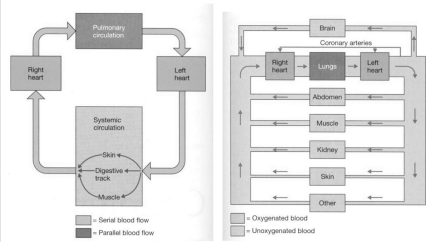


Arrangement of CVS bold

Arrangement of the CVS



Heart valves

TWO AV VALVES Aortic and pulmonary semilunar valves

□:AT AV JUNCTION 3 cusps

Prevent back flow into atria after ventricle contraction Guard the bases of large arteries leaving ventricles

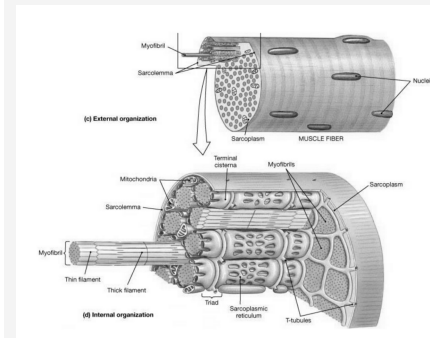
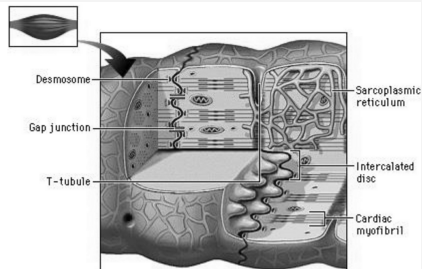
1. Right AV valve: aorta, pulmonary tricuspid 3 cusps trunk

2. Left AV valve: Prevent back flow of blood into the associated ventricles

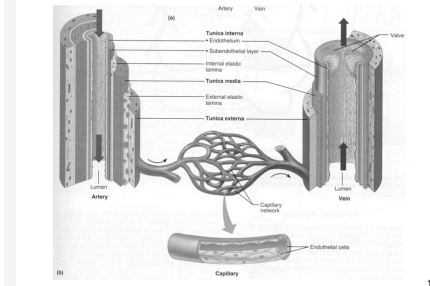
Operation of semilunar valves

A)ventricle **contract** and intraventricular pressure Rises blood is pushed against semilunar valves forcing them open

B)ventricle **relax** and intraventricular pressure falls blood flows back from arteries filling the cusps of semilunar valves & forcing them close



Blood vessel structure and function



Blood vessel structure:

Walls of arteries and veins are composed of 3 layers	Tunica interna - endothelium underlain by a subendothelial layer of loose connective tissue	Tunica media - smooth muscle cells & elastic fibers, thick in arteries and thin in veins	Tunica externa - largely collagen fibers
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Capillaries are tiny blood vessels with thin walls

Structure of the heart

Four chambered pump

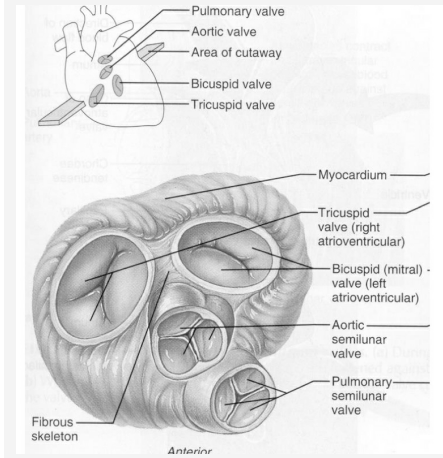
Right side pumps blood -> pulmonary circuit

Left side pumps blood->systematic circuit

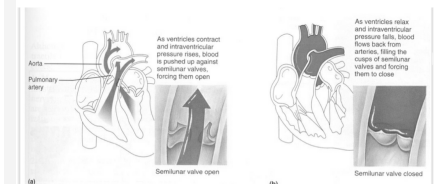
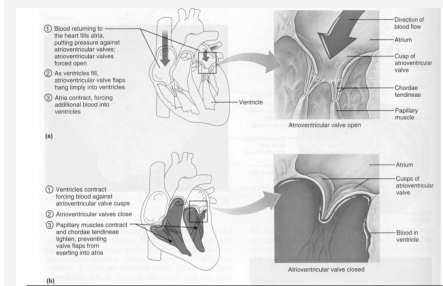
Pulmonary circuit: blood gains o₂ loses co₂

Systematic circuit loses o₂ gains co₂

Valves



Operation



Desmosomes and gap junctions

Desmosomes join cell	Gap junctions: membrane channels: mediate cell-to-cell movement of ions and small metabo- lites: In the heart, gap junctions: important role in impulse conduction. Directly transmit depolarizing current across the entire heart	Because of these electrical connections the entire myocardium behaves as a single coordinated unit or functional syncytium
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 Page 1 of 3.

