I. **Announcements**  Tomorrow HR & BP Lab 4  + **Required Notebook Check.** Turn in today? Thurs Blood Chemistry Lab 5. Please read Lab 5 twice prior to Thursday. 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 Midterm & Tests Returned**
Cardiovascular or CV System

1. Heart
2. Vessels
3. Blood
NB: Figure-8 loop

Pulmonary Systemic

Pulmonary circuit
- Pulmonary arteries
- Pulmonary veins
- Vena cavae
- Aorta and branches
- Right ventricle
- Left ventricle

Systemic circuit
- Arterioles
- Venules
- Capillary beds of all body tissues where gas exchange occurs

Oxygen-poor, CO₂-rich blood
Oxygen-rich, CO₂-poor blood

DC 2003
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!
Harvey
Experiments: 1-way system of venous valves!
Skeletal Muscle Pump

Open valve

Closed valve
The Heart

The Living Pump
Human heart = 4-chambered box? 2 separate pumps?

Upper = Atria
Lower = Ventricles

Pulmonary  Systemic

RA  LA
RV  LV

R  L

Primer Pumps
Power Pumps
Time-out for Questions!

+ Brief Break!
(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

(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
3. R AV = Tricuspid
4. L AV = Mitral/Bicuspid
Heart Valve Orientation & Scaffolding

- Pulmonary ring
- Aortic ring
- Mitral ring
- Tricuspid ring
- Muscle fiber
FIGURE 9-6
Mitral and aortic valves.
**Blood Flow**

- **Superior vena cava** (returns blood from head, upper limbs)
- **Right pulmonary veins** (return blood from right lung)
- **Pulmonary semilunar valve** (shown open)
- **Right atrium**
- **Right atrioventricular valve** (shown open)
- **Right ventricle**
- **Inferior vena cava** (returns blood from trunk, legs)

**KEY**
- O₂-rich blood
- O₂-poor blood

**To systemic circulation**
- (upper body)
- (lower body)
Patent or still open!

AO

Ductus arteriosus

PA
WOW!  SUPER  🥰
~ TOP 5 - 10.

EXCELLENT!!
~ TOP 15.

GREAT EFFORT
~ TOP 20 - 25.
# Class Frequency Distribution Report

## BI 121 MT U15, Part II, Multiple Choice

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Mean Score: 77.81%