

## BI 121 Lecture 8



... *Welcome back – let's get to work!!*

**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 2003 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



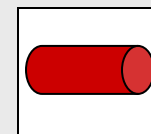
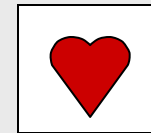
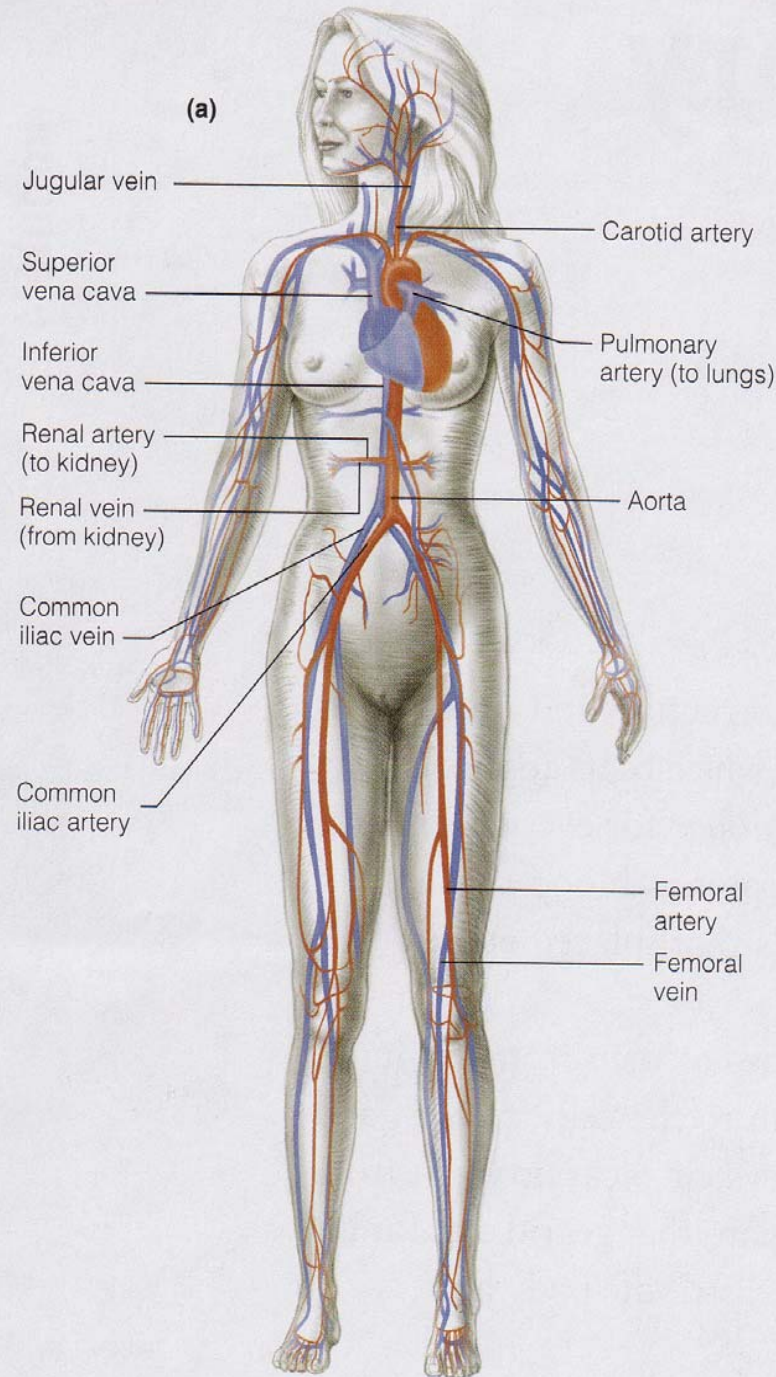
**III. Comments on Midterm & Tests Returned**

# Cardiovascular or CV System

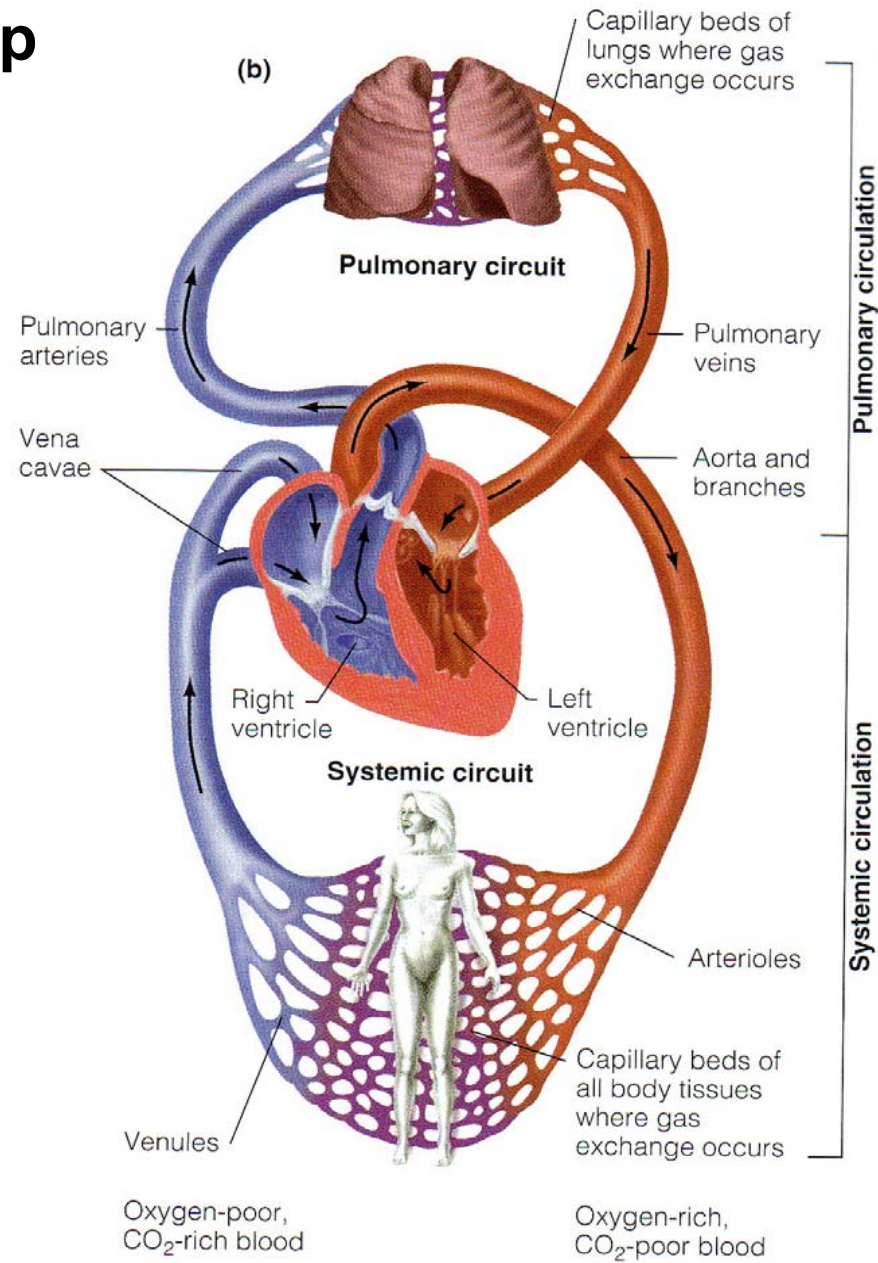
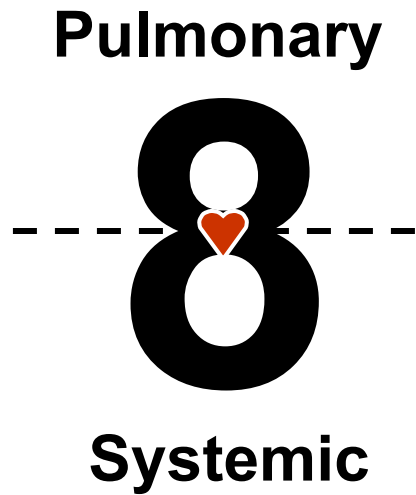
1. Heart

