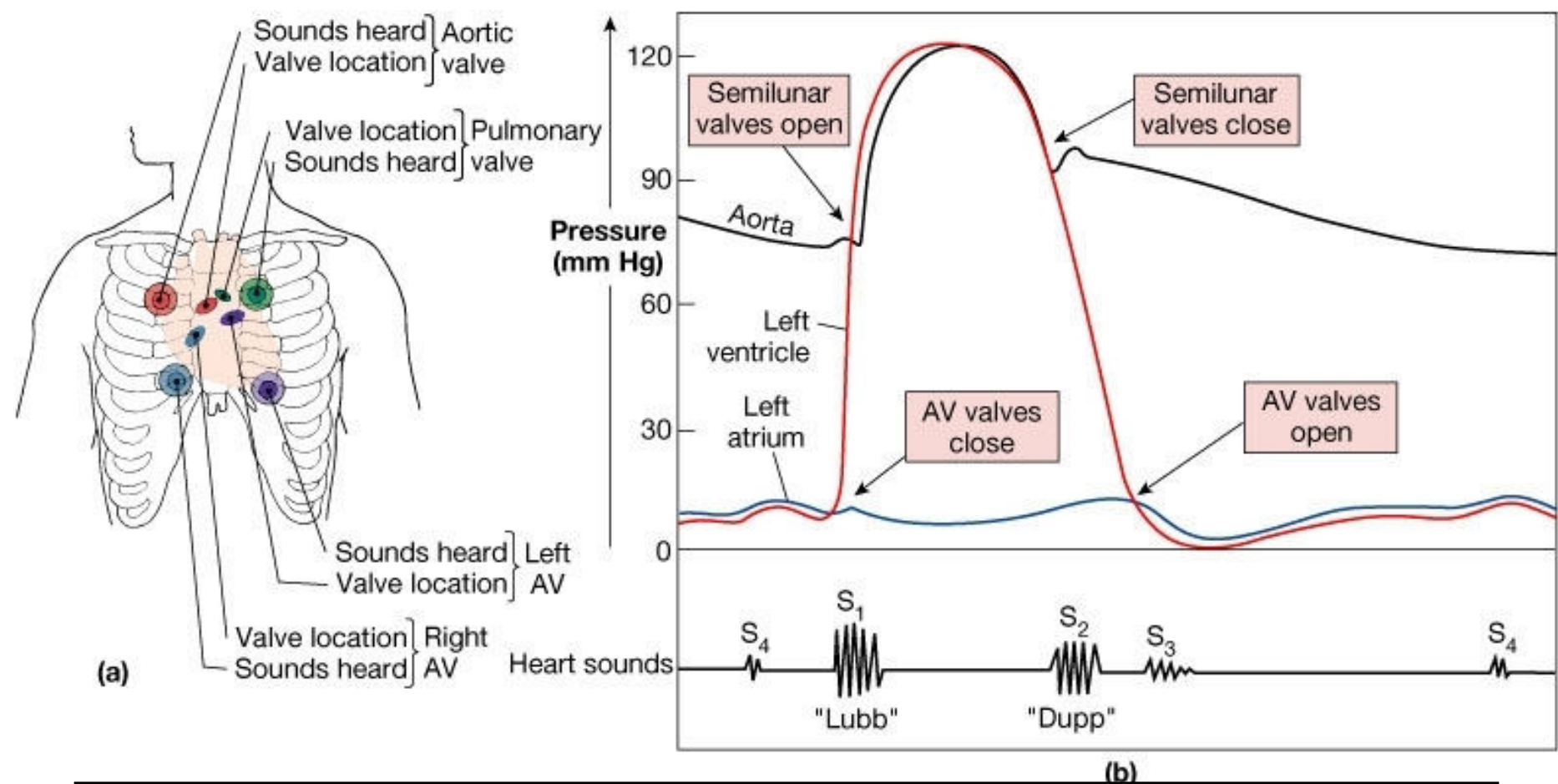


# Heart Sounds & Murmurs

Department of Physiology

## Heart Sounds



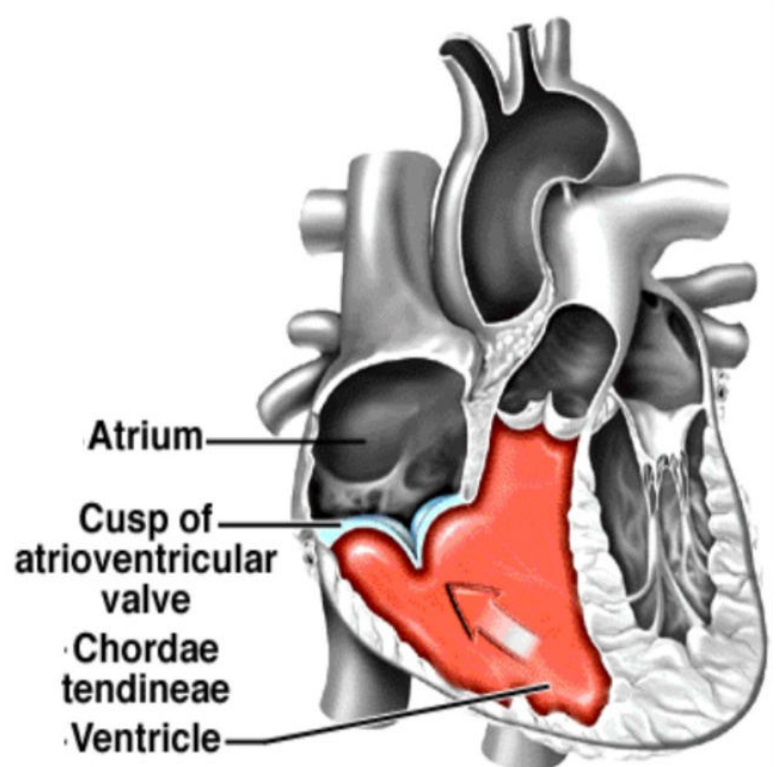
# Heart sounds

- $S_1$  – “lubb” caused by the closing of the AV valves
- $S_2$  – “dupp” caused by the closing of semilunar valves
- $S_3$  – associated with blood flowing into the ventricles
- $S_4$  – associated with atrial contraction

Four heart sounds can be recorded by phonocardiography, but normally only the **first** and the **second** heart sounds, are audible through a stethoscope

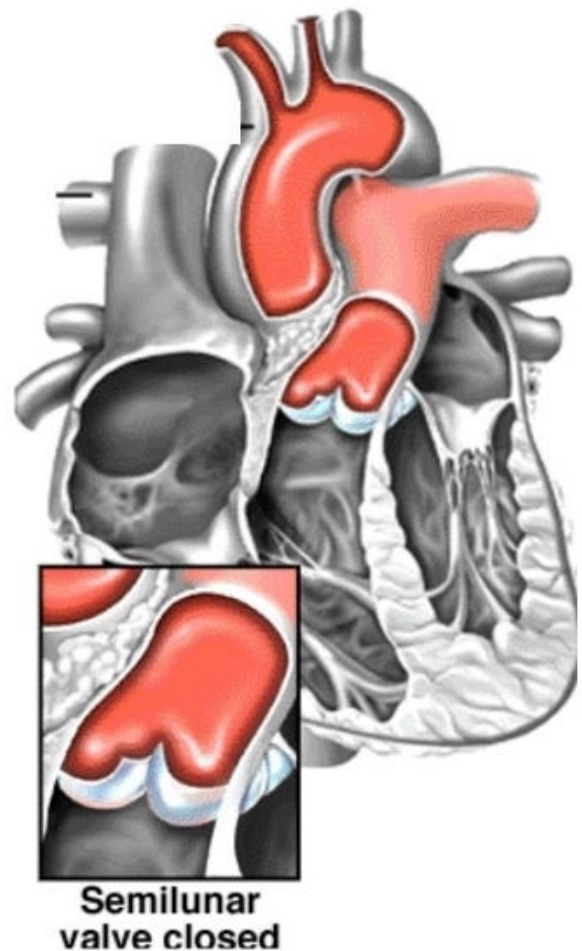
## First heart sound

- occurs when the atrioventricular (AV) valves close at the beginning of ventricular contraction
- generated by the vibration of the blood and the ventricular wall
- is louder, longer, more in duration than the second heart sound



## Second heart sound

- occurs when **aortic and pulmonary semilunar valves close** at the beginning of ventricular dilation
- generated by the vibration of the blood and the aorta
- Aortic valve closes slightly before pulmonary valve
- Splitting of  $S_2$



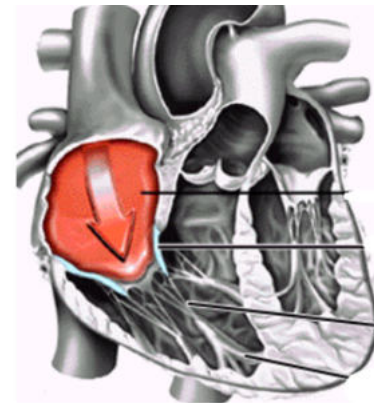
## Heart Murmur

- Cardiac murmurs are abnormal heart sounds in the form of noises resulting from turbulent blood flow,
- Murmurs may be:
  - Systolic murmurs, if they occur during systole.
  - Diastolic murmurs, if they occur during diastole
- Causes:
  - Stenosis (narrowing) of heart valves
  - Incompetence of heart valves
  - Increase of blood flow or decrease of blood viscosity (as in anemia).

