I. **Announcements**  
HR & BP Lab 4 tomorrow + Required Notebook Check. Include Nutrition Analyses. Q?  
Please read Blood Chemistry Lab 5 twice < Thurs. Thanks!

II. **Cardiovascular System**  
LS 2012 ch 9, Torstar Books 1984, DC 2013 Module 4, Guyton & Hall (G&H) 2011 +...

A. Circulatory vs Cardiovascular (CV)? cf + parts  
LS pp 229, CV vs Lymphatic, DC pp 23, 31

B. CV Pulmonary & Systemic circuits  
DC fig 4-1 p 24, LS fig 9-2b p 231

C. Arteries, capillaries, veins G&H +Torstar

D. Varicose veins? Phlebitis? DC

E. ❤️ layers, box, chambers, valves, inlets, outlets  
LS fig 9-4 p 233, fig 9-2a p 231; DC pp 23-6

F. Normal vs abnormal blood flow thru ❤️ & CV system  
Billy has a hole in his ❤️ SI Fox 2009 fig 13.16, 13.17

III. **Comments on Exam I & Exams Returned**
Cardiovascular (CV) = Heart + Vessels + Blood!
NB: Figure-8 loop

Pulmonary Systemic

Pulmonary arteries
Vena cavae
Right ventricle
Left ventricle
Pulmonary veins
Aorta and branches
Arterioles
Venes
Capillary beds of lungs where gas exchange occurs
Capillary beds of all body tissues where gas exchange occurs
Oxygen-poor, CO₂-rich blood
Oxygen-rich, CO₂-poor blood

D Chiras 2013 fig 4-1b
Dual Pump Action & Parallel Circulation
**Lymphatic System**

1. Lymph Nodes
2. Vessels
3. Lymph

No pump!
Lymphatic System
Alternative System of Circulation or Drainage System

Lymph Vessels || Veins
Lymphatic System Blockage in Elephantiasis from Mosquito-borne Parasitic Filaria Worm
Lymphatics collect run-off & are parallel to venules/small veins!
Microcirculation Exchange: 10 Billion Capillaries!

No cell > 25-50 μ away from a capillary! Like having bus stops @ every other block!

Guyton & Hall 2011 fig 1-2
Harvey
Experiments: 1-way system of venous valves!
The Heart
The Living Pump
Human 💖 = 4-chambered box? 2 separate pumps?

Upper = Atria

Lower = Ventricles

Pulmonary

Systemic

RA

LA

RV

LV

Primer Pumps

Power Pumps

R 💖 L 💖
Time-out for Questions!

+ Brief Break!
The diagram shows a longitudinal section of the heart, highlighting various components and valves:

- **Aorta**
- **Superior vena cava**
- **Pulmonary valve**
- **Pulmonary veins**
- **Left atrium**
- **Left AV valve**
- **Aortic valve**
- **Chordae tendineae**
- **Papillary muscle**
- **Left ventricle**
- **Right atrium**
- **Right AV valve**
- **Right ventricle**
- **Inferior vena cava**
- **Septum**

(a) Location of the heart valves in a longitudinal section of the heart.
Heart Valves Ensure Unidirectional Blood Flow!

(b) Heart valves in closed position, viewed from above

Right atrium
Right AV valve
Direction of backflow of blood
Right ventricle
Papillary muscle
Chordae tendineae
Septum

Valves must be normal & healthy to work well!

(c) Prevention of eversion of AV valves

*FIGURE 9-4 Heart valves.*
Human ♥ = 4 unique valves?  
2 valve sets?

Semilunar = Half-moon shaped

1. Pulmonic/Pulmonary
2. Aortic

AV = Atrioventricular

More rigid

3. R AV = Tricuspid
4. L AV = Mitral/Bicuspid

More flimsy
Heart Valve Orientation & Scaffolding

- Pulmonary ring
- Aortic ring
- Mitral ring
- Tricuspid ring
- Muscle fiber
FIGURE 9-6
Mitral and aortic valves.
Veins → Atria → Ventricles → Arteries

http://www.nhlbi.nih.gov/health/health-topics/topics/hhw/contraction.html
Fig 13.16 p 419

SI Fox 2009

Septal defect in atria
Patent or still open!

SI Fox 2009 fig 13.17 p 420
WOW! SUPER 😊 ~ TOP 5 - 10

EXEMPLARY!! ~ TOP 15

GREAT EFFORT ~ TOP 20 - 25
Class Frequency Distribution Report for BI 121 Midterm U18, Multiple Choice, Part II

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