2. Vessels

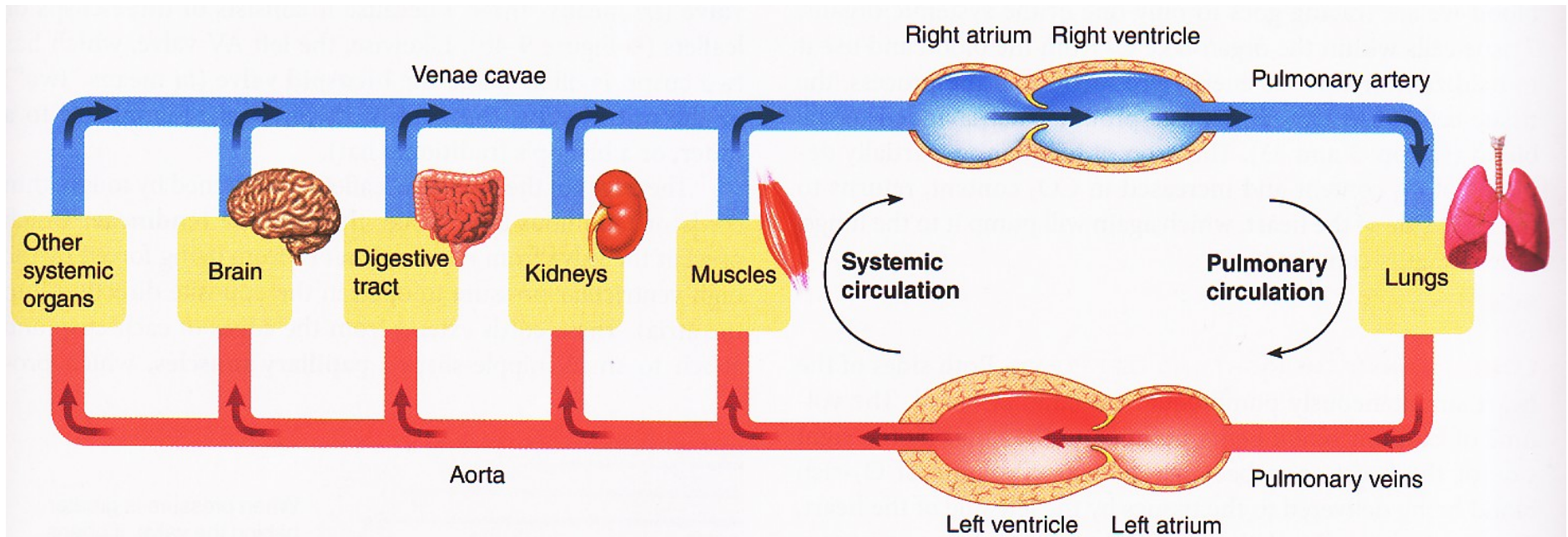
3. Blood

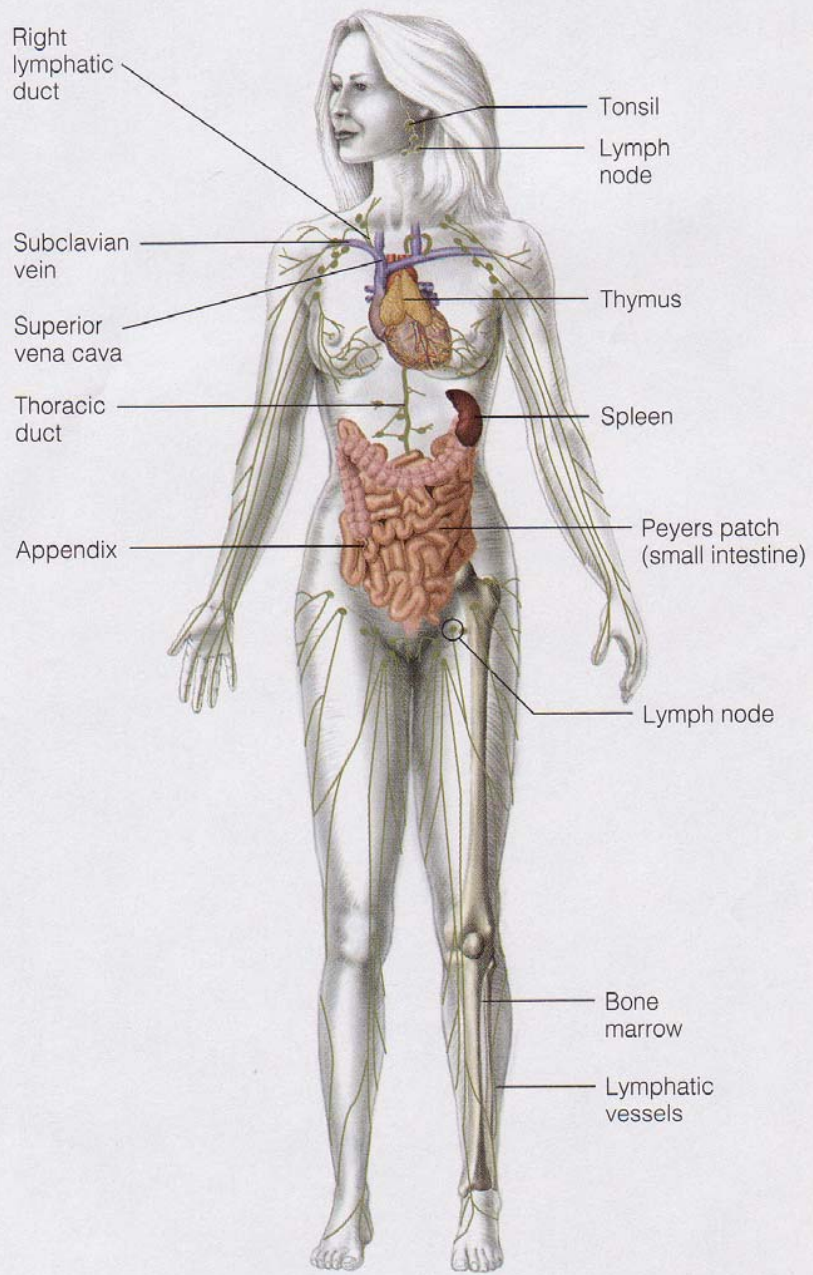


**NB: Figure-8 loop**



# Dual Pump Action & Parallel Circulation



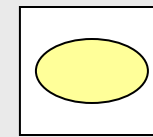


# ***Lymphatic System***

## **1. Lymph Nodes**

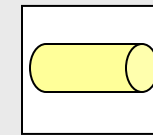
## **2. Vessels**

## **3. Lymph**

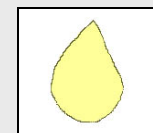


**No pump!**

**+**



**+**



# **Lymphatic System**

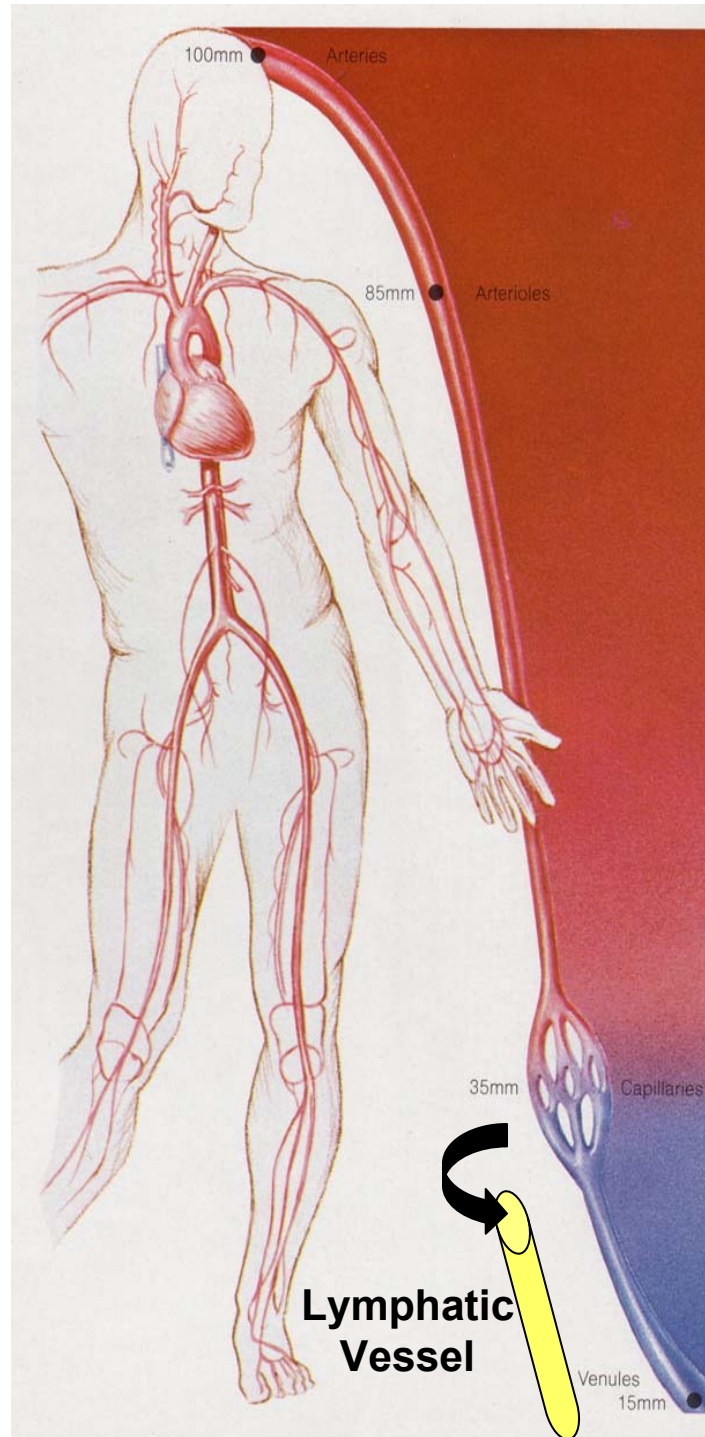
**Alternative System of  
Circulation  
or  
Drainage System**

