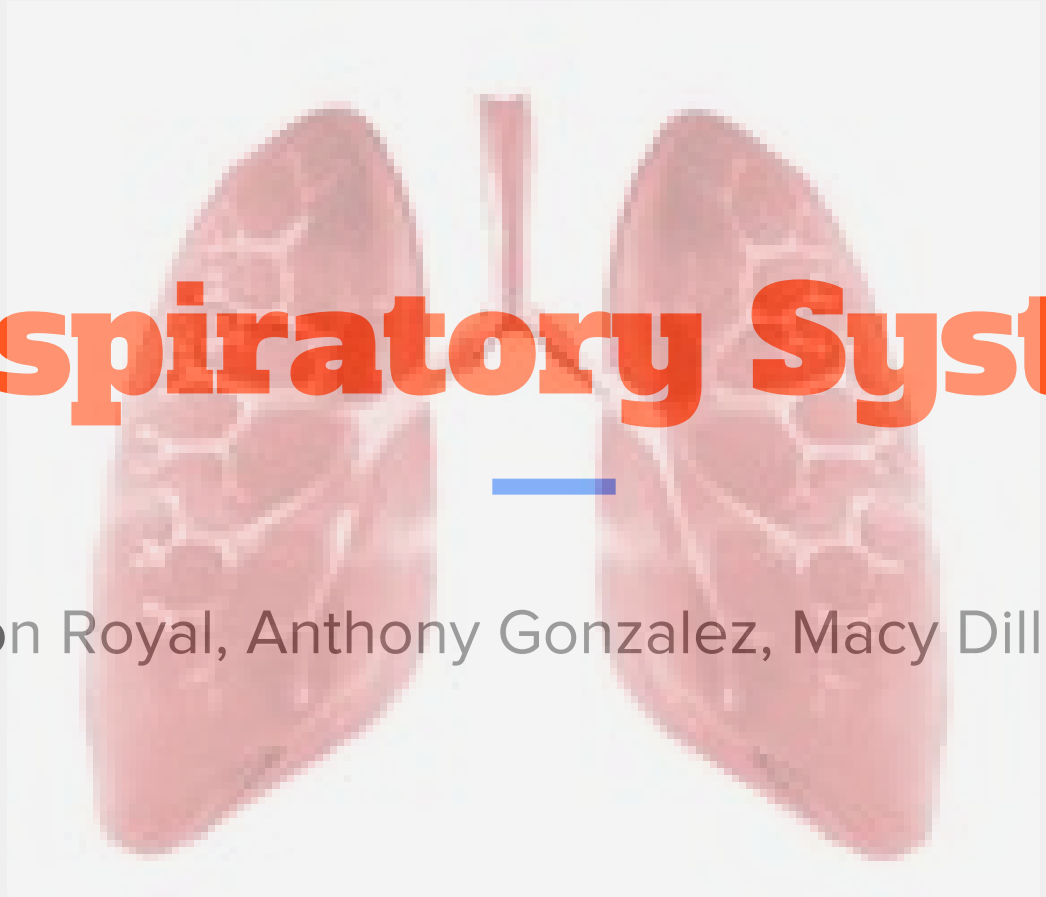


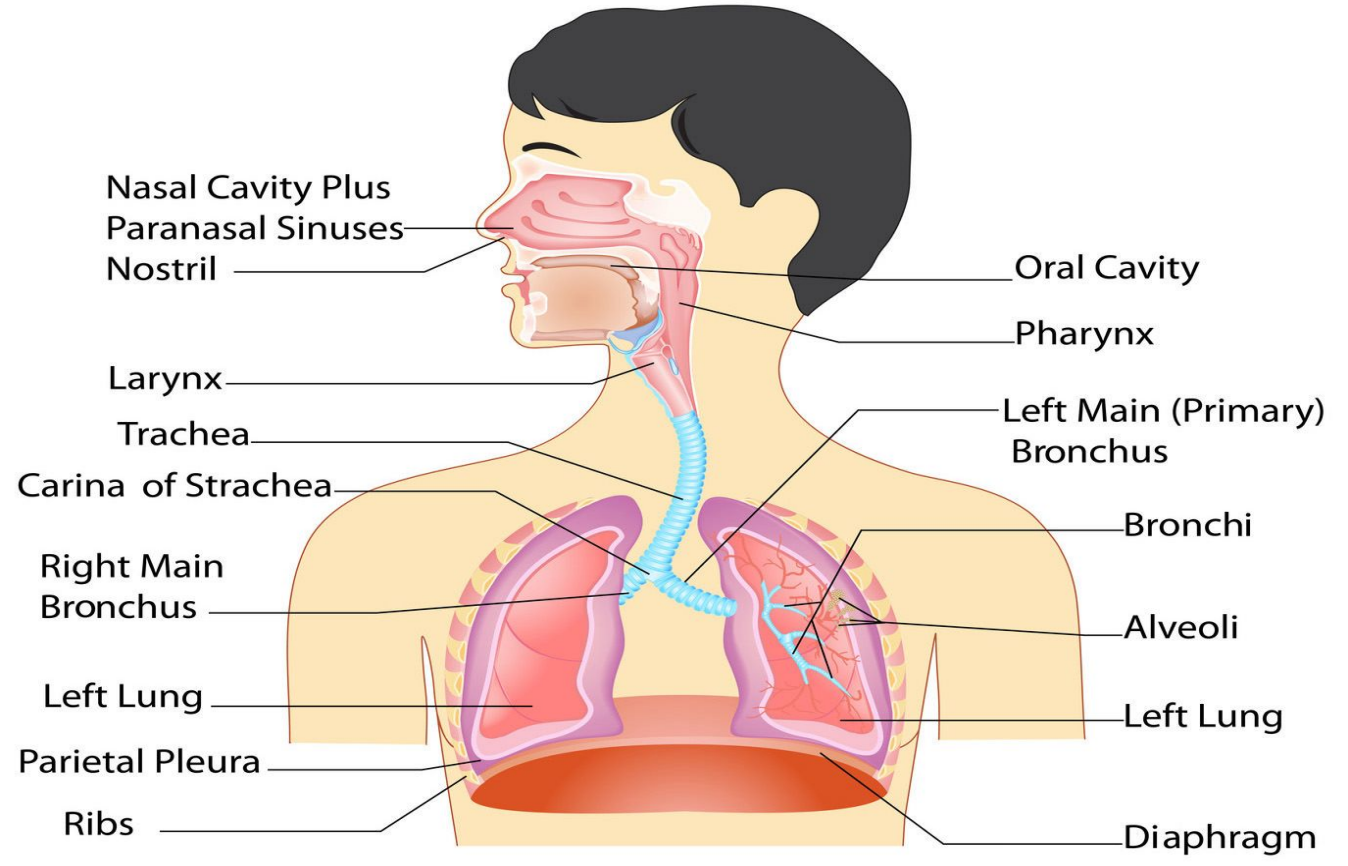
Respiratory System

Mason Royal, Anthony Gonzalez, Macy Dillenbeck

Essential Question

How do you push the limits of the respiratory system, and what is the outcome? **(Anthony)**

Organs in the Sustem



Lungs (Anthony)

- Oxygen is taken to the lungs through the nose and the mouth. The oxygen goes through the pharynx and larynx. The air is taken to the trachea, straight to the lungs.
- The lungs are directly connected to the nose and mouth.
- Protected by the ribcage.
- The diaphragm separates your lungs and your abdomen.
- The lungs are divided into five main sections called lobes.
- The right lung has 3 lobes, upper, middle, and lower.
- The left lung has 2 lobes, upper and middle,
- The reason the right is larger, is because it does not need to make room for the heart in its position in the chest.

Pharynx & Larynx (Anthony)

- The pharynx is a membrane lined cavity that sits behind the nose and mouth. It It connects them both to the esophagus.
- The pharynx is also referred to as the throat by many people
- It also brings food from the mouth to the esophagus.
- The larynx is often referred to as the voice box, because it is where the sound that comes out of your mouth is produced from.
- The larynx also is the reason that food doesn't go from your esophagus to your respiratory organs.

Trachea & Bronchi (Anthony)

- Once oxygen has reached the esophagus, it is taken into the trachea.
- The trachea brings the oxygen into the lungs.
- The trachea is a long, hollow tube, that connects the larynx to the bronchi.
- Bronchi are connected to the trachea and conduct air into the lungs, like a straw to blow up balloons.
- They branch out into smaller tubes known as bronchioles.

