

## Warm Up- Monday

Brainstorm in your notebook: If the heart sends blood to all organs, how and where does the heart get blood to provide oxygen for its muscles?

-AND-

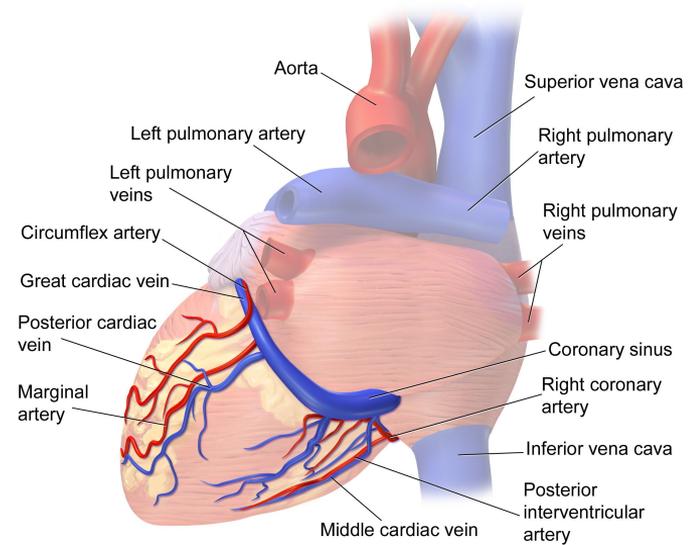
Setup Cornell Notes.

# Announcements

- Unit 4 test open now for corrections for grades less than 80%:
  - Check and make sure you got the correct points for #7 or that you took #7 → let Mrs.Beckham know if something is incorrect to add points back in
  - Question 9- I will also take the gluteus maximus +2
  - Question 14 for label 6 I will also take the pectoralis minor +1
  - Decide what will get you more points +3 or test corrections
- Short quiz over heart material on Friday Jan 20+ worktime
- Review for quiz Jan 18+ worktime

# Coronary Circulation: Notes

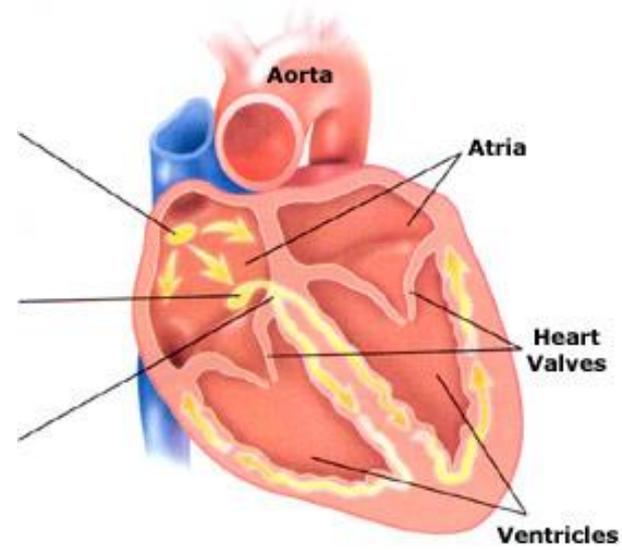
- The heart has blood vessels that provide nourishment to the myocardium
- Deliver blood when heart is relaxed
- Arteries come off of the aorta → capillaries → veins empty straight into the R atrium



**Coronary Circulation (Posterior)**

# How does the heart beat?

- **Intrinsic:** meaning it does not depend on the nervous system
- Based on high levels of Calcium that cause action potentials a.k.a electrical impulses

