RESPIRATORY SYSTEM

WRITE what you think the main purpose of the RESPIRATORY SYSTEM is.

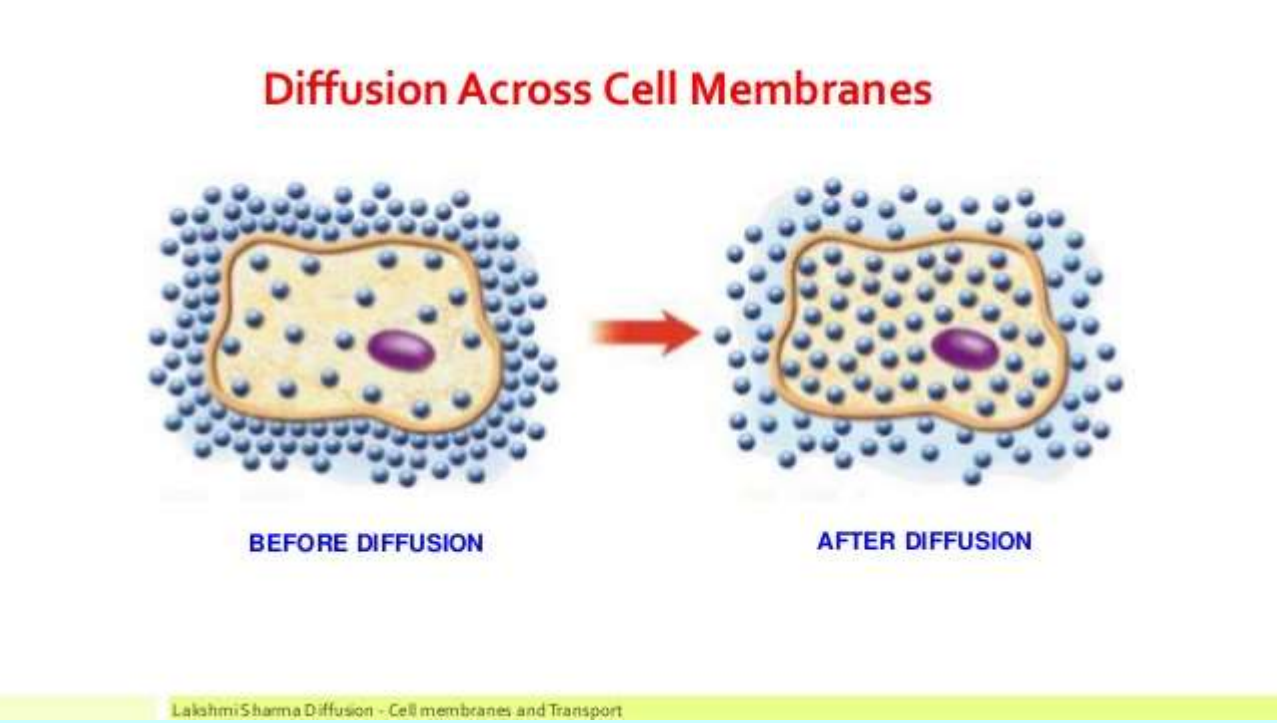
PURPOSE

=

Gas exchange

Gas exchange in cells

- Passive transport = diffusion
- High → Low
- Gases diffuse through cell membranes

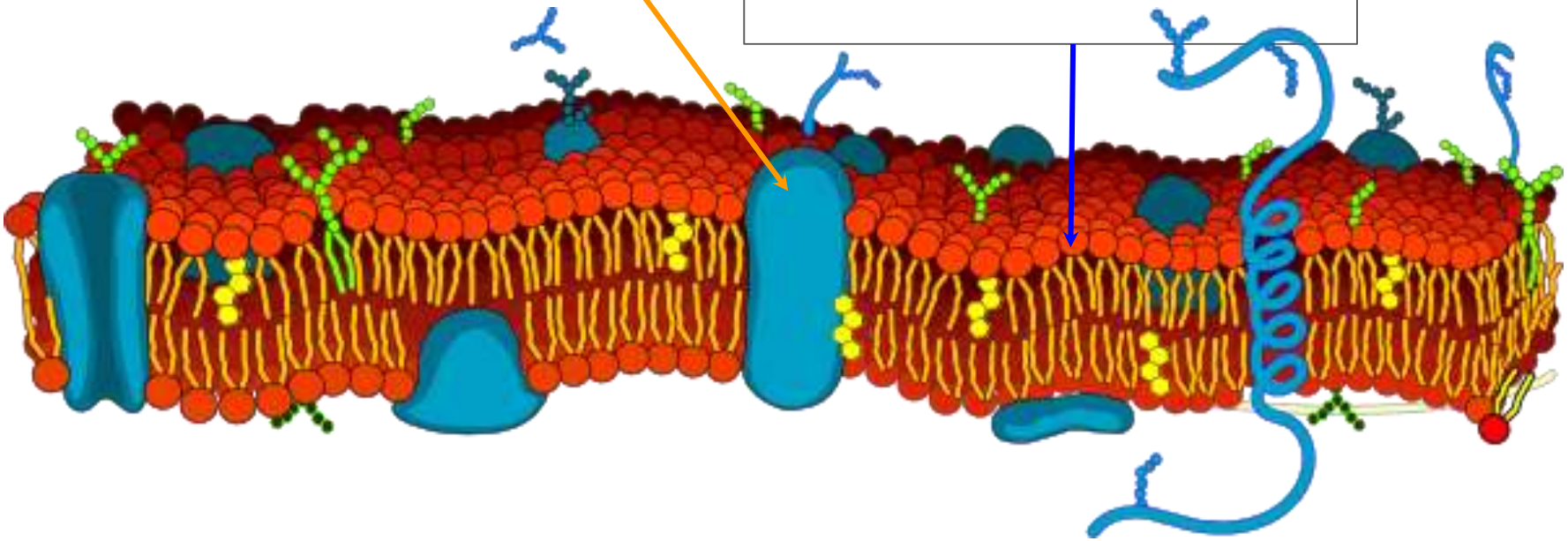


Type to label the diagram:

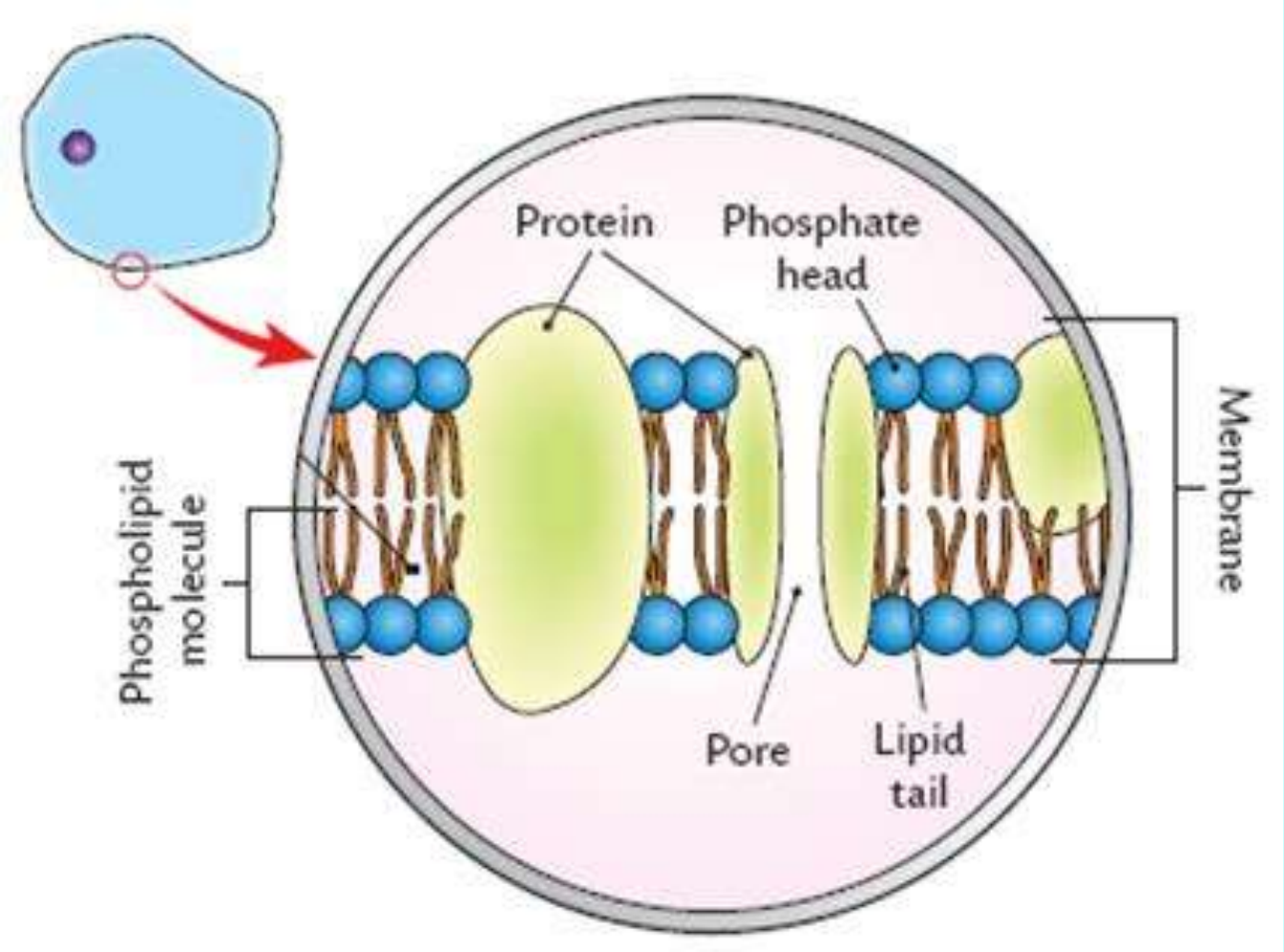
1.

2.

3.



