



عنوان المحاضرة

المحاضرة السادسة : الجهاز القلبي الوعائي

Cardiovascular system

ZUHEIR ALSHEHABI

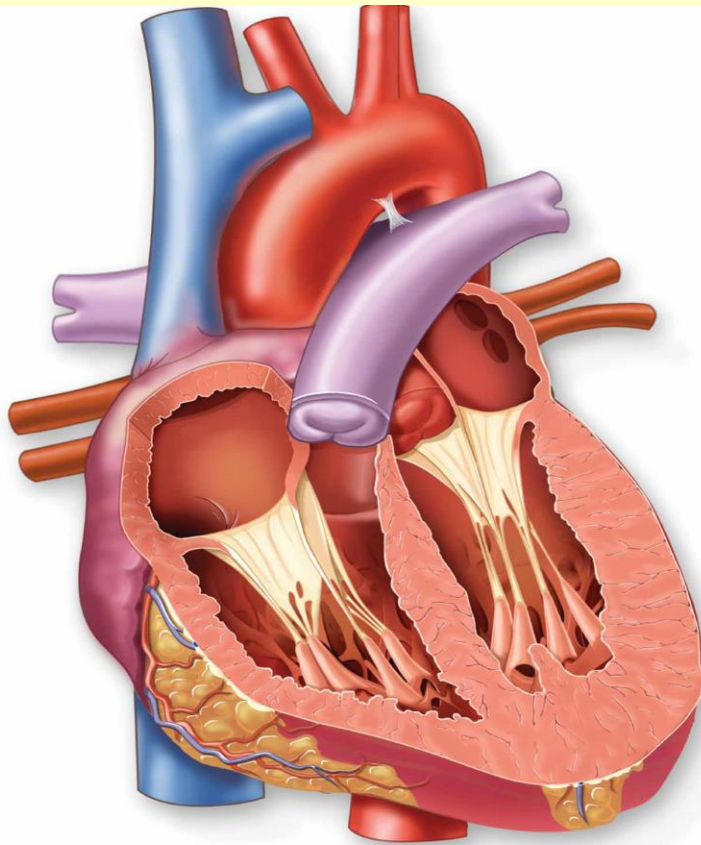
MD, PHD, FASCP

2022

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Medical Terminology

A Living Language

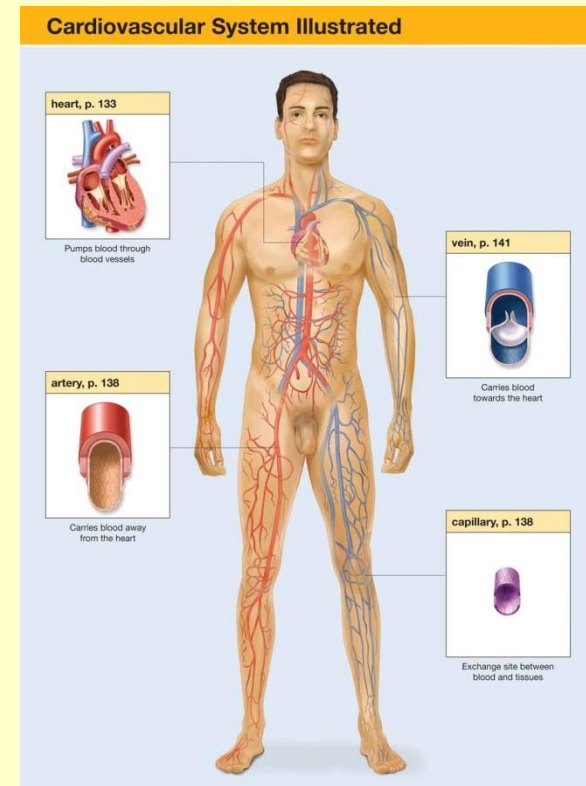


الجهاز القلبي الوعائي Cardiovascular System

Cardiovascular System at a Glance

- Organs of Cardiovascular System

- Heart القلب
- Arteries الشرايين
- Capillaries الأوعية الشعرية
- Veins الأوردة



Cardiovascular Combining Forms

الأشكال المولفة

● angi/o	vessel	وعاء دموي
● aort/o	aorta	الأبهر
● arteri/o	artery	شريان
● ather/o	fatty substance	عصيدة شريانية
● atri/o	atrium	أذينة
● cardi/o	heart	قلب