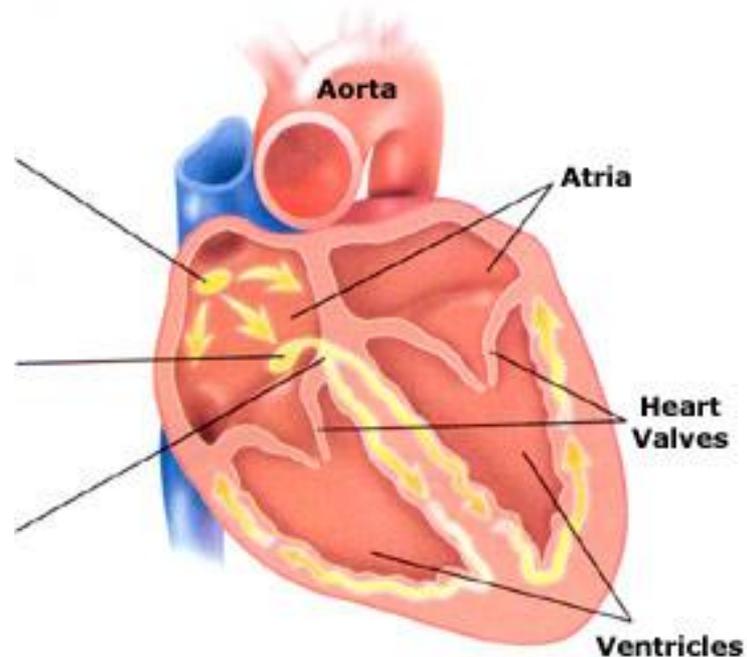


# How does the heart beat?

## 1. Sinoatrial (SA) node:

- a. Found in right atrium
- b. Pacemaker of heart
- c. Generates impulses 75x/ min

1

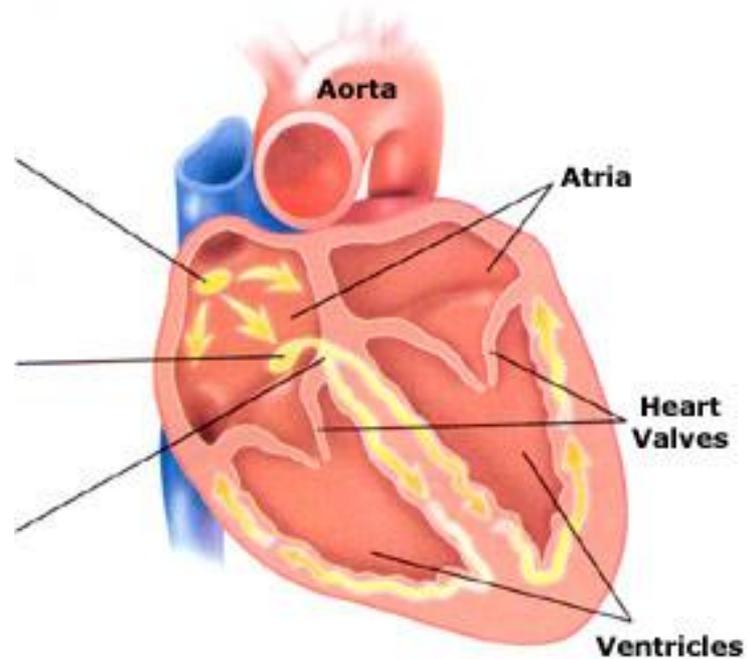


# How does the heart beat?

## 2. Atrioventricular (AV) node:

- a. Found above the tricuspid valve
- b. Delays response by 0.1s so atria can complete contraction prior to ventricles

