Distinguishing characteristics of insects, External features of Insect, sutures, sclerites of head capsule and types of head

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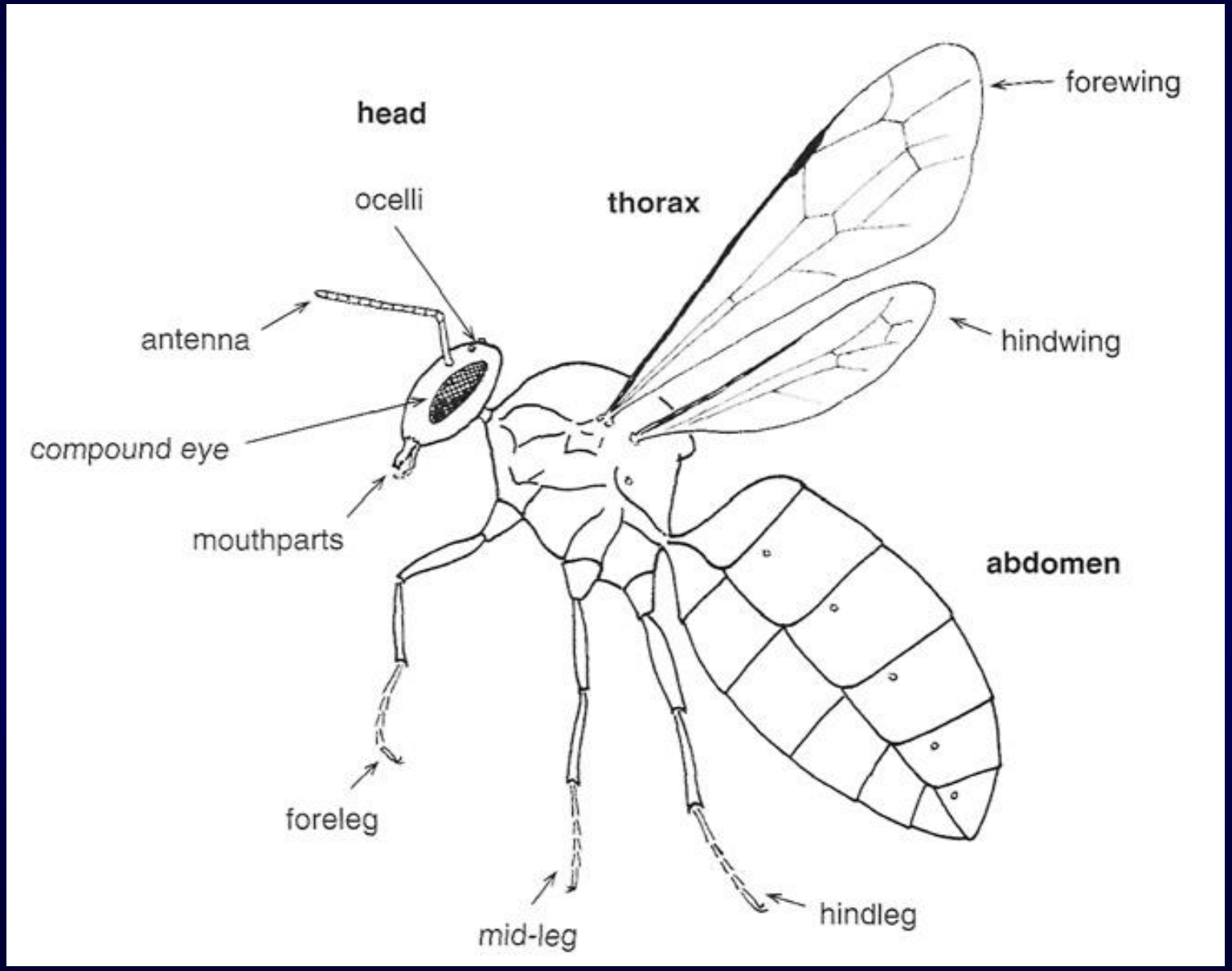
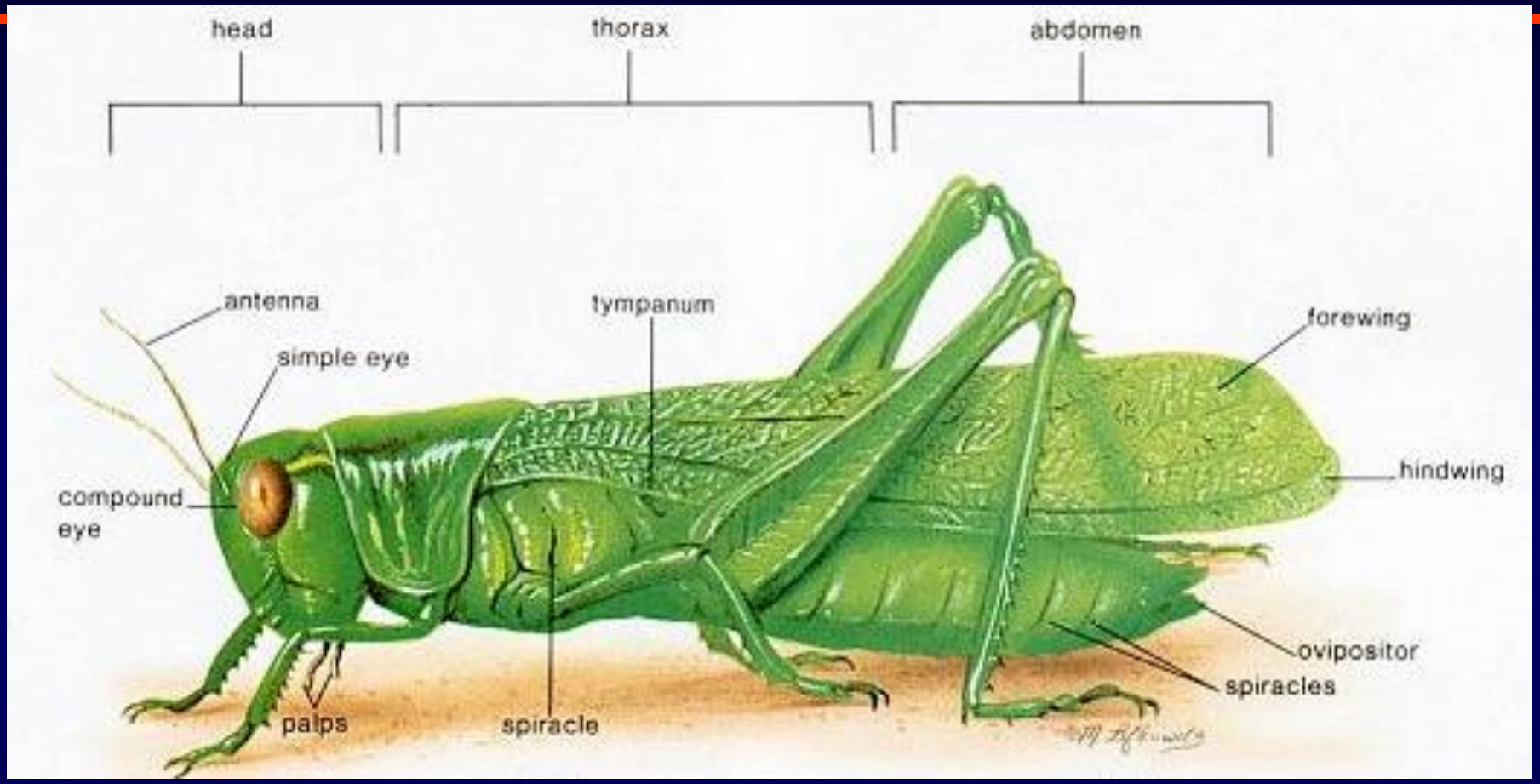
Distinguishing characteristics of insects