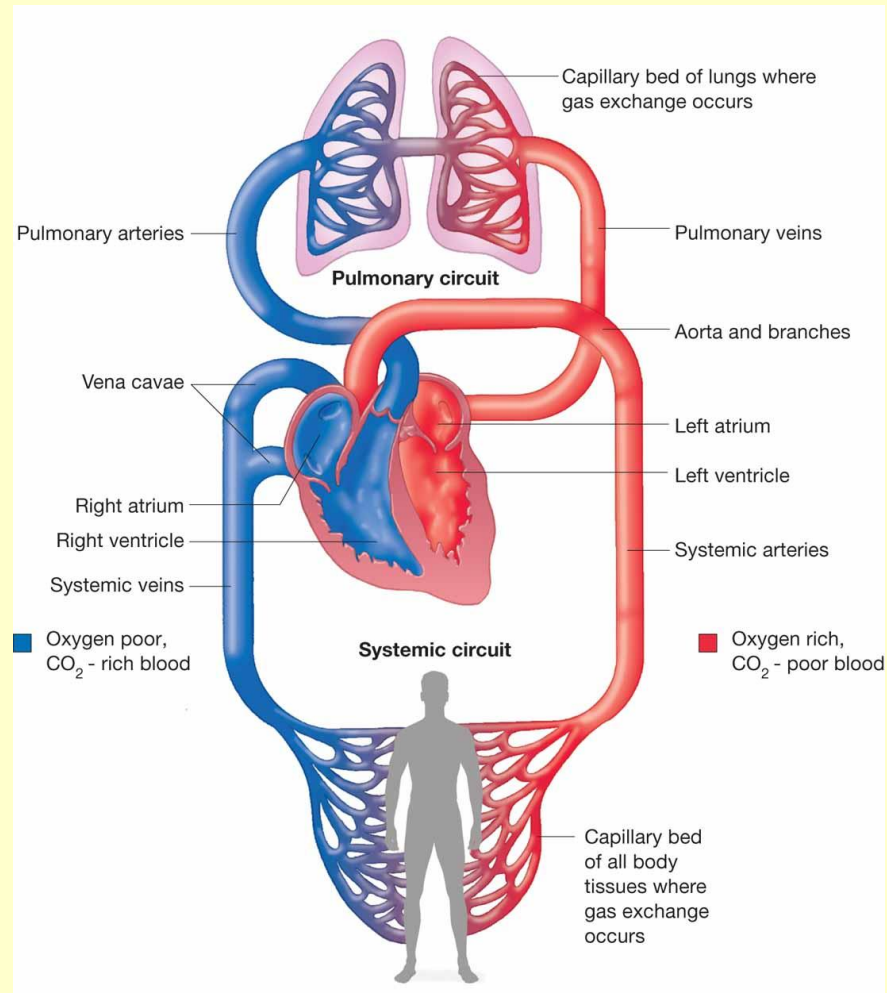
Cardiovascular Combining Forms

الأشكال المولفة

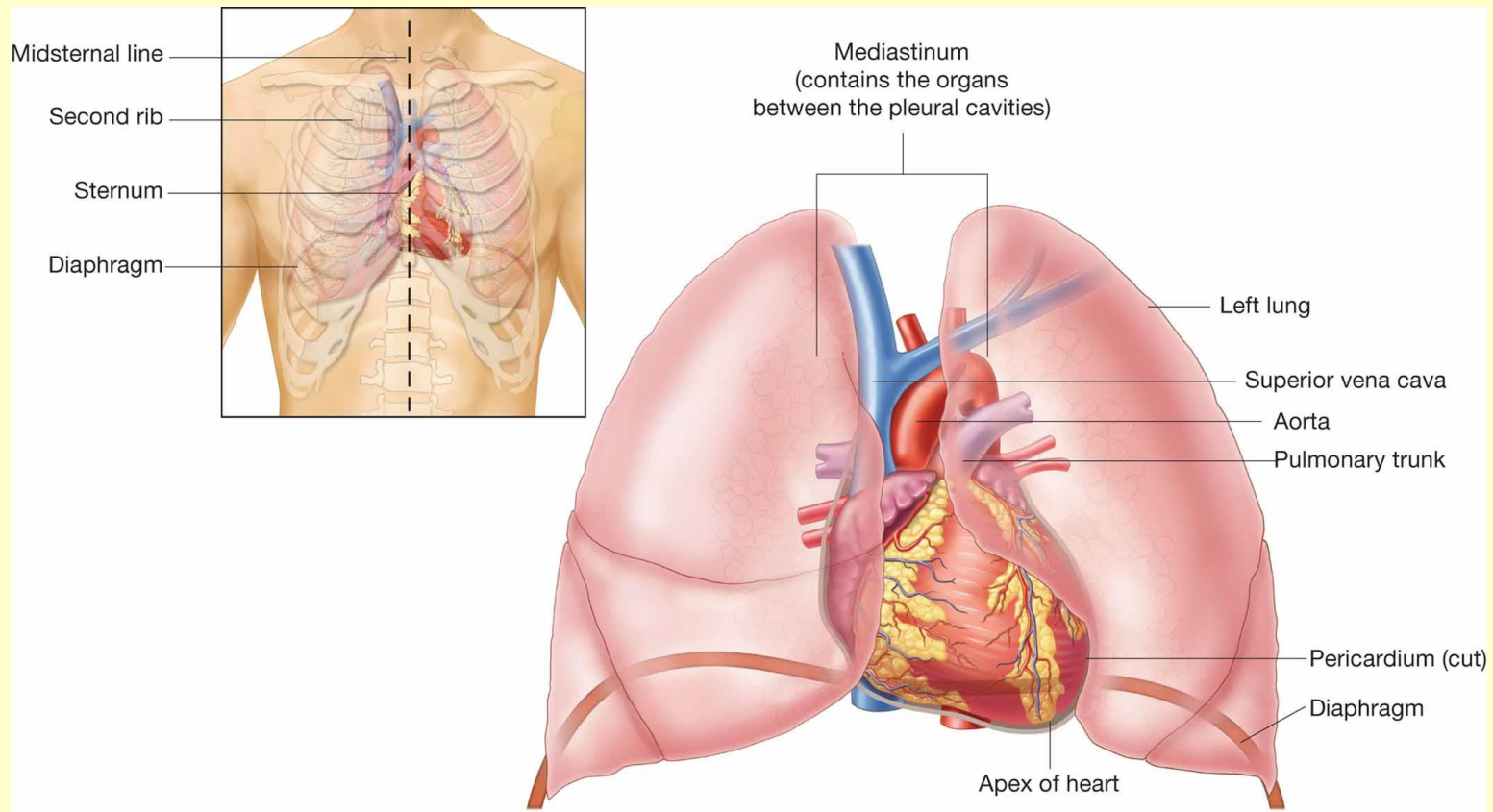
● coron/o	crown	تاج
● hemangi/o	blood vessel	وعاء دموي
● phleb/o	vein	وريد
● sphygm/o	pulse	نبض
● steth/o	chest	صدر
● thromb/o	clot	خثرة

