

MEDICAL BIOLOGY

Adipose Tissue

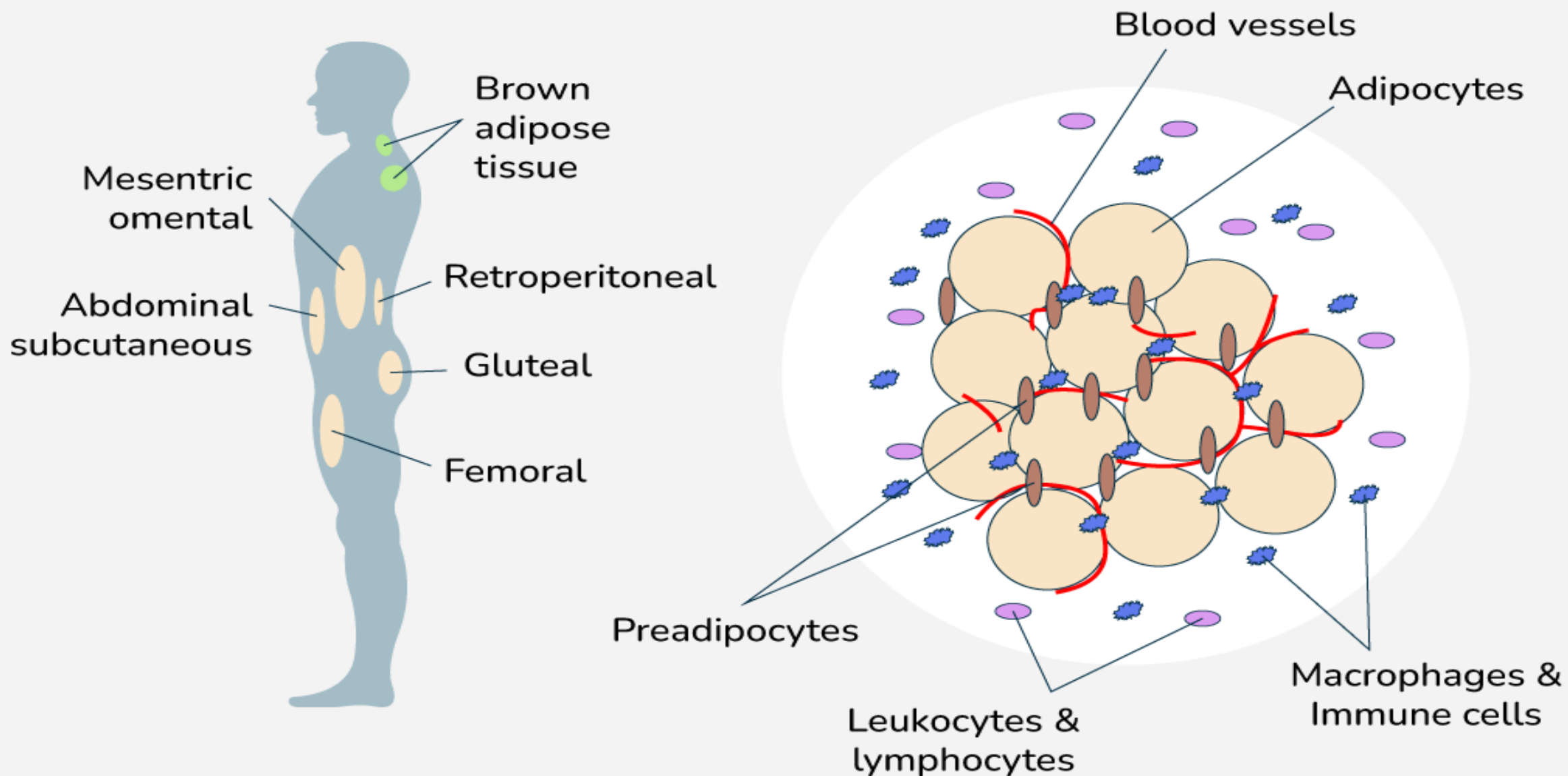
ADIPOSE TISSUE

- is a specialized connective tissue consisting of lipid-rich cells called adipocytes.
- As it comprises about 15-20 % of total body weight in men; slightly more in women
- the main function of adipose tissue is to store energy in the form of fat (triglycerides).

STRUCTURE AND LOCATION

- Adipose tissue is distributed within two compartments of the human body:
 - **Parietal or subcutaneous fat**, which is embedded in the connective tissue under the skin
 - **Visceral fat**, which surrounds the internal organs.
- adipose tissue consists of **cells and extracellular matrix**

