WALT - Understand strengths and areas for revision in the respiratory system

Why? - Prepare for exam on 11th May

What is the difference between external and internal respiration?

Respiratory System Purpose

- The external respiratory system involves the exchanges of gases between the lungs & the blood.
- The internal respiratory system involves the exchange of gases between the blood & the cells.
- The respiratory and cardiovascular systems work closely together to maintain a supply of oxygen to the working muscles and make energy via respiration.

What are the functions of the respiratory system?

Function of the Respiratory System

The respiratory system has two main functions:

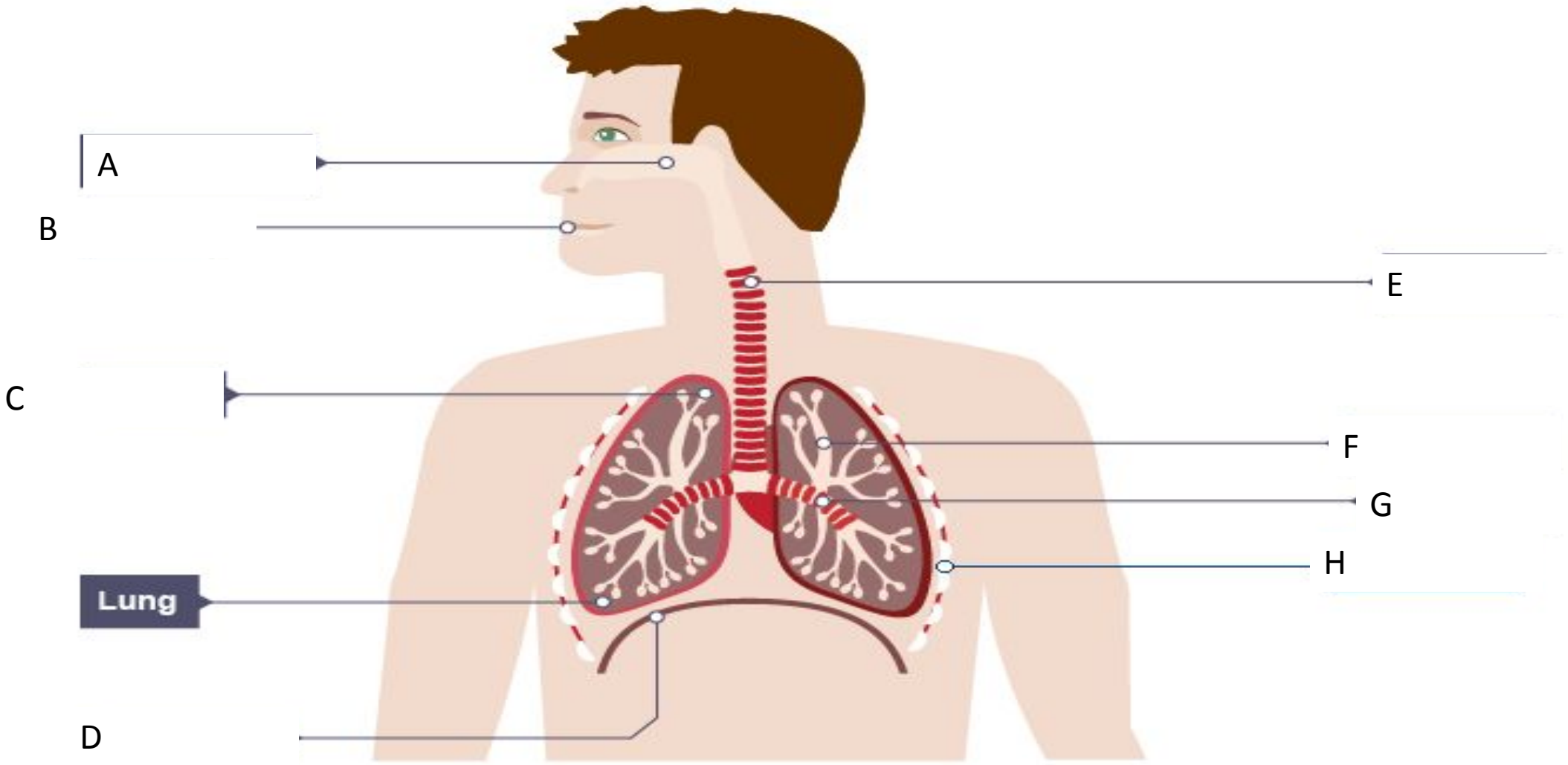
1. To transport **oxygen** into the body to make energy via respiration
2. To transport **carbon dioxide** and other **waste products** out of the body