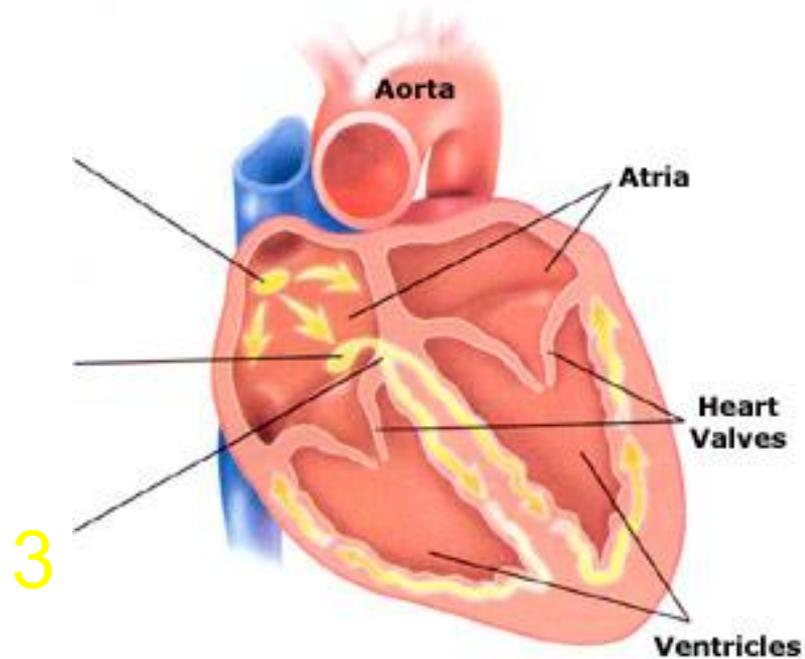
2



# How does the heart beat?

## 3. Atrioventricular (AV) bundle:

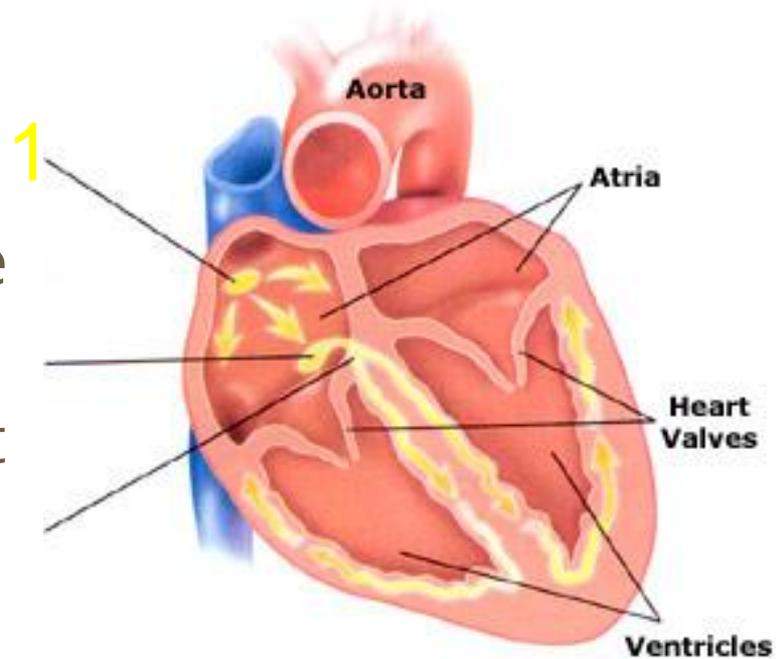
- a. Found in the septum between ventricles
- b. Electrical impulse travels down through bundles to bottom of ventricles
- c. Split into left and right branches



# How does the heart beat?

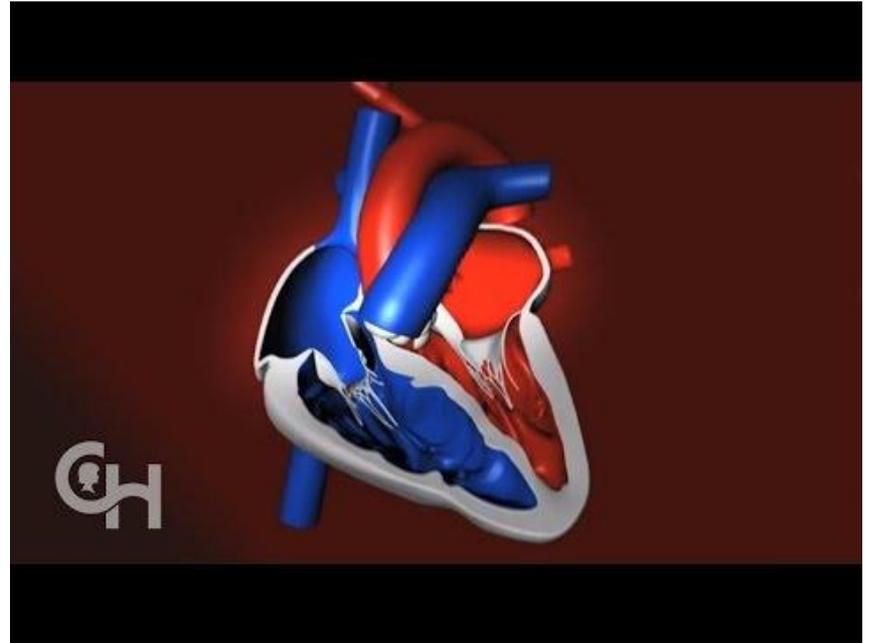
## 4. Purkinje Fibers

- Move from the septum into the walls of ventricles
- More extensive in L Ventricle since bigger than R
- Causes ventricles to contract



