EMBRYOLOGY

* ***Muscular system***
* **Skeletal muscles:**

1. **Limbs + trunk musculature:**

The myotomes of the somites + the somatic mesoderm layer give rise to the skeletal muscles of the back of the body , of the ventrolateral body wall , + limbs.

By the end of the 5th  week , the musculature in the body wall is divided into :

A small dorsal portion , the ***epimere*** , + a larger ventral part , the ***hypomere***.

***The epimere*** gives rise to the extensor muscles of the backs, + are innervated by the dorsal primary ramus.

***The hypomere*** gives rise to the muscles of limbs + lateral + ventral muscles of the body wall , + are innervated by the primary ventral ramus.

The muscles of the ventrolateral body wall splits into 3 layers , which representes :

In the thorax by the the external , internal + innermost intercostal m.

In the abdomen by the external + internal oblique muscle , as well as the transverse abdominis muscle.

At the tip of the hypomeres , a ventral longitudinal column arises giving rise to infrahyoid muscles in the cervicle region + rectus abdominis muscle in the abdominal region , as well as sternalis m. in the thorax.

In addition to the above muscles the hypomere in the lumber segment forms the quadratus muscles , + in the sacral + coccygeal regions forms the pelvic diaphragm + skeletal m. of the anus , moreover in the cervical regions forms the scalene , genohyoid + prevertebral muscles.

1. ***Head musculare :***

All voluntary muscles of the head are derived from the somites including musculature of the tongue , eye , and that associated with the pharyngeal arches.

* **Smooth muscles:**

They are derived from the splanchnic mesoderm layer surrounding the primitive gut + its derivatives. These muscles will form the musculature of the respiratory tract , GIT , + muscles of the wall of the vessels of the mesentery.

Other blood vessls in the head , limbs , + body wall obtain their m. from the local mesenchyme.

* **Cardiac muscle:**

The cardiac muscle is derived from the splanchnic mesoderm surrounding the endothelial heart tube.

***Abnormalities:***

**Congenital absence of the muscles:** partial or complete absence of one or more muscles is rather common. e.g. total or partial absence of the pectoralis major muscle, Palmaris longus, serratus anterior + quadratus femoris muscle. In addition to partial or total absence of abdominal musculature.

* **Skeletal system**
* **The skull :** the bones of the skull derived from the neural crest cells + occipital somites.
* **The limbs :** bones of the limbs, derived from the somatic mesoderm layer.
* **The vertebral + ribs :** develop from the sclerotomes of the somites.
* **Sternum :** is derived from mesoderm in the ventral body wall.
* **Newborn skull**

At birth the flat bones of the skull are separated from each other by connective tissue , the sutures. At points where more than two bones meet, sutures are wide + are called fontanelles. The most prominent one is the anterior fontanelle ( between the parietal + fontal bones ). Sutures + fontanelles allow the bones of the skull to overlap during birth.

In the first few years of the birth palpation of the anterior fontanelle may give valuable information as to whether ossification of the skull is proceeding normaly + whether cranial pressure is normal.

* **Integumentary system**
* **Skin:**

The skin is of 2 origins + consists of 2 layers , superficial layer derived from the ectoderm called epidermis , + deep layer derived from the mesoderm called dermis.

* **Epidermis:**

Initially the embryo is covered by a single layer of ectodermal cells, later on with development , about the 2nd month another layer is formed called the ***periderm***, + with farther development other layer is formed called ***the intermediate*** ***zone,*** later on at the end of the 4th month 4 layers are distinguished in the epidermis :

1. **Basal layer ( germinative ) *:*** responsible for the formation of new cells, it forms ridges + hallows , which are reflected on the surface of the skin in the fingerprint.
2. ***Spinous layer :*** consists of large polyhedral cells.
3. ***Granular layer*** : contains keratohyalin granules in its cells.
4. ***Horny layer*** : consists of packed dead cells loaded or filled with keratine.

The melanocytes are formed in the epidermis during the IU life ( lst 3 months ), they responsible for the pigmentation of the skin after birth.

* **Dermis:**

It consists of 2 layer : upper carium which forms the dermal papillae + deeper layer called subcorium filled with fatty tissue.

At time of birth, the skin is covered with whitish fatty substance called ***vernix caseosa*** which is the secretory product of the sebaceous glands with some dead cells + hair, this substance will protect the skin of the fetus from the macerating action of amniotic fluid.

* ***Mammary gland:***

The mammary gland is formed of a band like thickeing of the epidermis on each side of the body wall extending from the base of the upper limb to the upper part of the lower limb called ***the mammary line or ridge***, with development, this line disappears except for a small portion in the thoracic region which penetrates the underlying mesenchyme forming about 16-24 sprouts, which in turn give rise to a small out buddings, with farther development + by the end of the I.U. life the sprouts canalized forming the lactiferous ducts, + the buds form small ducts + alveoli of the gland. The lactiferous duct, open to the surface into a small pit. Shortly after birth this pit is transformed into the nipple by proliferation of the underlying mesenchyme.

***Abnormalities:***

1. **Polythelia :** a condition where accessory nipple have formed, due to persistence of fragments of the mammary line. Accessory nipple appear anywhere along the original mammary line , but usually appear in the axillary region.
2. **Polymastia :** occurs when a remnants of the mammary line develops into a complete breast.
3. **Inverted nipple :** a condition in which the lactiferous ducts open into the original opithelial pit that has failed to evert.