Picture of a **(1) cell membrane** with **(2) proteins** and **(3)phospholipids**



Aerobic Cellular Respiration

- Needed for energy
- Requires oxygen
- Waste products are CO_2 and H_2O
- Occurs in mitochondria

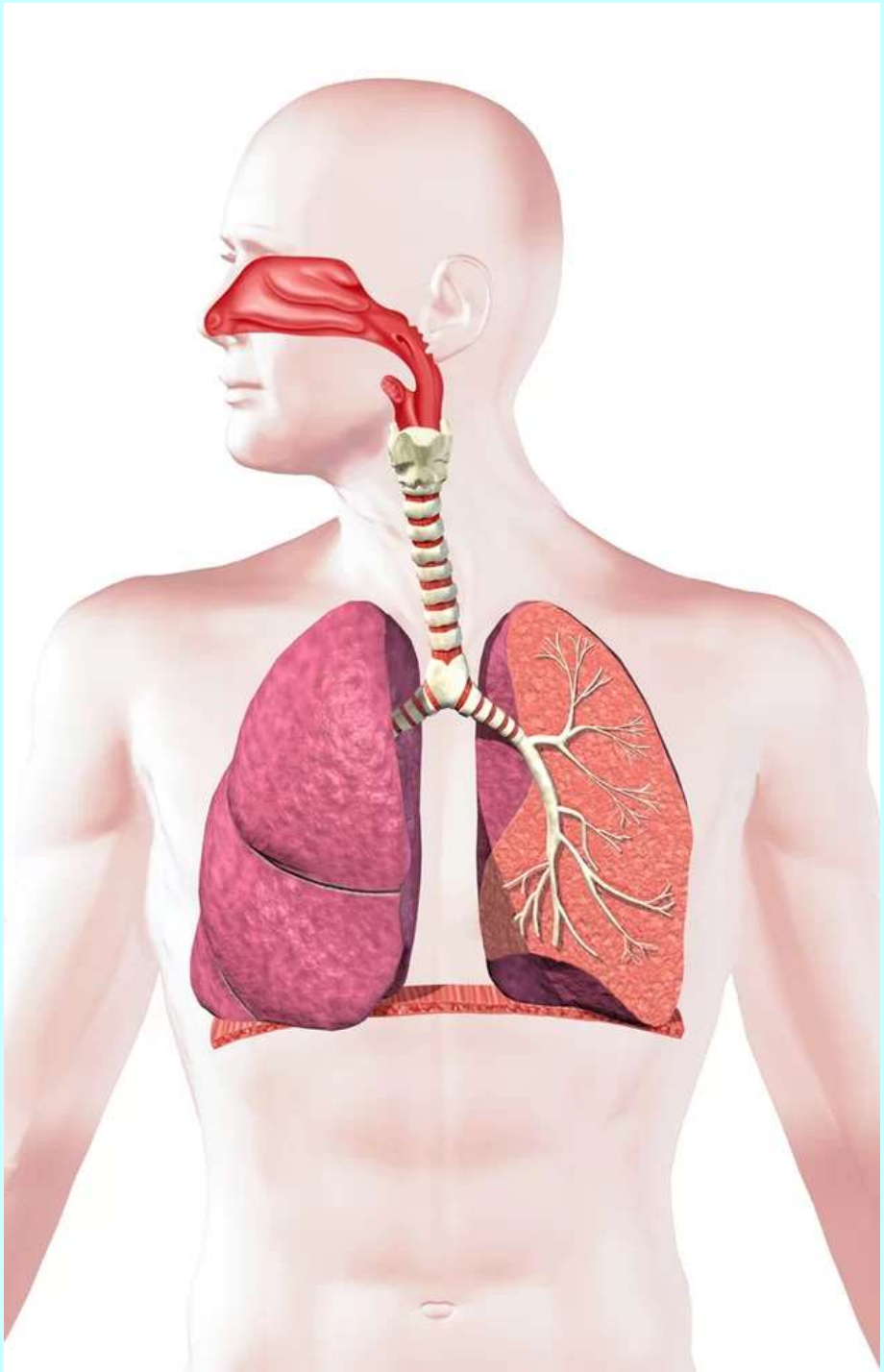
Write the formula for aerobic cellular respiration and label energy molecules on both sides

energy energy

$$C_6H_{12}O_6 + O_2 \rightarrow ATP + CO_2 + H_2O$$

Now onto respiration of the lungs

The system



Nose, Mouth, and Pharynx

- Filter dust and bacteria from air
- Warm and moisten air

PIECES AND PARTS

Pharynx

- opening to the trachea
- always open

Epiglottis

- covers airways when swallowing

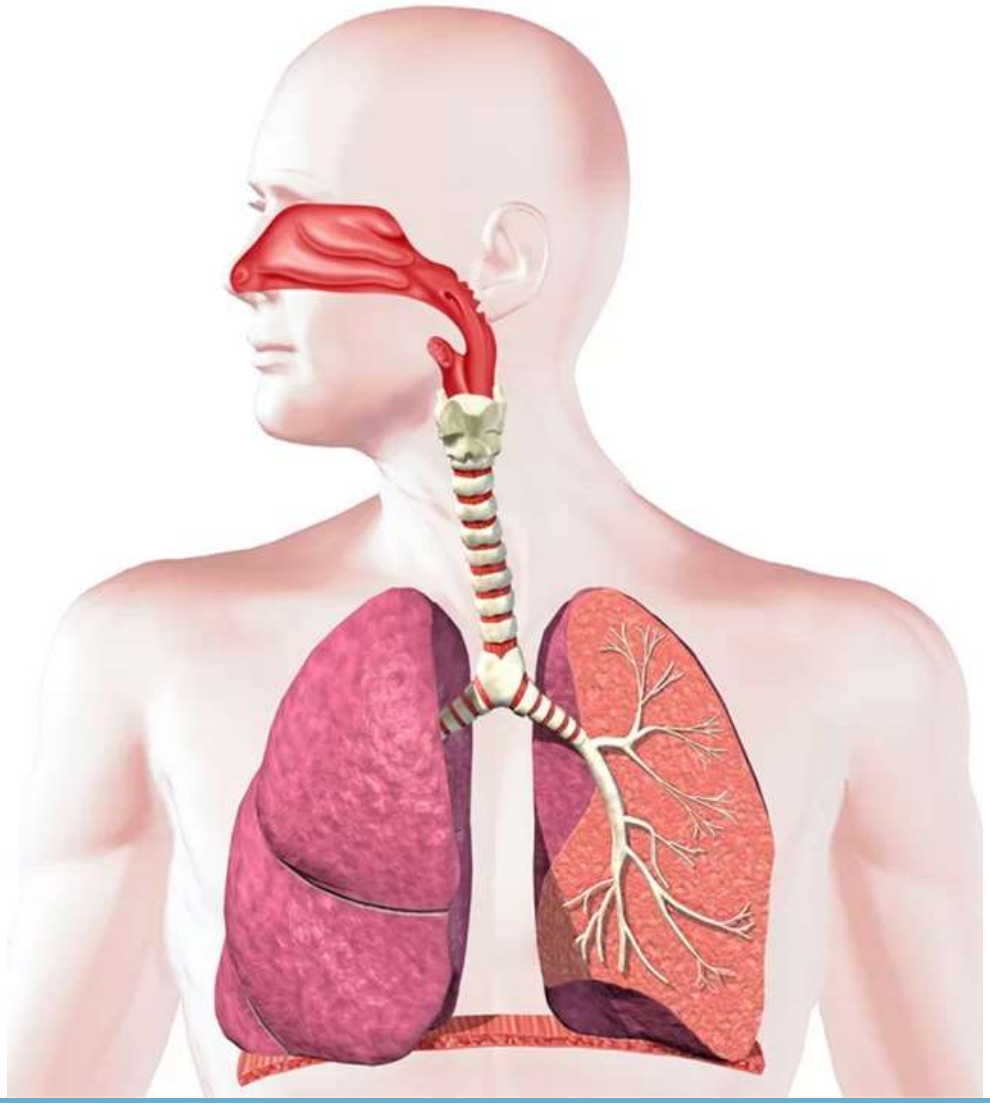
Larynx = vocal chords

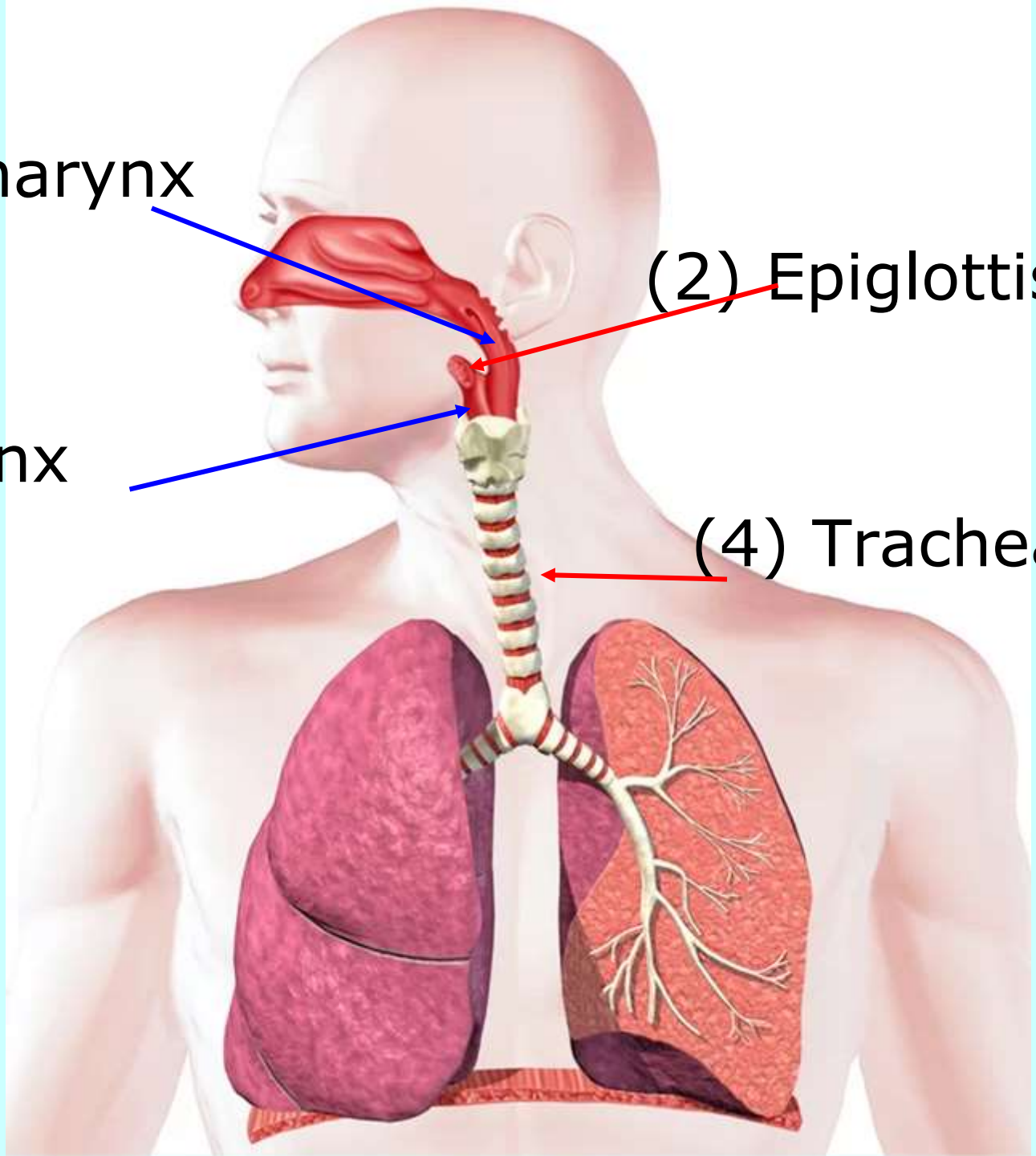
- Vibrate when exhale > sounds
- Adams apple