Alveoli and Blood Vessels (Macy)

The bronchioles branch out into microscopic air sacs called alveoli.

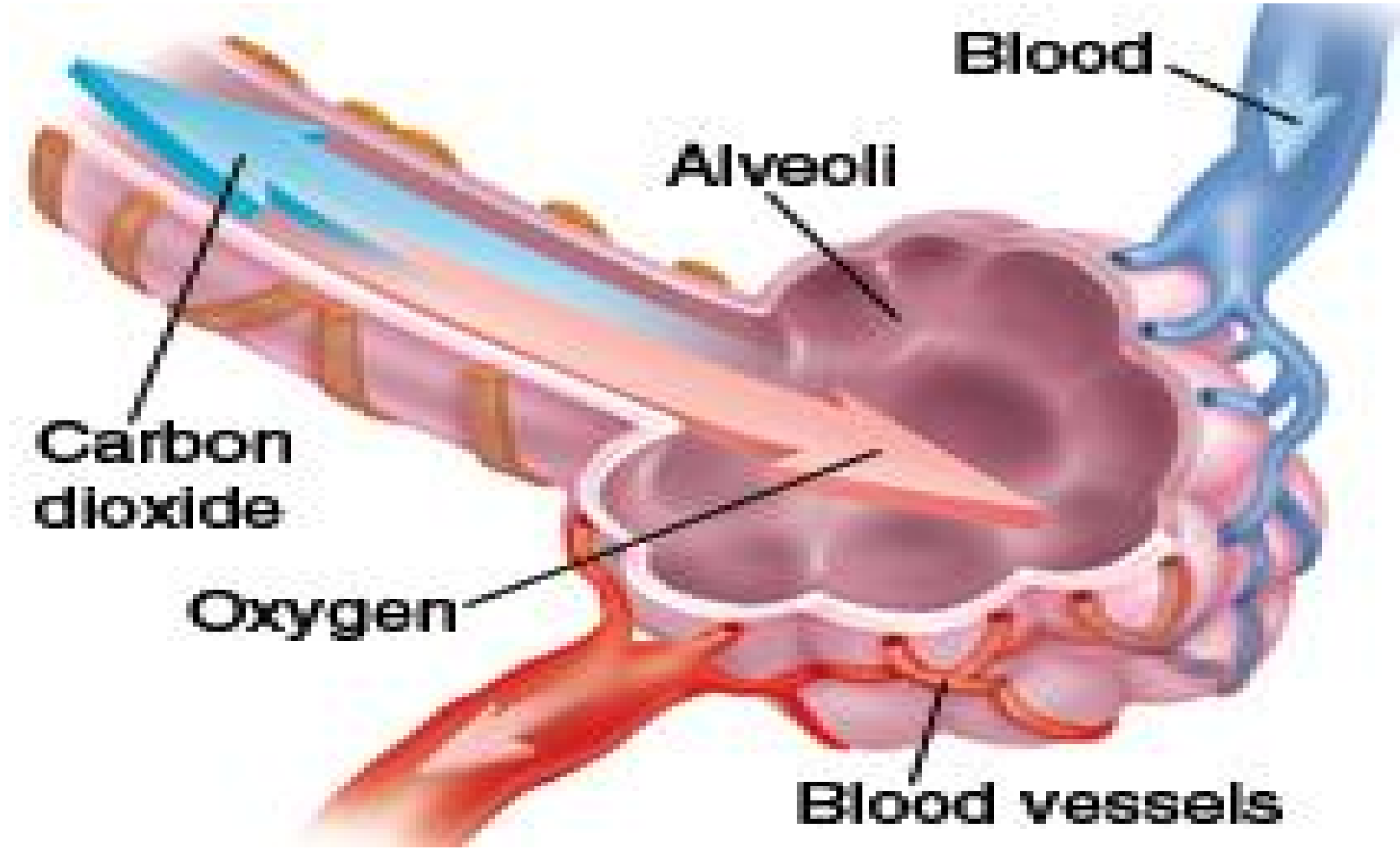
The alveoli are covered by a net of tiny blood vessels called capillaries.