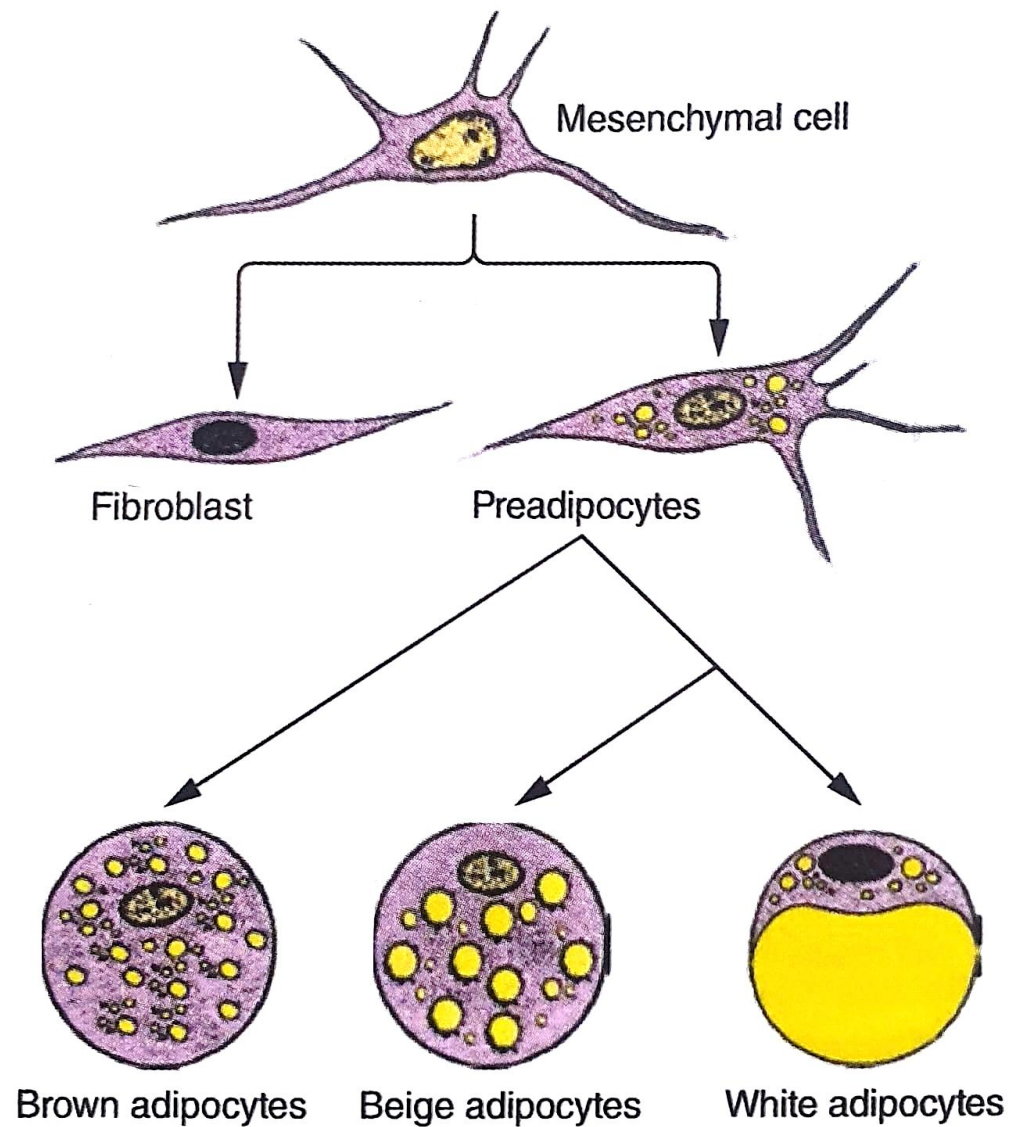
Adipose Tissue



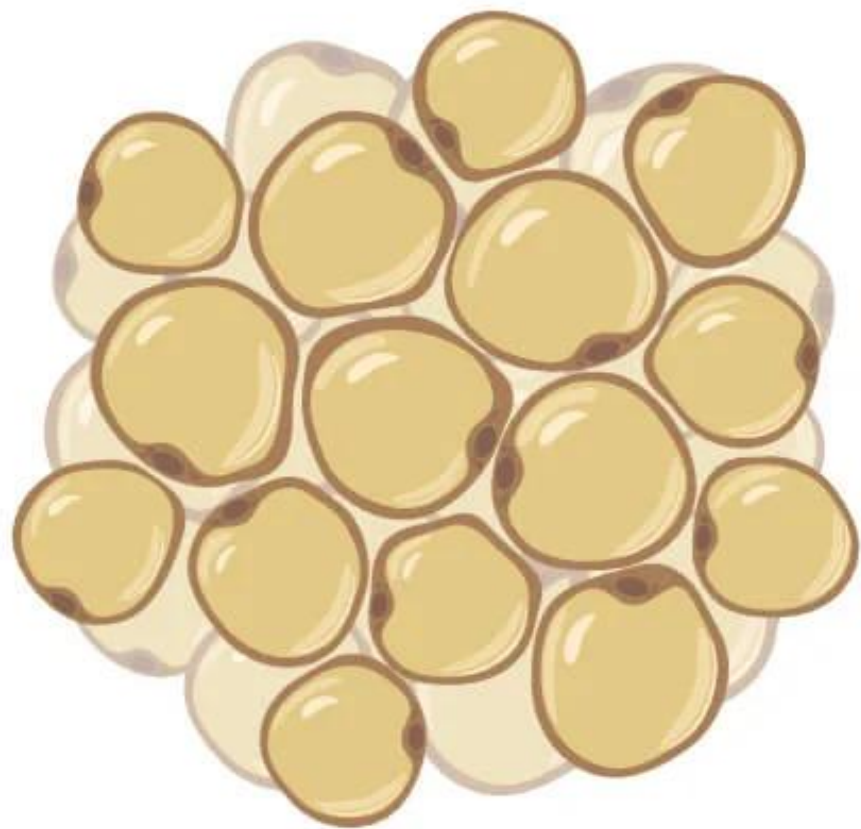
ADIPOCYTES

- Adipocytes (adipose cells, fat cells) are the building blocks of adipose tissue. There are three types of adipocytes that constitute two different types of adipose tissue:
 - • **White adipocytes - main cells of the white adipose tissue**
 - • **Brown adipocytes - chief cells of the brown adipose tissue**
 - • **Beige adipocytes - a recently discovered type, found dispersed within white fat tissue**

the origin of 3 types of adipocytes is from *undifferentiated mesenchymal cells* that give rise to *preadipocytes*.