***Lymph Vessels || Veins***

# ***Lymphatic System Blockage in Elephantiasis from Mosquito-borne Parasitic Filaria Worm***

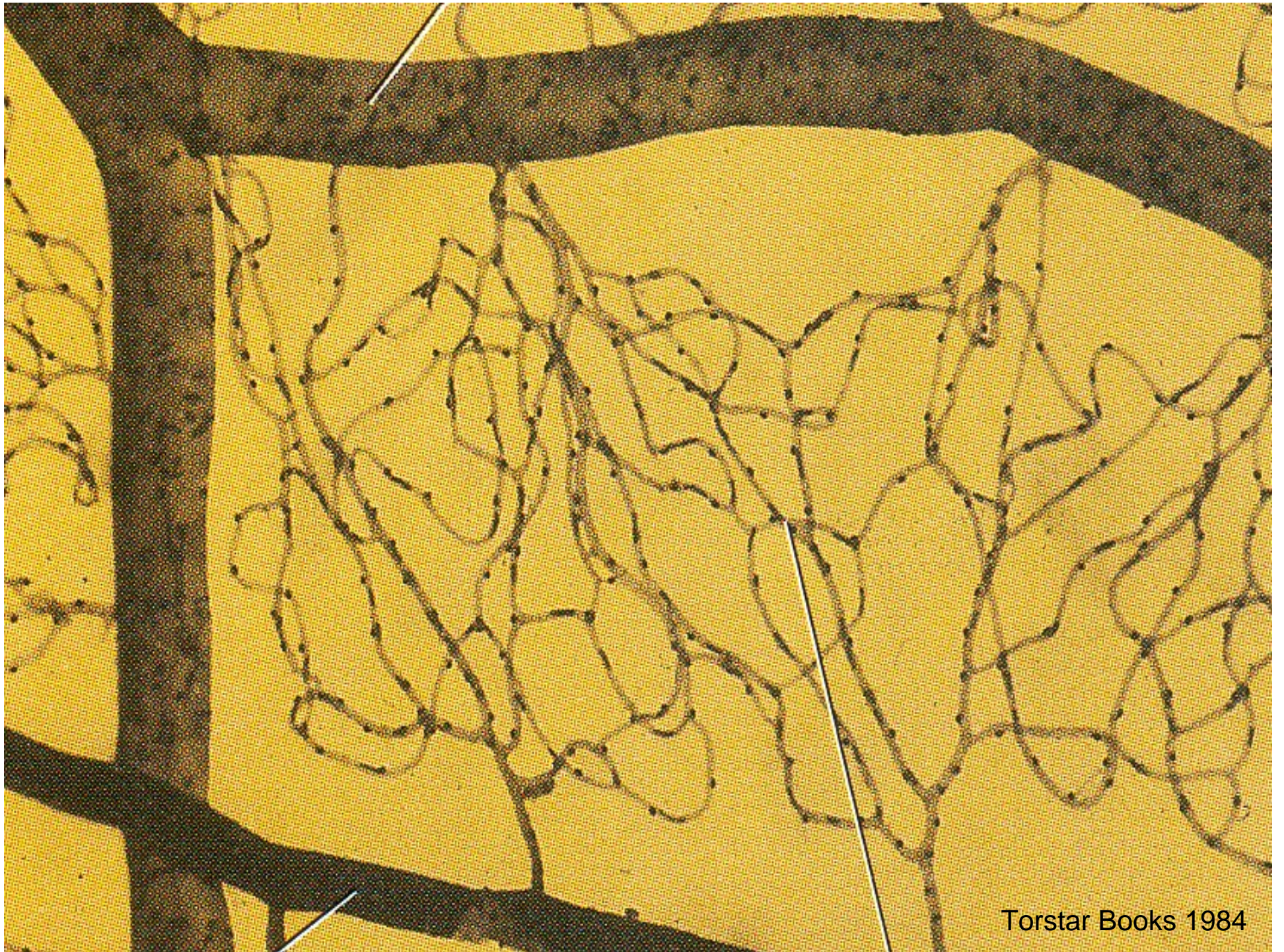


Fred Marsik/Visuals Unlimited



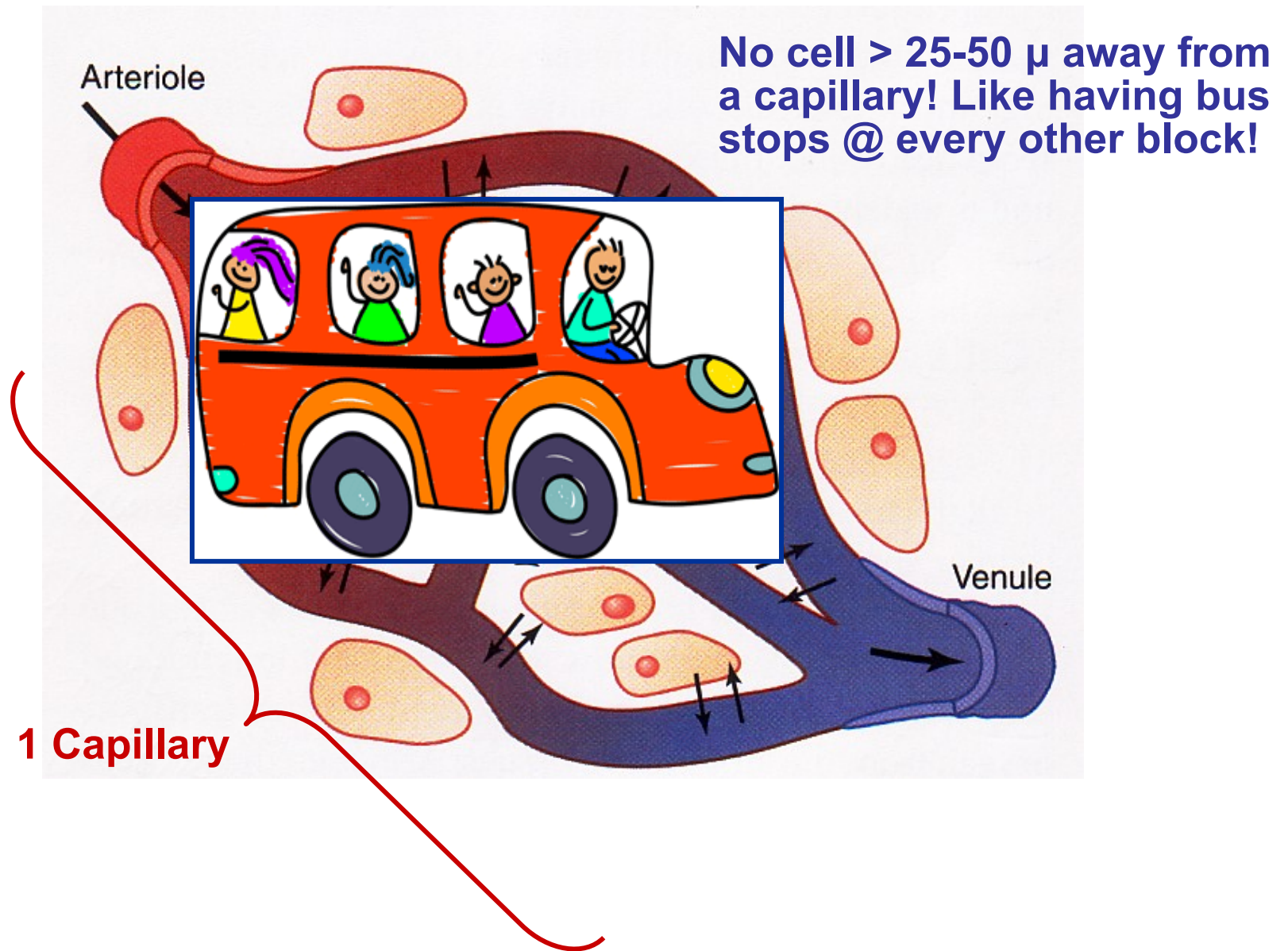
**Lymphatics collect run-off & are parallel to venules/small veins!**