- This happens through the act of **breathing**.

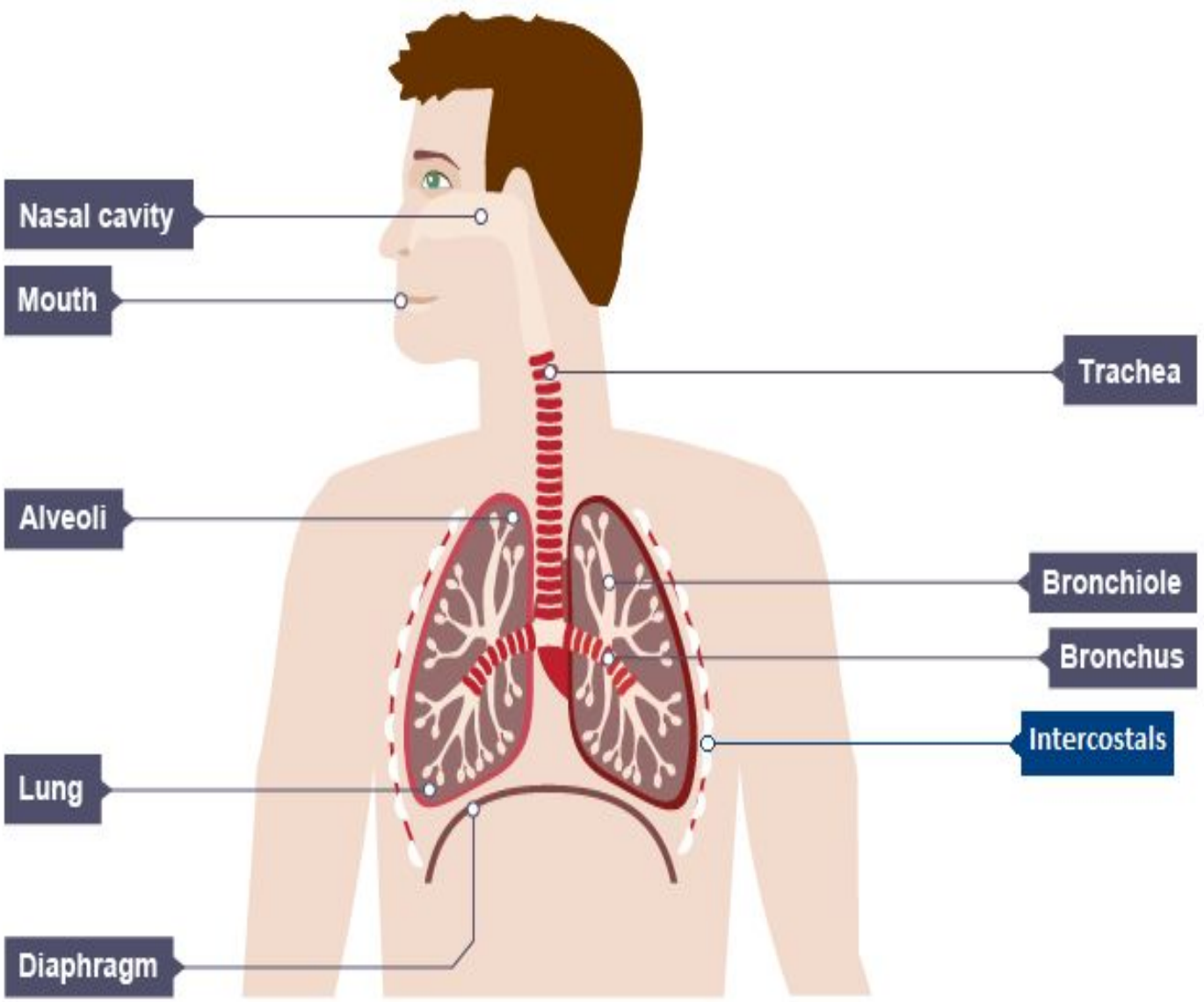
Oxygen passes **into** the blood during **inhalation**, so that it can be transported to muscles.

