



لجان الرفعات

PHYSIOLOGY

MORPHINE ACADEMY

MORPHINE
ACADEMY



PHYSIOLOGY

FACULTY OF PHARMACEUTICAL SCIENCES

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**LECTURE 1-PART 1 : FUNCTIONAL ORGANIZATION OF THE HUMAN BODY
AND CONTROL OF THE “INTERNAL ENVIRONMENT”**

Objectives أهداف

1. Discuss **organization levels of human body**. (Pages 2-5 of the reference).
↳ chemical → cellular → tissue → organ → system → organism

2. Describe **characteristics of the living human organism**. (Pages 5-8 of the reference).
الصفات الطبيعية لجسم الإنسان

الموازن (يكون الجسم في الوضع الطبيعي)

3. Explore **homeostasis in the human body, including feedback systems and homeostatic imbalances**. (Pages 8-12 of the reference).

General Overview

Branches of science are:

- 1- Anatomy (structures of body parts)
- 2- Physiology (functions of these parts)

Anatomy



Physiology



Physiology → normal function

1- Cellular Physiology: Biochemical and biophysical processes occurs within cells. *Chemical reactions و chemicals التي بتخلي الخلية تؤدي وظيفتها*

2- Systemic Physiology: The regulation of physiological processes within the body. *يعني كيف الـ system يشتغل حتى يؤدي وظيفته*

Pathophysiology → ^{up}normal function

- ❑ The study of disordered body function (i.e., disease).
- ❑ The basis for clinical medicine.

Pharmacology

- ❑ The study of the effect of drugs on body processes.

ORGANIZATION LEVELS OF HUMAN BODY

1- **Chemical level** (atoms that form molecules). *اصغر level*

2- **Cellular level** (cells: muscle, nerve and epithelial cells). *أنواع* Cells: the basic structural and functional unit (~100 trillion).

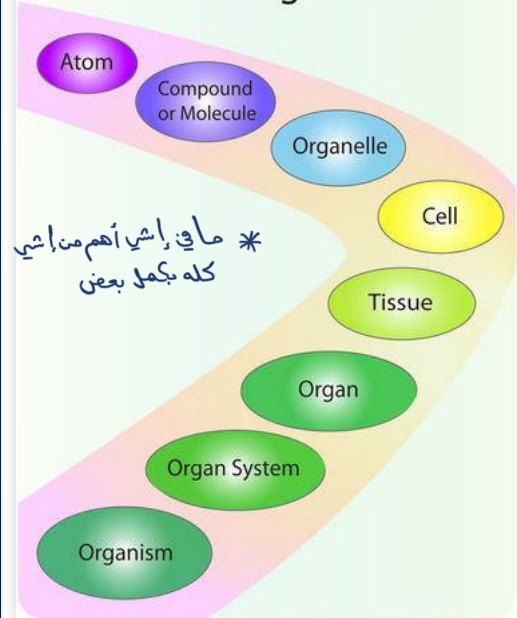
3- **Tissue level** (tissues: epithelial, connective, muscular and nervous tissues). *أنواع*

4- **Organ level** (organs: stomach, skin, bones, heart, liver, lungs and brain). *أمثلة*

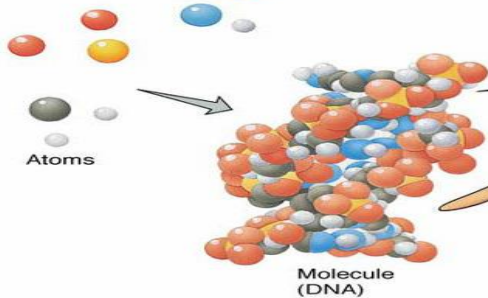
5- **System level** (systems: cardiovascular, urinary). *مثل*