Trachea = windpipe

- Held open by rings of cartilage

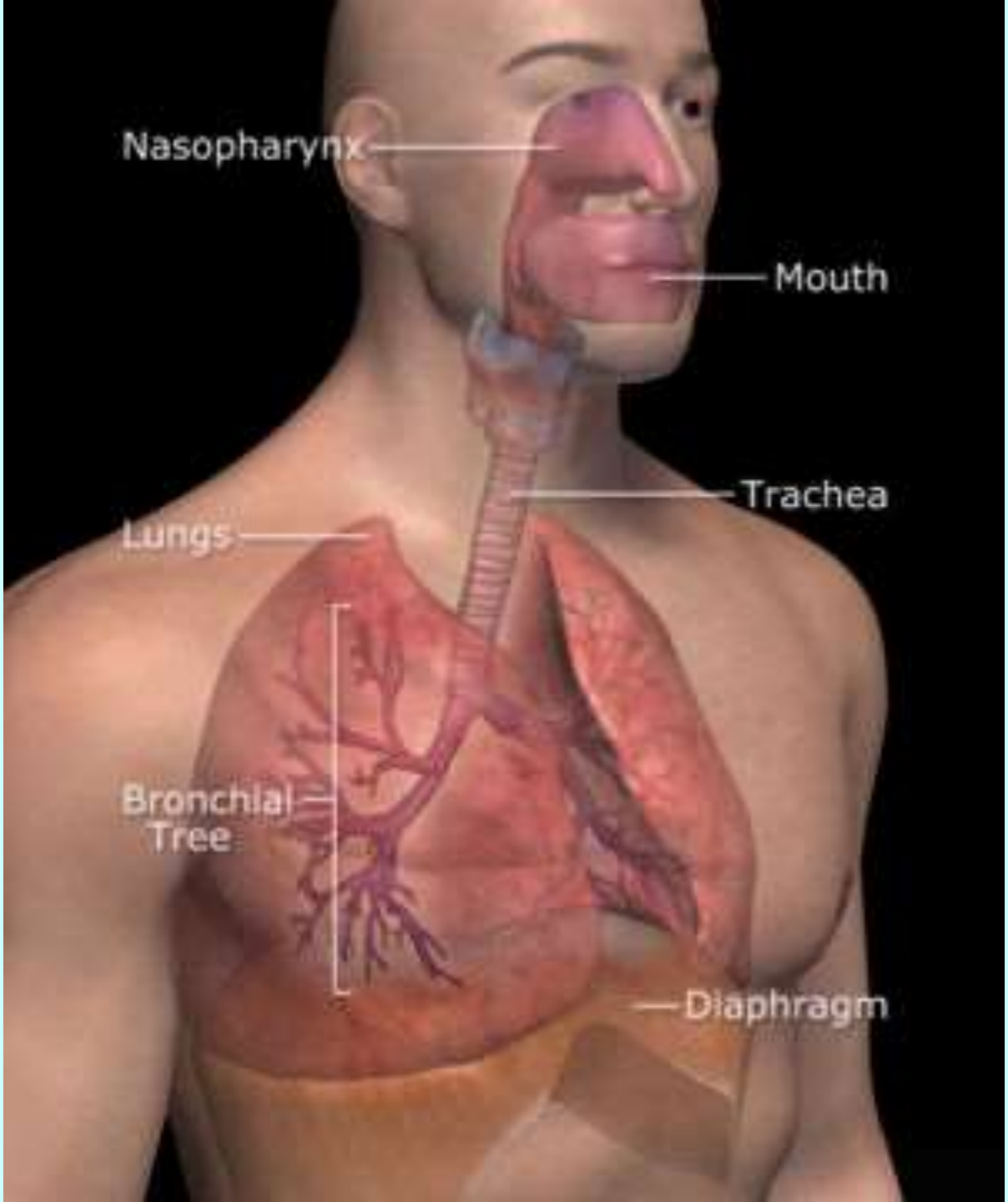
Label the (1) pharynx (2) epiglottis (3) larynx (4) trachea on the following diagram



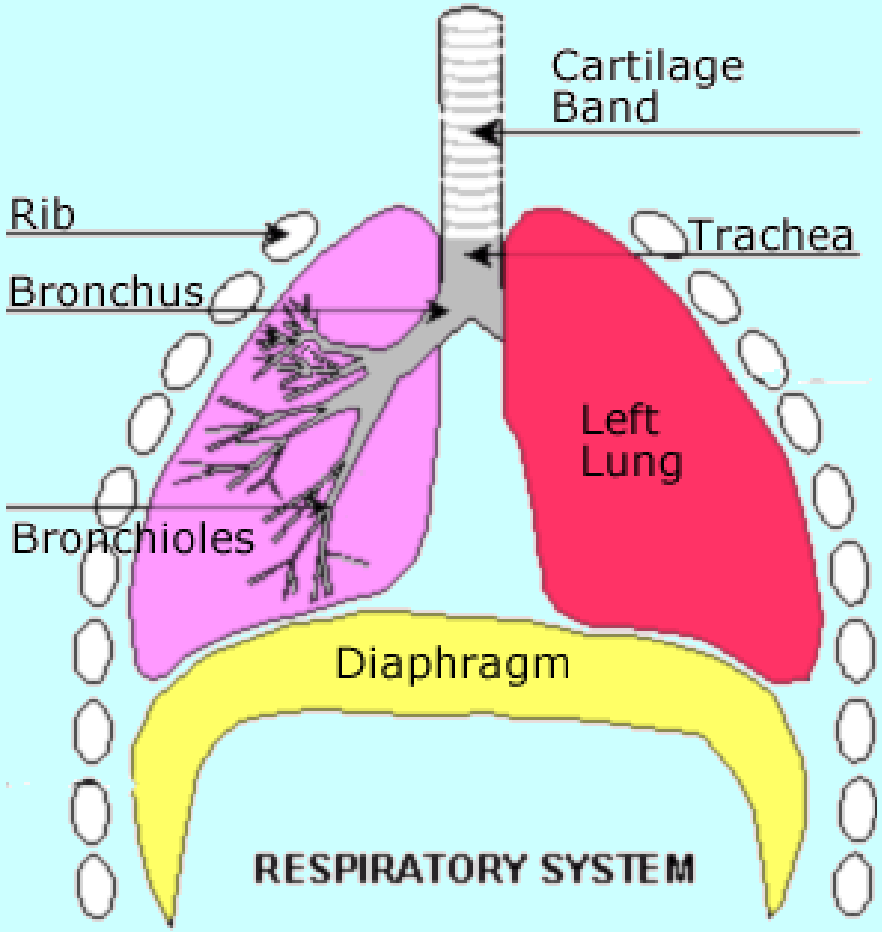

(1) Pharynx
(2) Epiglottis
(3) Larynx
(4) Trachea

WARNING: We are about to get up close and personal with this man's throat, brace yourself

Onto the main event...

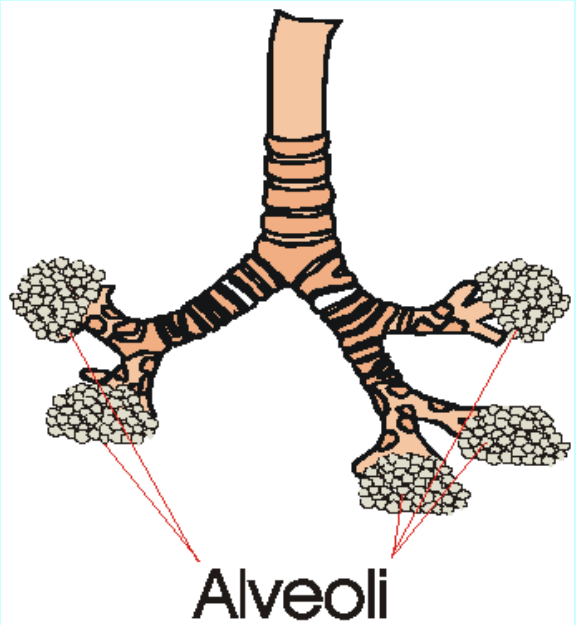

Nasopharynx
Mouth
Trachea
Lungs
Bronchial Tree
Diaphragm

- Bronchi = 2 main branches to lungs
- Lungs = sponge-like tissue (not muscular)