- Segmented body
- Segments grouped into 2 or 3 regions (tagma) known as Tagmosis.
- Renewable chitinous exoskeleton - a hard protective covering around the outside of the body (divided by sutures into plates called sclerites)
- Grow by molting.
- Bilateral symmetry of body - whereby a central line can divide the body into two identical halves, left and right.
- Body cavity filled with blood and called as haemocoel.
- Tubular alimentary canal with mouth and anus at anterior and posterior ends.
- Paired, segmented appendages - that allow extensive specialization.

External features of Insect



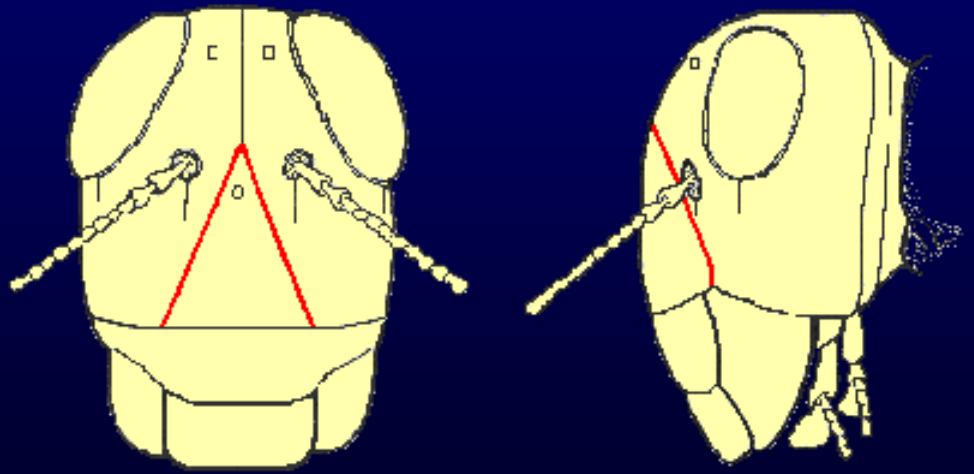
External features of Insect



Insect body divided in to 3 regions:
Head
Thorax
Abdomen

HEAD

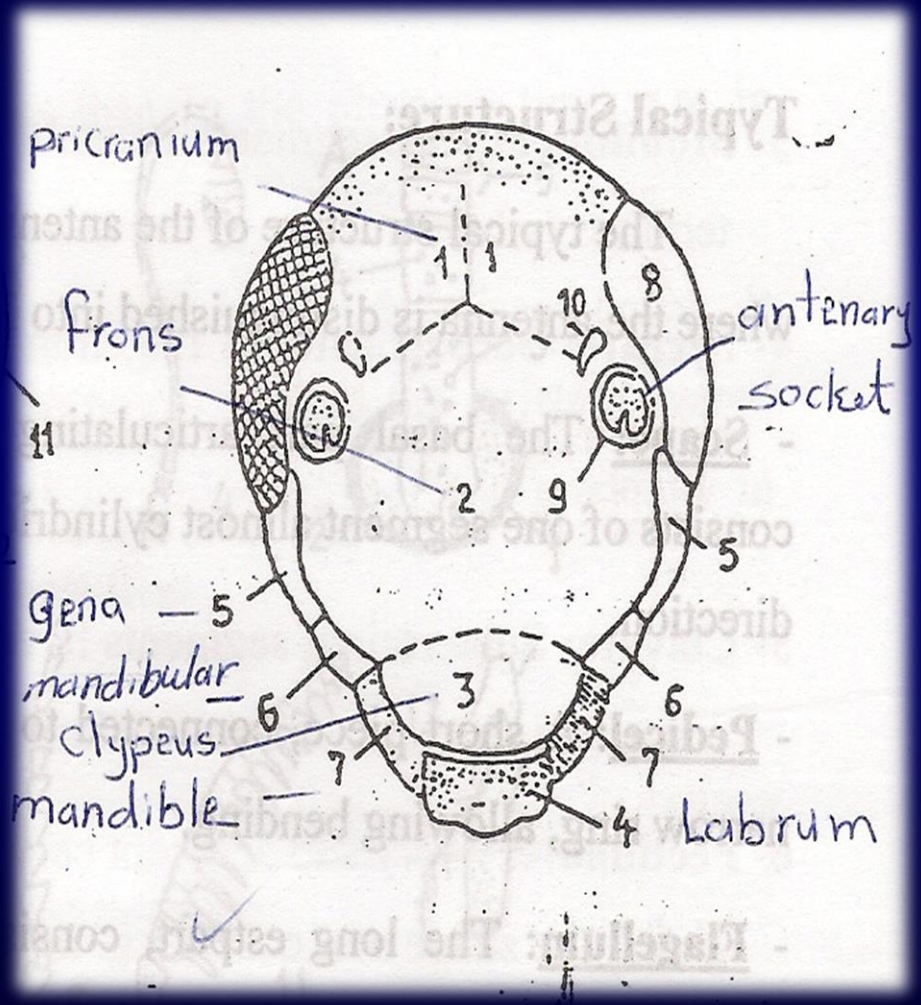
The head is a first anterior tagma formed by the fusion of six segments namely preantennary, antennary, intercalary, mandibular, maxillary and labial segments. Head is attached or articulated to the thorax through neck or **cervix**. Head capsule is sclerotized and the head capsule excluding appendages formed by the fusion of several sclerites is known as **cranium**. The insect head is a contains the compound eyes, simple eyes (ocelli), mouthparts, and antennae.



Sclerites of Head

Hardened sclerotized plate between suture call sclerites.

i. **Vertex**: Summit of the head between compound eyes.
ii. **Frons**: Facial area below the vertex and above clypeus.
iii. **Clypeus**: Cranial area below the frons to which labrum is attached.
iv. **Gena**: Lateral cranial area behind the compound eyes.
v. **Occiput** : Cranial area between occipital and post occipital suture.