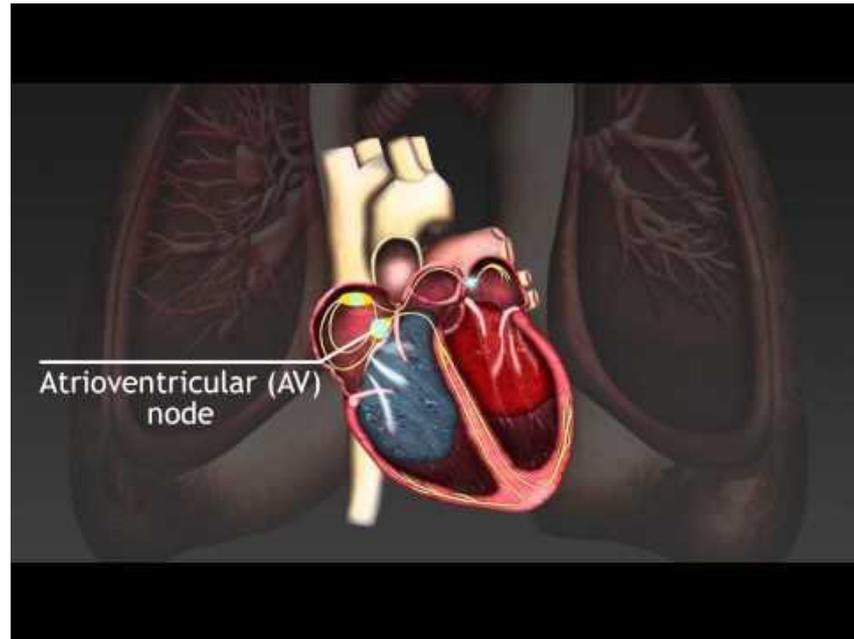
# Ventricle Contraction

- Ventricles contraction starts at the apex of heart moving towards atrium



# Summary of Electrical Impulse

- SA node → AV node → AV bundles → Purkinje Fibers
- Impulse lasts 22 secs



# Work Time: Record in notebook

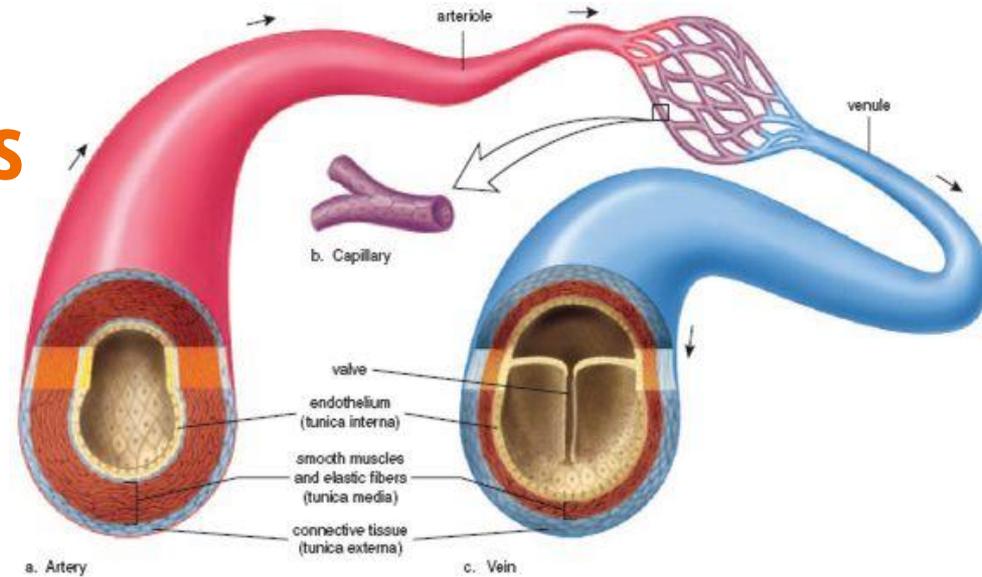
- Decide your specific topic for final
- Develop idea for case study/ investigation question & hypothesis
- Get notebook stamped when you are finished

