Review 07

Circulatory system, con't.

Effects of norepinepherine on heart and body

as neurotransmitter, inc. rate of heartbeat

as hormone, ❶inc. rate of heartbeat; ❷increase conduction velocities of depolarizations and contractility of both atria and ventricles; ❸raise blood pressure; ❹shunts blood from gut to skeletal muscle; ❺dec. insulin secretion; ❻blushing; ❼sweating

Circulatory "plumbing"

Arteries and arterioles

high pressure; thick-walled, elastic and muscular

Capillaries

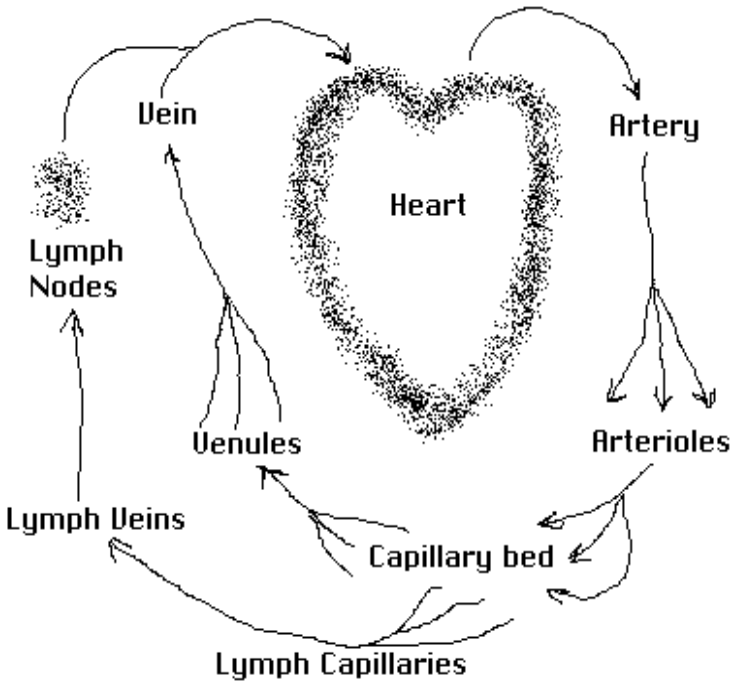
low pressure; walls made up of single cells

site of all nutrient, gas, waste exchanges

interstitial fluid (blood plasma that leaks out at arteriole ends) surrounds tissues and re-enters along capillaries and at venule ends of capillary beds + picked up by lymphatic system

Lymphatic system

- LYMPH CAPILLARIES begin in tissues, fuse to form lymph veins; collect interstitial fluid (lymph) from tissues
- LYMPH NODES filter lymph, removing bacteria & other fluid-borne invaders, which engulfed by lymphocytes in the lymph nodes
- LYMPH propelled as result of muscular contractions; one-way valves keep it flowing toward heart; re-enters circulation via vena cavae



Review 07, con't

Venules and Veins

very low pressure; thin-walled; larger than arteries
blood propelled to heart by contractions of skeletal muscles
one-way valves along the way to keep blood moving toward heart

Circulatory Patterns change with various states of activity

see lecture notes, page 26
effectors = smooth muscles of arterioles + precapillary sphincters
action of norepinepherine:
in skeletal muscle: relax arterioles; open precapillary sphincters
in gut & digestive organs: contract arterioles; close precapillary sphincters

---------- FIRST EXAM MATERIAL ENDS HERE!!! ----------

Regulation of blood sugar (glucose) levels

"normal" level ≈ 700 mg glucose/liter blood
prolonged fasting individuals
males ≈ 650 mg/l females ≈ 400 mg/l
therefore, some sort of *homeostatic control* over level of glucose in blood
involvement of liver:
- unusual circulatory connection of liver:

heart ➟ gut ➟ liver ➟ heart