Sutures of Head

The linear invaginations of the exoskeleton between two sclerites are called as suture (sulcus).

i. **Epicranial suture/ ecdysial line**: Inverted `Y' shaped suture found medially on the top of head, with a median suture (coronal suture) and lateral sutures (frontal suture).

ii. **Epistomal suture/ Fronto clypeal suture**

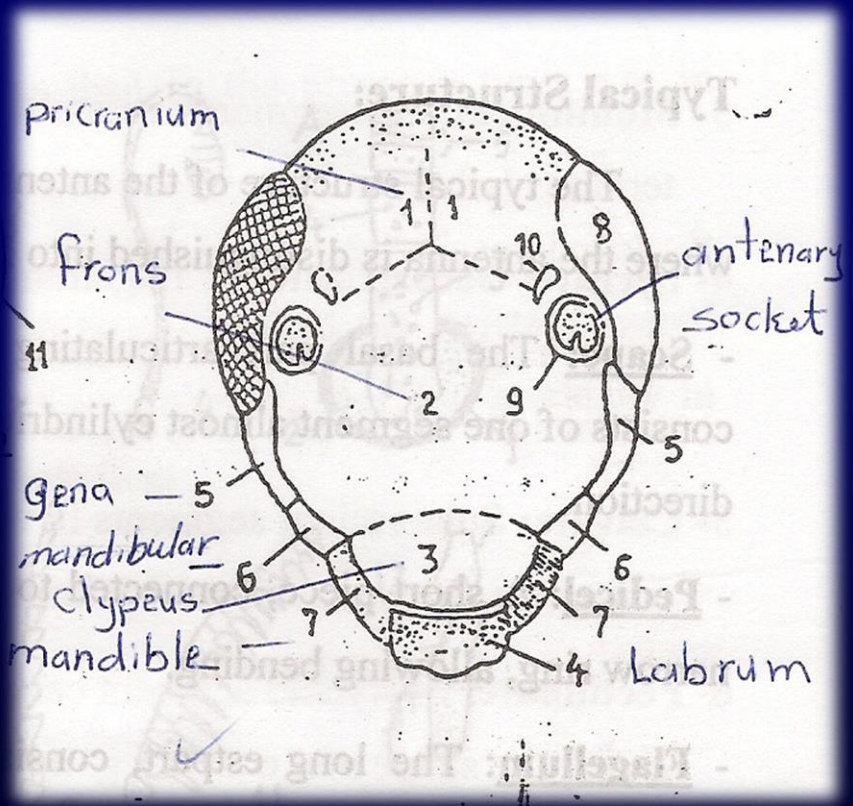
iii. **Clypeo-labral suture**:

iii. Antennal suture

iv. Frontogenal or Subocular suture

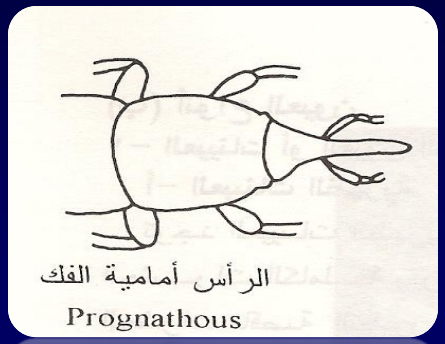
v. Ocular suture

iv. **Postoccipital suture**

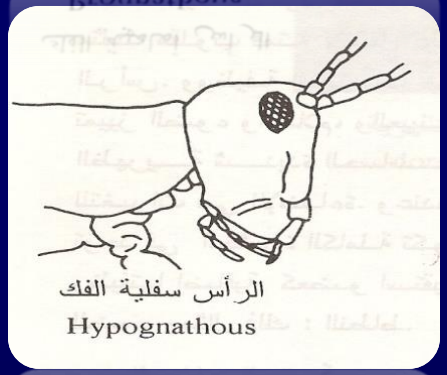


Types of insects heads

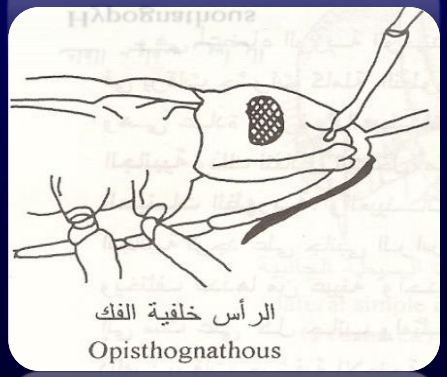
Based on the long axis of head and orientation of mouth parts



- Pro-gnathous: head extended longitudinally with body axis (m.p are pointed forward, Weevils)



- Hypo-gnathous: head perpendicular to longitudinal body axis (m.p pointed downwards, Locust)



- Opitho-gnathous: head bent underneath thorax during rest (m.p pointed backwards, Aphids)