Fat Cells (Adipocytes or Adipose Cells)



Adipose Tissue



**Adipocyte
(White)**



**Adipocyte
(Brown)**

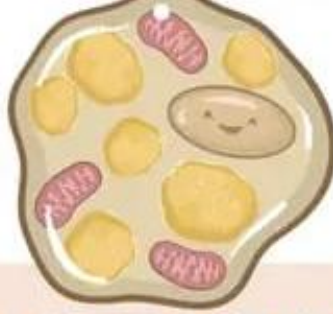


**Adipocyte
(Beige)**

- * 1 FAT DROPLET
- * FEW ORGANELLES
- * MOST ABUNDANT



- * SCATTERED AMONG WHITE ADIPOCYTES
- * SOMETIMES GENERATES HEAT



- * MANY FAT DROPLETS
- * MANY MITOCHONDRIA
- * GENERATES HEAT



WHITE ADIPOSE TISSUE

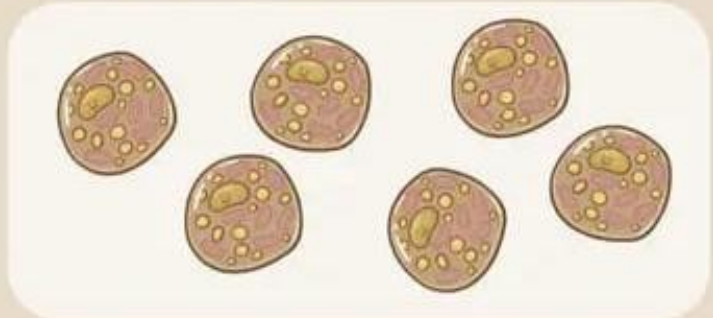
(made up of white & beige adipocytes)



- * **PREDOMINANT TYPE** of FAT in BODY
- * **LOCATED:** under SKIN, around INTERNAL ORGANS, in CENTRAL CAVITIES of BONES
- * **MAIN FUNCTION:** STORE ENERGY

