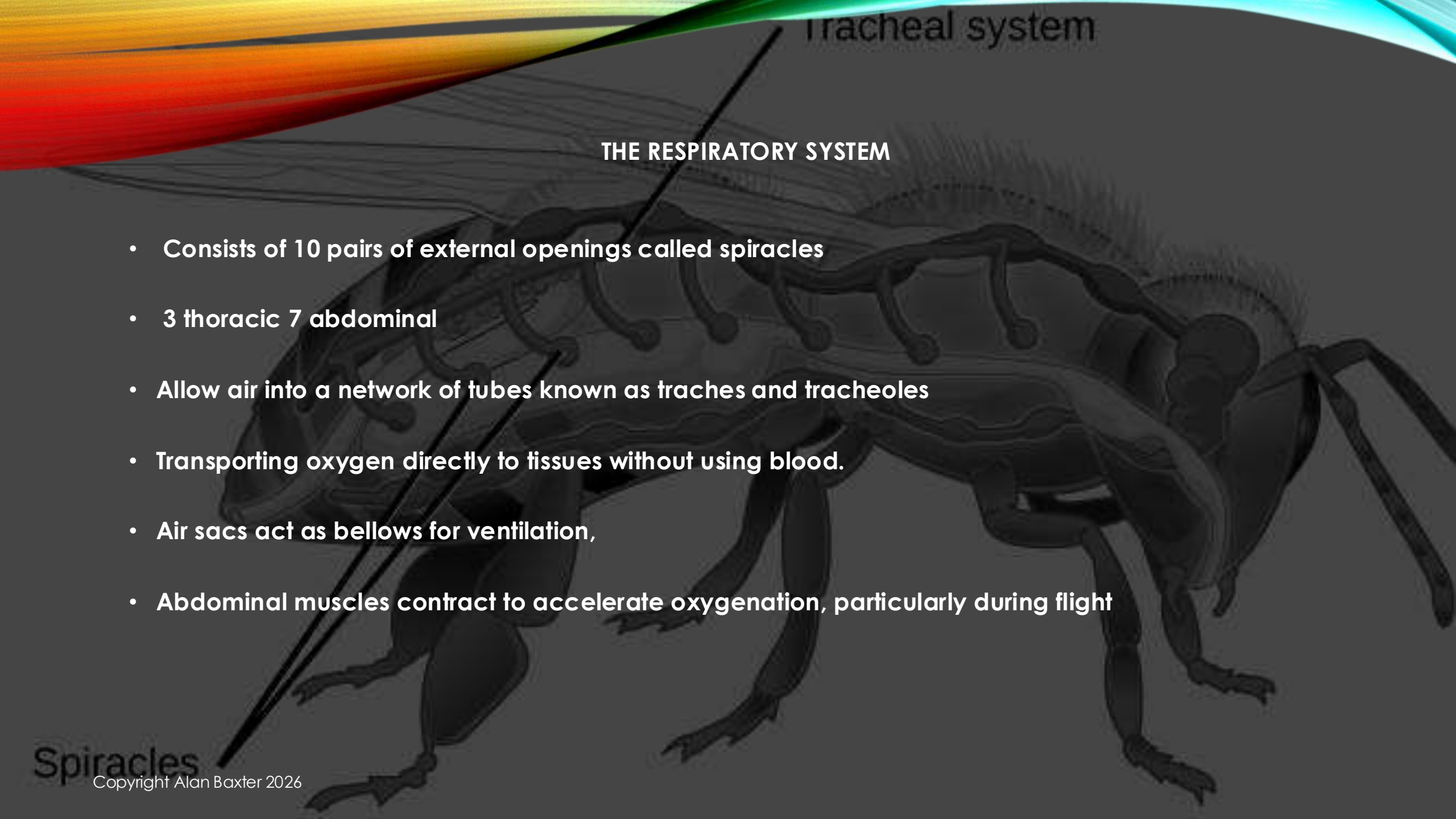
MODULE 5 STUDY GROUP

SESSION 2

RESPIRATORY SYSTEM OF ADULT HONEY BEE