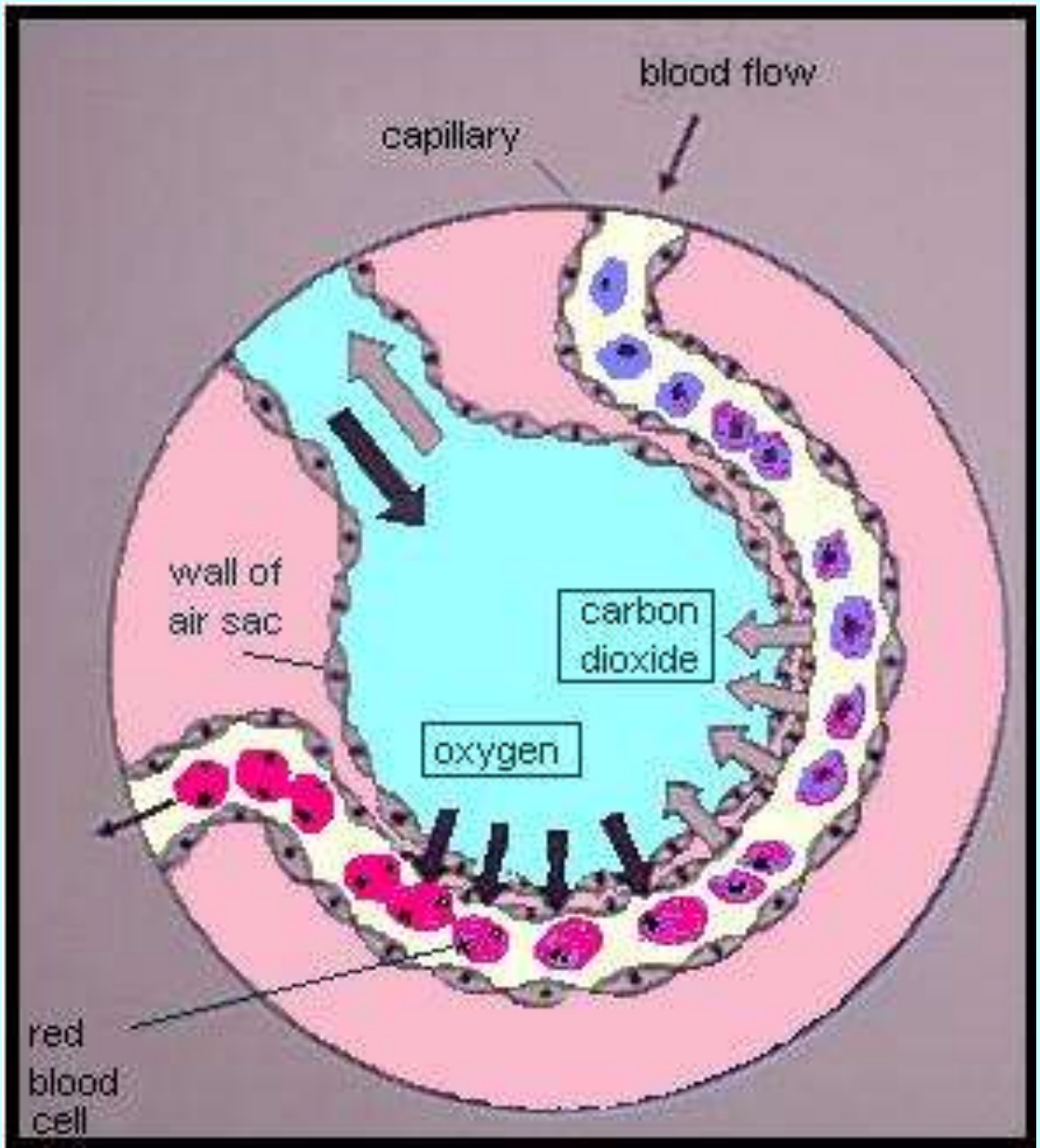
http://www.visit-islay.com/resources/body_files/image006.gif

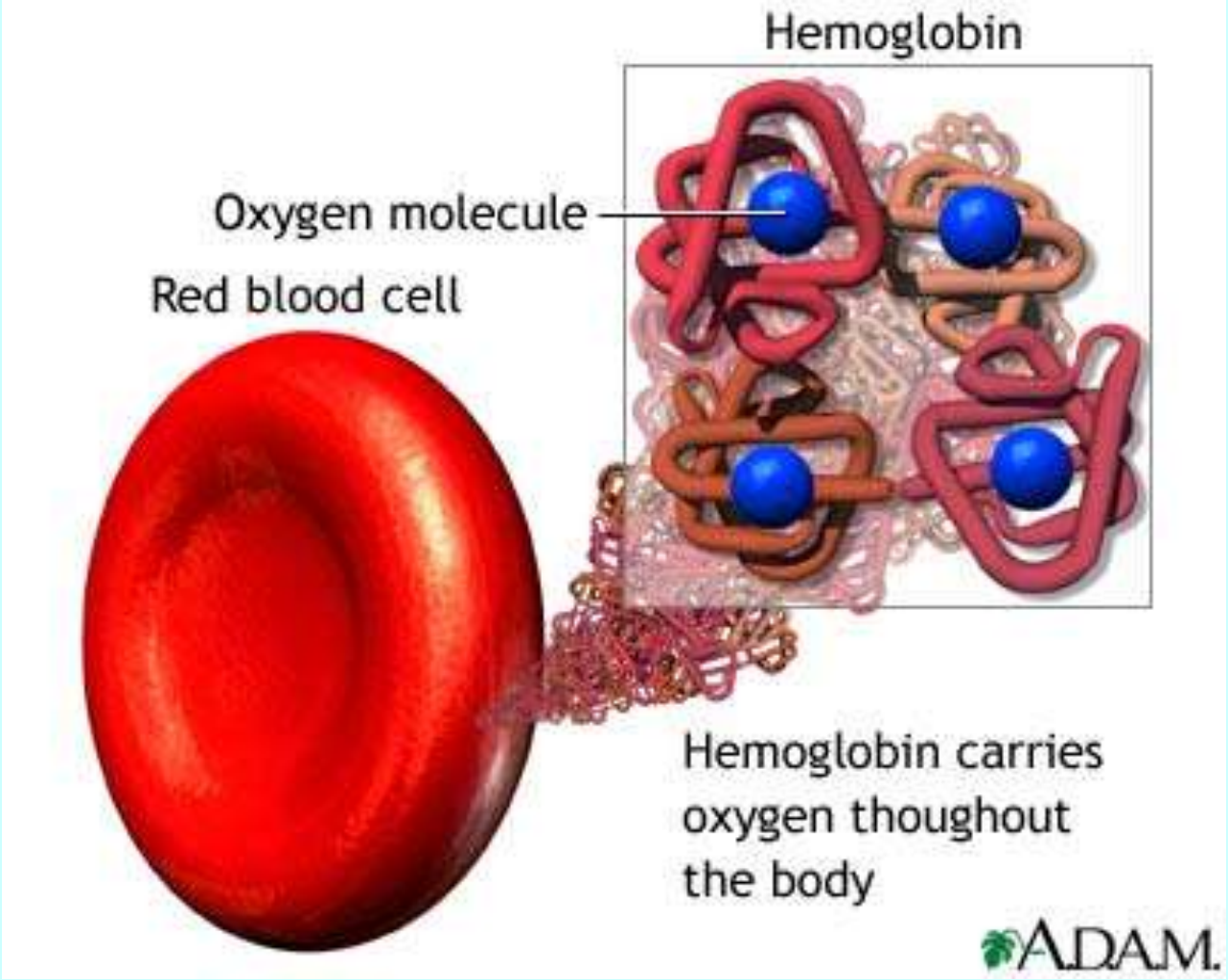
- Alveoli = air sacs
  - Surrounded by capillaries
  - Gas exchange occurs here



http://www.umt.edu/libbyhealth/gifs/secondary/health_resources/alveoli.gif

$\underline{O_2}$ in and $\underline{CO_2}$ out of blood





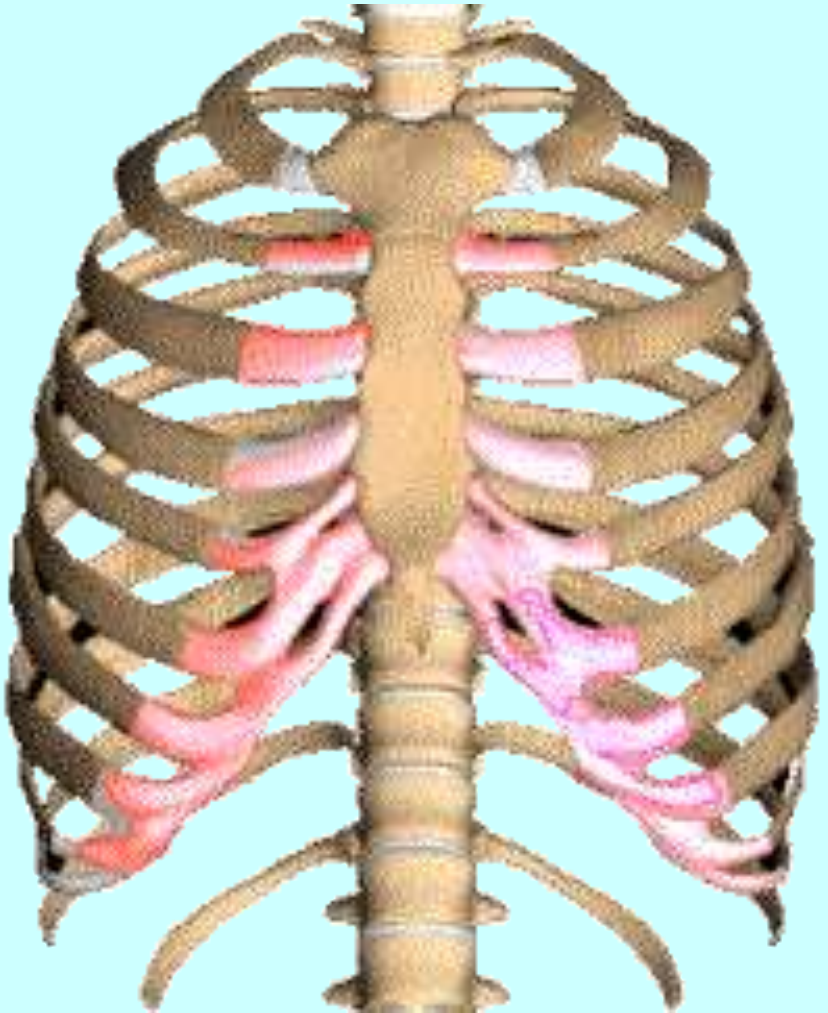
- Oxygen carried in RBC's <u>as oxyhemoglobin</u>