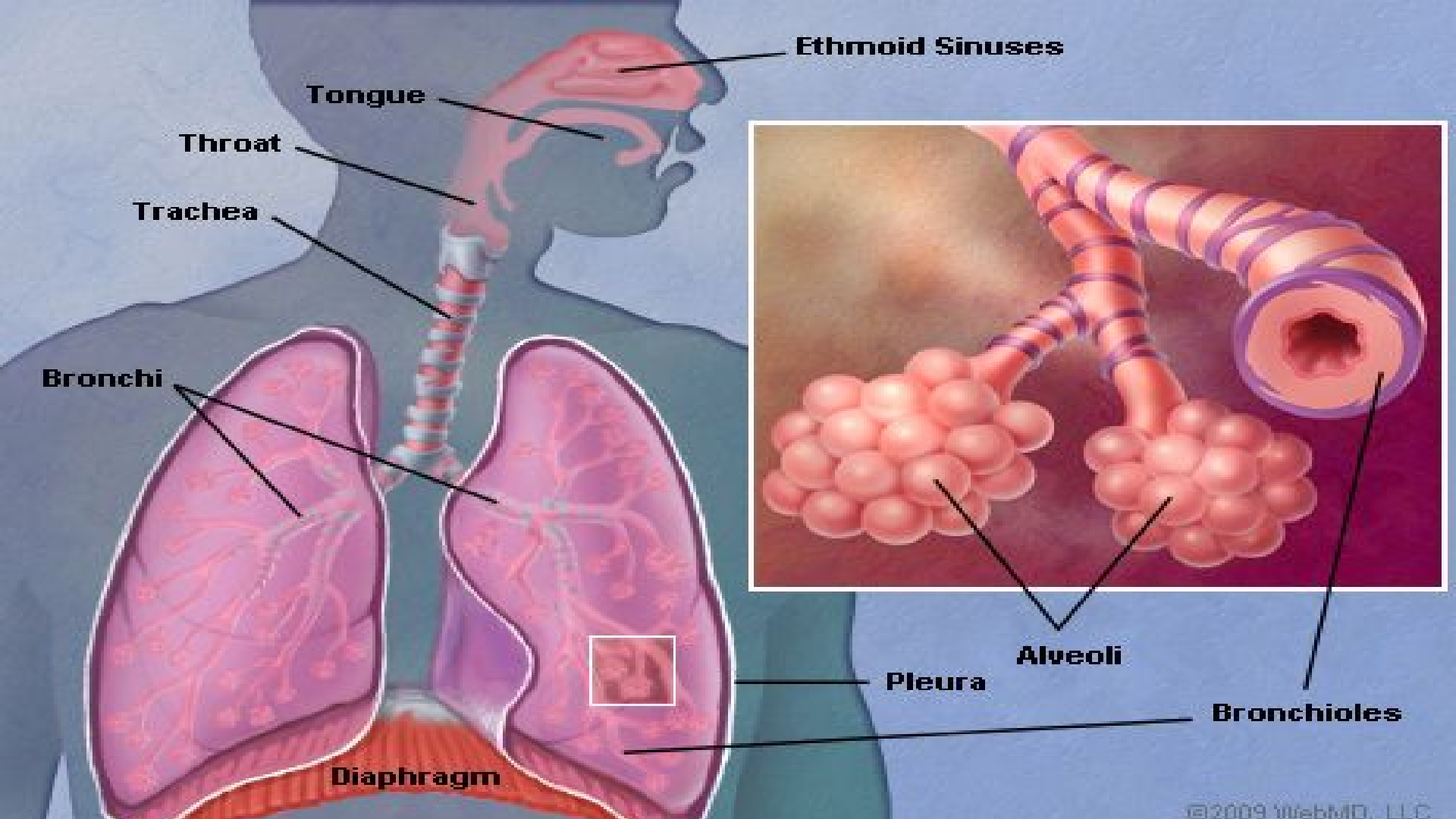
The capillaries work with arteries and veins that move blood through your body.

