epinephrine (Epi)
- E. More than one of the above

M receptors subtypes

M_1, M_2, M_3, M_4, M_5

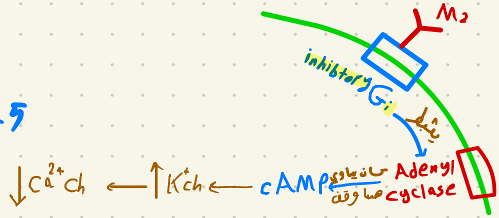


M receptors subtypes

M1, M2, M3, M4, M5

M2 → linked to inhibitory G protein, ↓cAMP, ↑K^+ channels, ↓T tube Ca^{2+} channels

↓ Heart rate



Inhibitory ↓ Heart rate

excitatory ↑ Heart rate

M1, M3, M5

- exicitory
- in smooth muscle, glands

→ muscarinic Poisoning (parasympathetic)

1. ↑secretion, ↑salivation (اللعاب), ↑tearing (دموع), ↑nasal, ↑bronchial, ↑urination ..
2. GI motility ↑, vomating ↑, diarrhea ↑ (اسهال)
3. Bradycardia ↓ (القلب يبطئ)
4. miosis

→ Atropine (sympathetic)

1. ↓secretion, dry mouth, eye, nasal cavity
2. Tachycardia ↑
3. ↓near vision (قل قرب النظر / بنستطيع للبعيد عشان نهرب)
4. ↓ Pupillary light reflex

بال nara تستنتج الفوهلا ✗

26. All the following structures are bearing muscarinic receptors EXCEPT:

A. Postganglionic neurons.
B. Sweat glands
C. Intestine.
D. Salivary glands.
E. Heart conductive tissue.

33. By muscarinic intoxication, all the followings are taking place EXCEPT:

A. Vomiting and diarrhea ✓
B. Dilation of pupil(mydriasis) ✗ myosis
C. Hyper salivation ✓
D. High sweating ✓
E. Decrease heart rate. ✓

@ receptors

@$_1$: Excitatory, PLC → ↑ IP_3 → contraction

↳ sympathetic [smooth muscle in blood vesseles of the skin]

@$_2$:

↳ sympathetic

@$_3$ hetero receptors — Non adrenergic — Gi, ↓ Adenylyl cyclase, ↓ cAMP

↳ BaRa

β receptors:

B_1: ↑ cAMP, ↓ K^+ channels, ↑ T-type Ca^{2+} Channels, ↑ Heart rate

↳ sympathetic — excitatory

B_2: - Inhibitory

↳ BaRa

- Trachial, bronchial smooth muscles
- GI — dilation of air ways

28.Which of the following actions is/are mediated by β2 receptors:

A. decreased heart rate
B. contraction of gastrointestinal sphincters
C. contraction of vascular smooth muscle
D. dilation of airways,
E. NONE OF THE ABOVE