http://www.dhmc.org/shared/adam/graphics/images/en/19443.jpg

Breathing

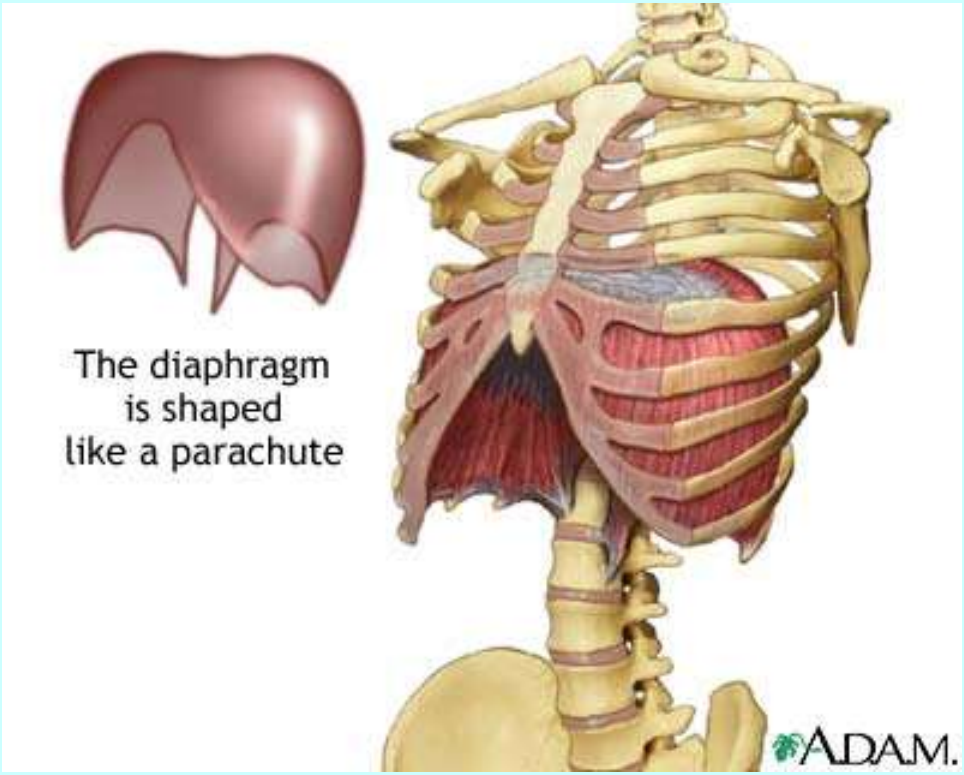
Ribs

- Protect lungs
- Connected to breast bone by cartilage
- Cartilage → flexibility



Diaphragm = muscle under lungs

- Contracts → inhale
- Relaxes →exhale



http://www.nlm.nih.gov/medlineplus/ency/images/ency/fullsize/19072.jpg

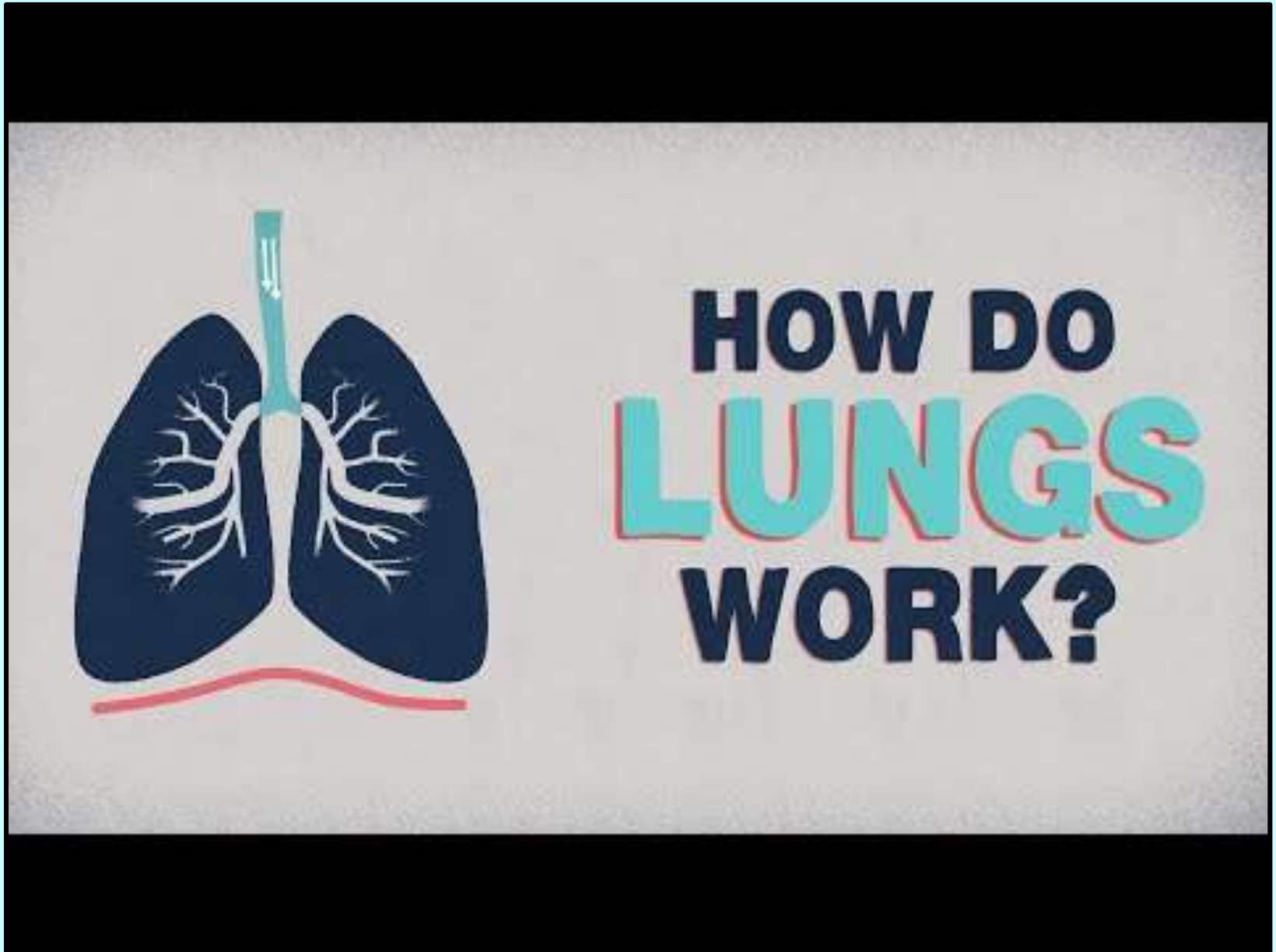
Inhale

- Diaphragm contracts → dec. air pressure → air moves in
- O_2 diffuses into blood
- About 15 times a min. = 21,000 / day

Exhale

- Diaphragm relax→ inc. air pressure → air moves out
- CO_2 and H_2O diffuses out

Put it all together…



Regulation of Breathing

CO_2 levels control breathing rates

- ➔High CO_2
- ➔H_2CO_3 (carbonic acid) in blood
- ➔Decreased pH
- ➔Brain sends nerve impulse
- ➔Increase breathing rate

Maintaining homeostasis

- Increased activity = increased CO_2 → increased breathing rates
- Can't get enough oxygen to cells → anaerobic respiration

Are you more full of hot air than your classmates?

CLICK HERE to find out

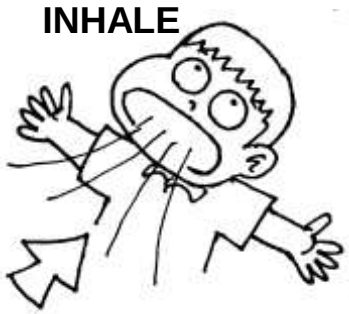
GROUPS

1. John, Zac, Forrest
2. Rachel, Hailey, Molly
3. Sarah, Annabell, Olivia
4. Keegan, Willa, Sydney
5. Sean, Nora, Jenna

GROUPS

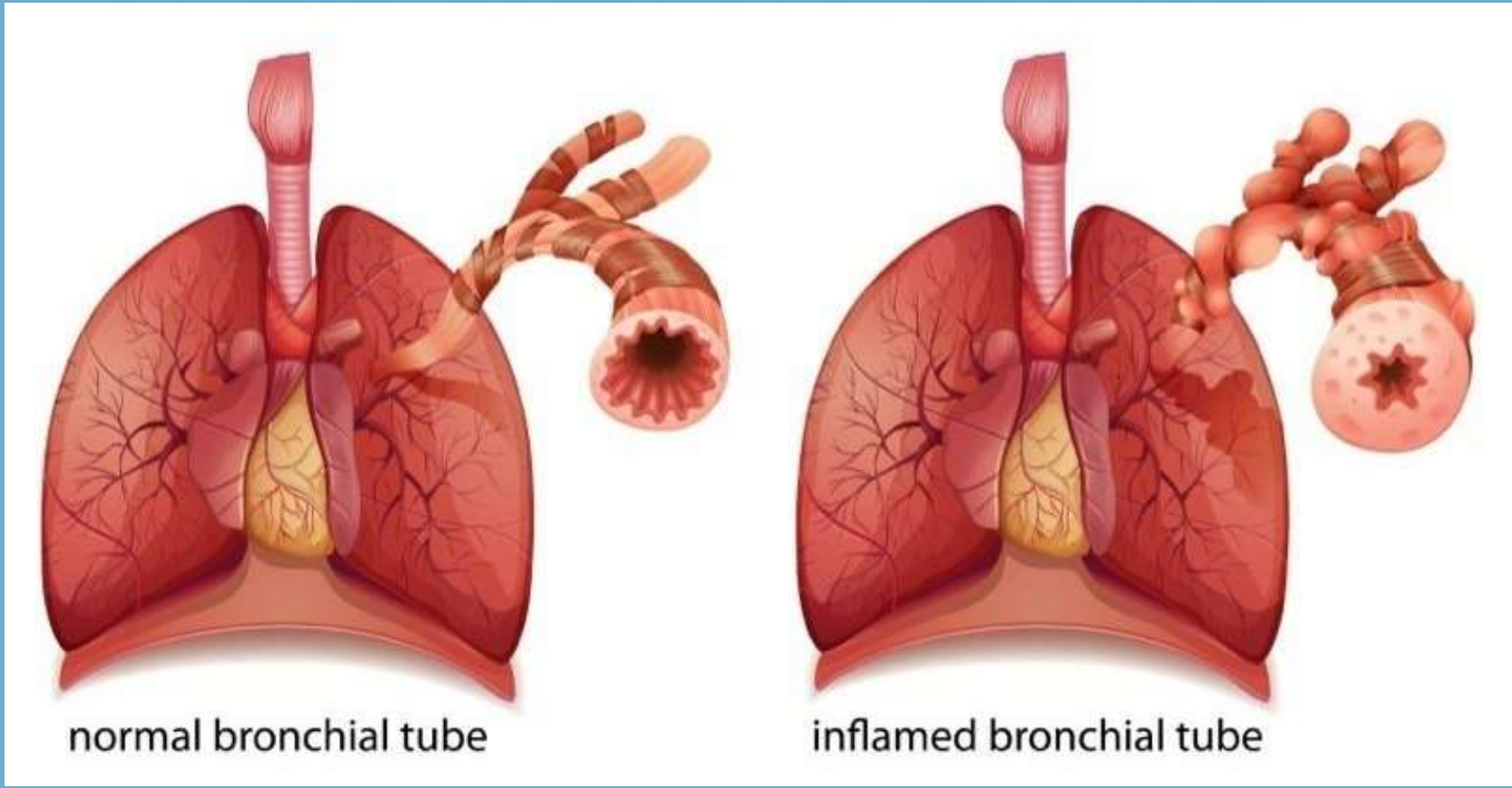
1. George, Peter, Brayden
2. Emma, Kaila, GraceAnn
3. Almin, Dylan, Will