## Two Basic Types of Valvular Diseases

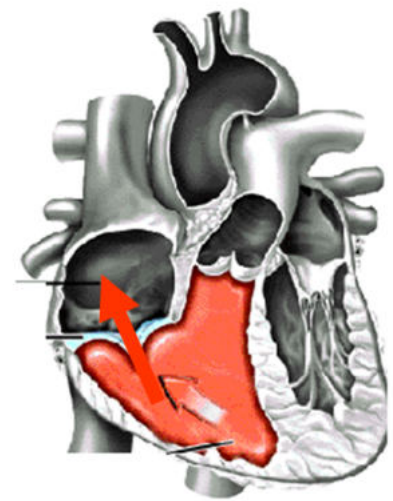
valvular stenosis:

- narrowing of the valve

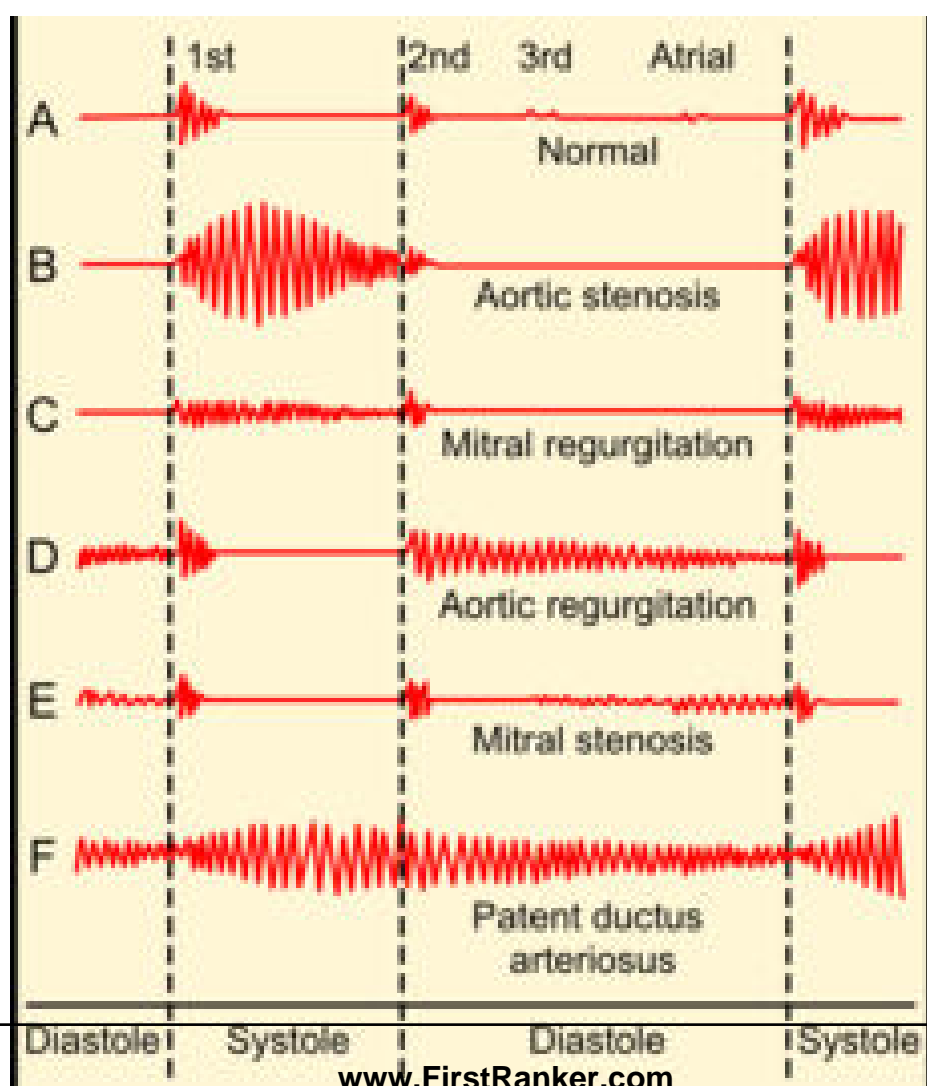


valvular insufficiency (incompetence):

- valve is unable to close fully; so there is regurgitation



## Phonocardiograms examples



# Thank You

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