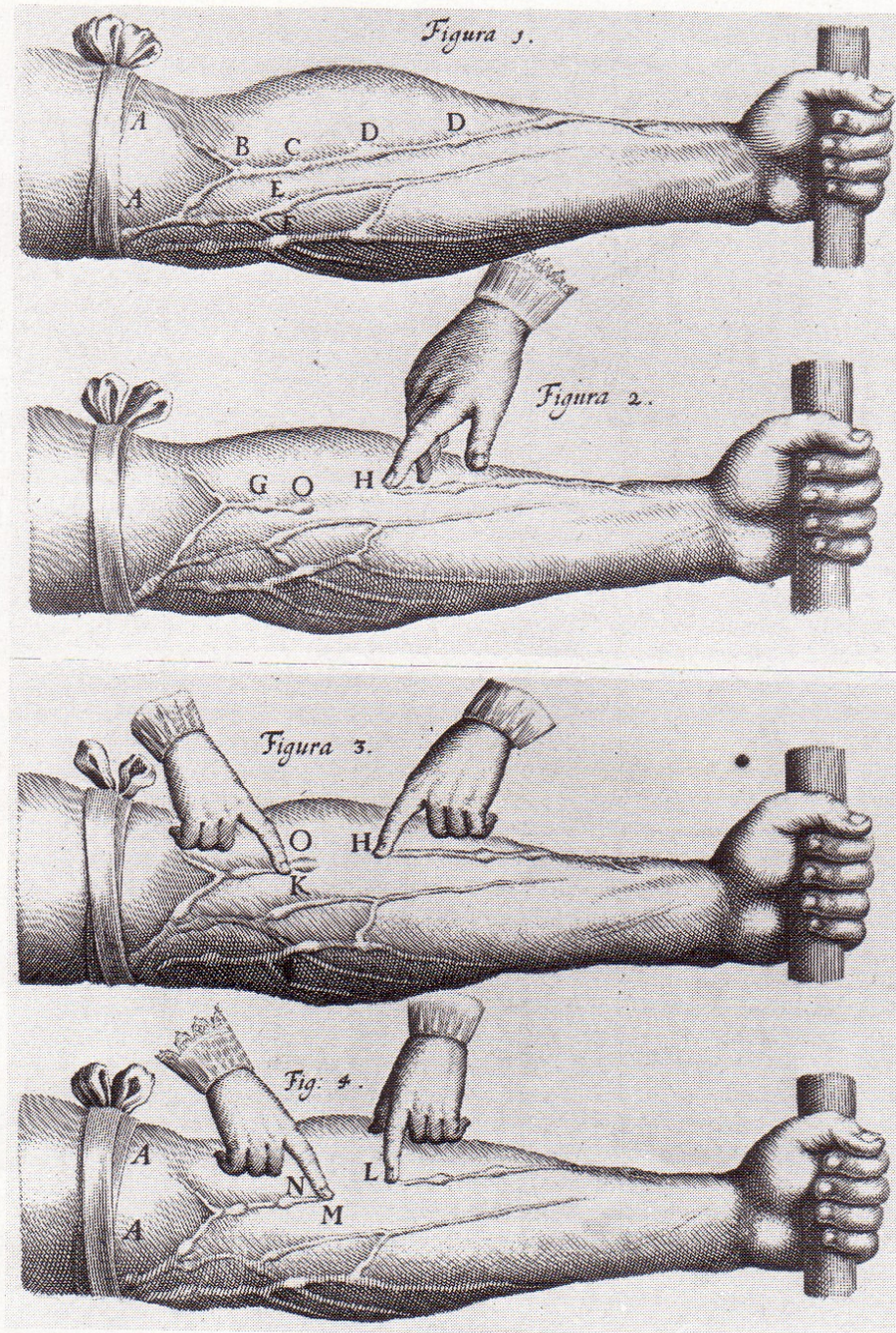




Torstar Books 1984

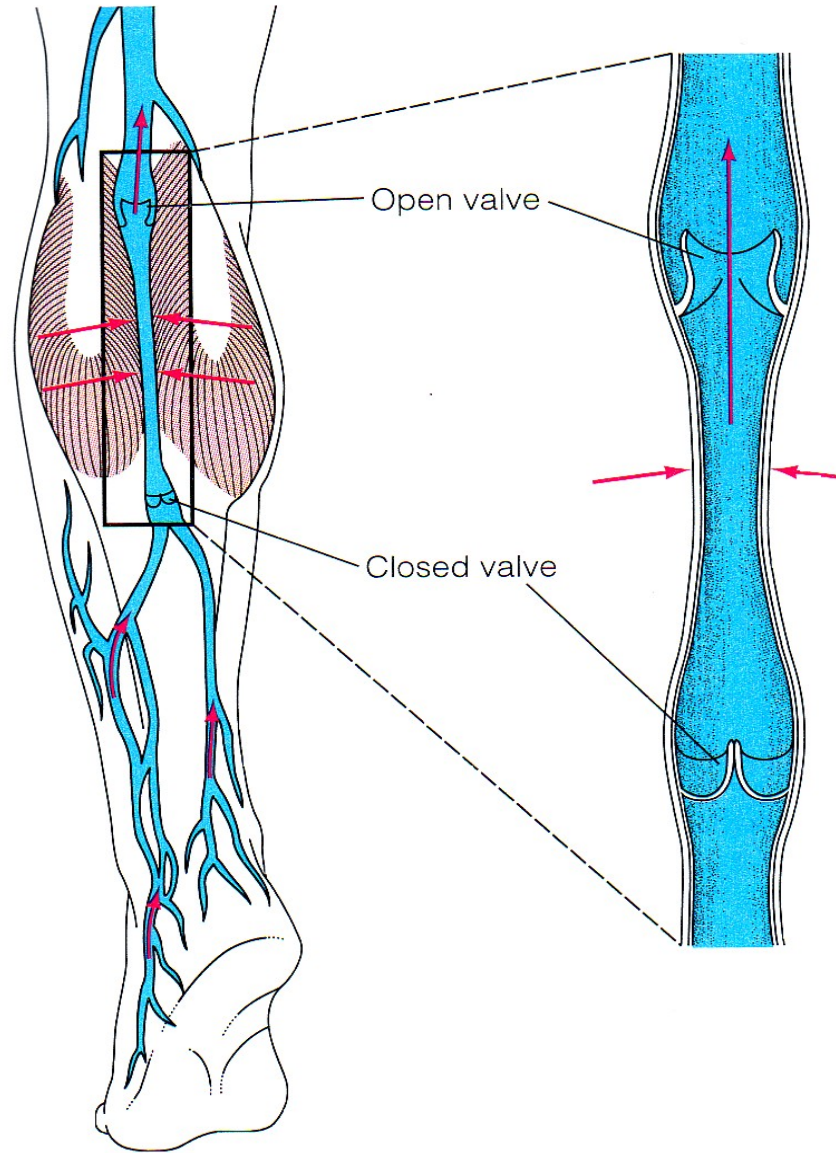
# Microcirculation Exchange: 10 Billion Capillaries!