6- **Organismal level.**

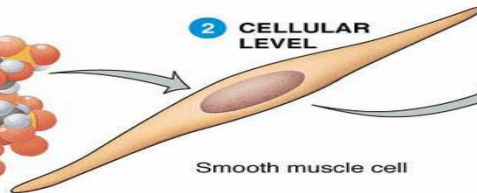
Levels of Organization



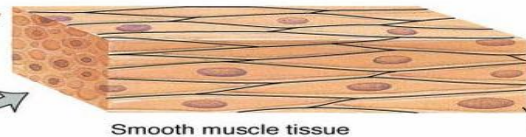
1 CHEMICAL LEVEL



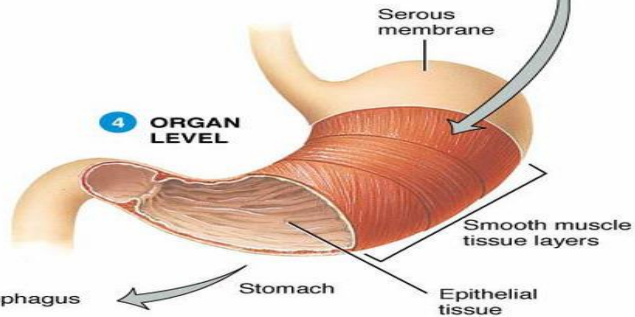
2 CELLULAR LEVEL



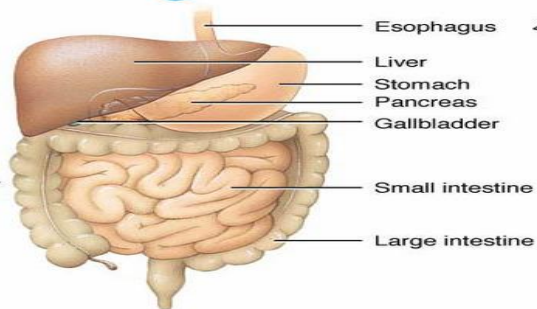
3 TISSUE LEVEL



4 ORGAN LEVEL



5 SYSTEM LEVEL



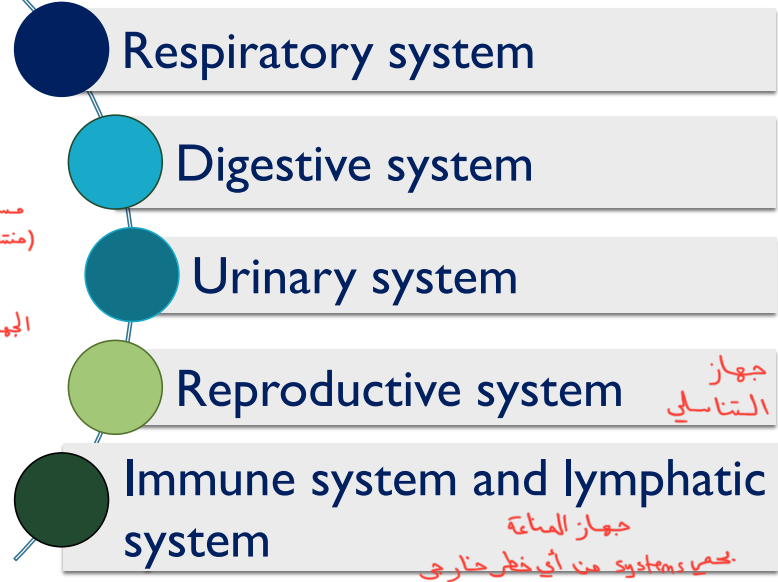
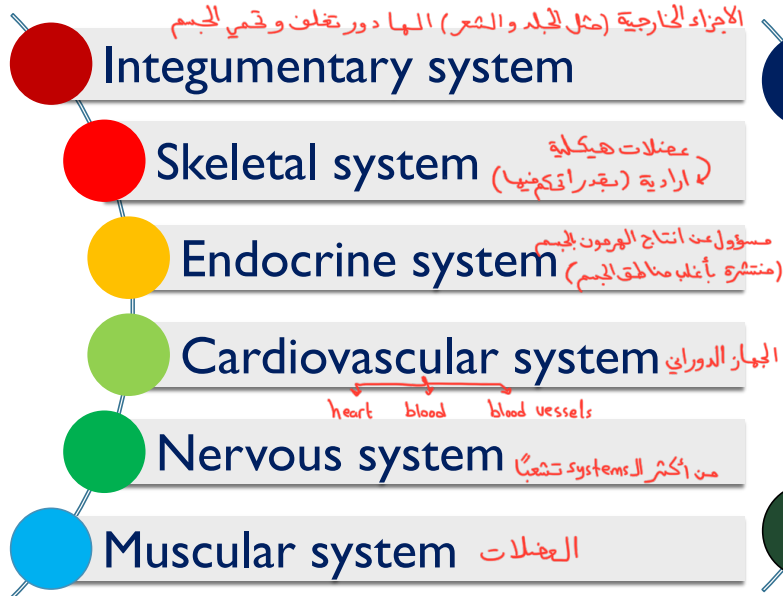
Digestive system