Anatomy and Physiology

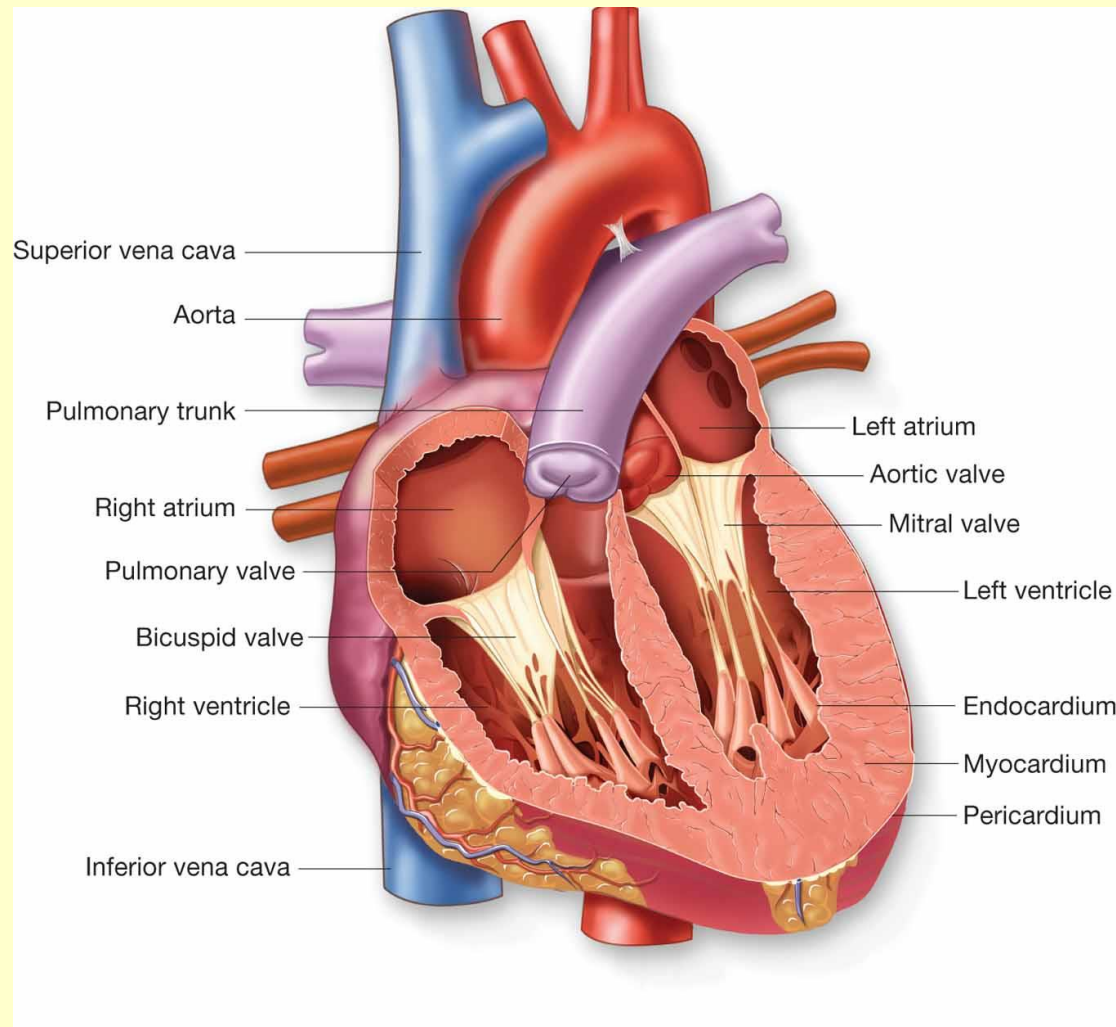
- Is composed of:
 - **Heart**
 - Blood vessels
 - **Arteries**
 - **Capillaries**
 - **Veins**
- Divided into :
 - **pulmonary circulation** الدورة الدموية الصغرى
 - **systemic circulation** الدورة الدموية الكبرى



A schematic of the circulatory system illustrating the pulmonary circulation picking up oxygen from the lungs and the systemic circulation delivering oxygen to the body.



Location of the heart within
the mediastinum of the thoracic cavity.