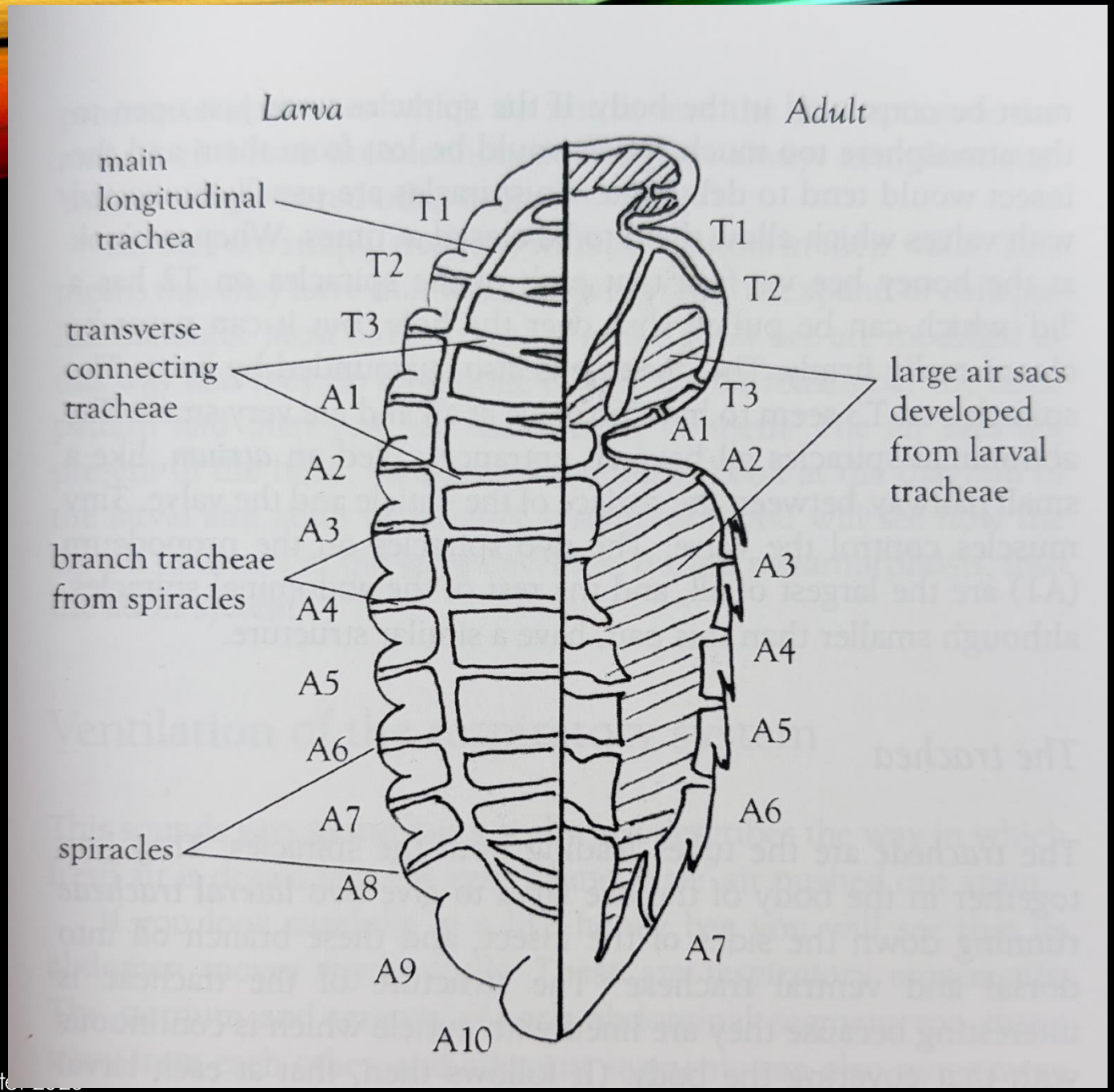
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THE RESPIRATORY SYSTEM