Oxygen in the air can be absorbed by blood because of the alveoli

Carbon dioxide travels from the blood and is exhaled

Between the alveoli is a thin layer of cells called the interstitium, which contains blood vessels and cells that help support the alveoli

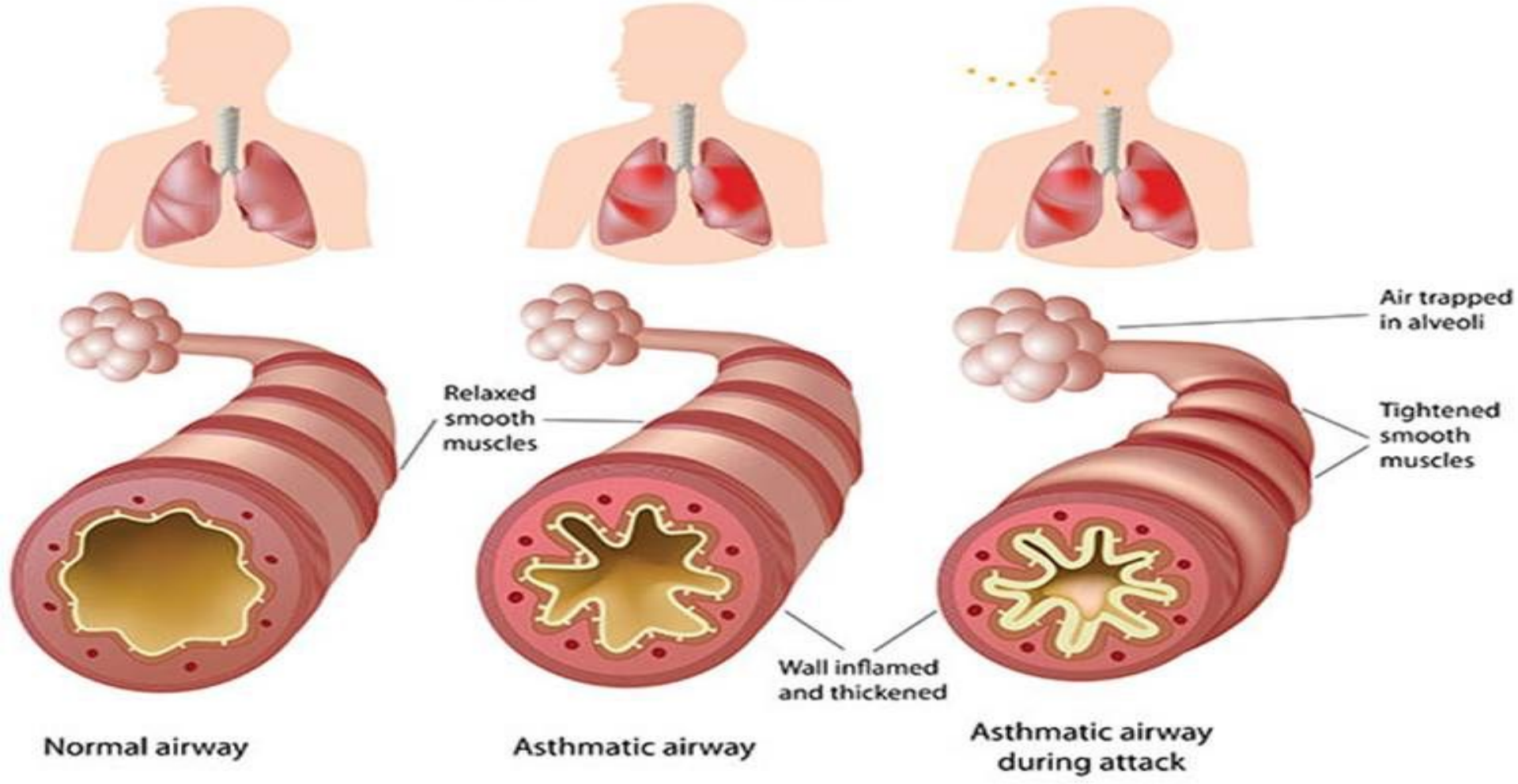

Blood
Alveoli
Carbon dioxide
Oxygen
Blood vessels



The effects of Asthma (Anthony)

- Asthma is a disease that affects the respiratory system causing the airways to become inflamed and irritated, narrowing the airways.
- Asthma then causes you to make more mucus, which makes it harder to breathe. Depending on the severeness of asthma, it can be possibly fatal under certain circumstances, like an intense allergy attack.

Asthma and Your Airways



Asthma Related Gene (Macy)

- ORMDL3 is directly related to respiratory issues, as 35% of people containing this gene have asthma.
- This gene is passed through generations, making it a hereditary gene.