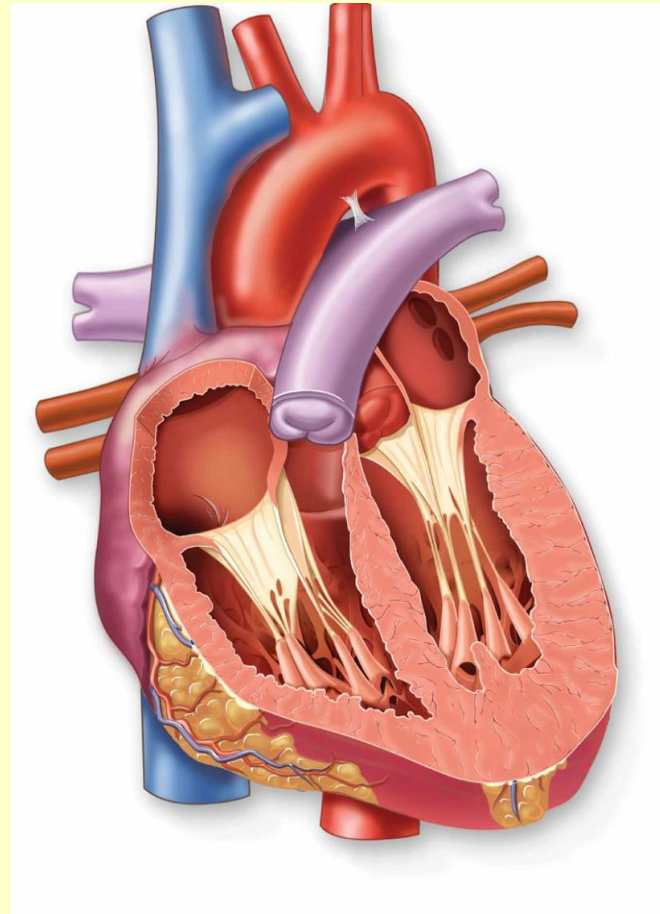
Internal view of the heart illustrating the heart chambers, heart layers, and major blood vessels associated with the heart.

Heart Chambers أجواف القلب

- Divided into four chambers
 - **Two atria** أذيتان
 - **Two ventricles** بطينان
- Heart is divided into right and left sides by a wall called the **septum** الحاجز