6 ORGANISMAL LEVEL



SYSTEMS OF THE HUMAN BODY

* إذا صار خلل بـ system
حـ يصير خلل بالباقي

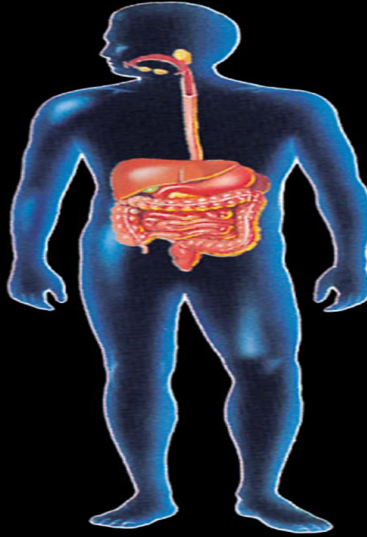




موزع على
الجسم

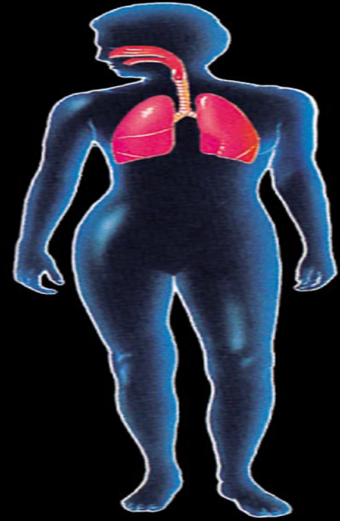
Circulatory system

heart, blood,
blood vessels



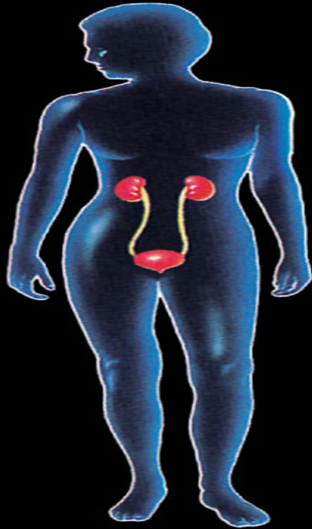
Digestive system

mouth, pharynx, esophagus, stomach,
small intestine, large intestine, salivary
glands, exocrine pancreas, liver,
gallbladder