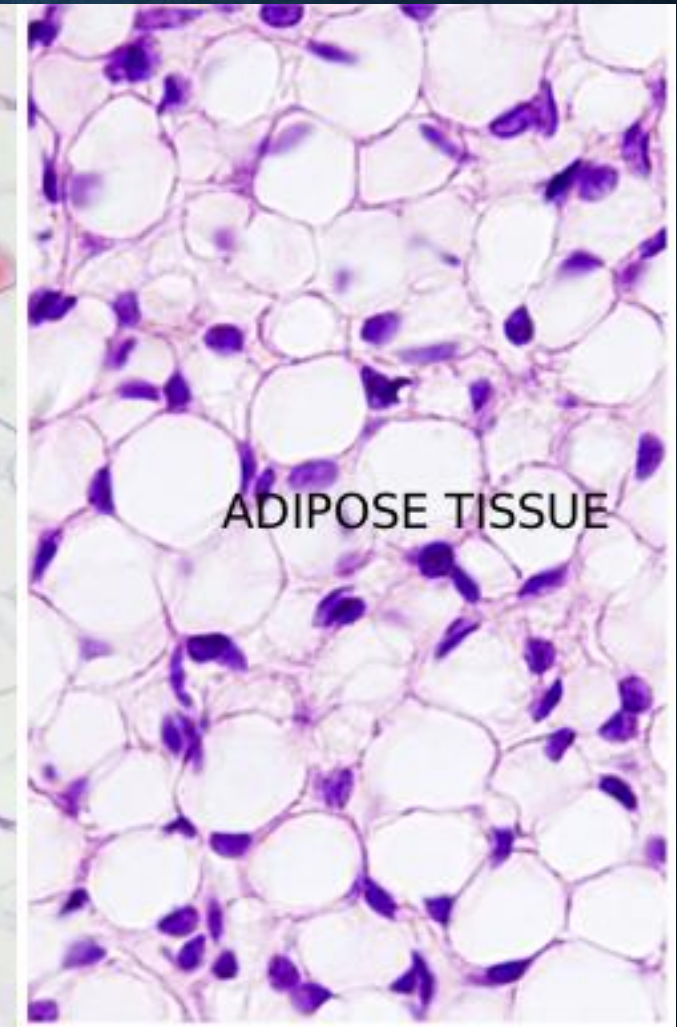
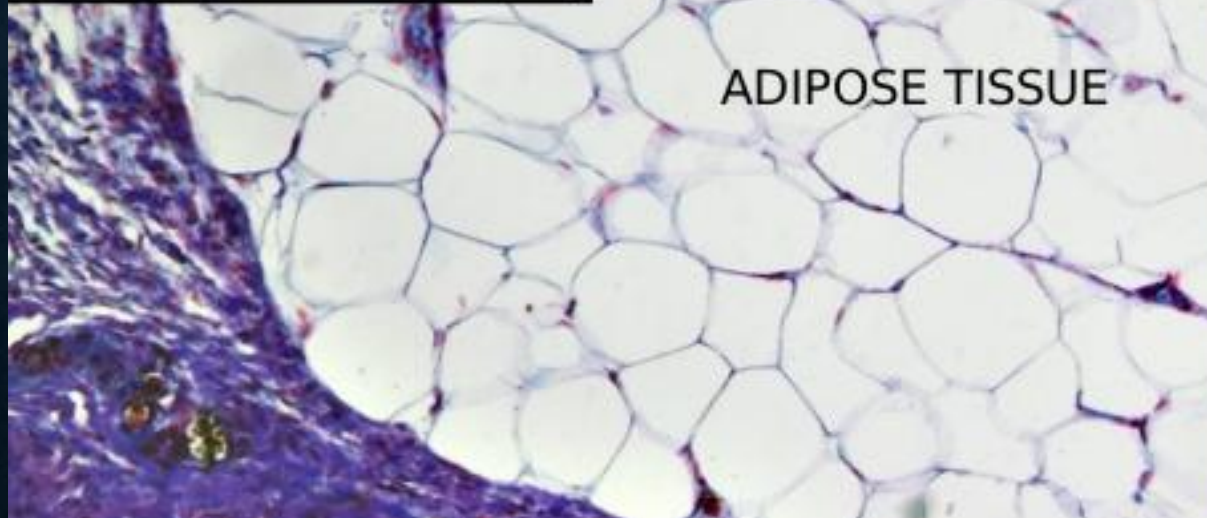
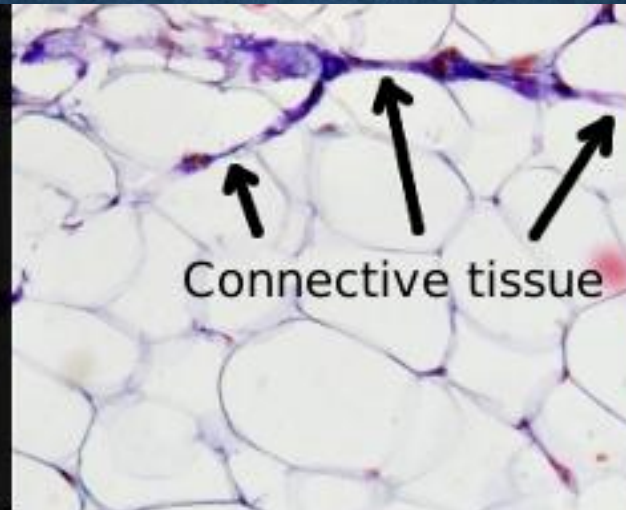
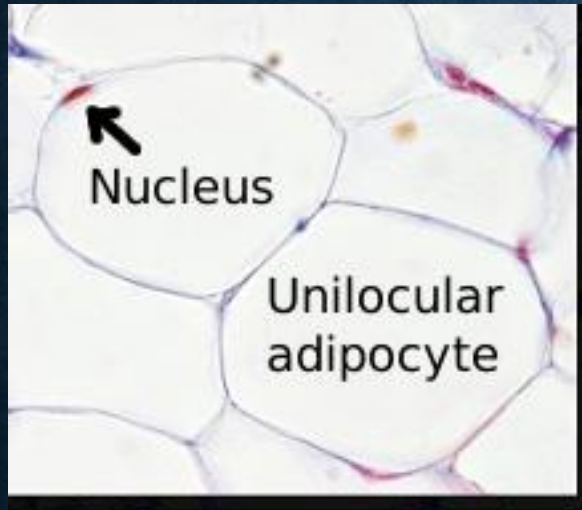
BROWN ADIPOSE TISSUE

(made up of brown adipocytes)