Compound eyes and ocelli

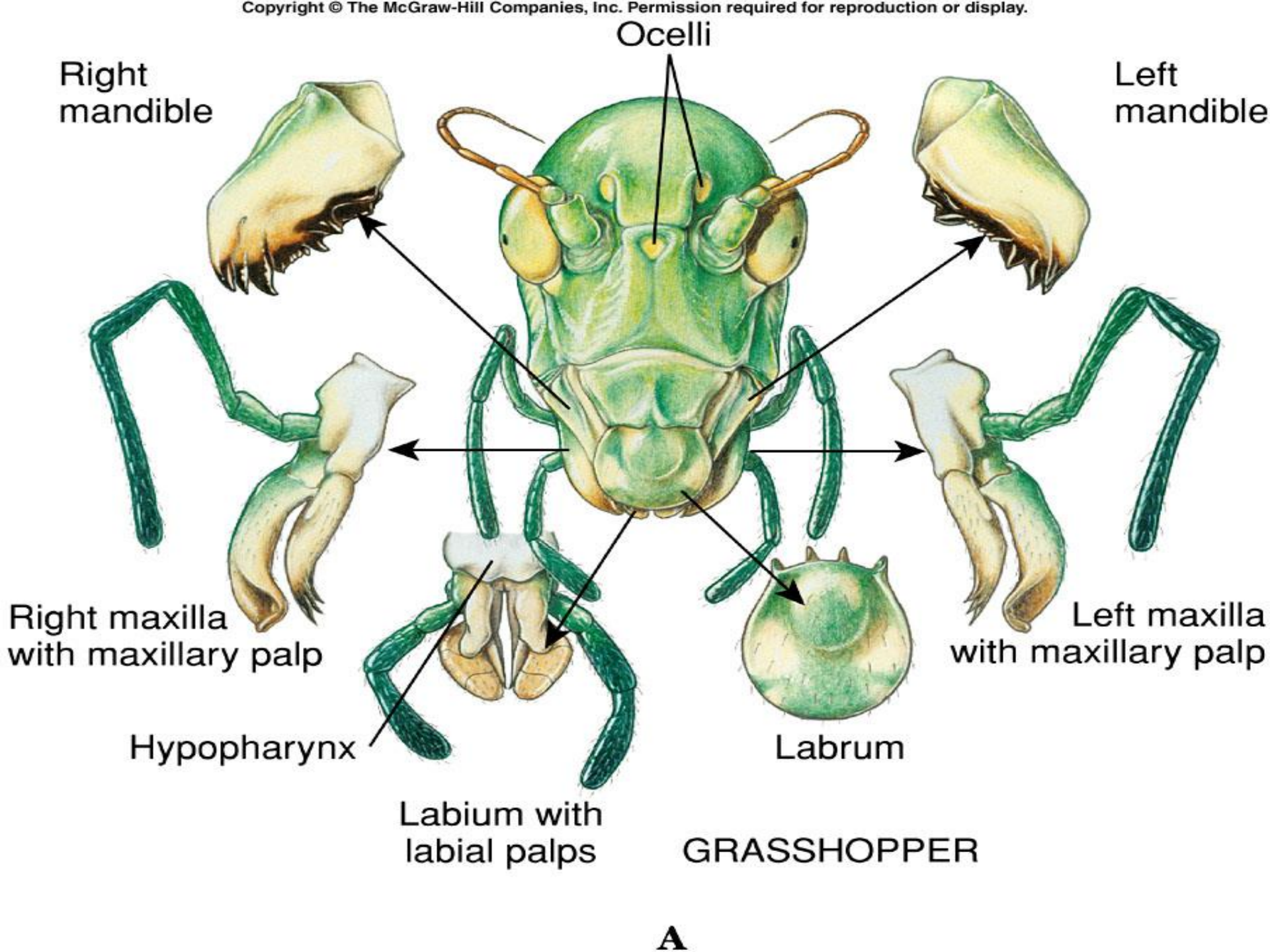
In most insects there is one pair of large, prominent compound eyes composed of units called ommatidia. This type of eye gives acute perception of movement. When present, ocelli (either 2 or 3), detect low light or small changes in light intensity.

compound eyes.

ocelli

Mouthparts

- The 4 main mouthparts are the **labrum, mandibles, maxillae (plural maxilla) and labium.**
- The labrum is fused sclerite, also called upper lip, and moves vertical. It is hinged to the clypeus.
- The mandibles, or jaws, highly sclerotized paired structures. They are used for biting, and chewing.
- The maxillae are paired structures. They are used for grinding.
- The labium (lower lip), is a fused structure that moves vertical.
- Mouthparts are two main functional groups: mandibulate and haustellate.