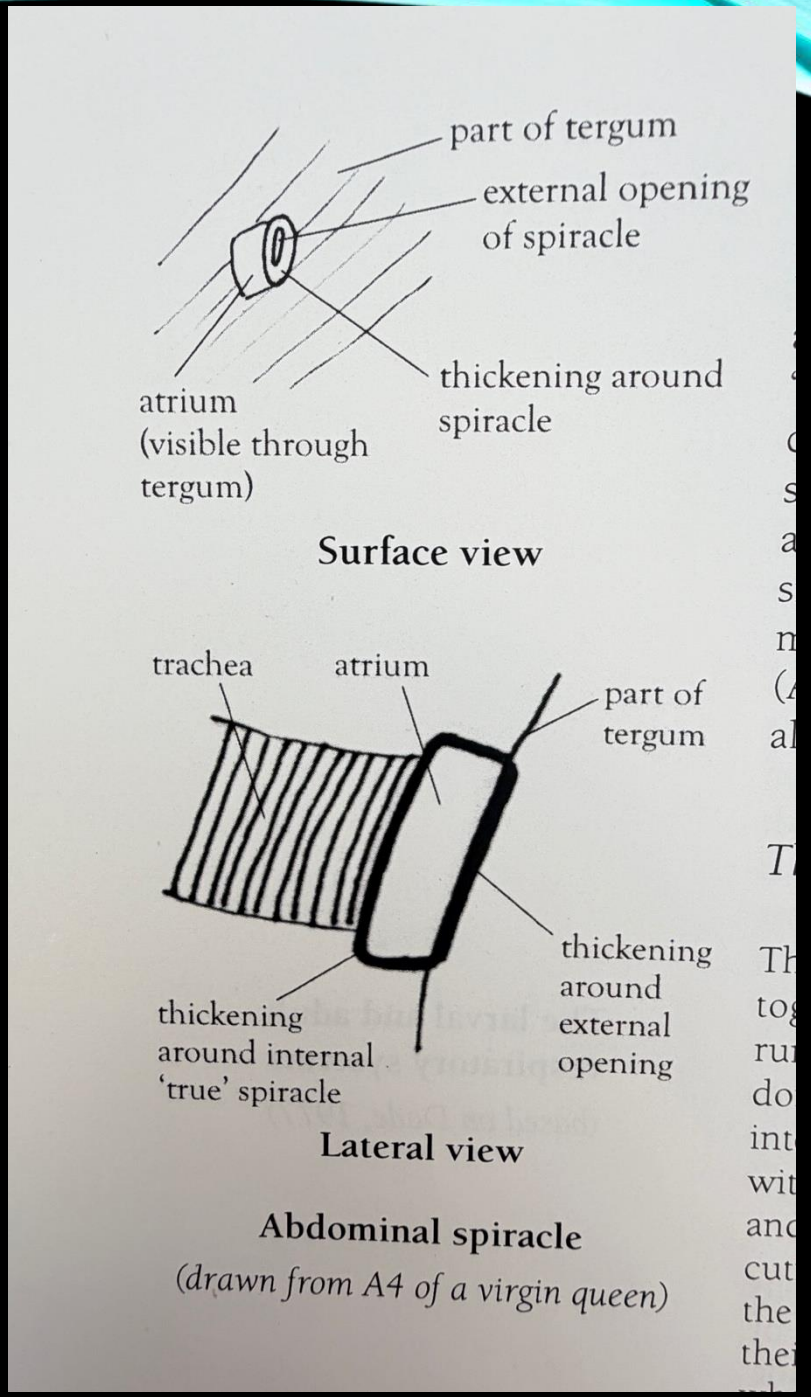
- Consists of 10 pairs of external openings called spiracles
- 3 thoracic 7 abdominal
- Allow air into a network of tubes known as traches and tracheoles
- Transporting oxygen directly to tissues without using blood.
- Air sacs act as bellows for ventilation,
- Abdominal muscles contract to accelerate oxygenation, particularly during flight

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- **SPIRACLES**
- **10 pairs on thorax and abdomena**
- **Equipped with valves to prevent ingress and egress of water but:**
- **Spiracles on T2 have a lid surrounded by hairs can be pulled shut but never firmly closed**
- **Spiracles on T3 have no valve and are very small**
- **Spiracles on abdomen have entrance called an atrium between the surface of the cuticle and the valve controlled by tiny muscles**
- **Allow the passage of air in and CO2 out**