# Blood Pressure: Wednesday

# Anatomy of Blood Vessels

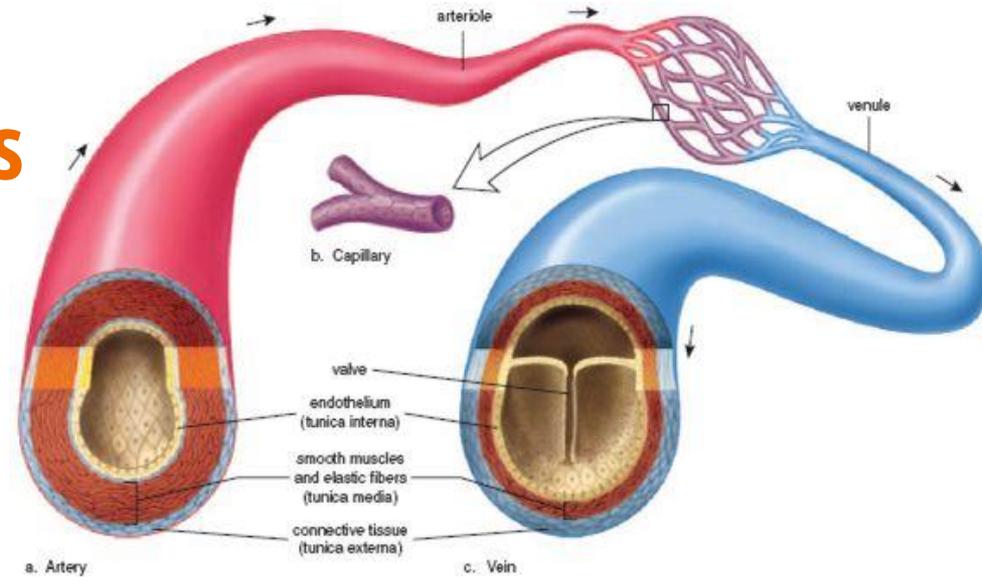
## Three Layers:

1. **Tunica intima:** lined with endothelium, smooth → frictionless
2. **Tunica media:** smooth muscle & elastin
3. **Tunica externa:** protects/ reinforces vessel and contains nerves



# Anatomy of Blood Vessels

- **Arteries:** Thickest, contain elastin which allows them to expand
  - Thicker so they don't burst from pressure from heart
- **Veins:** Thin walls, large openings,
  - Contains valves (a lot in limbs)
    - blood flow against gravity



# Cardiac Cycle

- Contractions of the heart are controlled by electrical currents and do not depend on nervous system
- **Cardiac cycle:** all events associated with blood flow through heart in one complete heart beat
  - **Systole:** Contraction
  - **Diastole:** Relaxation

# Arterial Blood Pressure

- High force exerted on blood vessel walls
  - Highest pressure found closest to heart
  - Longer blood vessel have more resistance to blood flow

# Venous Blood Pressure

- Changes little during cardiac cycle
- Little pressure in veins so...
  - Breathing helps bring blood back to heart (squeezes veins)
  - Skeletal muscles also pump deep veins
  - Veins have valves that prevents backflow

# Blood Pressure Determinations

- Drs take two blood pressure reading
  - Systolic pressure: pressure at arteries at peak of ventricular ejection
  - Diastolic pressure: pressure during ventricular relaxation

# Blood Pressure Lab

- If you have heart issues do not be the test subject for the sitting to standing portion
- Whisper during lab time! (otherwise it will be hard to hear blood pressures in stethoscope).
- DO NOT keep the blood pressure cuff inflated over 1 minute. IF you can't get a reading, deflate cuff and switch to partner.
- Clean stethoscope earpieces prior to use (keep same alcohol swab for you to use throughout lab).
- Read through all steps before starting, make sure you understand before starting
- Make sure you breath as you are taking blood pressures
- When you are finished work with your group on your final project.

# Vasoconstriction & Vasodilation: Friday

# Warm Up

Think back to the skin unit: What happens to blood vessels when the skin becomes hot or cold?

# Answer

When you become hot your blood vessels vasodilate (expand) to allow blood to release heat from your skin.

When you are cold your blood vessels vasoconstrict (constrict) to send blood to the internal organs to keep them warm.