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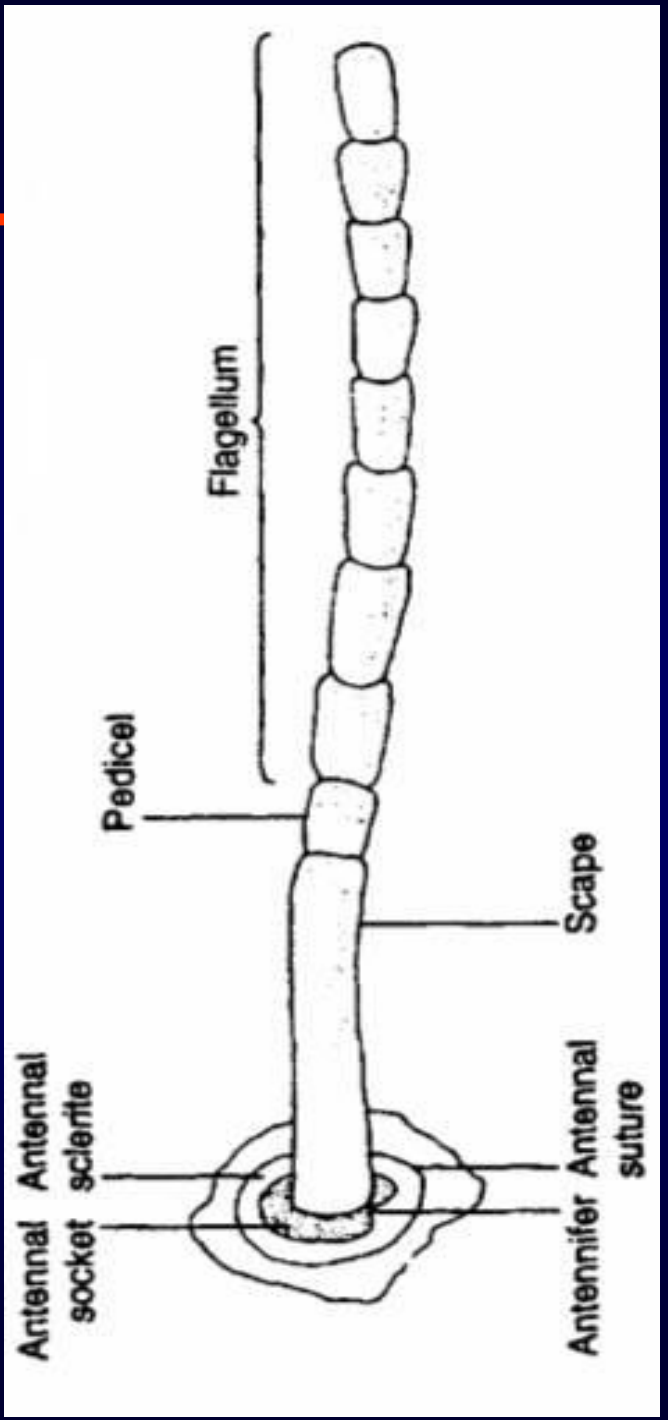
Antennae

Antennae function almost exclusively in sensory perception. Some of the information that can be detected by insect antennae includes: **motion and orientation, odor, sound, humidity, and a variety of chemical cues.**