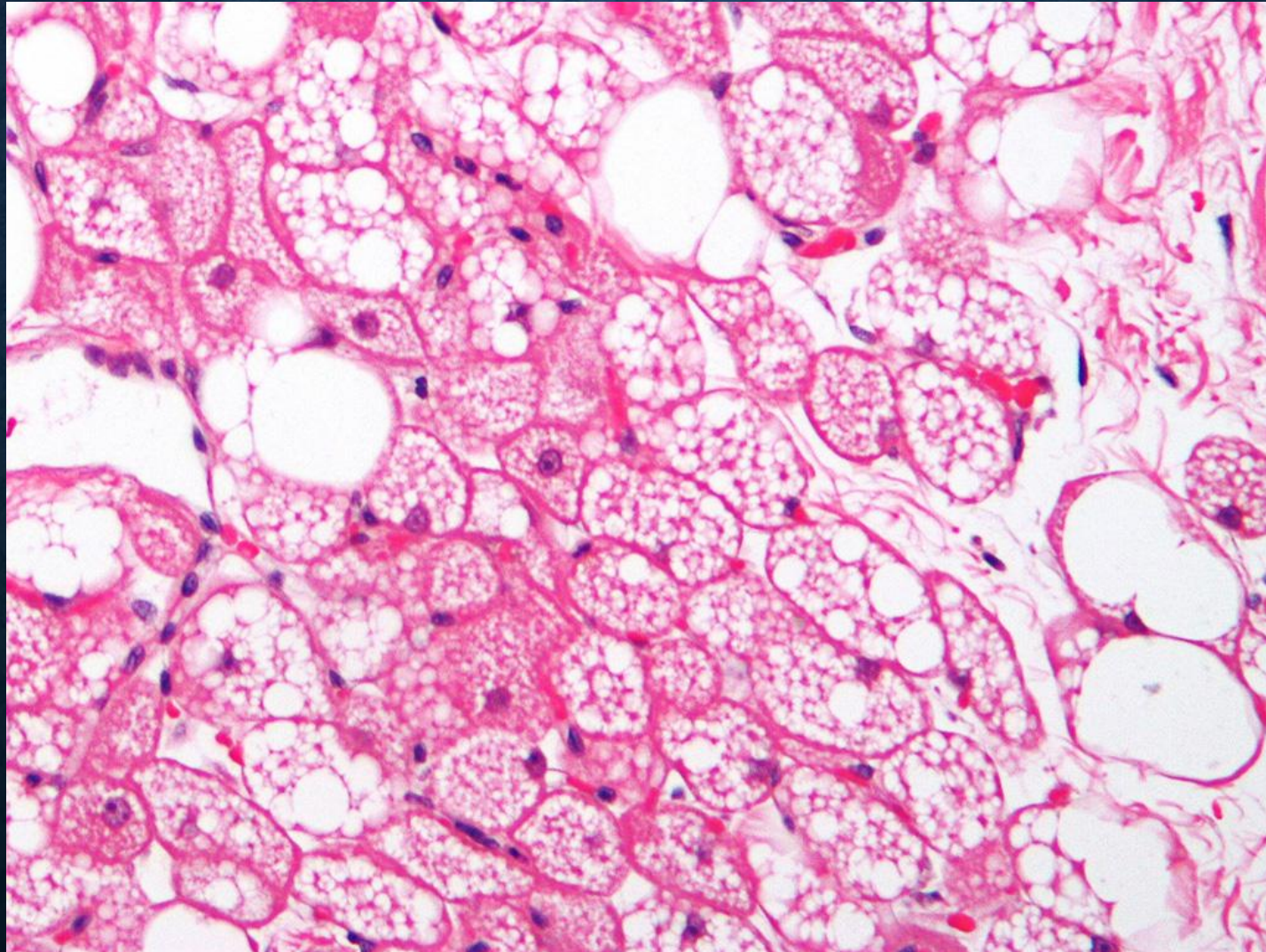


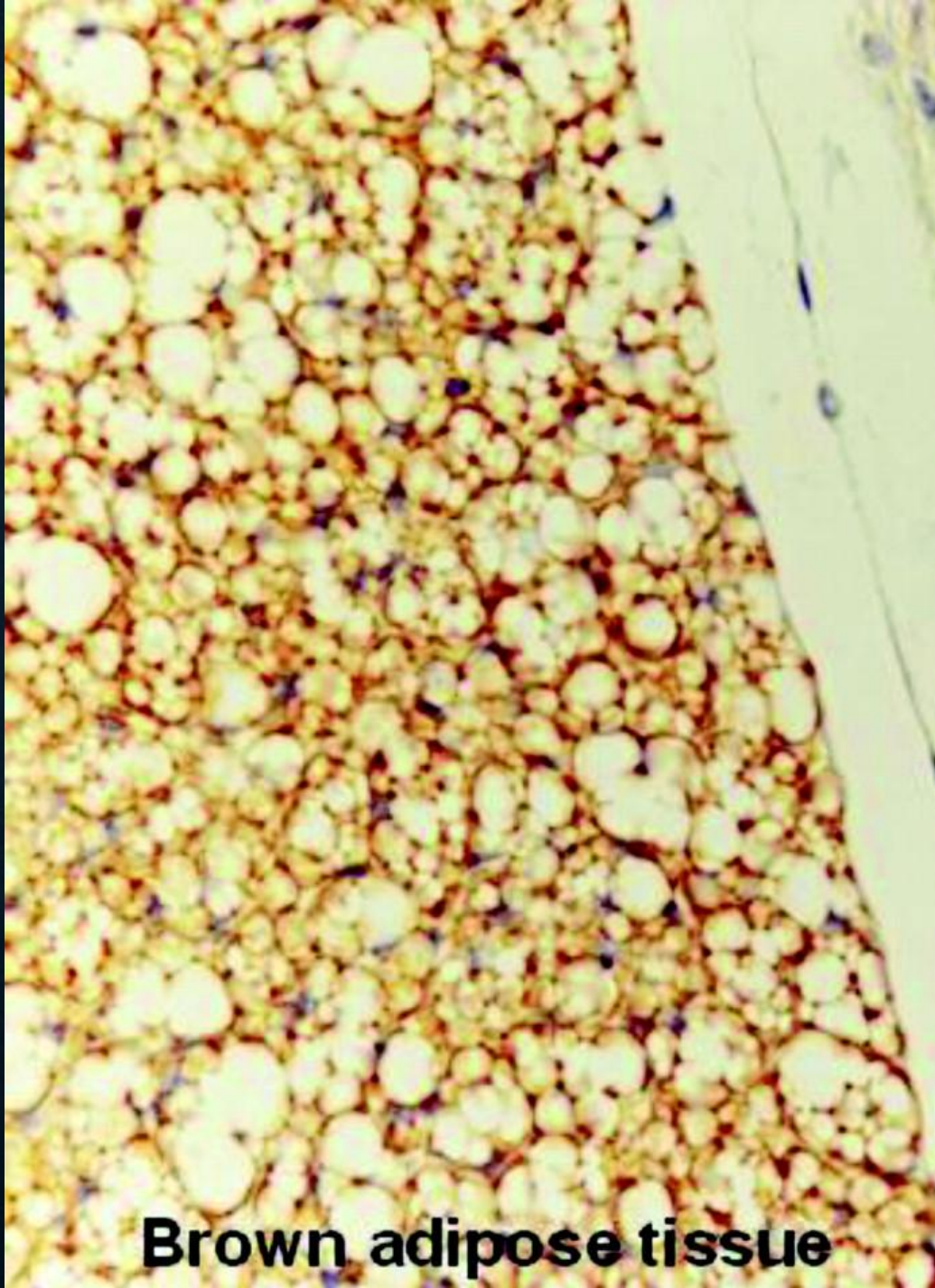
- * **MORE** in FETAL LIFE and INFANCY
- * **LOCATED:** UPPER BACK, above CLAVICLES, around VERTEBRAE
- * **MAIN FUNCTION:** GENERATE HEAT