Respiratory system

Nose, pharynx, larynx,
trachea, bronchi, lungs



Urinary system

kidneys, ureters,
urinary bladder,
urethra



Skeletal system

bones, cartilage,
joints



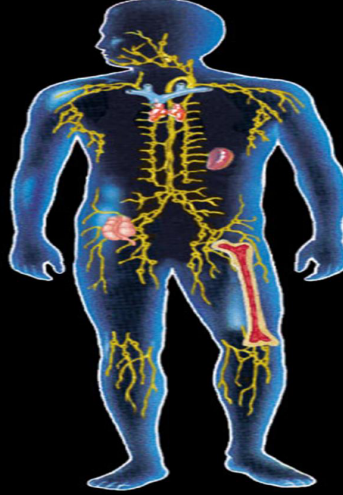
Muscular system

skeletal muscles



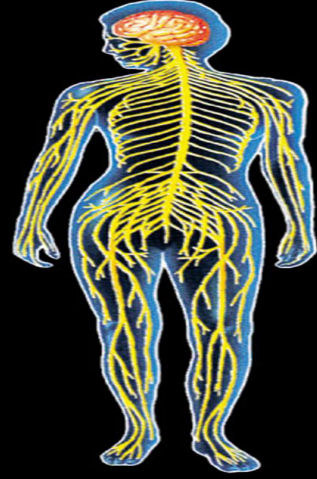
Integumentary system

skin, hair, nails



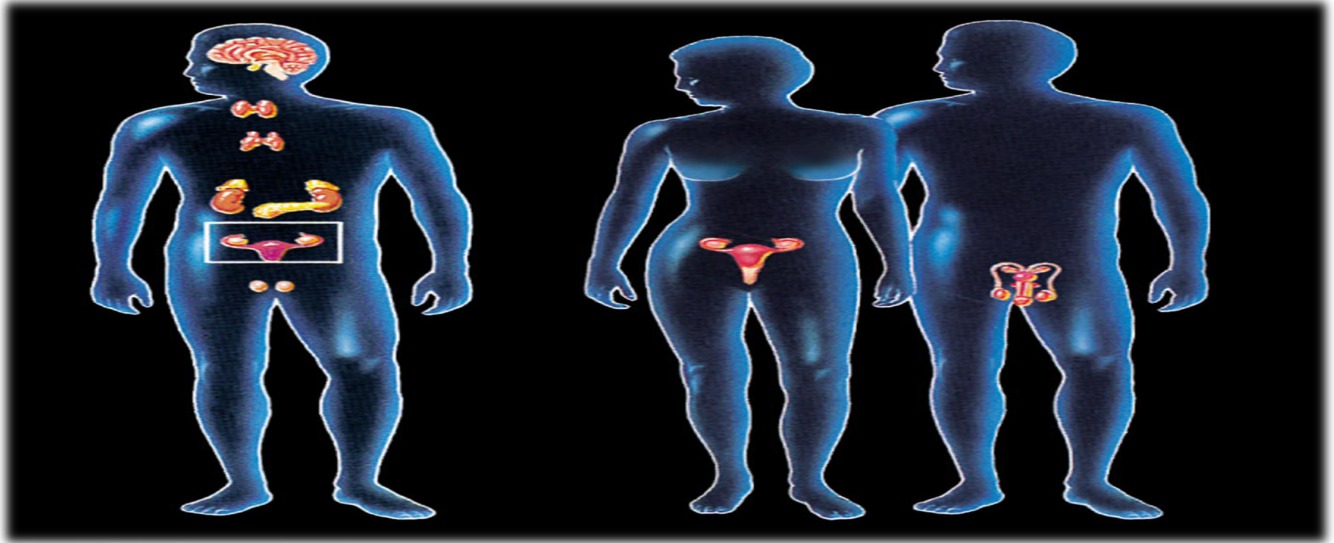
Immune system

lymph nodes, thymus, bone marrow, tonsils, adenoids, spleen, appendix, and, not shown, white blood cells, gut-associated lymphoid tissue, and skin-associated lymphoid tissue



Nervous system

brain, spinal cord, peripheral nerves, and, not shown, special sense organs



Endocrine system

all hormone-secreting tissues, including hypothalamus, pituitary, thyroid, adrenals, endocrine, pancreas, gonads, kidneys, pineal, thymus, and, not shown, parathyroids, intestine, heart, and skin

Reproductive system

Male: testes, penis, prostate gland, seminal vesicles, bulbourethral glands, and associated ducts