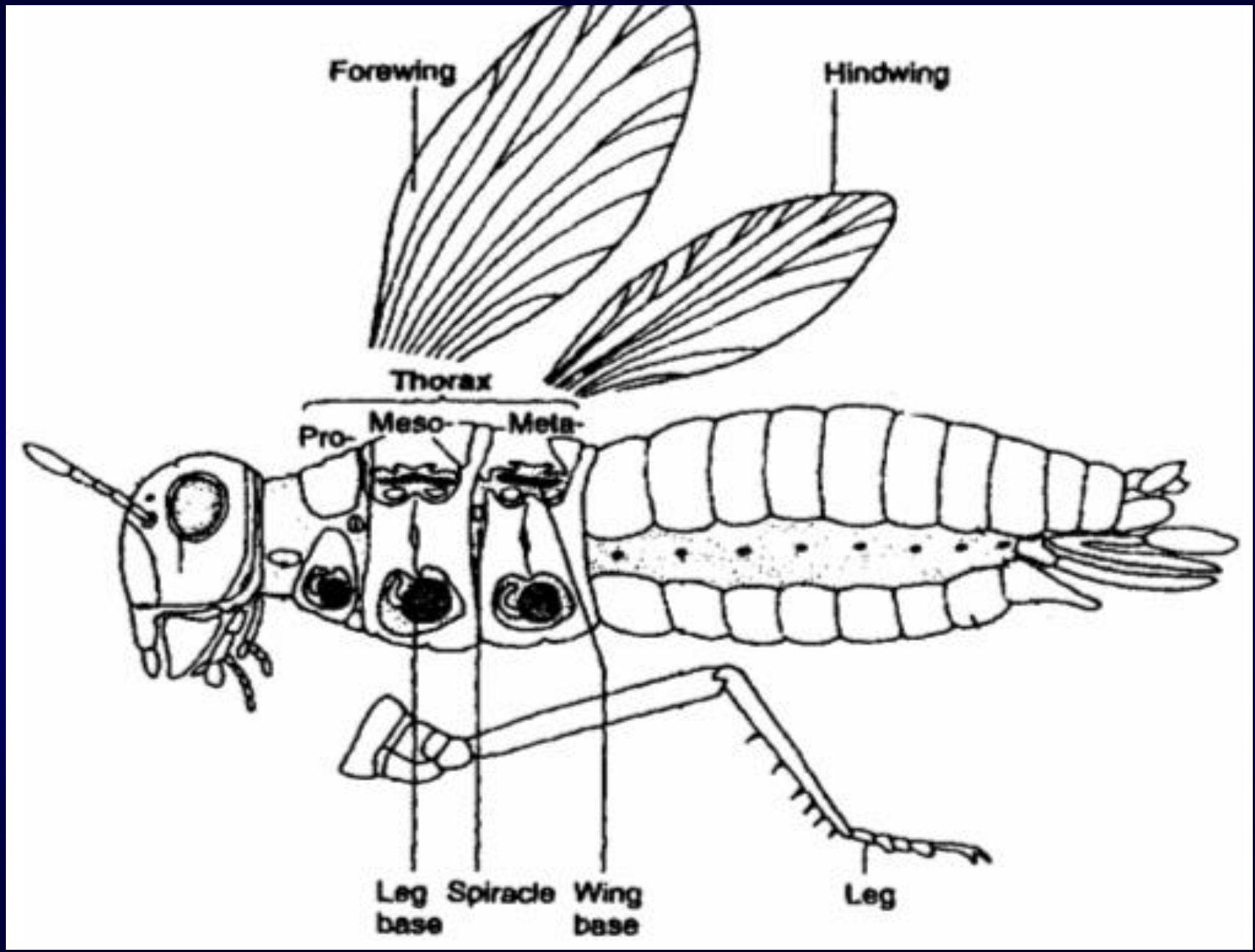


THORAX

The insect thorax is divided into three parts: prothorax (pro=first), mesothorax (meso=middle), and metathorax (meta=last).