**The smooth muscles in your blood vessels complete these actions making the lumen (opening) of the blood vessel larger or smaller.**

**Predict how vasodilation and vasoconstriction  
effect blood pressure?**

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→ **Vasodilation: decreases**

→ **Vasoconstriction: increases**

**What layer is of the blood vessels is the smooth muscle found in?**

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**Tunica Media → because it dilates or constricts blood vessels it is largely responsible for blood pressure.**

# How is blood pressure regulated?

- Short term: nervous system + chemicals in blood (hormones)
  - Alter diameter of vessel
  - Alter where blood is being sent based on organ demands
  - Hormones released by the brain, kidneys, and atria can also cause vasoconstriction and vasodilation
- Long term: Kidneys
  - Do not alter vessel size but change the amount of blood volume
  - Increased blood volume = increased blood pressure

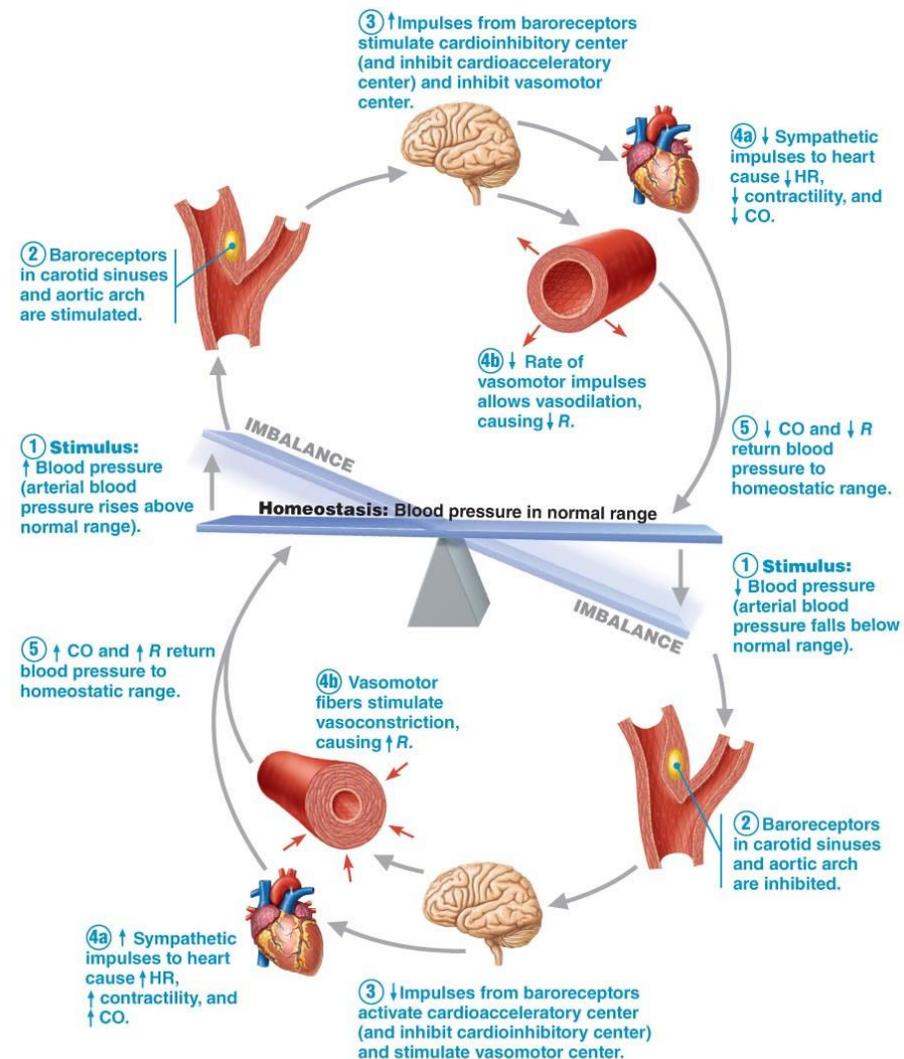
# Short Term Regulation

Stimulus: Blood pressure rises or drops

Receptor: Aortic arch

Control Center: Brain

Effector: Vasodilation or Vasoconstriction



# Long Term Regulation

Stimulus: High or low blood pressure

Receptor: Brain

Control Center: Brain

Effector: Kidney → increases filtration to excrete fluid (decrease fluid in blood) OR retains more fluid puts back into blood