Female: ovaries, oviducts, uterus, vagina, breasts

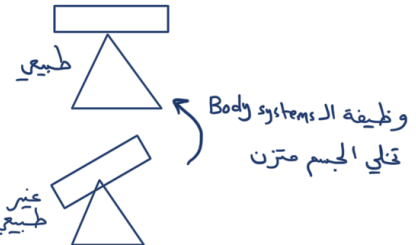
Human physiology

آليات و خصائص ← بتخليه يفضل عايش

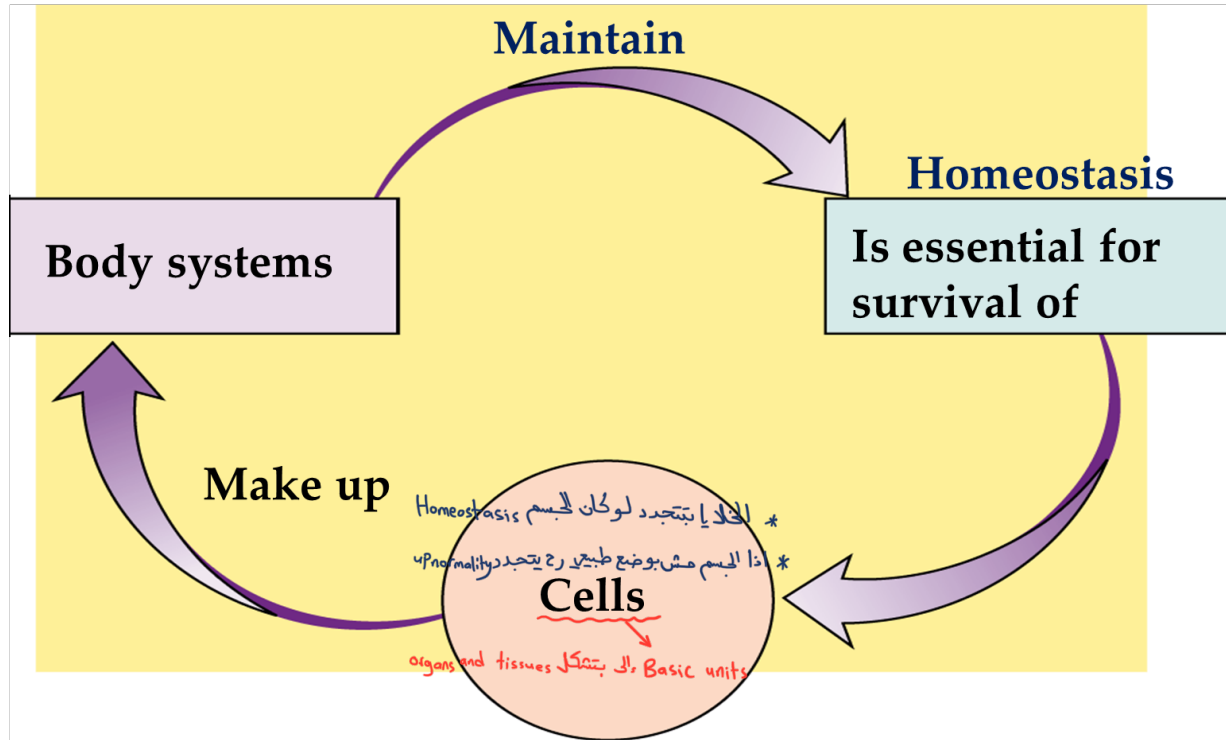
Specific characteristic and mechanisms of the human body that make it a living being. All organs and tissues perform functions that help to maintain internal environment constant (Homeostasis).

له اتزان بأداء أجهزة الجسم كاملة للمحافظة على جسم
الإنسان يفضل بالوضع الطبيعي

* ممكن يصير أشياء بالجسم تغير من وضعه الطبيعي



طبيعي [إذا استمر يصير abnormality وبهاي الحالة نحتاج علاج]



CHARACTERISTICS OF THE LIVING HUMAN ORGANISM (LIFE PROCESSES)

* عمليات بتصير الجسم
بتشكل يومياً

Metabolism (catabolism as well as anabolism)

مسؤول عن النمو
وانتاج الطاقة

الاستجابات لتأثيرات
خارجية داخلية

Responsiveness (detecting and responding to internal or external changes)

Movement (motion of the whole body)

الحركة

CHARACTERISTICS OF THE LIVING HUMAN ORGANISM (LIFE PROCESSES)

يُضَلُّ مُسْتَمَرَّعَ الْجِسْمِ حُلُولَ عَمْرِهِ

Growth (increasing in body size)

تَعَايُنُ

Differentiation (developing of specialized cells from precursor cells)

الْخَلَايَا الْجَدْعِيَّةُ يَتَحَوَّلُ
خَلَايَا مُتَخَصِّصَةً بِكَوْنِهَا
وَمُطَبَّقَةً مُتَخَصِّصَةً

Reproduction (cell division or fertilization)

قَادِرٌ عَلَى
التَّكَاثُرِ

عَنْ طَرِيقِ التَّزَاوُجِ

HOMEOSTASIS

Homeostasis is an **equilibrium** (balance) in the body's internal environment.