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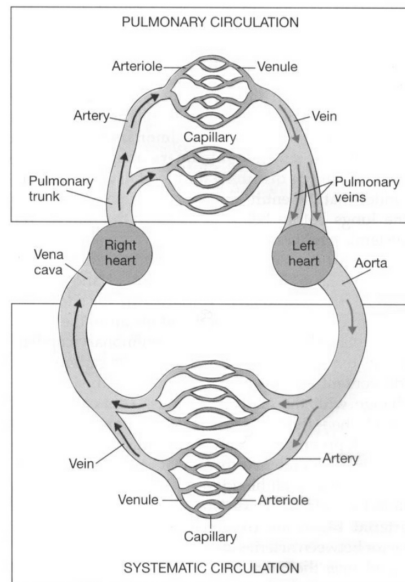
blood vessel

3 major types of blood vessel – arteries, capillaries, veins

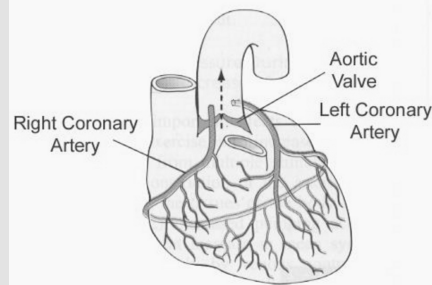
heart contracts it forces blood into successively smaller arteries → the arterioles (smallest branches) → capillary beds of body organs and tissues

Blood draining from the capillaries flows → venules → small veins that merge to form larger veins → empty into the heart

Exchanges between blood and tissue cells occur primarily through thin walled capillaries



Coronary circulation



Operation of atrioventricular

1) blood returning to heart fills atria → putting pressure on AV valves ← forcing them open

2) ventricles fill AV flaps hang limply into ventricles

3) atria contract forcing (+nal) bld into ventricles

1) ventricle contract forcing blood against atrioventricular valve close

2) atrioventricular valves close

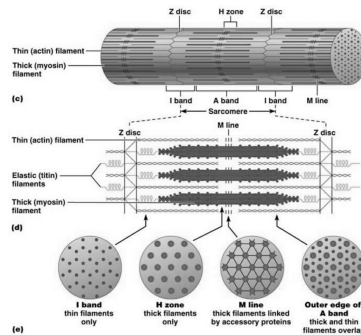
3) papillary muscles contract & chordae tendineae tighten, preventing valve flaps from everting into atria

Cardiac muscle

Striated Short fast branched interconnected

Each cardiac myocyte contain a single nucleus Adjacent myocytes interlock at junctions (intercalated discs): contain anchoring desmosomes & gap junctions

Myocytes composed of sarcomeres: contain thick (myosin) & thin (actin) filaments Contraction: sliding filament mechanism



Distribution of blood

Systemic	Pulmonary
Largest portion of blood at rest is in systemic veins and venules	Blood reservoir
	Venoconstriction reduces volume of blood in reservoirs and allows greater blood volume to flow into arteries

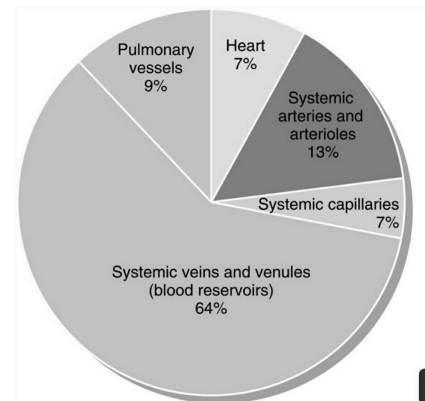
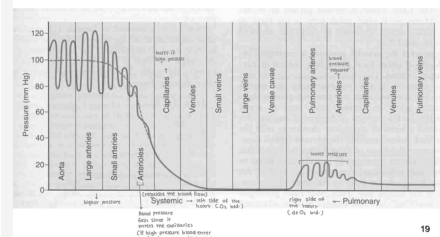


Figure 21.06, Tortora - Fund 13/e

Normal blood pressures in different parts of the circulatory system when a person is lying in the horizontal position



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