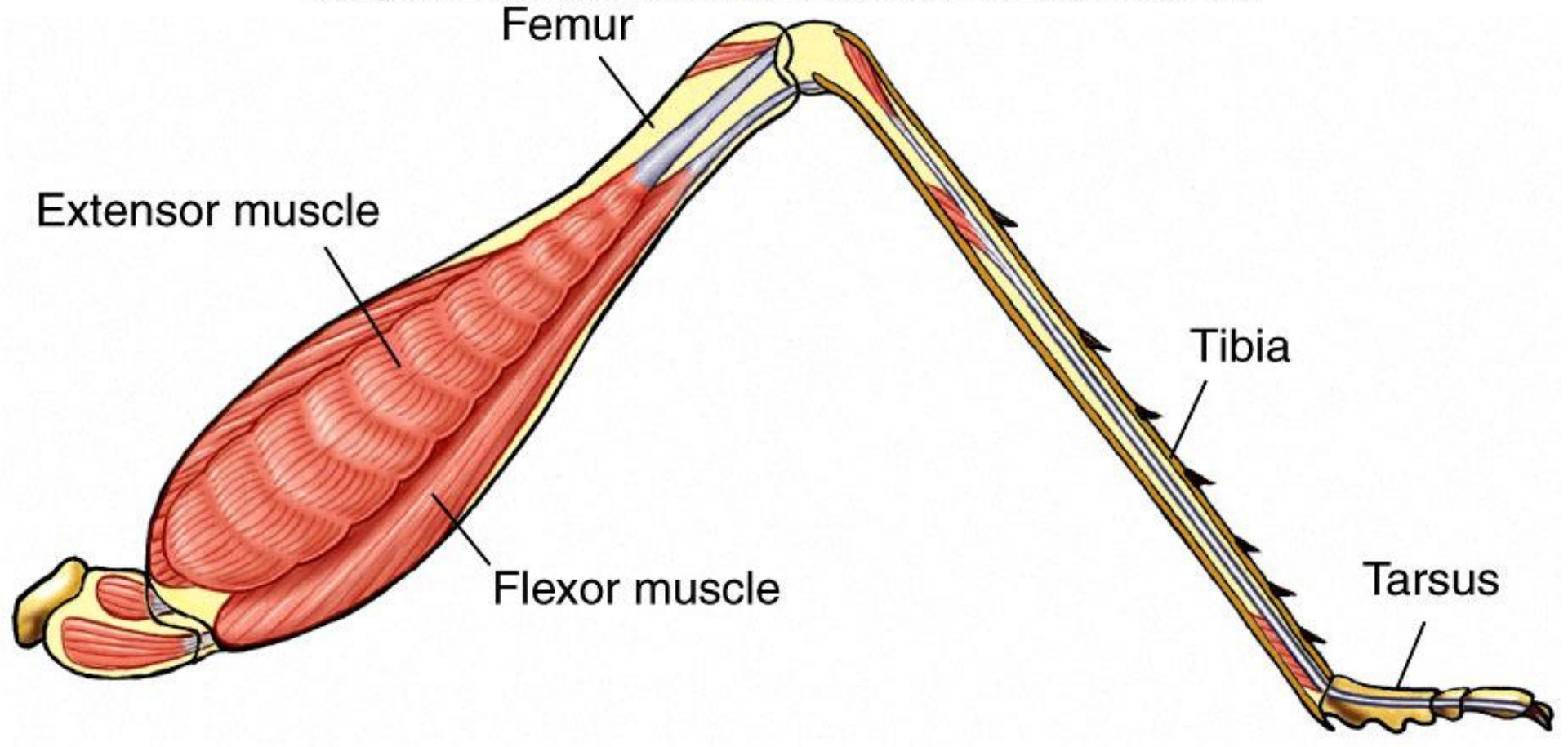
Each segment consists of hardened plates, or sclerites. Dorsal sclerites are called nota (notum), lateral sclerites pleura (pleuron), ventral sclerites sterna (sternum).