Homeostasis and body fluids:

يحافظ على الكميات ما تكون كثير ولا قليل

مثال Blood/extracellular fluids / Intracellular fluids

- Maintaining the volume and composition of body fluids.
- The fluid within cells is intracellular fluid (ICF).
- The fluid outside body cells is extracellular fluid (ECF).

HOMEOSTASIS AND BODY FLUIDS

- The ECF that fills the narrow spaces between cells of tissues is known as **interstitial fluid**.

وسط لعملية التبادل التي تتم بين الدم والخلايا



- The composition of interstitial fluid changes within blood capillaries to provide tissue cells with needed materials, such as glucose, oxygen, etc. Moreover, it removes wastes, such as carbon dioxide from interstitial fluid.

HOMEOSTASIS

Homeostasis in the human body is continually being disturbed,

- From the external environment, the internal environment and psychological stresses.

- Can be temporarily or prolonged.

دائم أو مؤقت
- The body has many regulating systems that can usually return the internal environment back into balance.


لوحاظ دائم بتحول من normal ← upnormal

HOMEOSTASIS

* أمثلة كيف الجسم يحافظ على Homeostasis

- Nervous system regulates homeostasis through sending electrical signals known as **nerve impulses** (action potentials) to organs....

nervous system يرسل إشارات عصبية للorgans

Rapid change

سريع

تأثيره يأخذ وقت عشان يبين

- The **endocrine** system regulates homeostasis through secreting messenger molecules called **hormones** into the blood..... Slow change

الغدة بدها تصنع الهرمون والهرمون بده يمشي مع الدم

- Rapid or slow changes work toward the **negative feedback systems**.

* إذا استمر negative فهي طبيعية ← لأنه لو قل عادي. يرجع يزيد لوضعه الطبيعي

* إذا استمر Positive رج يقول لإممي مرضي ← لأنه لو وصل يزيد رج يصير أكثر من الطبيعي وما يقدر ارجعه طبيعي

negative feedback system (مقلد)

يعني لما يوصل الحد الطبيعي بالجسم

Positive feedback system (مغالي)