Using your notes draw or write a feedback loop for why/how our bodies inhale :



FAILURE TO MAINTAIN HOMEOSTASIS…

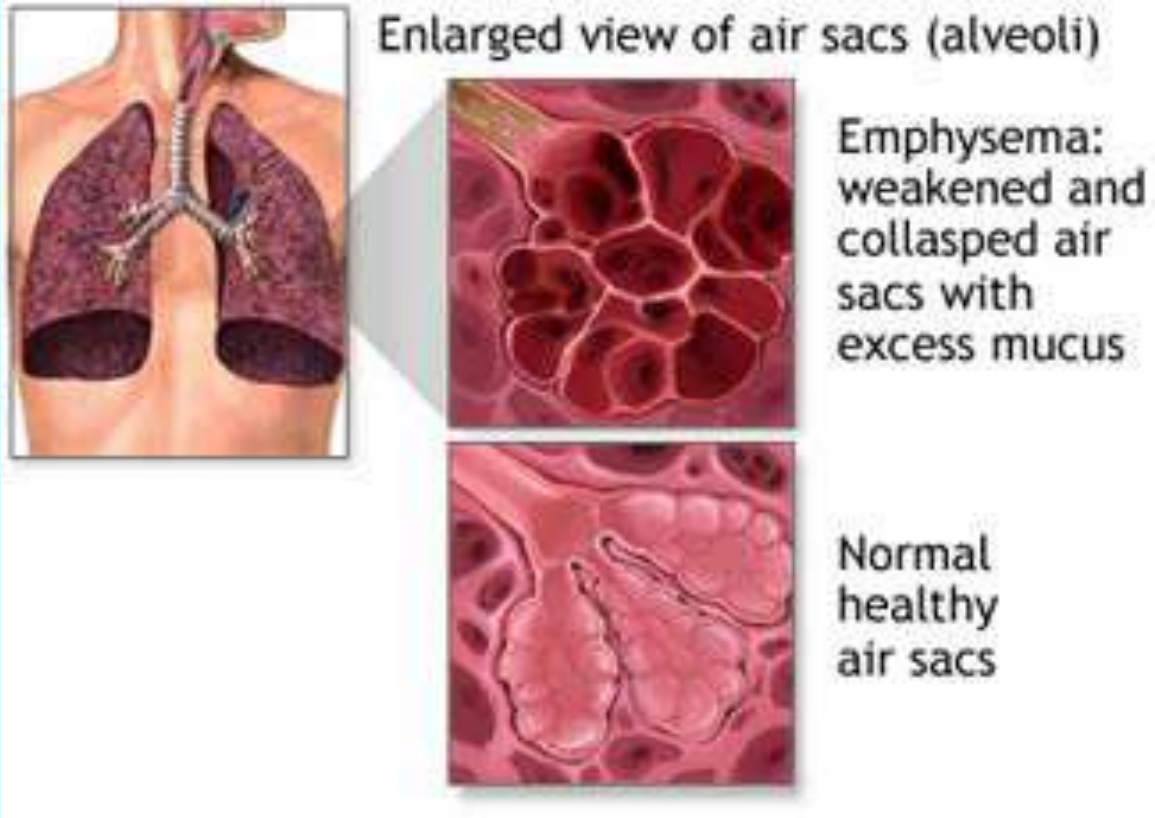
List symptoms someone with the inflamed bronchial tube may experience.



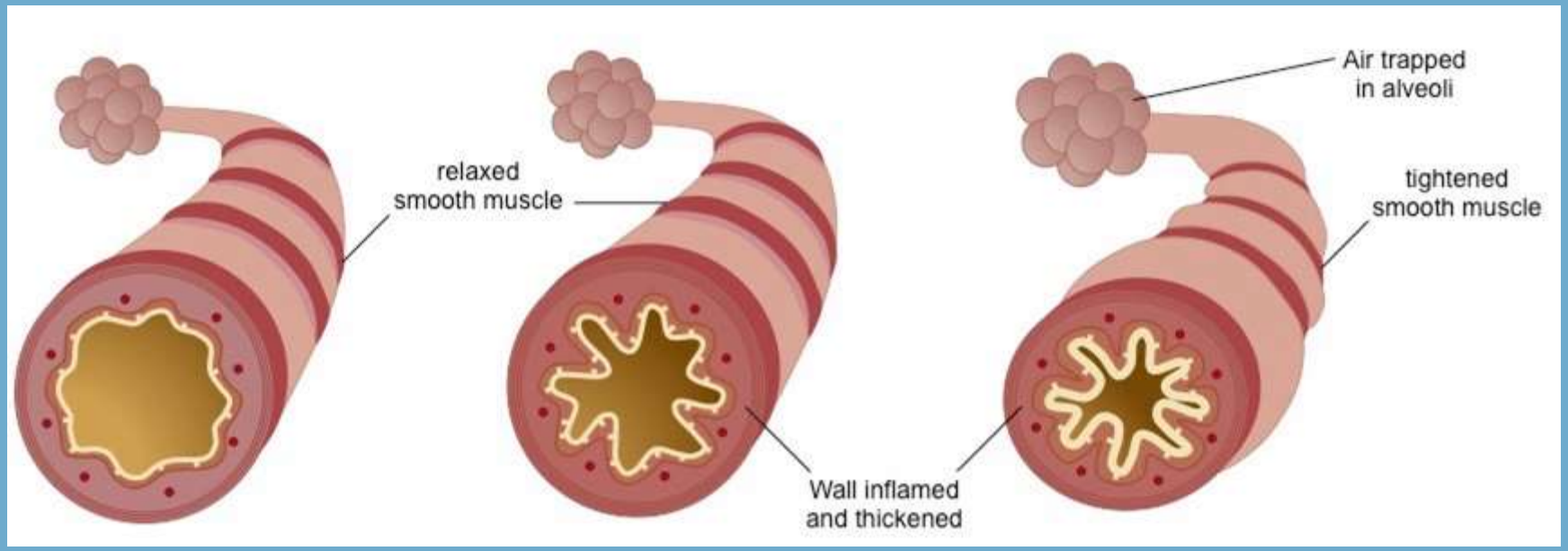
Any idea what the inflammation of the bronchial tubes is called?

- Bronchitis = inflammation of bronchi

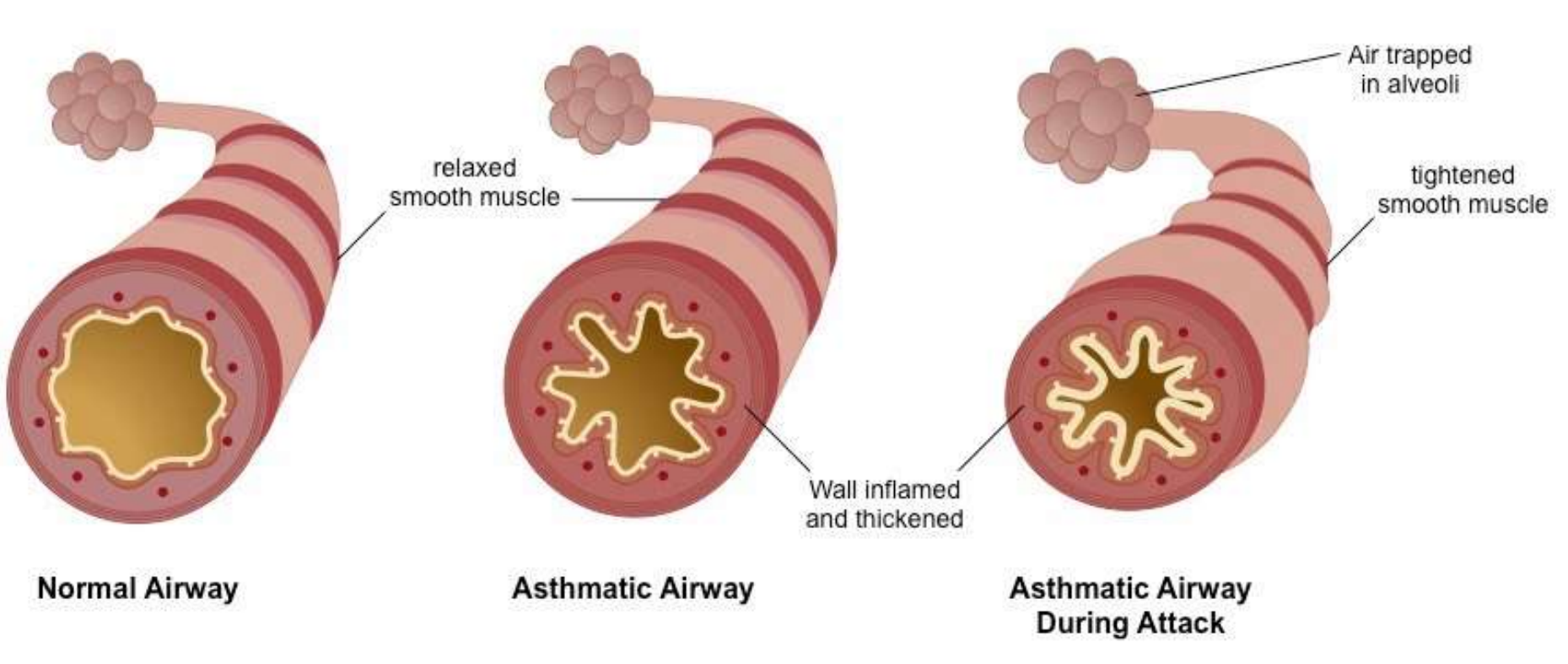
- Emphysema = decreased elasticity of alveoli
  - Heavily linked to smoking