WHITE ADIPOSE TISSUE

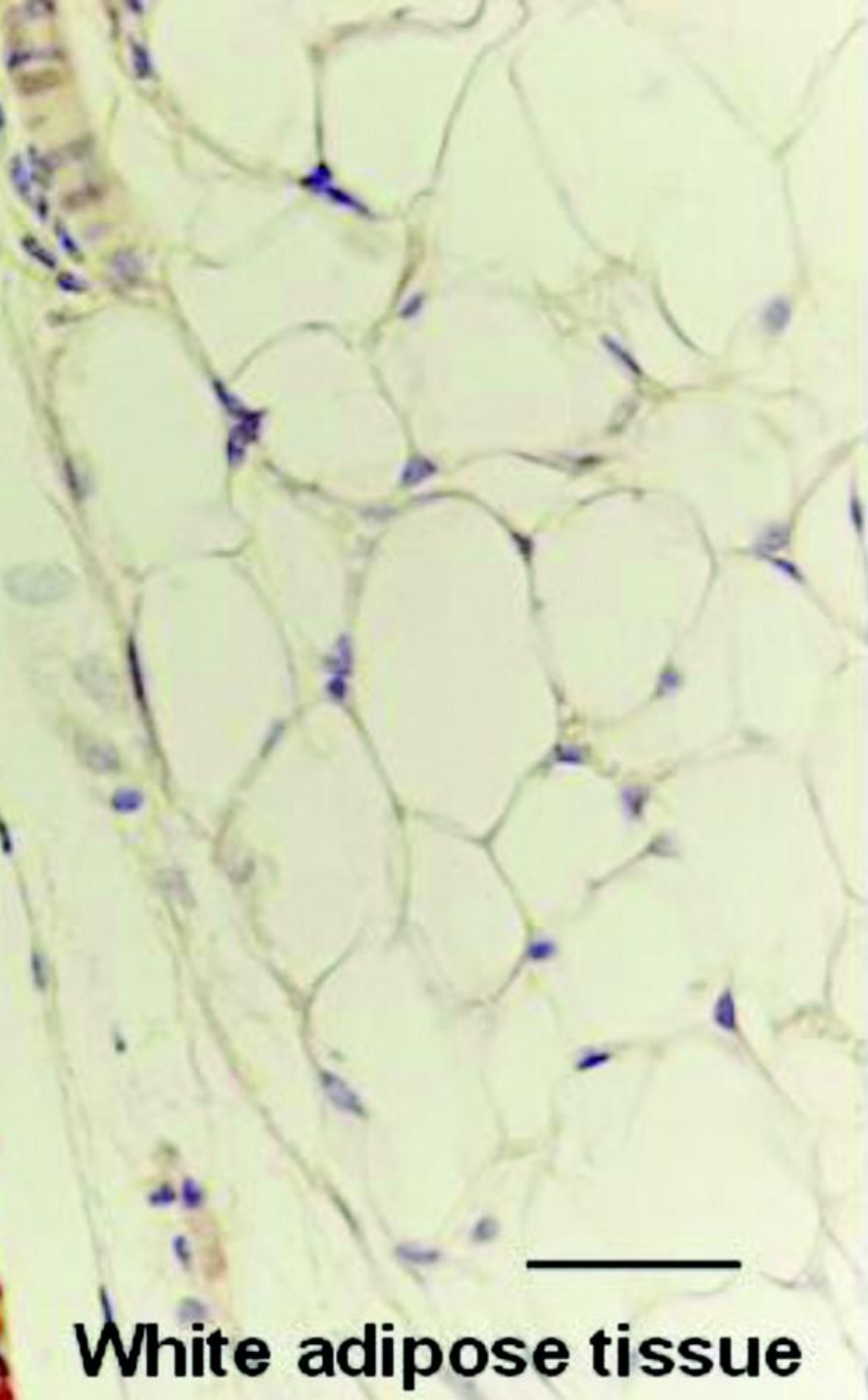


BROWN ADIPOSE TISSUE





Brown adipose tissue



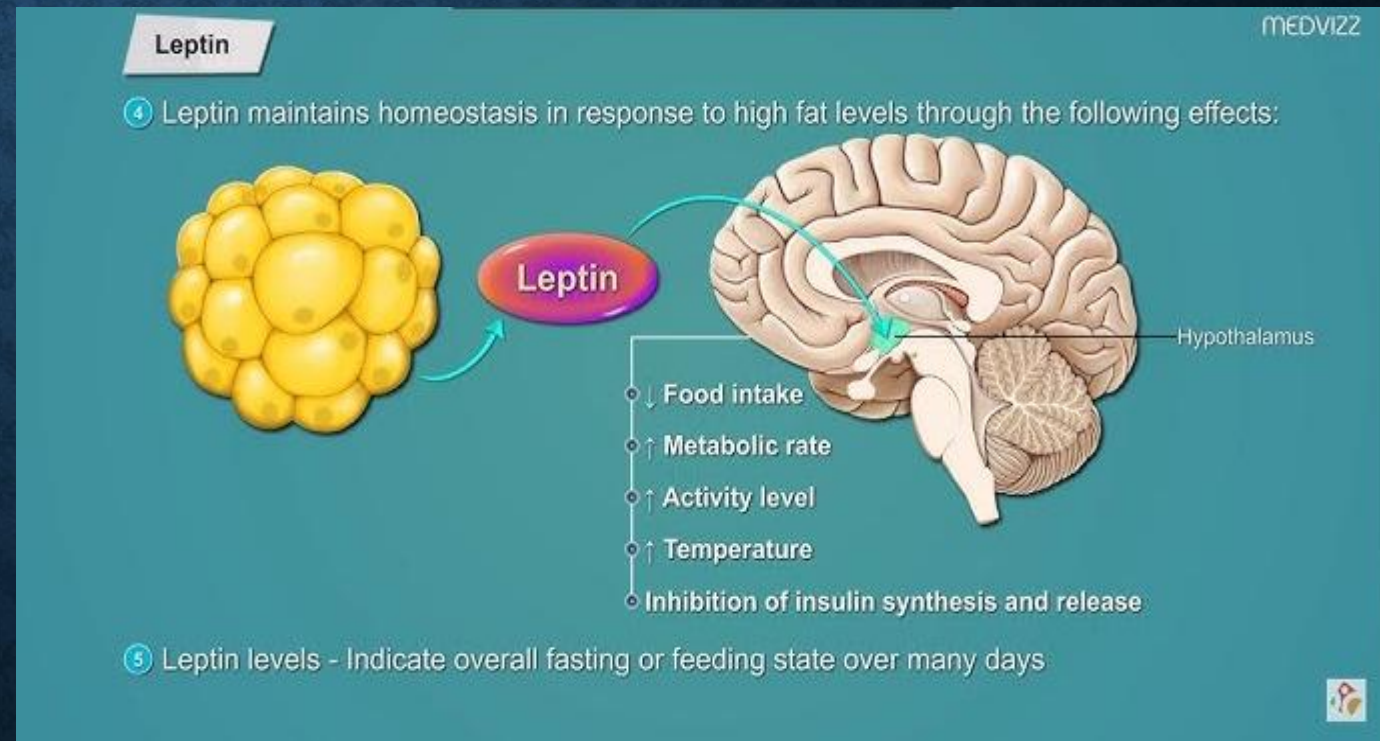
White adipose tissue

FUNCTION

- energy storage
- endocrine organ
- Different localizations of the adipose tissue have different roles in the human body
 - **abdominal fat = metabolic profile** influence in inducing insulin resistance.
 - **Parietal fat = thermoregulation.**
 - **visceral fat = cushion-like support** for internal organs.
- • During reduced caloric intake, the amount of parietal adipose tissue decreases, while the visceral fat remains undiminished.
- • brown adipose tissue transforms chemical energy into heat. That way it prevents obesity, other metabolic disorders, and hypothermia.