**Harvey  
Experiments:  
1-way system  
of venous  
valves!**

# *Skeletal Muscle Pump*

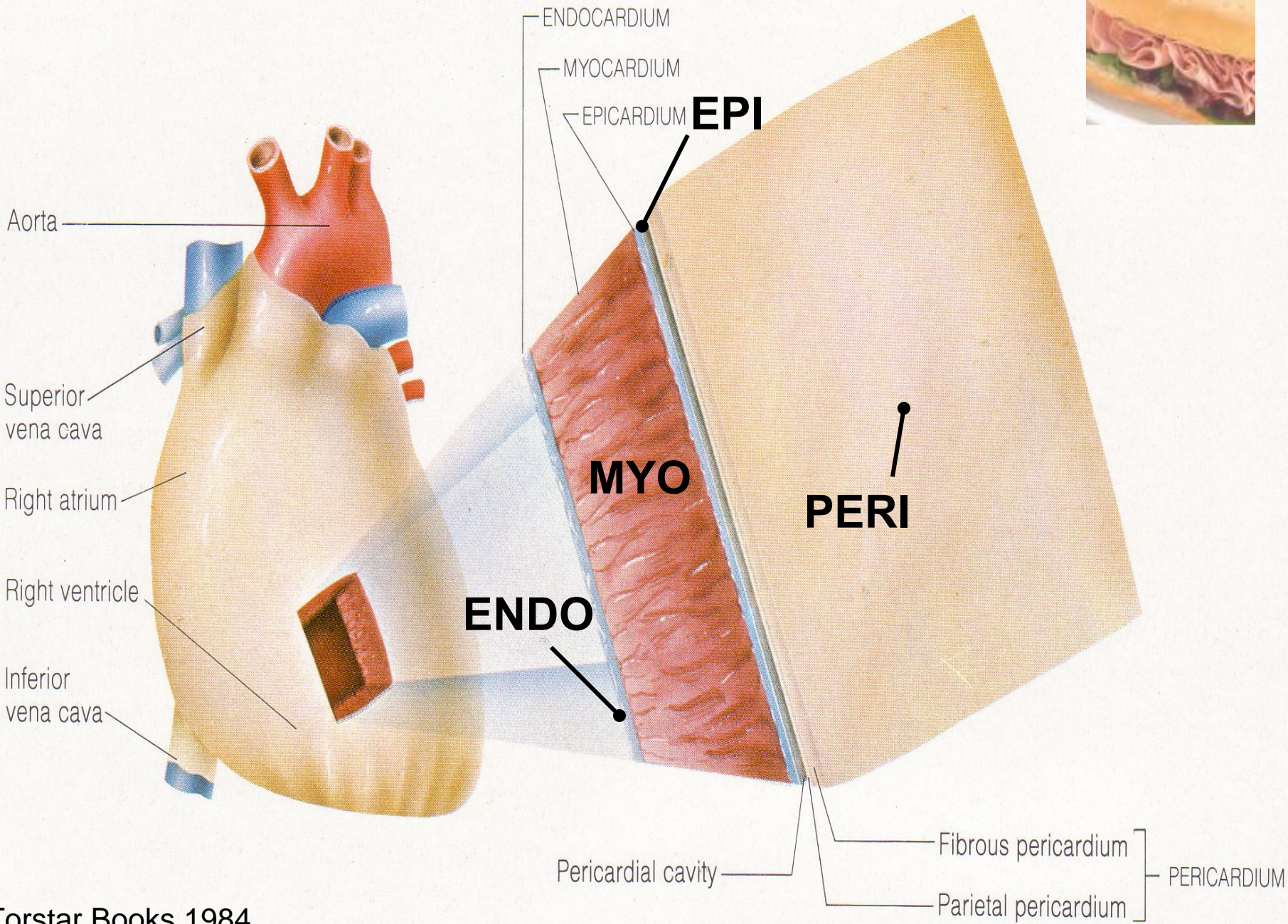




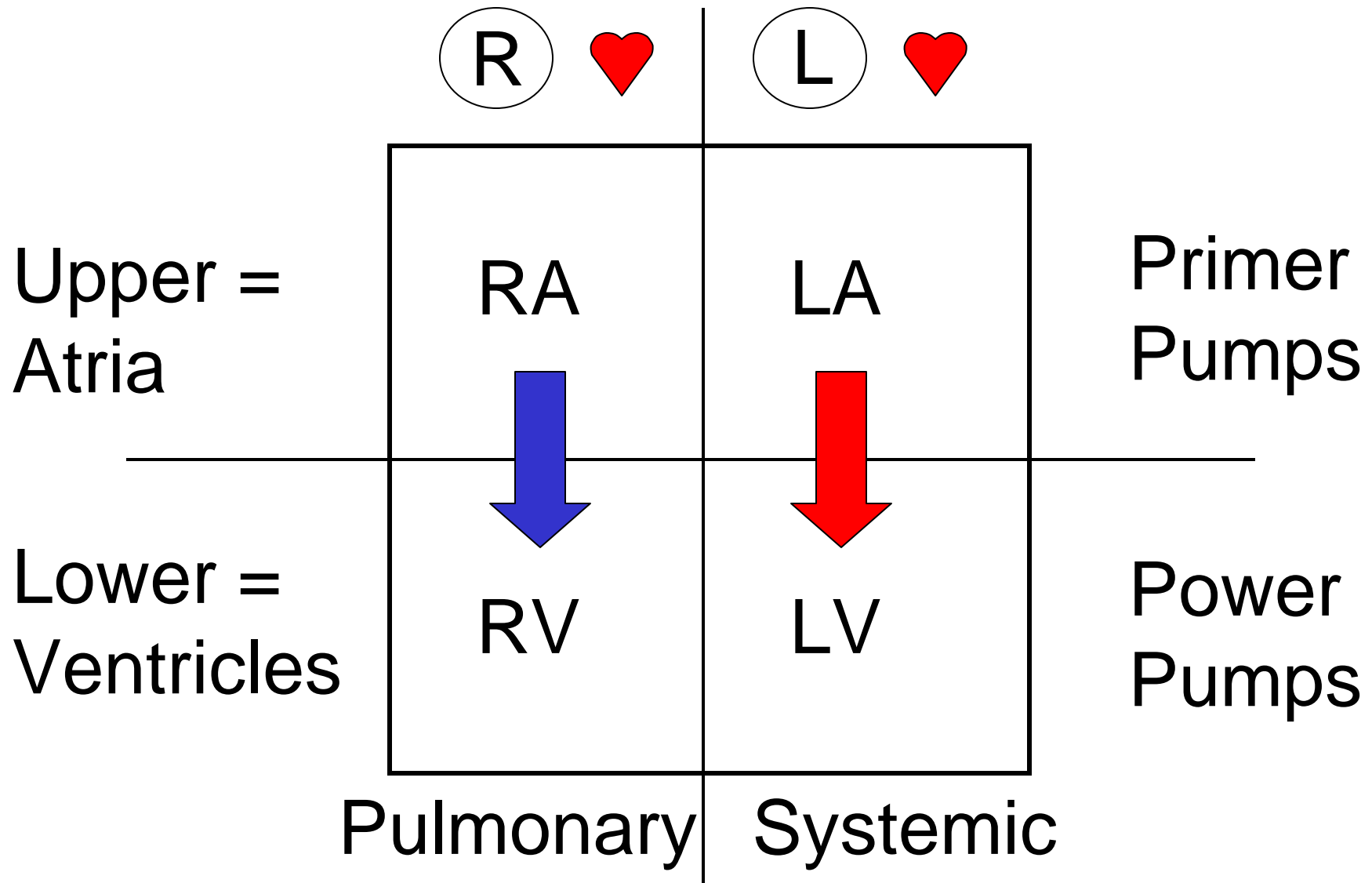
DC 2003

# The Heart

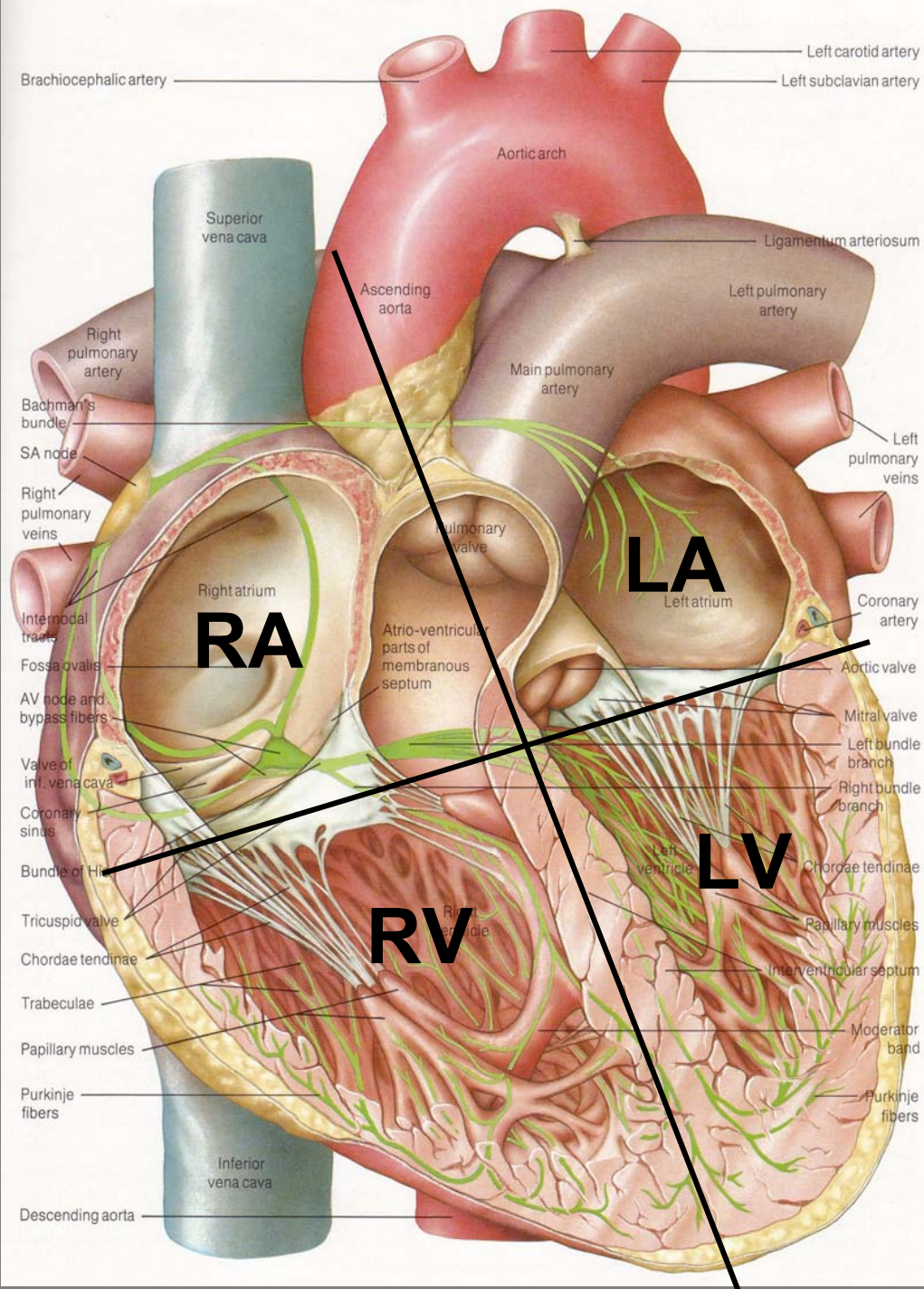
The Living Pump



Human  = 4-chambered box?  
2 separate pumps?