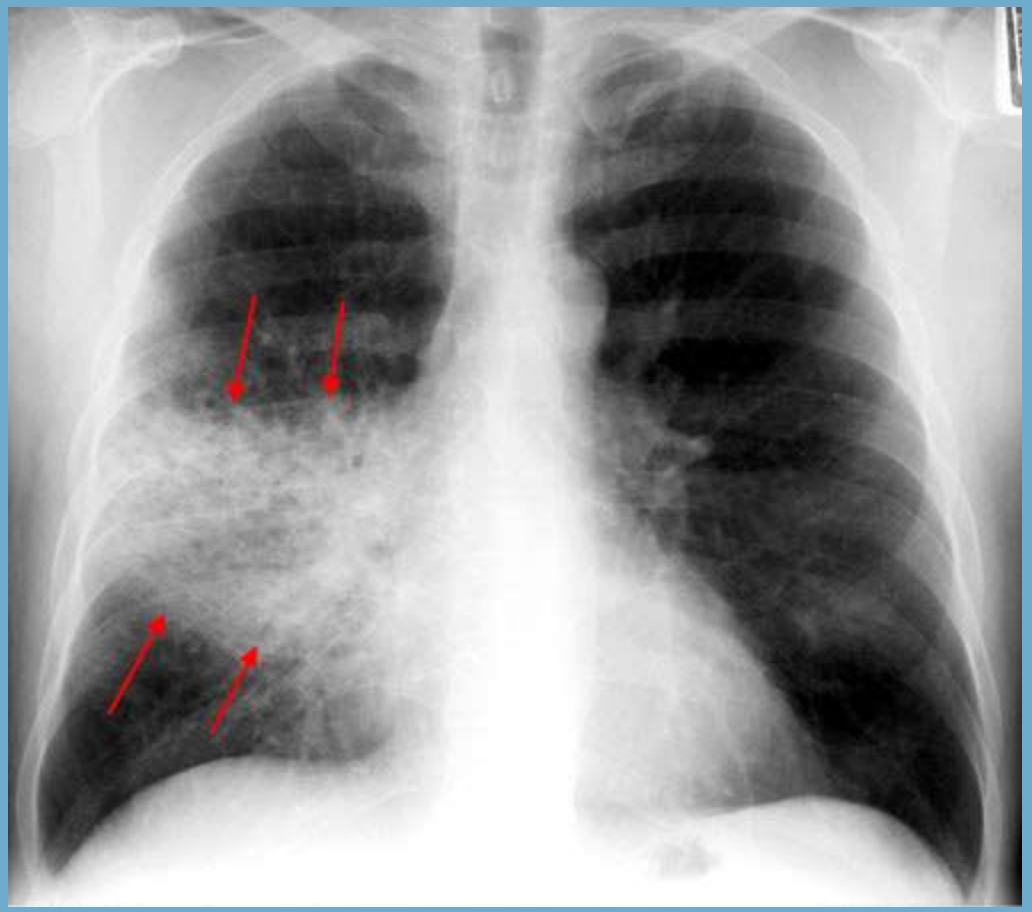
What does someone suffer from if their bronchial tubes look like the two on the right?



- Asthma = allergic response leads to constriction of airways

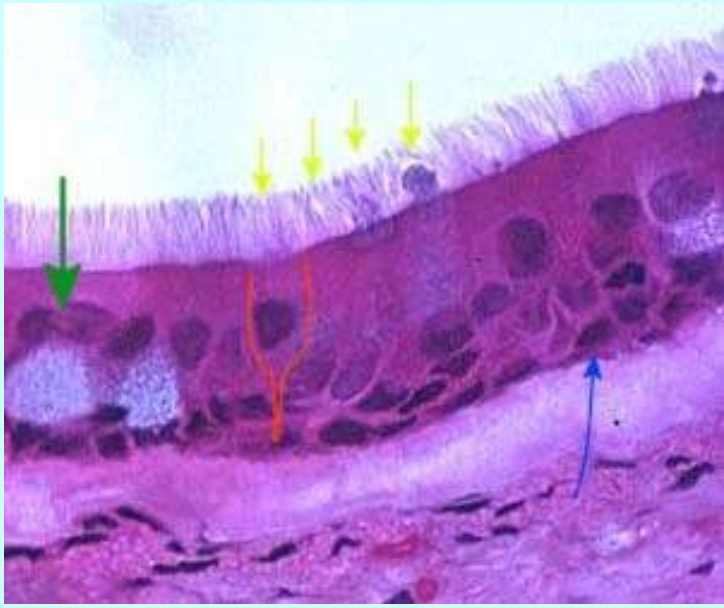


When you have fluid in your lungs you could have what?



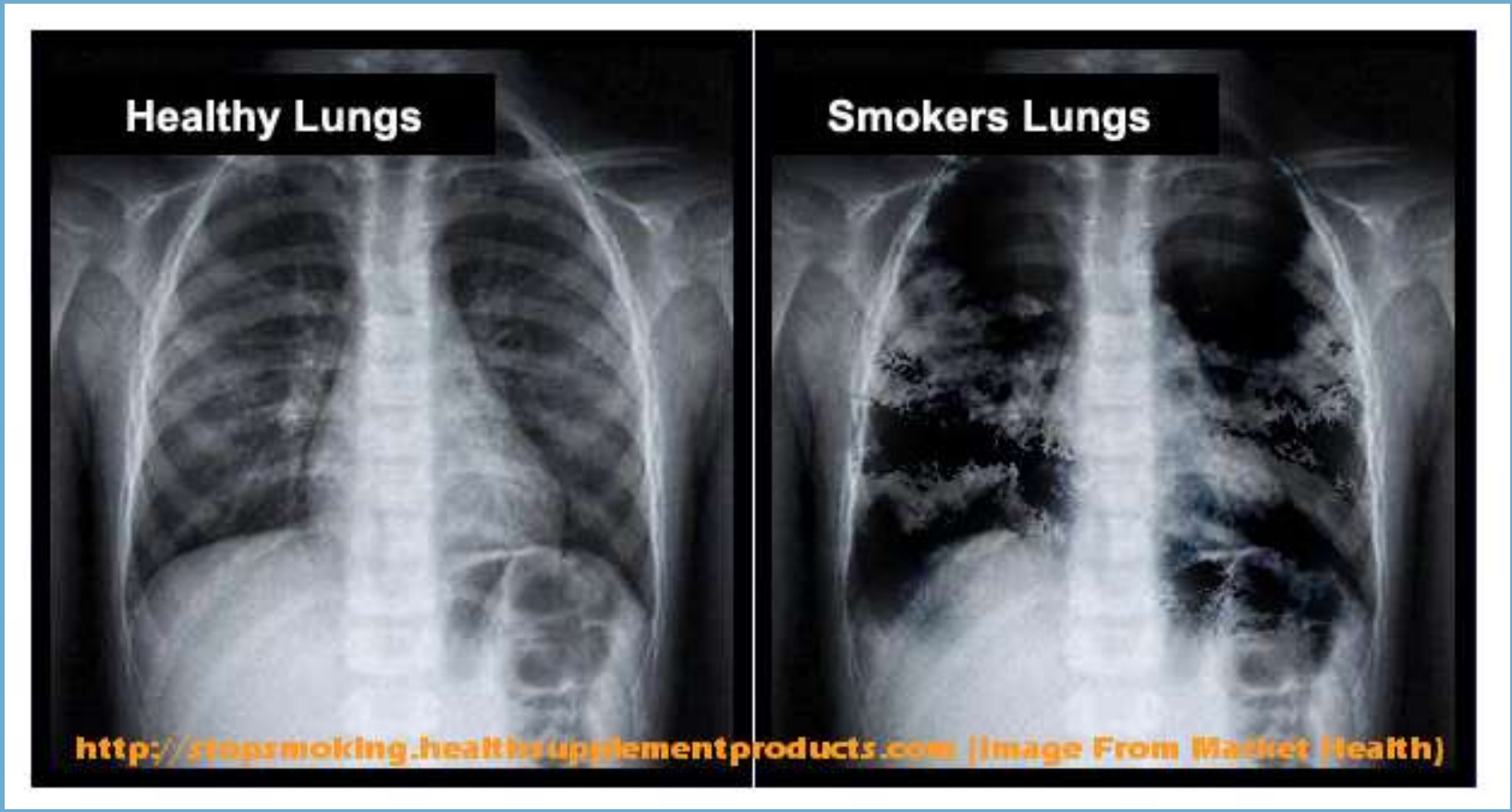
- Pneumonia = fluid fills lungs (many causes)