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THE TRACHEA

Tubes leading from the spiracles

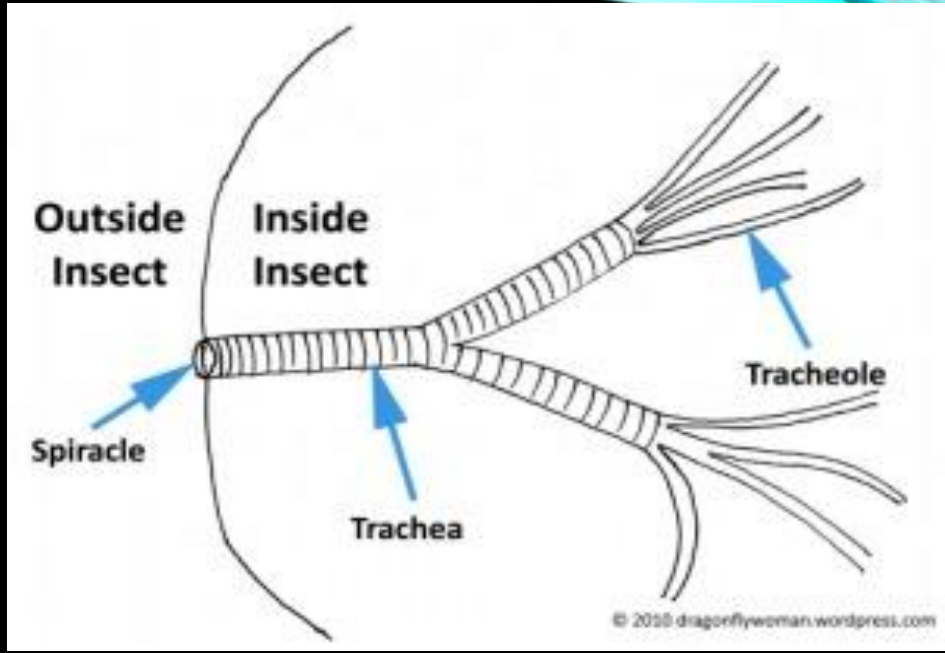
Join together to form the lateral trachea

Branch off to form the ventral and dorsal tracheae

Lined with spiral spring-like cuticle tissue to strengthen the tube and prevent collapse