يكون قليل فلازم يصير زيادة عشان يوصل الحد الطبيعي

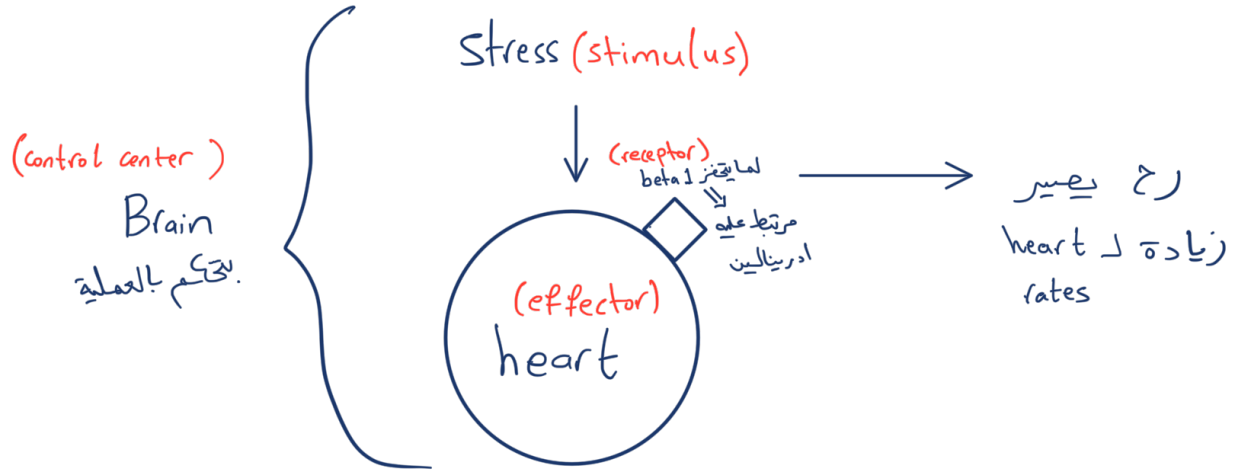
FEEDBACK SYSTEMS التغذية الراجعة

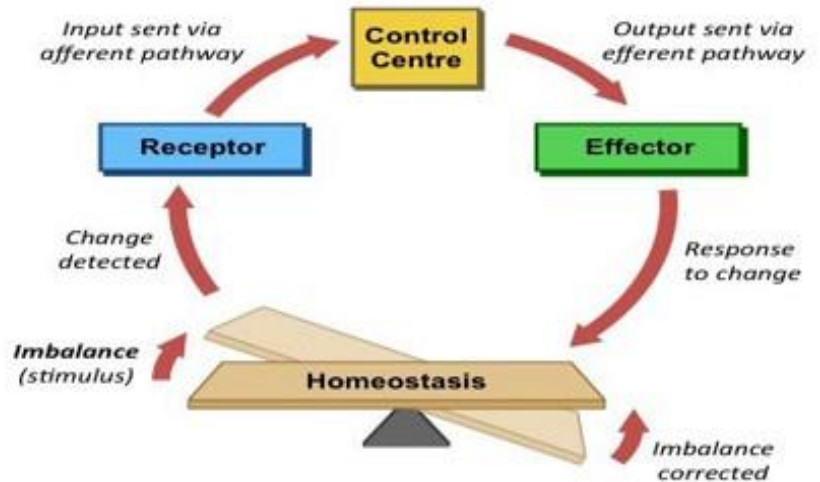
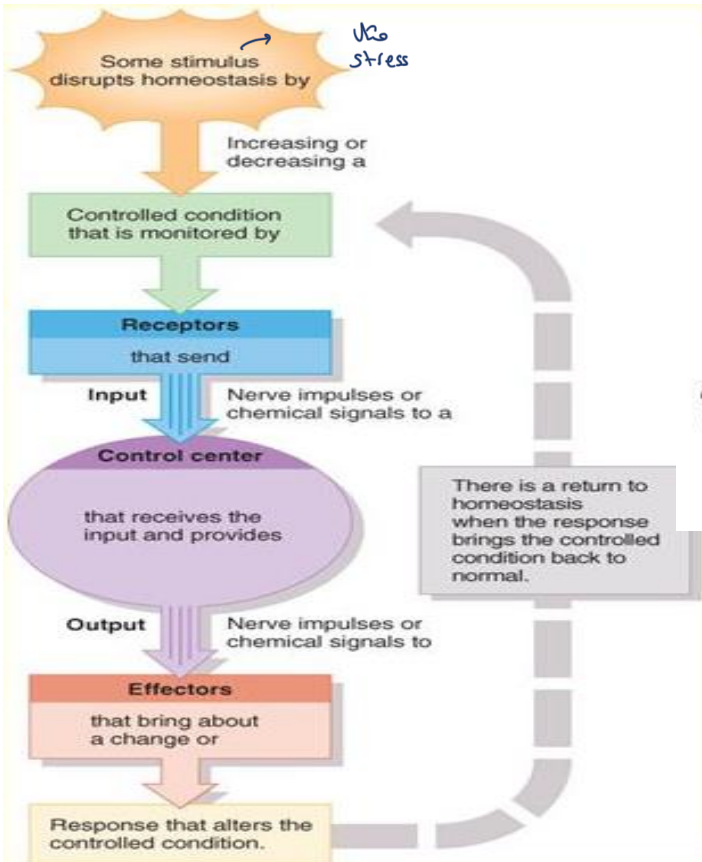
- The internal environment can be regulated through **feedback system or feedback loop that monitored controlled variables** such as body temperature, blood pressure, or blood glucose level. (**Homeostatic reflex that can be innate “built-in” and learned homeostatic reflex.**)

محفز ← عشان يصير خلل بلا Homeostasis وبالتالي feedback

- Changing of a controlled condition is called **stimulus**.
- Basic components of feedback system are a **stimulus, a receptor, a control center, and an effector**.