At the same time, **CO2** and other waste products pass **out** of the blood and are removed during **exhalation**.

Retrieval



The Pathway of Air



- Air passes through the nose/mouth & is warmed, filtered & moistened.
- Air passes through a long tube called the trachea.
- The trachea branches left & right into the bronchi which takes air to the lungs.
- The bronchi branches into smaller tubes called bronchioles.
- The bronchioles enable the air to pass into the alveoli, which are tiny sacs, where gaseous exchange takes place.

Passage of air

- write the correct order

(4.1) Passage of air

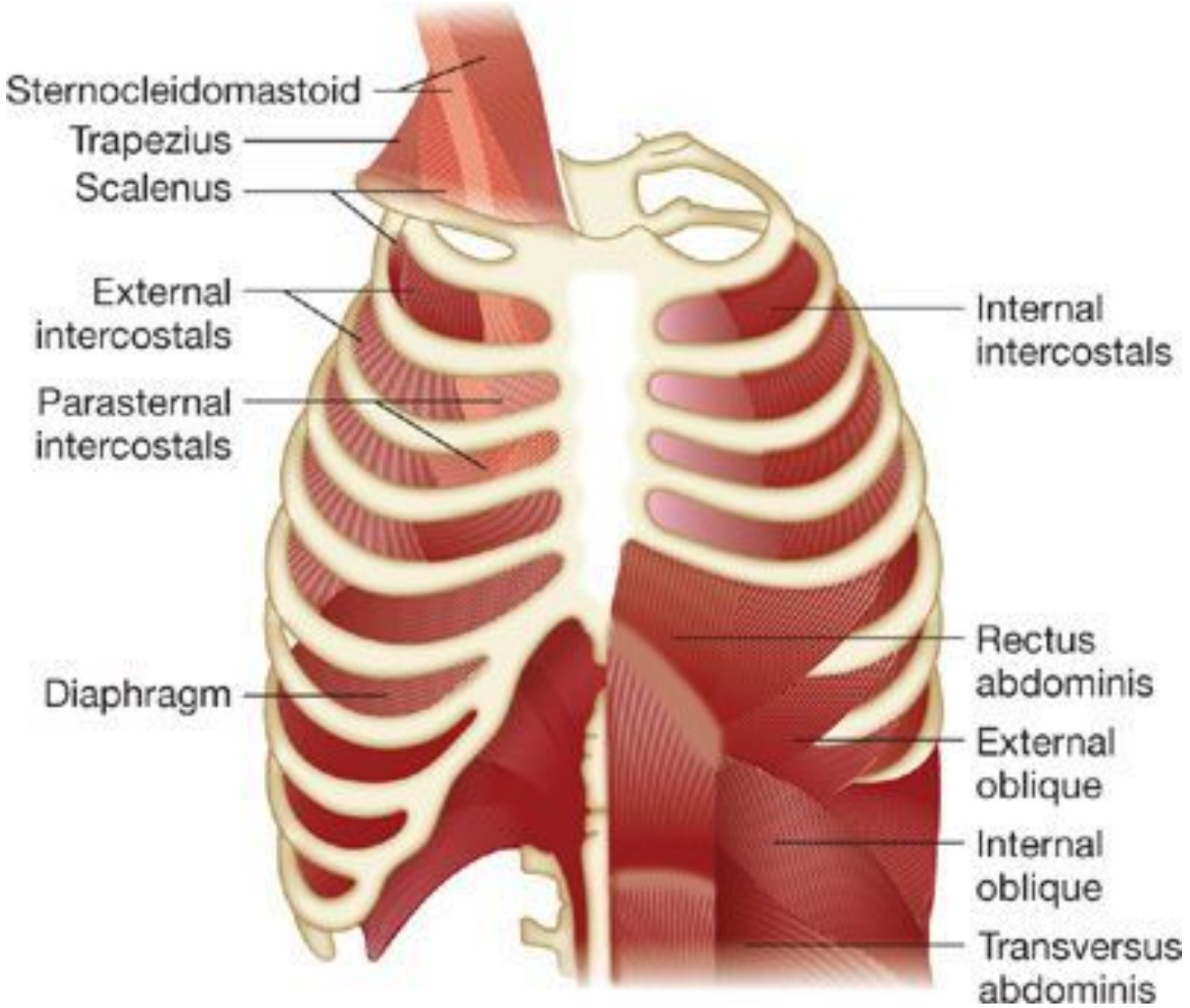
1. Air enters through mouth and nasal cavity
2. Passes through pharynx and larynx
3. Past epiglottis
4. Down Trachea
5. Trachea branches into two bronchi (left and right)
6. Each bronchus breaks down into smaller bronchioles
7. Alveoli where oxygen diffuses into the blood and CO2 back into the lungs