Spiral thickenings at each turn called taenidia keep the trachea dilated

Lead into smaller tracheoles within the body

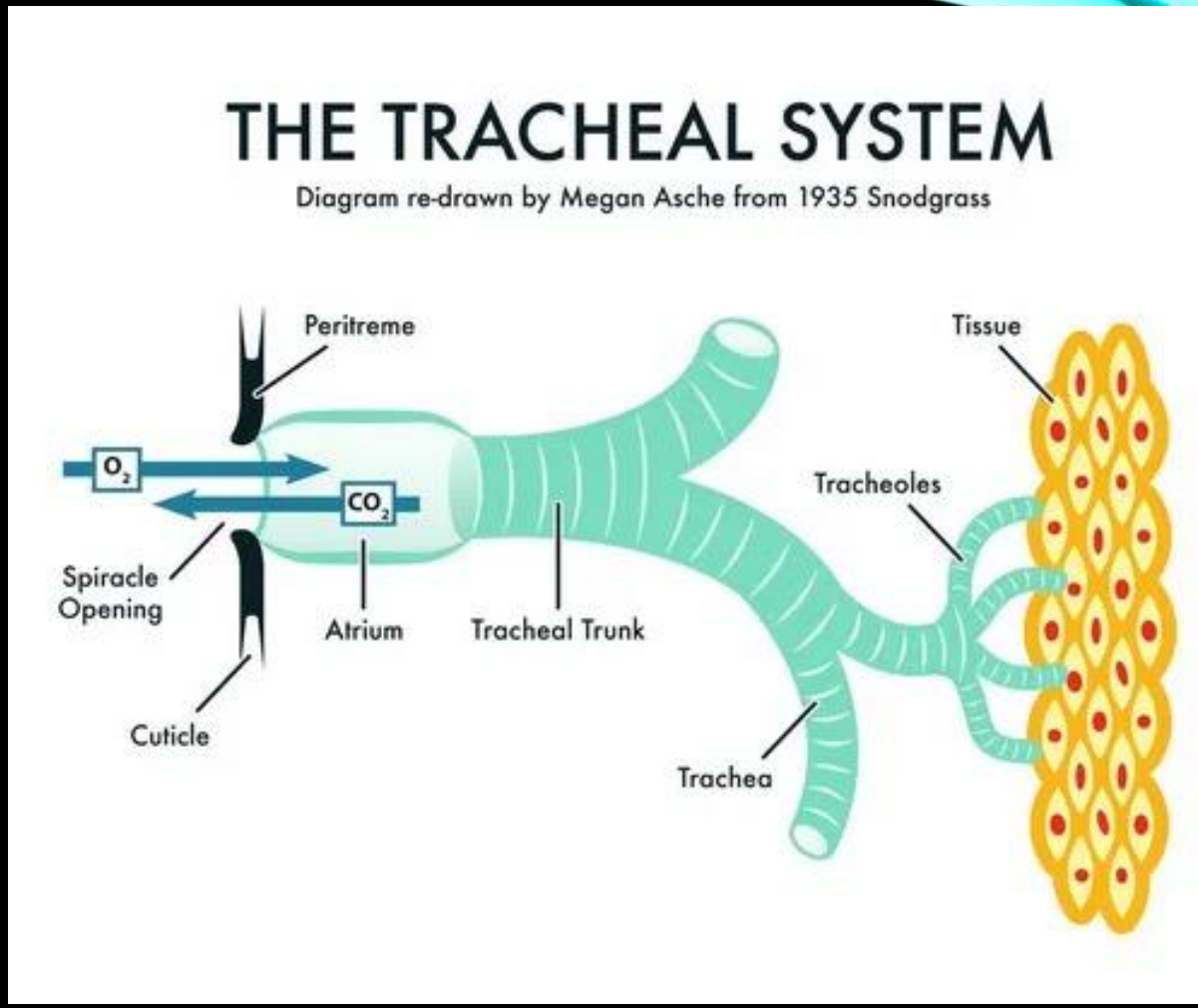




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TRACHEOLES

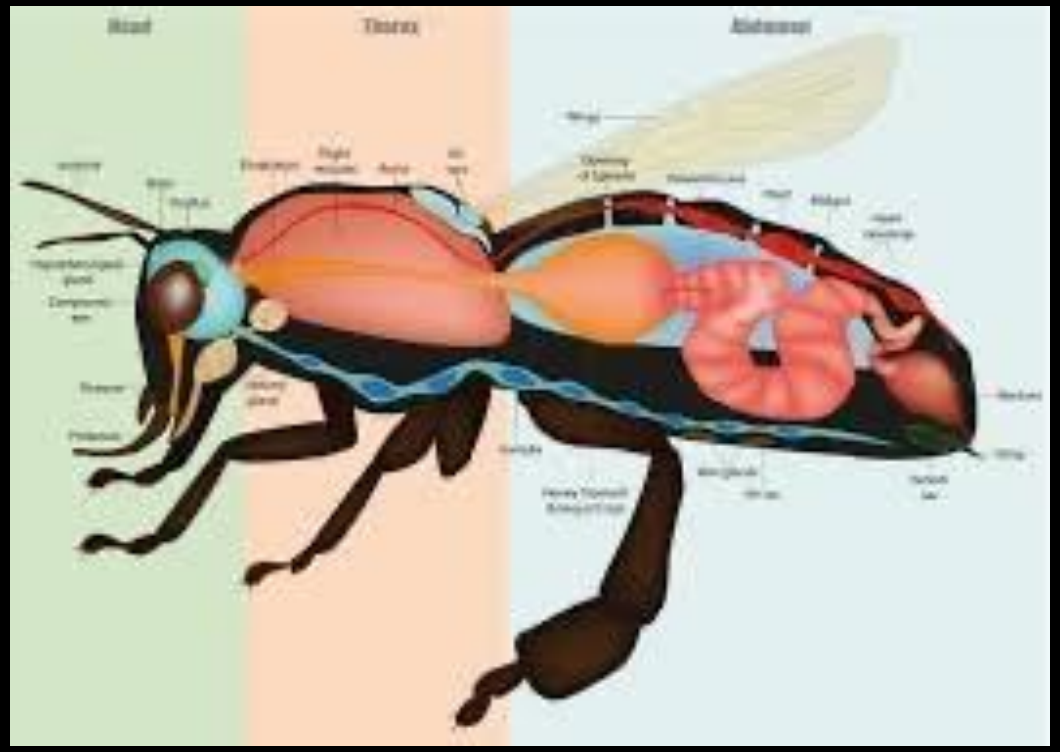
- Smallest branches radiating from the tracheal trunks
- 1µ to 0.1µ in diameter
- Closely applied to the tissues
- Usually terminate near muscles or organs that require energy
- O2 brought from the tracheoles is dissolved in the haemolymph and CO2 is removed