Cilia and mucus



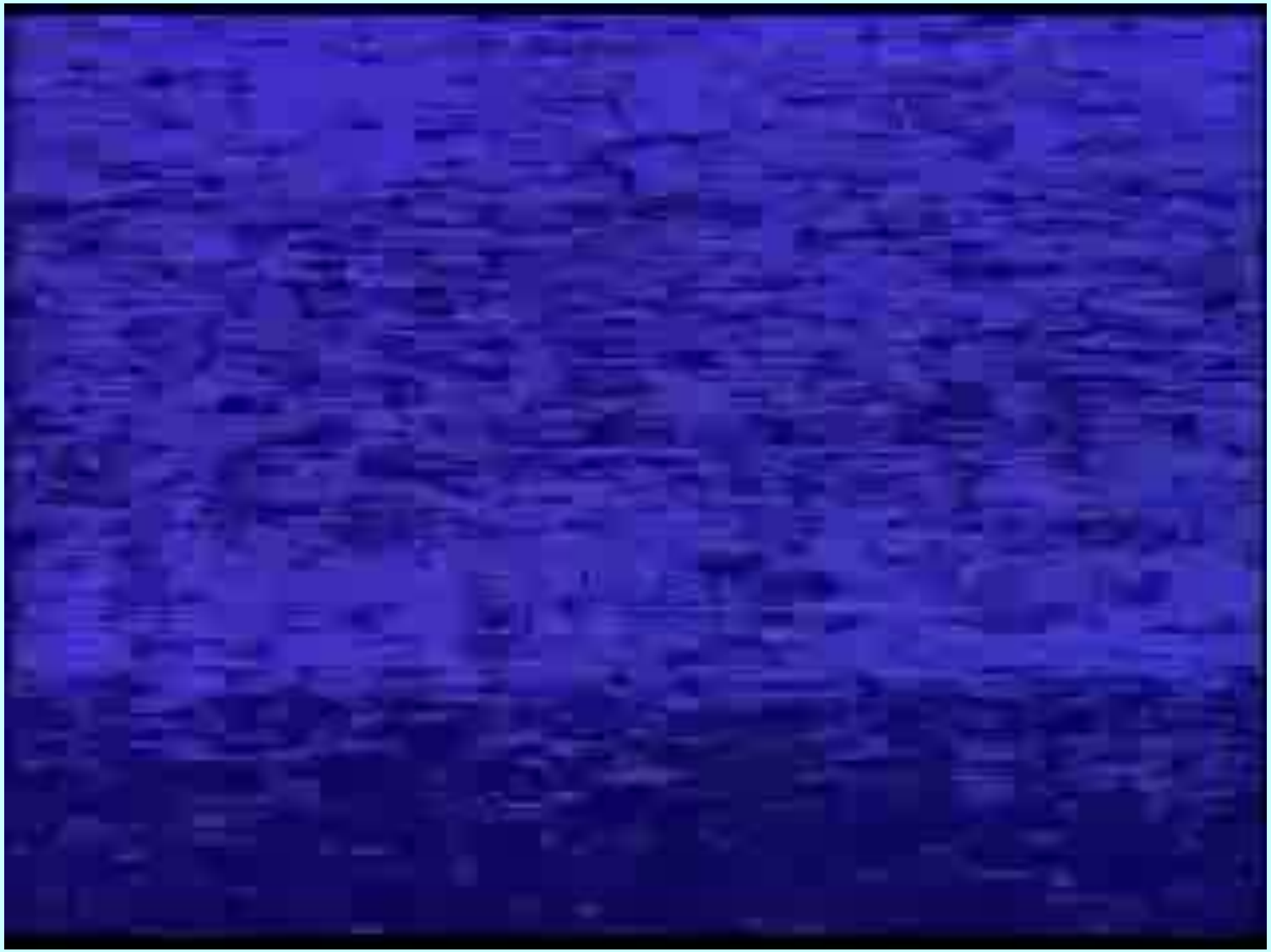
- Protect the lungs
- Keep moist
- Damaged cilia → coughing
- SMOKING Destroys cilia which leads to decreased immunity

List reasons why smoking isn't great for your body.



http://www.maricopa.gov/Public_Health/Community/images/[illegible]y_Ply.jpg

Smoking



SMOKING

- Inc. cancer risk (lung, bladder, pancreas, mouth and throat…)
- 90% all lung cancer victims = smokers
- Increases cardiovascular disease
- Increases bad cholesterol levels in blood
- CHEMICALS IN SECONDHAND SMOKE diffuse across the placenta from mother to baby resulting in complications

http://www.vitamins-nutrition-good-health-info.com/images/lungs2.jpg

Asbestos

- Glass fibers used to fireproof buildings
- When breaks down → lung cancer

http://www.caylamax.com.au/Portals/0/Asbestos-03.JPG

It is a fact that when you introduce any substance into the human body to which it is not accustomed, there can be side effects. So, no matter if you inhale, ingest or even just touch certain chemical substances, your body will show certain adverse effects.

Vaping is safer than smoking but not without risks

E-liquid is made up from just a few different ingredients: Propylene Glycol (PG), Vegetable Glycerin (VG), water, flavorings and nicotine. Nicotine in any form IS ADDICTIVE.. Some e-liquids are 0% nicotine, and these contain exactly the same ingredients minus the nicotine.

RESPIRATION SUMMARY

- AEROBIC CELLULAR RESPIRATION
  - Requires O_2 and glucose
  - Releases energy (ATP = usable energy)
  - Wastes produced = water and CO_2
  - Glucose energy broken down → more usable form of energy

RESPIRATION SUMMARY

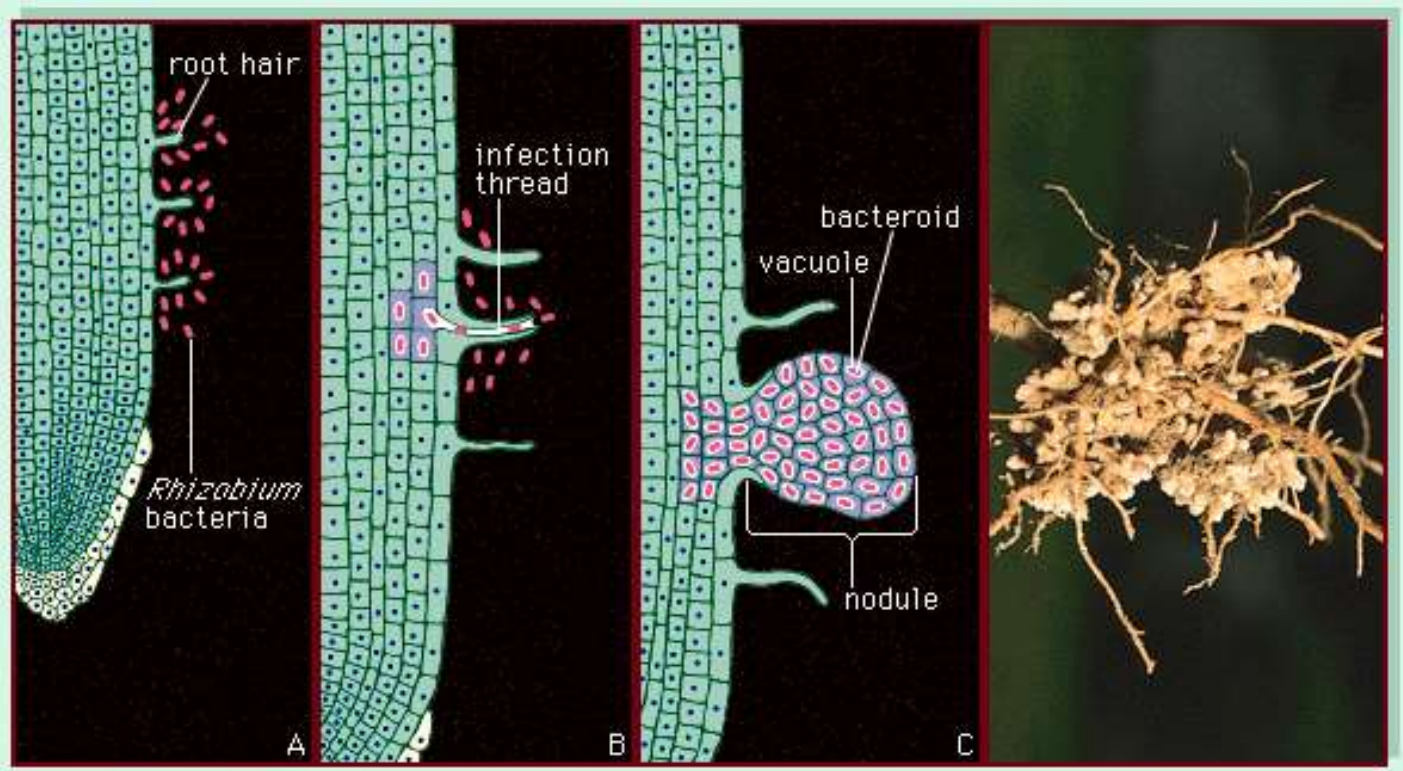
- ORGAN SYSTEMS work together to maintain homeostasis
  - Digestive system provides glucose
  - Circulatory system transports glucose and O_2 to cells
  - Respiratory system exchanges gases O_2 in CO_2 out

Anaerobic Respiration

- Occurs in cytoplasm
- Produces less ATP
  - (3 molecules compared to 36)
- Produces Lactic Acid → muscle fatigue

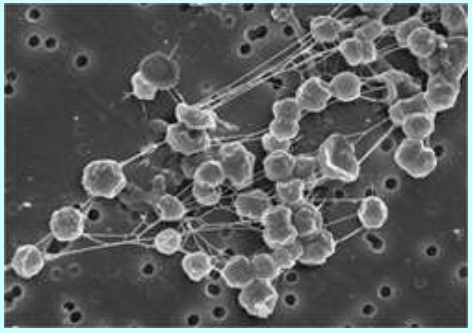
Anaerobic bacteria

- Live in the absence of oxygen
- Anaerobic respiration → energy
- Examples:
- <u>Nitrogen fixing bacteria live in plant roots (mutualistic relationship)</u>



Anaerobic bacteria

- Methanogens → methane gas
- Found in sewage, intestines, and landfills



http://www.astronomy.com/asy/default.aspx?c=a&id=4605

Humans and other animals need

oxygen → energy

Plants produce oxygen

Quiz

1. Write the formula for aerobic cellular respiration.
2. Name the organelle where aerobic cellular respiration occurs
3. Where in the lungs does gas exchange occur and what type of blood vessels would you find there?
4. Name the muscle involved in breathing and where is it located

5. What is a waste product of anaerobic respiration in human cells

6. What holds the trachea open

7. What happens when you have an increase in CO_2 in the blood?

8. List 3 problems caused by smoking

9. Asbestos fibers in the lungs can lead to _____

10. Nitrogen fixing bacteria in the roots of legumes are an example of which symbiotic relationship.

Review cellular respiration