Respiratory muscles

- Name 6 respiratory muscles used to in breathing in or out when exercising and what their function is.

(4.2) Respiratory muscles used during exercise

1. Sternocleidomastoid
2. Scalene
3. Pectoralis Major
4. Internal Intercostals
5. Rectus abdominus
6. Diaphragm



Muscles of inspiration

Accessory

Sternocleidomastoid (elevates sternum)

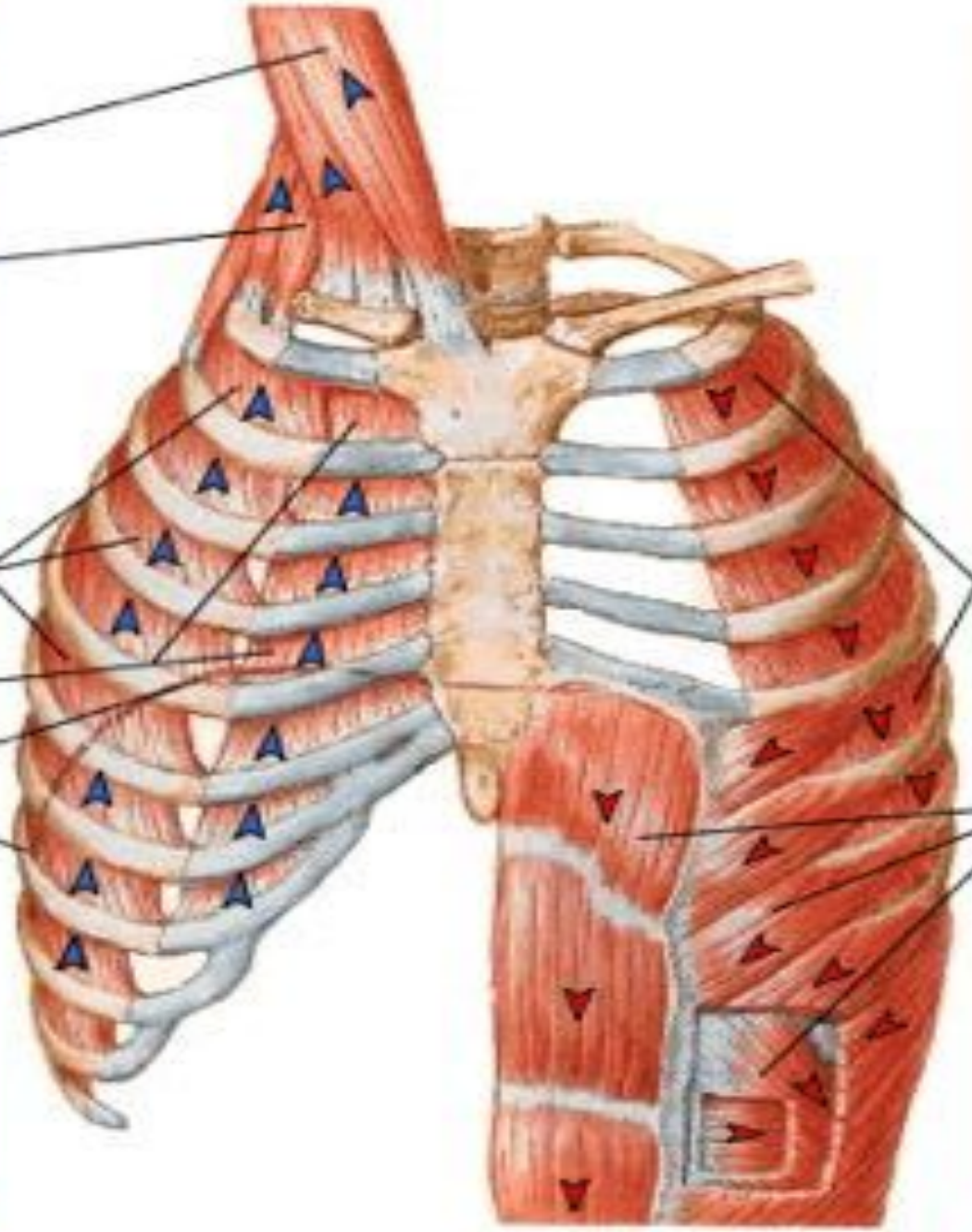
Scalenes Group (elevate upper ribs)

Not shown:
Pectoralis minor

Principal

External intercostals
Interchondral part of internal intercostals (also elevates ribs)

Diaphragm (dome descends, thus increasing vertical dimension of thorac cavity; also elevates lower ribs)



Muscles of expiration

Quiet breathing

Expiration results from passive, elastic recoil of the lungs, dib cage and diaphragm

Active breathing

Internal intercostals, except interchondral part (pull ribs down)

Abdominals (pull ribs down, compress abdominal contents thus pushing diaphragm up)

Note shown:
Quadratus lumborum (pulls ribs down)