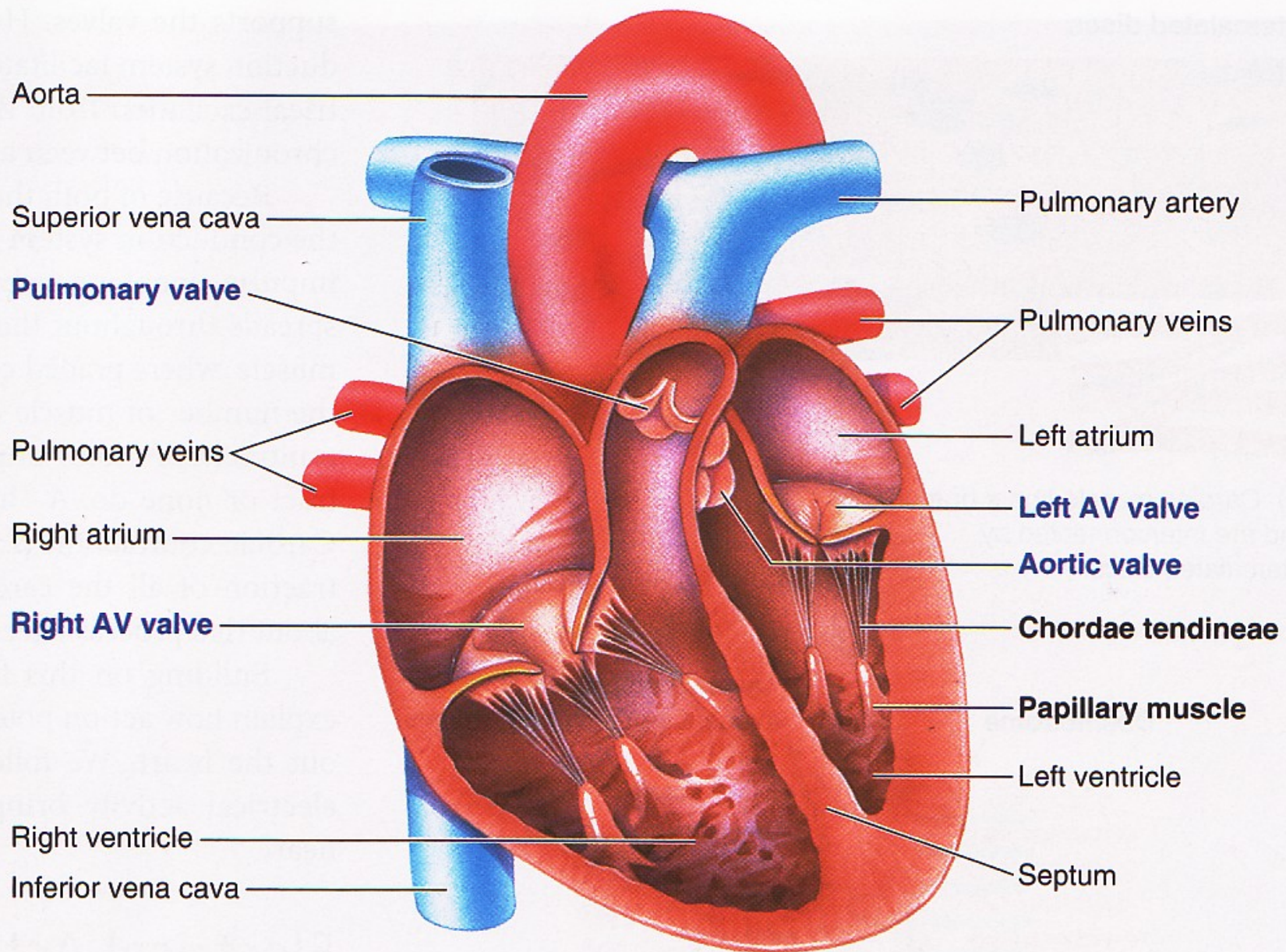




***Discussion***

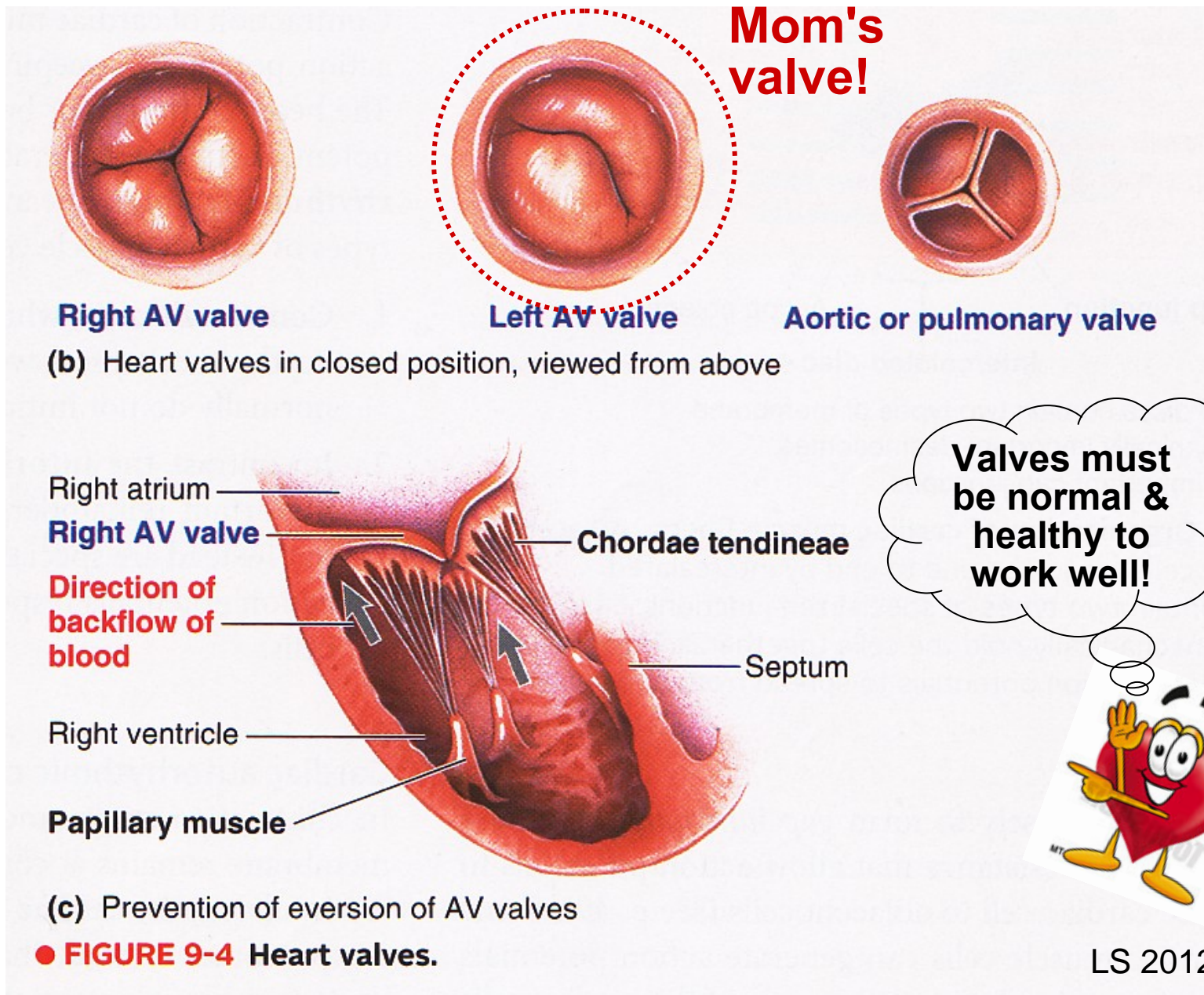
**+**

***Brief Break***



(a) Location of the heart valves in a longitudinal section of the heart

# Heart Valves Ensure Unidirectional Blood Flow!



Human ♥ = 4 unique valves?  
2 valve sets?