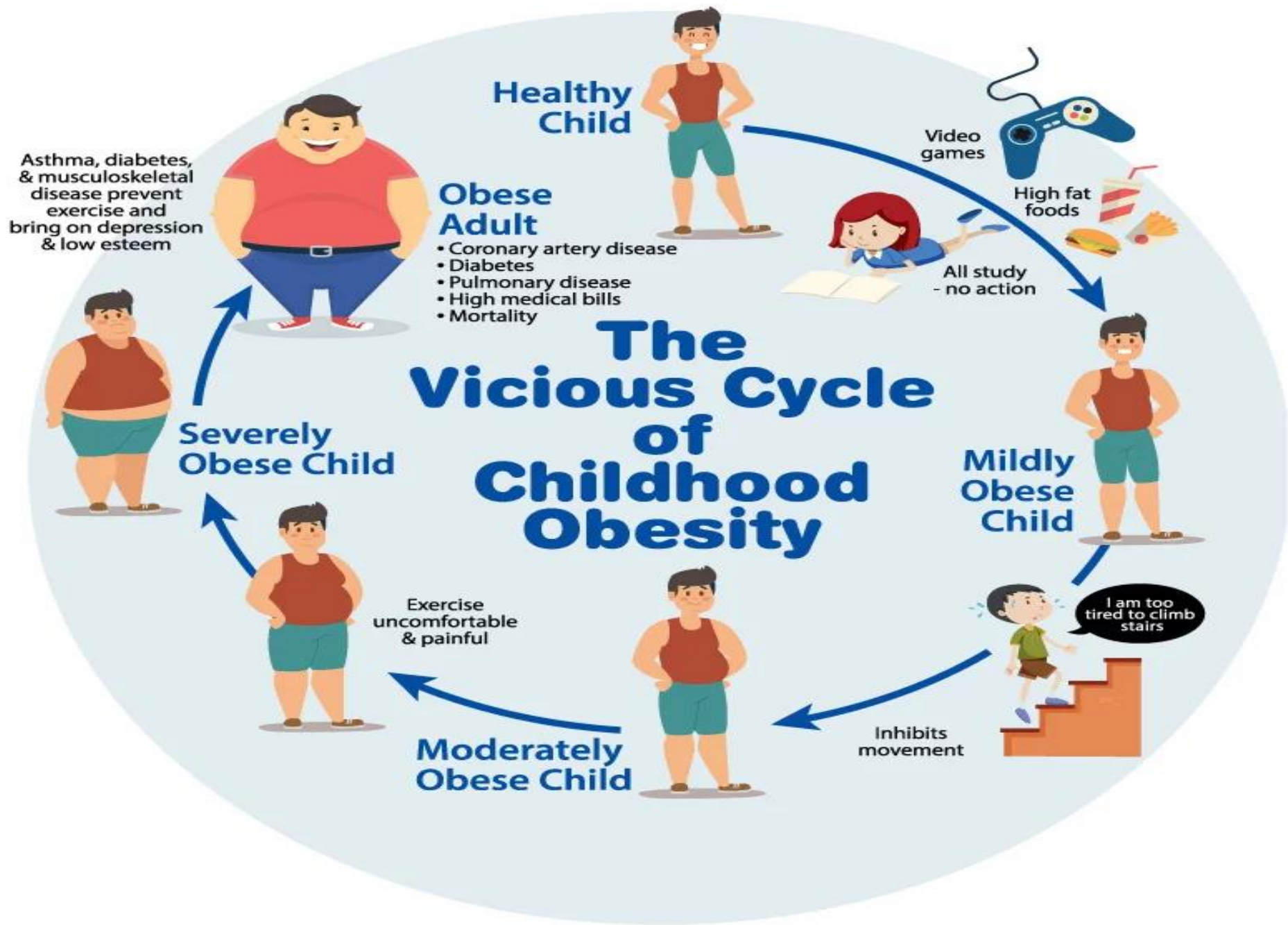
MEDICAL APPLICATION

- Unilocular adipocytes can generate benign tumors called lipomas that are relatively common, while malignant adipose tumors called liposarcomas are uncommon.
- In most obese individuals, adipocytes produce excess amount of leptin but target cells are not responsive due to insufficient or defective receptor.



Classifications of Obesity

- Hypertrophic (adult-onset) obesity:
 - A normal number of fat cells, which are twice as large as those of a non-obese person.
- Hyperplastic (juvenile-onset) obesity:
 - A higher number of enlarged fat cells.



THANK YOU