Inspiratory

PULMONARY RIBCAGE

Sternocleidomatoids
Elevate the sternum
Rotates head

Scalenes
Elevate the upper ribs

External Intercostals
Elevate ribcage

ABDOMINAL RIBCAGE

Diaphragm
* Primary muscle of respiration
Flow generator

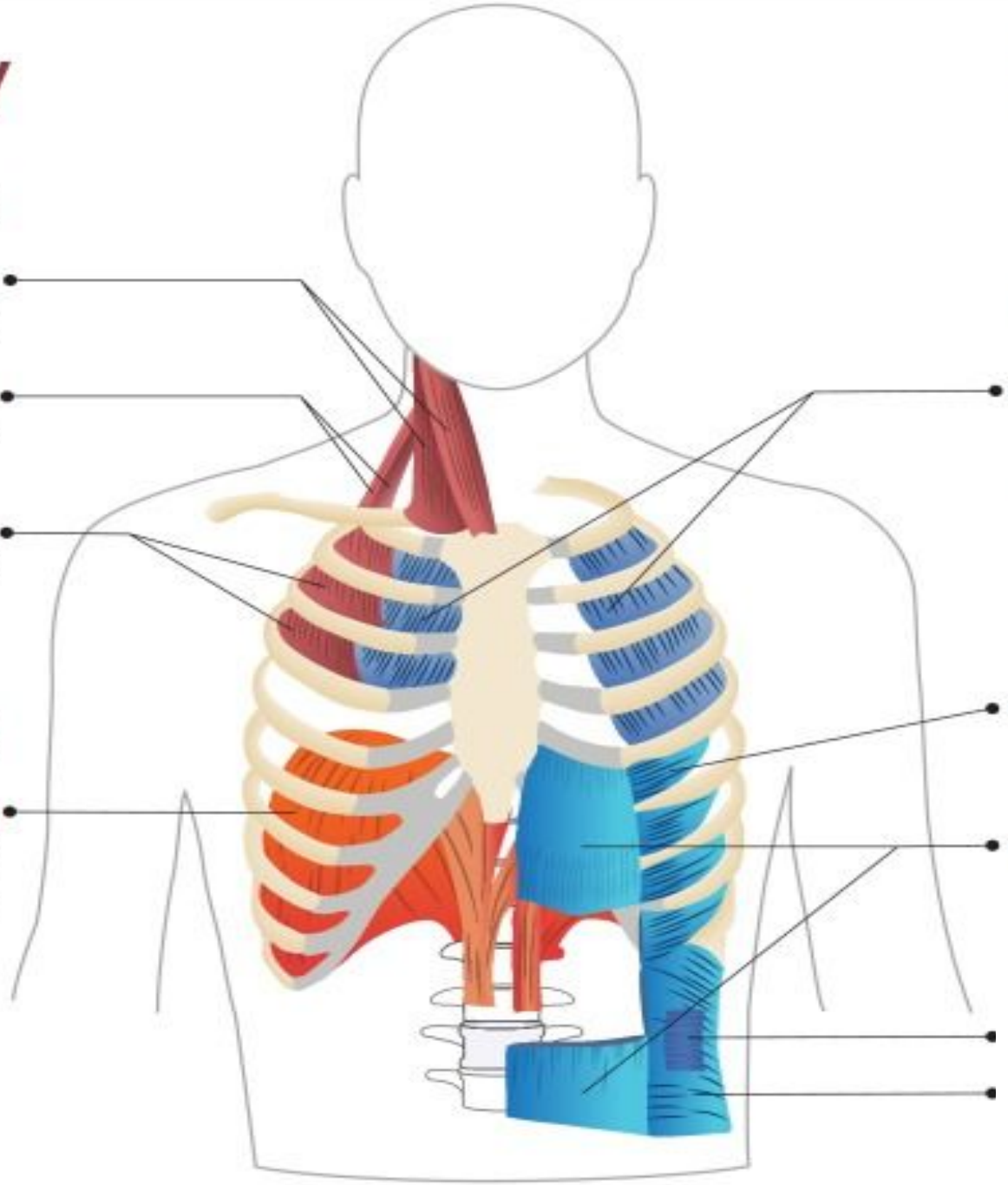
Expiratory

PULMONARY RIBCAGE

Internal Intercostals
Depress ribcage

External Obliques
Contralateral rotation of torso

Rectus Abdominis
Flexes vertebral column



Current Opinion in Physiology

Exam Question

- What is the difference between inspiration at rest and when exercising with respiratory muscles?