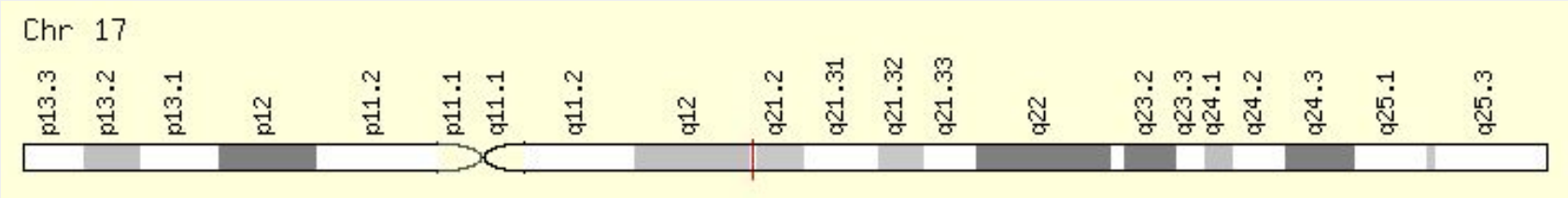
ORMDL3 (Macy)

Located on Chromosome 17 of 23

Two copies of Chromosome 17, one from each parent

Chromosome 17 likely contains 1,200 to 1,300 genes that provide instructions for making proteins

ORMDL3 (ORMDL Sphingolipid Biosynthesis Regulator 3) is a Protein Coding gene. Diseases associated with ORMDL3 include Asthma and Ileocolitis



Asthma Triggers (Macy)

Asthma triggers include:

- Allergens (animal dander, dust mites, etc.)
- Chemical fumes (chlorine, ammonia, etc.)
- Air pollution (second hand smoke, emissions from gas stoves, etc.)
- Workplace exposures (latex, building materials, etc.)
- Obesity

Ways to treat asthma (Macy)

- Asthma is a long-term disease that has no cure
- Avoid things that could trigger asthma
- Use an inhaler, which contain different types of medicine that help the small airways.

Chronic Obstructive Pulmonary Disease (COPD) (Mason)

COPD: Umbrella Term (Mason)

Chronic Bronchitis - Long term inflammation in the bronchi

Emphysema - Destruction of Alveoli

Some people can have both asthma and COPD.

The Effects of COPD (Mason)

- Progressive disease, meaning it gets worse with time.
- Affects the alveoli, they lose elasticity, which makes it harder to exhale
- Increase in mucus, which can clog the airways
- Clogged airways ⟹ Inflamed airways ⟹ Muscle Spasms in airway
- Overinflated lungs

80-90%

Of COPD cases are caused by chronic smoking **(Mason)**

Other Causes of COPD (Macy)

Long term exposure to:

1) Second hand smoke
2) Dust
3) Industrial pollutants (chemical fumes, etc.)
4) Biomass (Woodsmoke, etc.)

Genetic

Alpha 1 antitrypsin deficiency

A□-antitrypsin (AAT) (Macy)

AAT is a protein made in the liver

This deficiency occurs when the proteins are misshapen and can’t exit the liver and enter the bloodstream.

COPD Exacerbations (Macy)

Exacerbations happen when COPD flares up and gets worse than usual

- Can last from days to weeks
- Symptoms include
  - Change in amount or color of phlegm
  - Worsened cough
  - Increase of shortness of breath
- Treatments for COPD Exacerbations include
  - Antibiotics
  - Oral corticosteroids (Synthetic hormones)
  - Hospitalization

Physician Interview: Jay Schmakel (Anthony)

- Jay Schmakel is a doctor in Detroit, Michigan.
- He works on making emergency medications.
- He says the best thing to do to make sure your respiratory system stays healthy, is to avoid the things you could be allergic to, and to never start smoking. He went into detail on how smoking is the best way to ruin your lungs.
- He was saying that the heart works very closely with the lungs, making the respiratory system equally as important as the heart itself.

Athlete Interview: Micah Savin, professional dancer (Anthony)

- Micah Savin's biggest weakness in his sport used to be his stamina. Because of his exercise induced asthma, he struggled with his breathing while performing.
- He has overcome his asthma by doing lots of training, and working hard to make his respiratory system stronger.
- Something he does to help his respiratory issues was to drink water mixed with lemon and ginger. This drink helps to reduce inflammation on the lungs.

Activity time!

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