Semilunar = Half-moon shaped

More rigid

1. Pulmonic/Pulmonary
2. Aortic



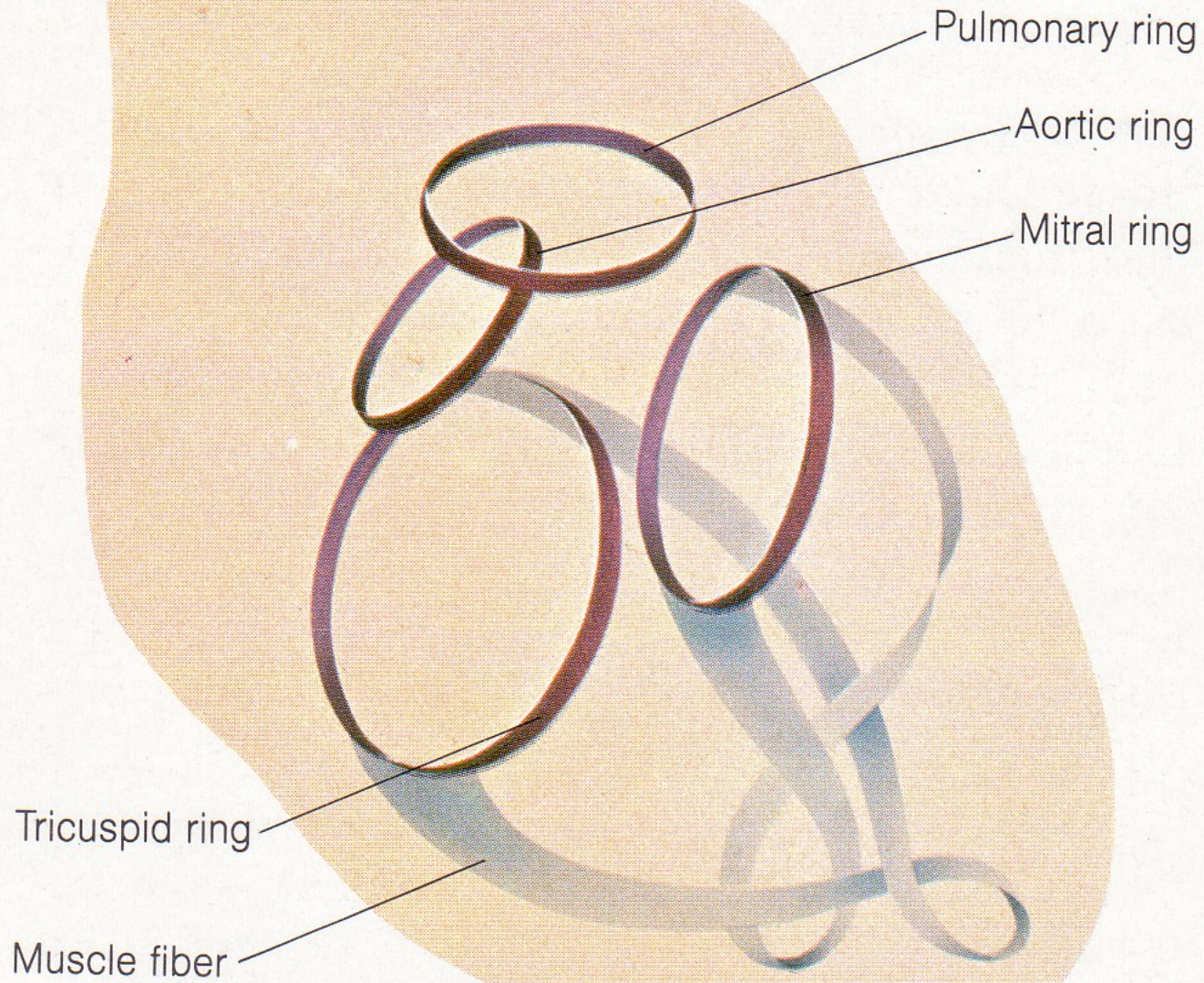
AV = Atrioventricular

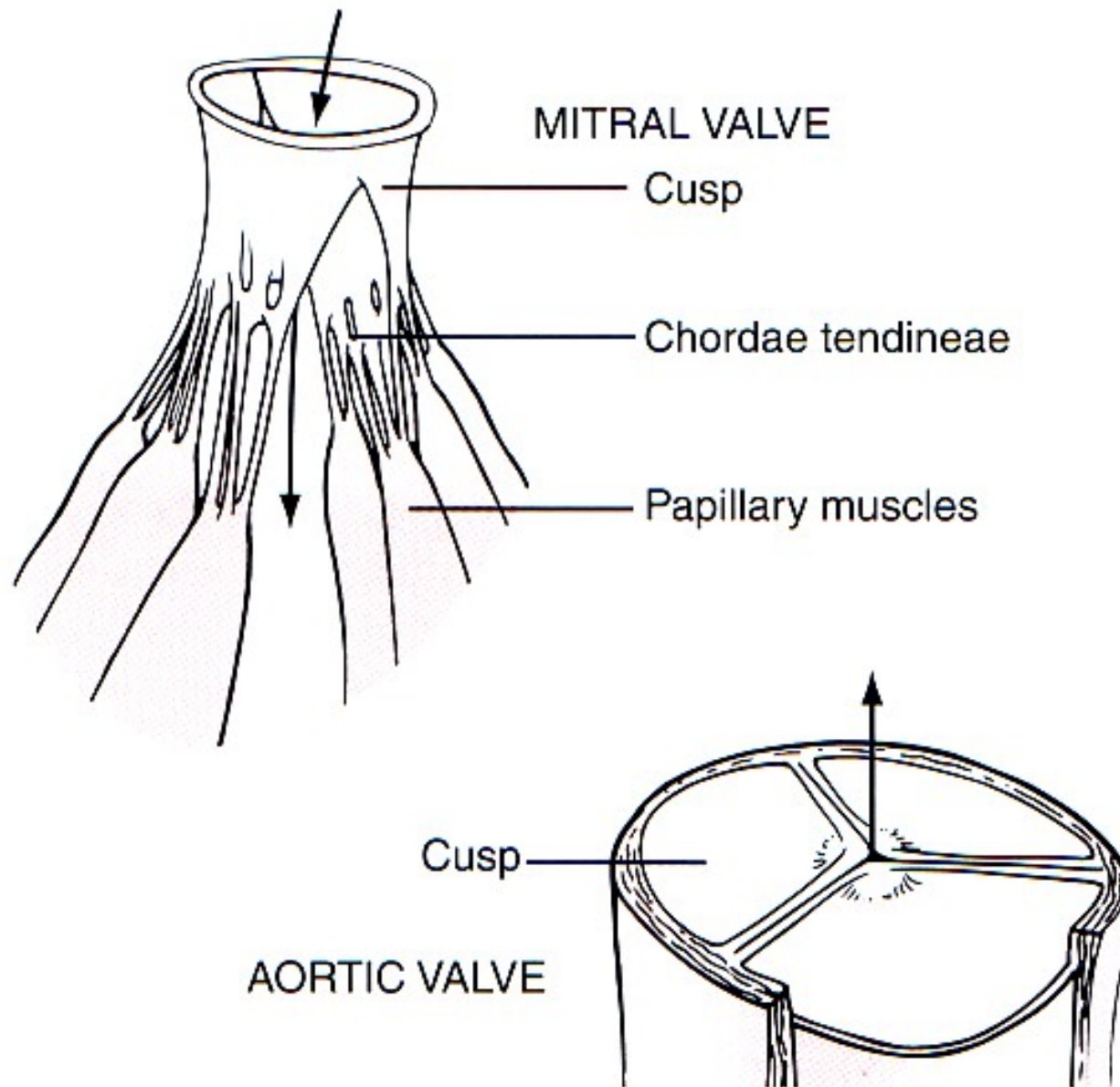
More flimsy

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



# Heart Valve Orientation & Scaffolding

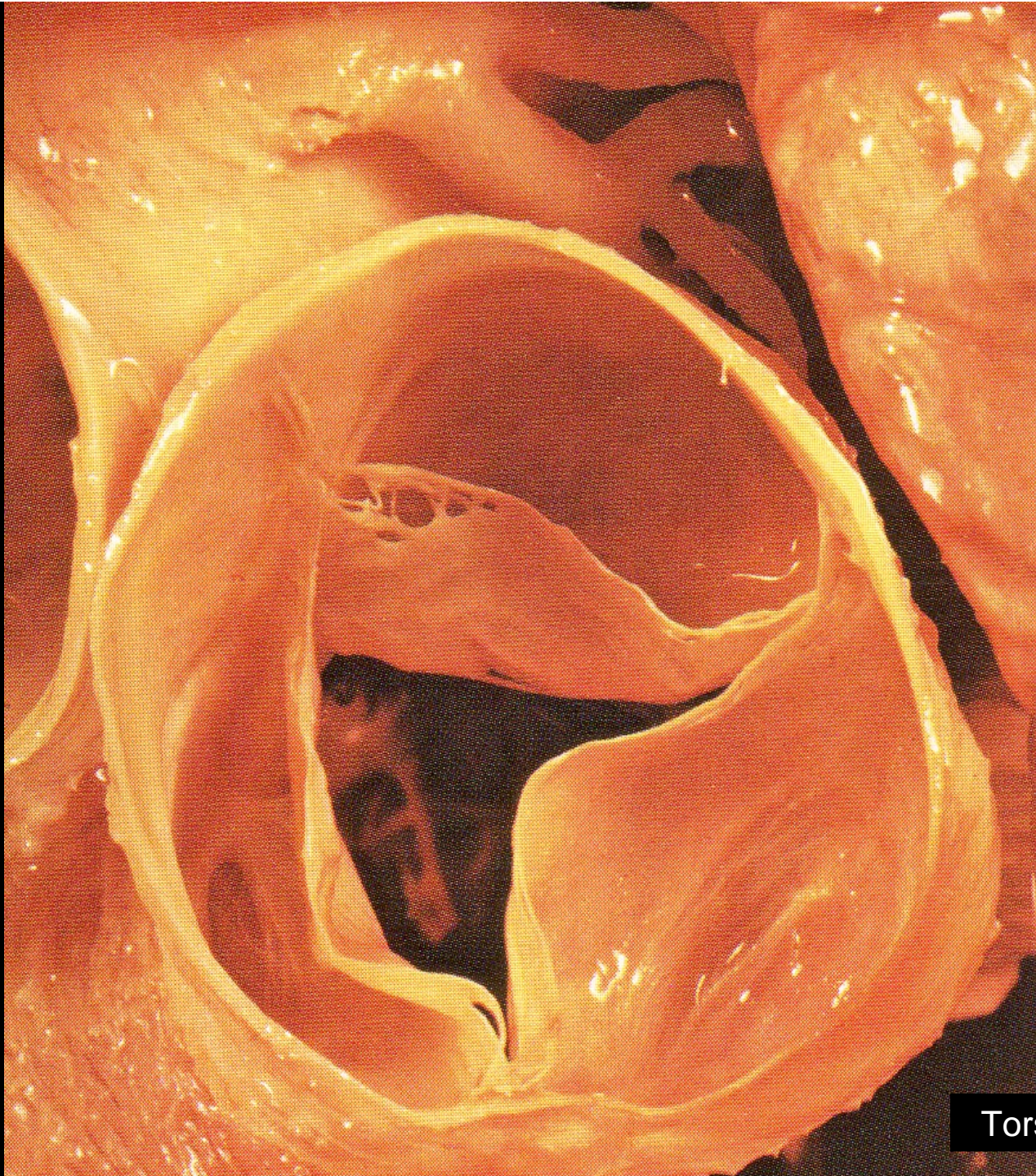




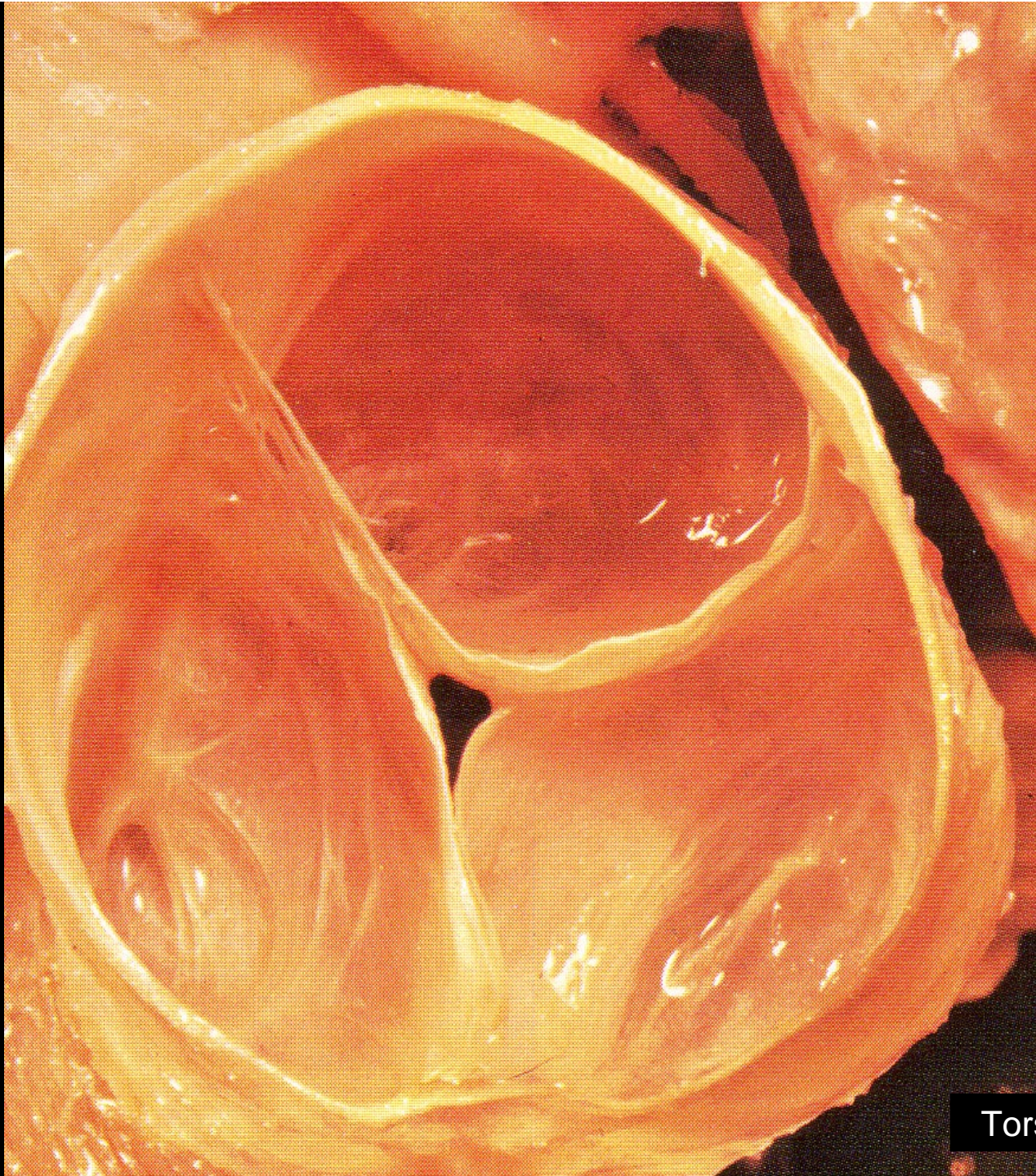
**FIGURE 9-6**

Mitral and aortic valves.

Guyton & Hall







Torstar Books 1984



Torstar Books 1984



To systemic circulation  
(upper body)

# ♥ 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)

Aorta

Right and left  
pulmonary arteries  
(to lungs)

Left pulmonary  
veins (return blood  
from left lung)

Left atrium

Aortic semilunar  
valve (shown open)

Left atrioventricular  
valve (shown open)