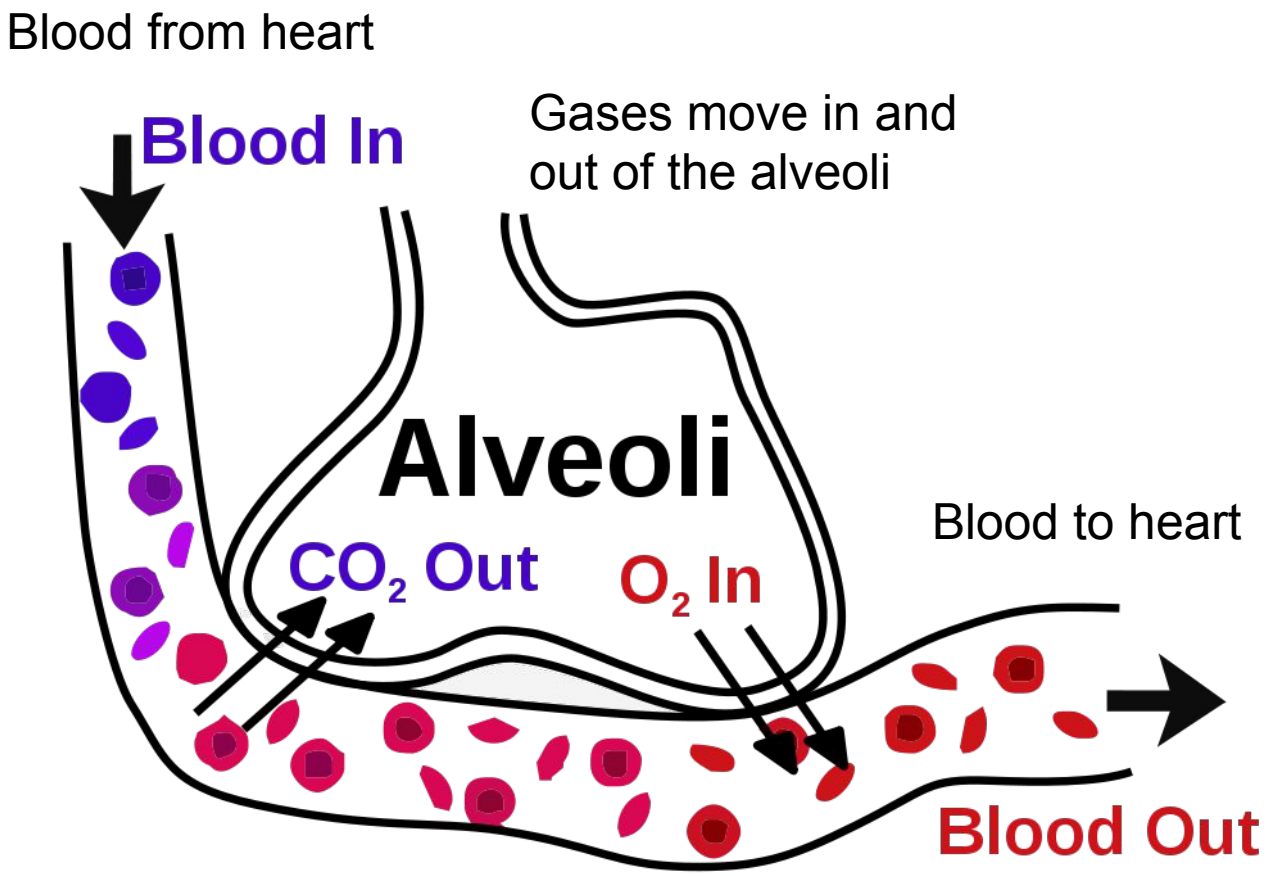
- What is the difference between expiration at rest and when exercising with respiratory muscles?

Explain how oxygen diffuses into the blood from the alveoli (2 marks)

.4) Gaseous exchange at the alveoli

- Pressure of 02 inside the lungs is high (21%).
- Capillaries are low pressure (16%).
- This means 02 moves into the bloodstream from the alveoli.

- C02 moved from capillaries into the lungs from an area of high concentration in the blood (4%) to an area of low concentration in the lungs (0.04%)



Explain the percentage of gas in the air we breathe in and out and why it changes (12 marks)

Explain the differences between air breathed in and out and why.

Gas	Atmospheric air %	Exhaled air %	Change %
Nitrogen, N_2	79	79	0
Oxygen, O_2	21	16	-5
Carbon dioxide, CO_2	0.04	4	+3.96
Water vapour	Variable	Saturated or 1%	-

Explain the long term effects of exercise on the respiratory system for a marathon runner and why it will benefit their performance (10 marks)