Each of the three thoracic segments contains one pair of legs. Wings found only on meso- & metathoracic segments.


Forewing
Hindwing
Thorax
Pro-
Meso-
Meta-
Leg base
Spiracle
Wing base
Leg

Legs

The **fore-legs** located on prothorax, **mid-legs** on mesothorax, and **the hind legs** on the metathorax. Each leg has six major components, from proximal to distal: **coxa**, **trochanter**, **femur**, **tibia**, **tarsus**, **pretarsus**.

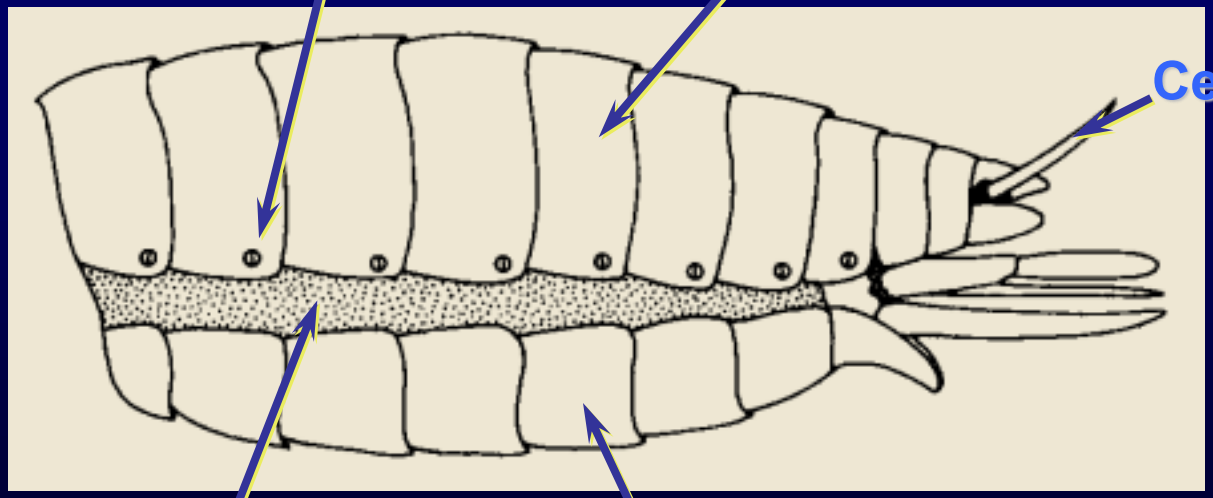


Wings

Typically, adult insects *have two pairs of wings* articulating with the thorax, one pair on the mesothorax and one pair on the metathorax (never on the prothorax). The wing-bearing thoracic segments (meso-& meta-thorax) together called as *pterothorax*.

ABDOMEN

The abdomen contains the reproductive organs and the majority of the organ systems. The dorsal and ventral abdominal segments are termed terga (tergum) and sterna (sternum), respectively. Spiracles usually can be found in the conjunctive tissue between the terga and sterna of abdominal segments 1-8. Reproductive structures are located on the 9th segment in males and on the 8th and 9th abdominal segments in females. The ovipositor is the egg-laying device found only in female insects.




THANK
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