Left ventricle

Septum

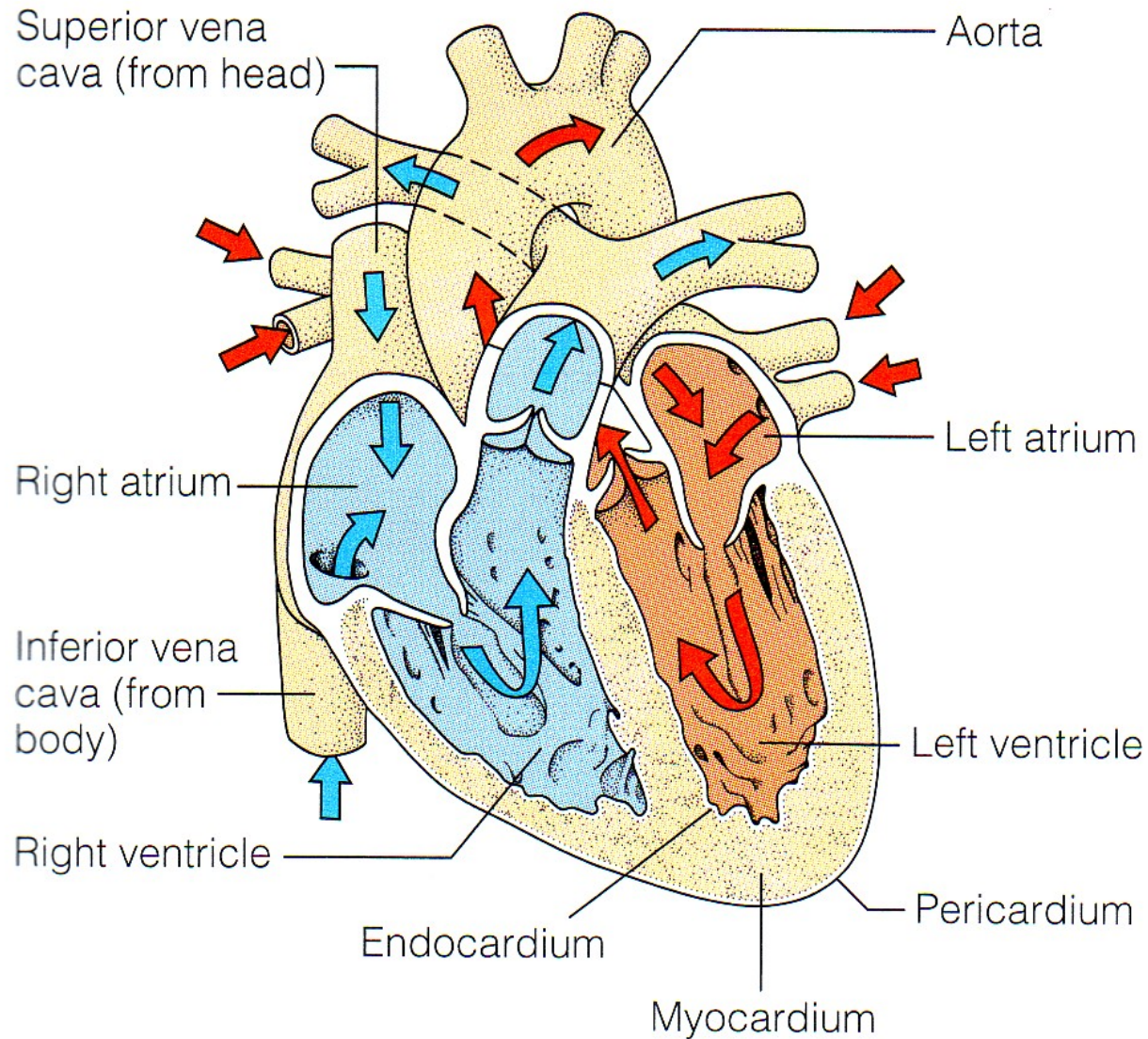
## KEY

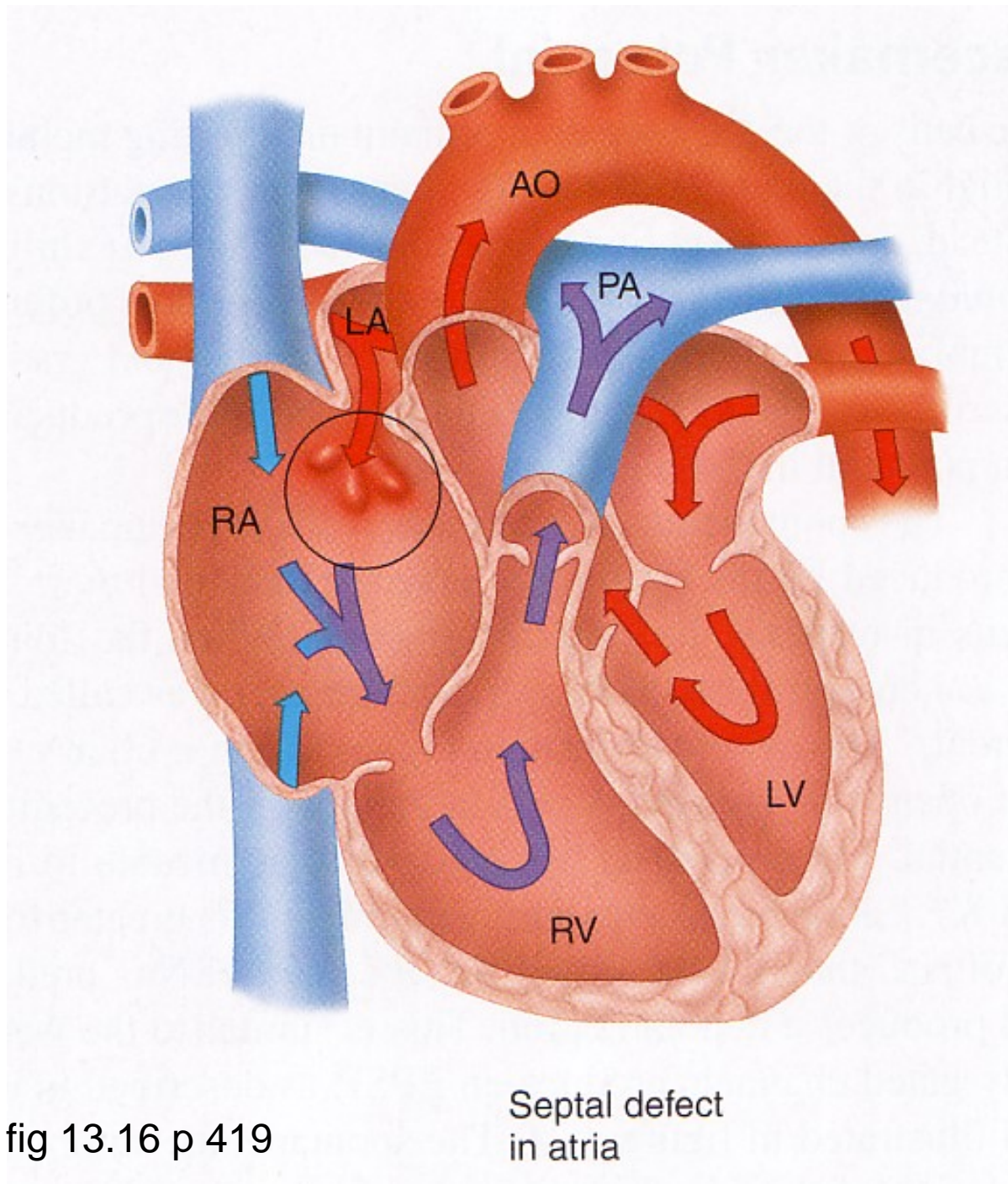
■ O<sub>2</sub>-rich blood

■ O<sub>2</sub>-poor blood

To systemic circulation  
(lower body)

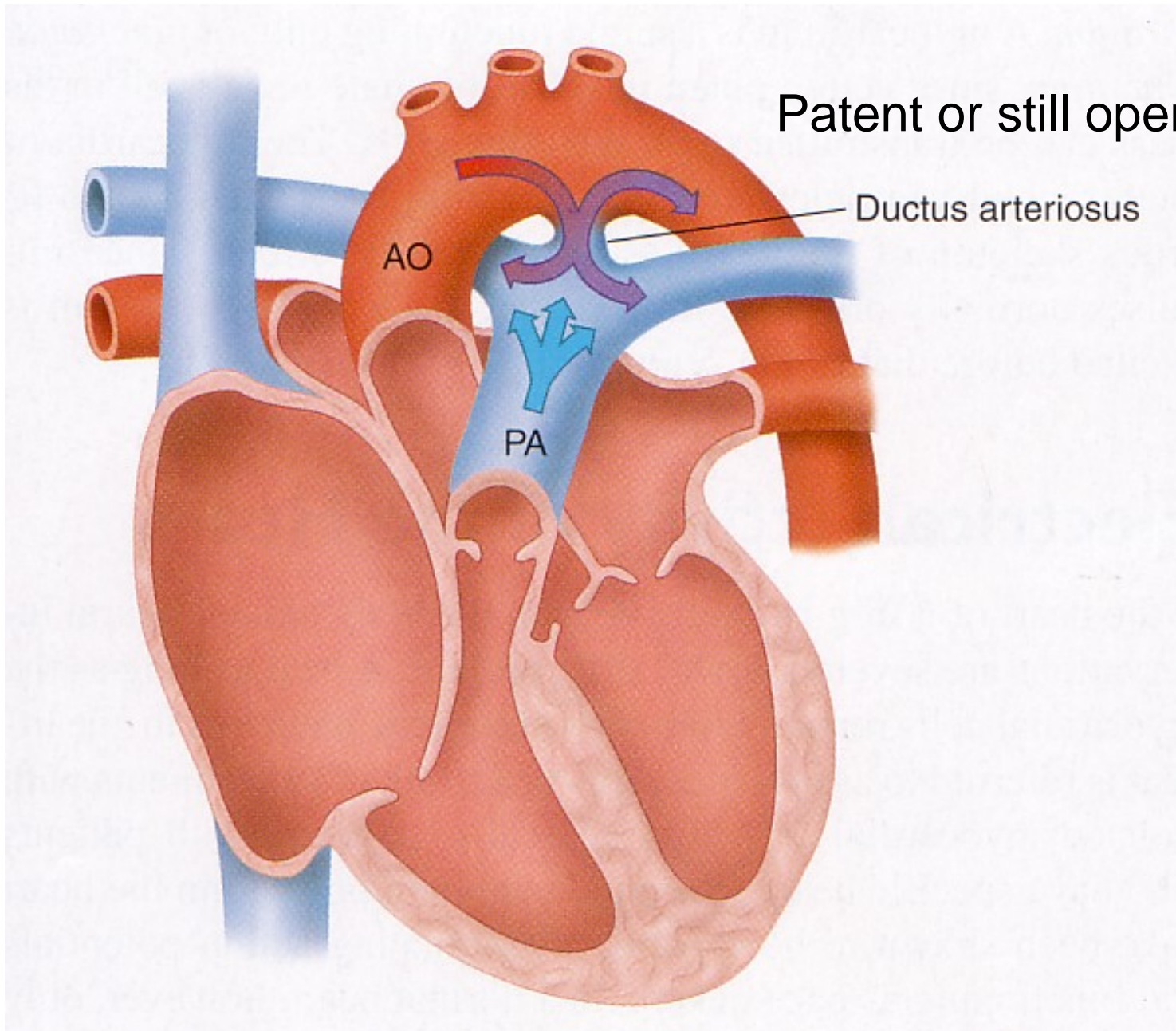
# Veins → Atria → Ventricles → Arteries





SI Fox 2009 fig 13.16 p 419

Septal defect  
in atria



SI Fox 2009 fig 13.17 p 420

WOW!



SUPER



~ TOP 5-10!

EXCELLENT!!



~ TOP 15!

GREAT EFFORT



~ TOP 20-25!

# BI 121 Midterm

- N = 43
- Mean + 1 SD =  $74.9 \pm 11.9 \rightarrow$
- 2/3 of scores between 63.0 & 86.8
  - Maximum 96.5
  - Minimum 52



*...Let's do much better next time!*



# Class Frequency Distribution Report for BI 121 Midterm U13, Multiple Choice, Part II

Overall

Mean Score: 77.00%



Grade	Percent Score	Raw Score	Frequency	Percent
A	90.00 - 100.00	36.00 - 40.00	7	17.50
B	80.00 - 89.99	32.00 - 35.99	12	30.00
C	70.00 - 79.99	28.00 - 31.99	9	22.50
D	60.00 - 69.99	24.00 - 27.99	8	20.00
F	0.00 - 59.99	0.00 - 23.99	4	10.00