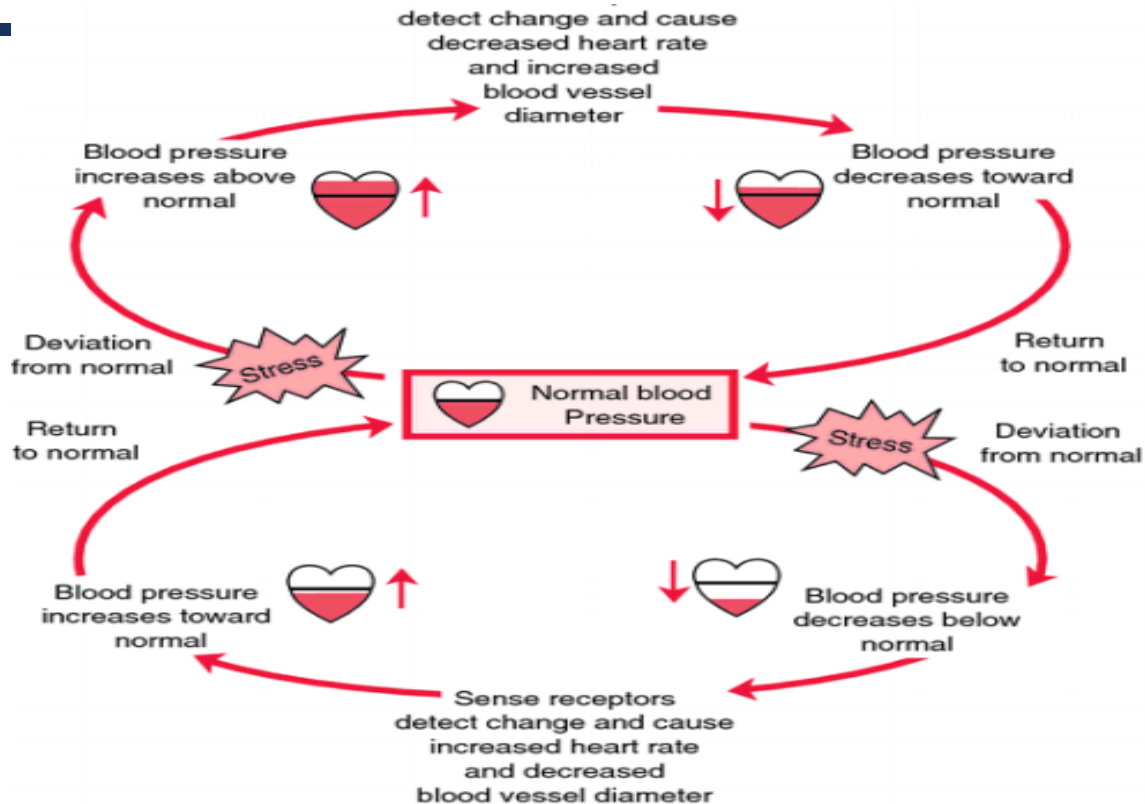
مثال





Group of receptors and effectors communicating with their control center forms a feedback system

-
- **The feedback systems can be positive or negative feedback systems.**
 - **A negative feedback system reverses the change in a controlled condition.**
 - **Unlike a negative feedback system, a positive feedback system tends to strengthen or reinforce a change in one of the body's controlled conditions.**
 - **If the action of a positive feedback system is continued, it may produce life-threatening conditions in the body.**
 - **Unlike a positive feedback system, the action of a negative feedback system slows and then stops because the controlled condition returns to its normal state.**



HOMEOSTATIC IMBALANCES

يعني عندي مريض

- **[Disease]** is a more specific term for an illness that is characterized by a recognizable set of **signs and symptoms**.

علامات بتكون ظاهرة
و بتقدر اقيسها

امراض
شعور بوصفه

- Local disease affects a specific region of the body.
- Systemic disease affects either the entire body or several parts of it.
- Subjective changes in body functions (symptoms) that are not apparent to an observer (i.e. headache, nausea, and anxiety).
- Objective changes that a clinician can observe and measure are called signs.

مثلا زيادة نبضات القلب



THANK YOU

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