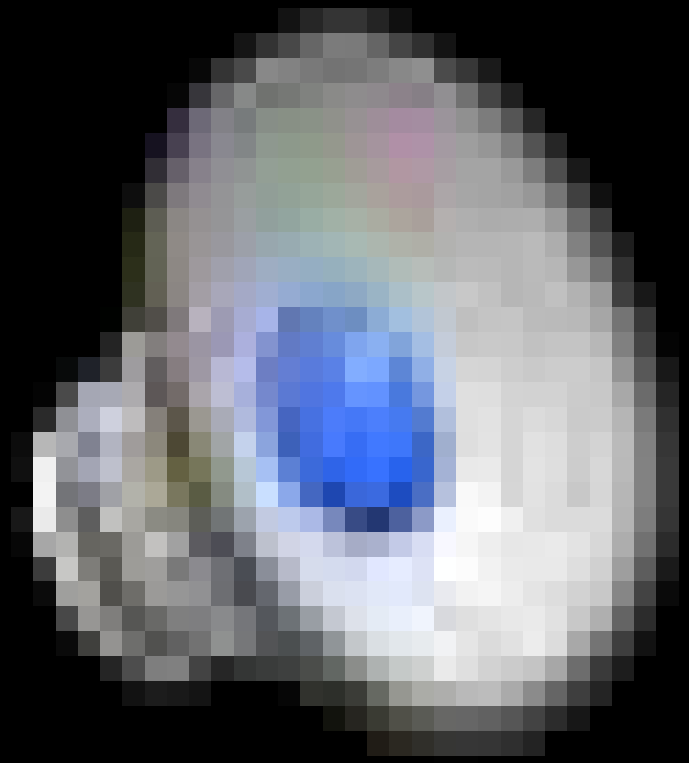
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AIR SACS

- Trachea with no taenidia in the walls
- Have thin walls that expand and collapse like balloons
- Present in head, thorax and abdomen

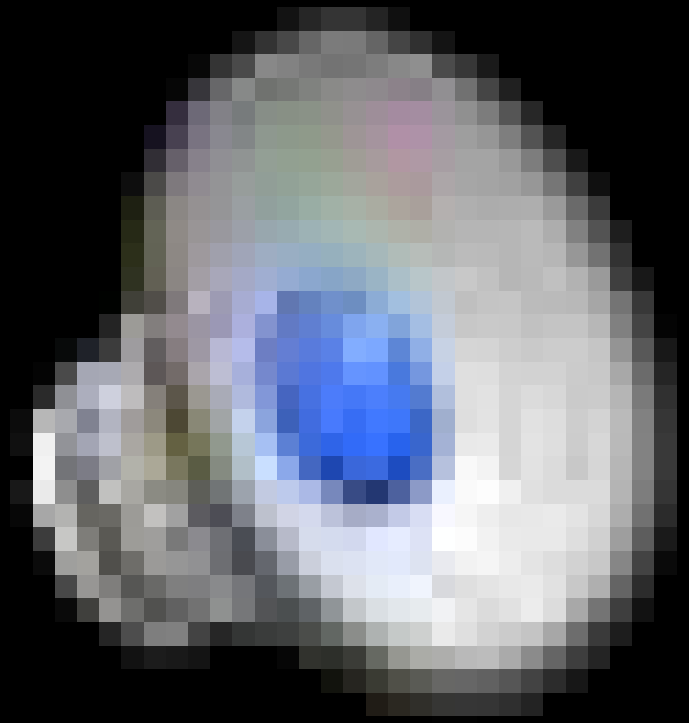


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HOMEWORK

ANY QUESTIONS ?

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RESPIRATION

At rest

CO_2 in the cells stimulates nerves which control abdominal muscles

Abdominal movements increase the volume of the abdomen

Terga and sterna relative to one another and segments move longitudinally

Air sacs within the abdomen, thorax and head expand

Air enters as pressure is lower inside than outside

Most of air enters via 1st thoracic spiracle when at rest

Air moves through tracheae by diffusion to air sacs

Controlled by CO_2 levels in haemolymph

Most air expelled through 2nd thoracic spiracle

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RESPIRATION

When flying

Air drawn in through 1st thoracic spiracle

Air expelled through abdominal spiracles

Valves on spiracles controlled by muscles are coordinated

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