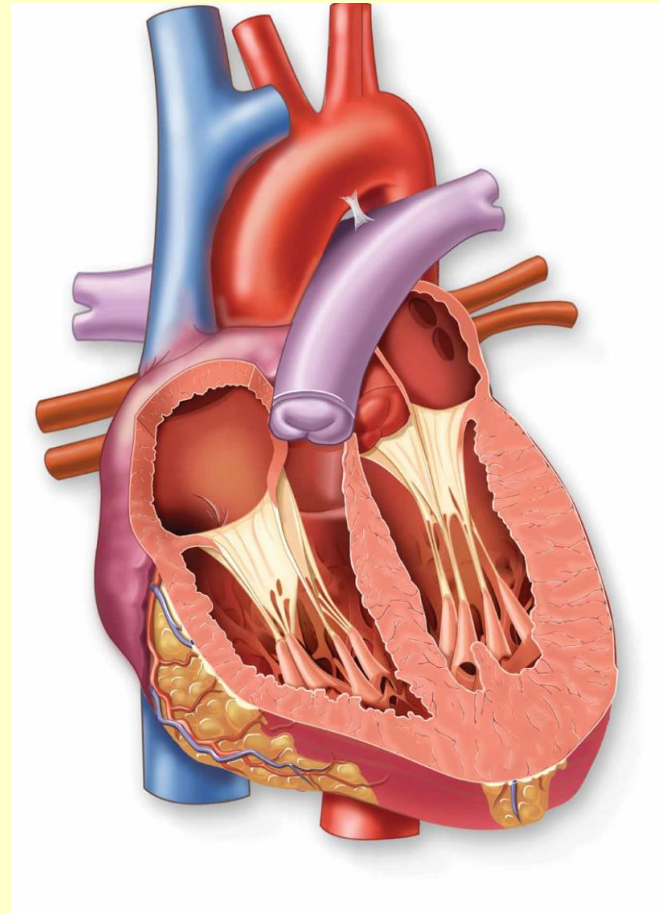
Atria الأذينة

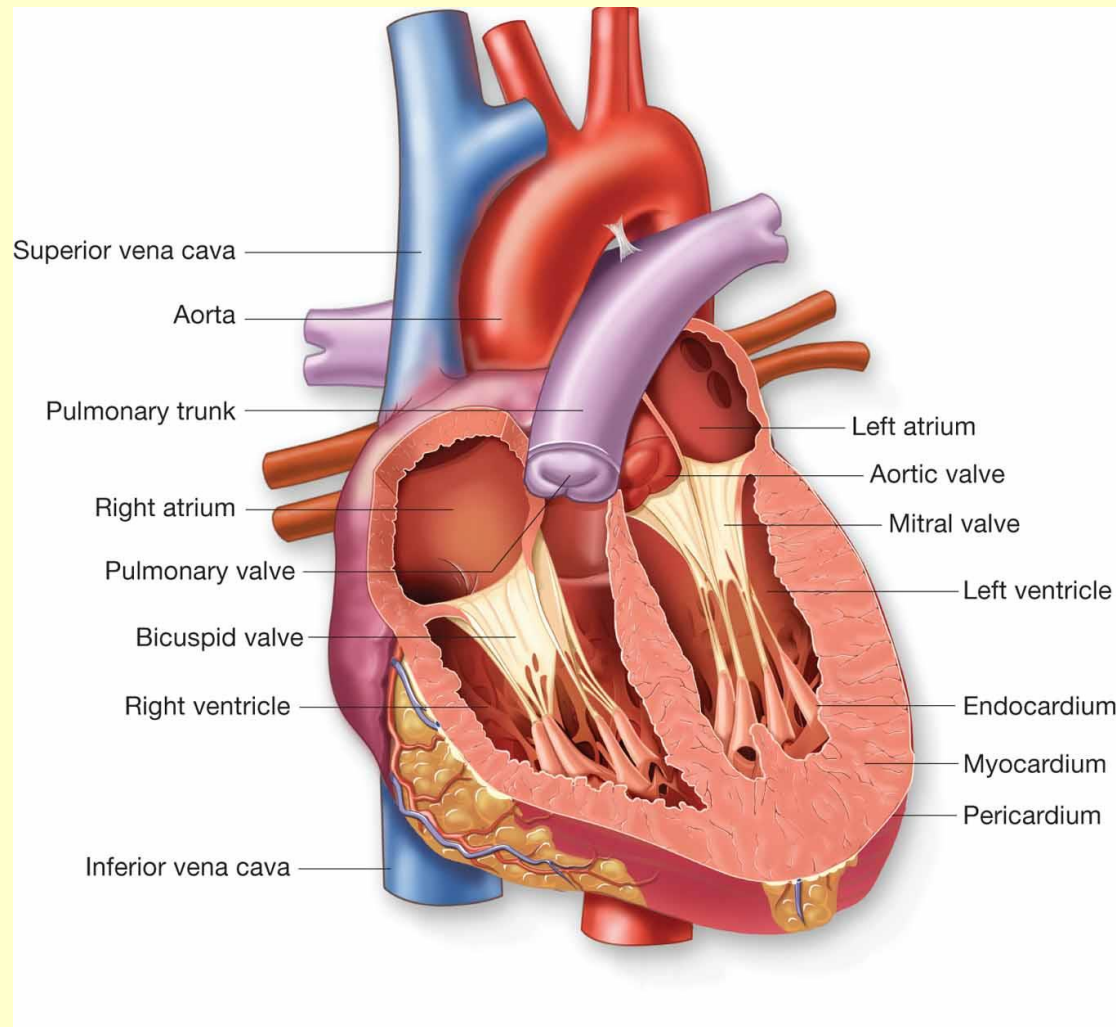
- Left and right upper chambers
- Receiving chambers
- Blood returns to atria in veins
 - **Superior and inferior vena cava**
 - **Pulmonary veins**



Ventricles البطينات

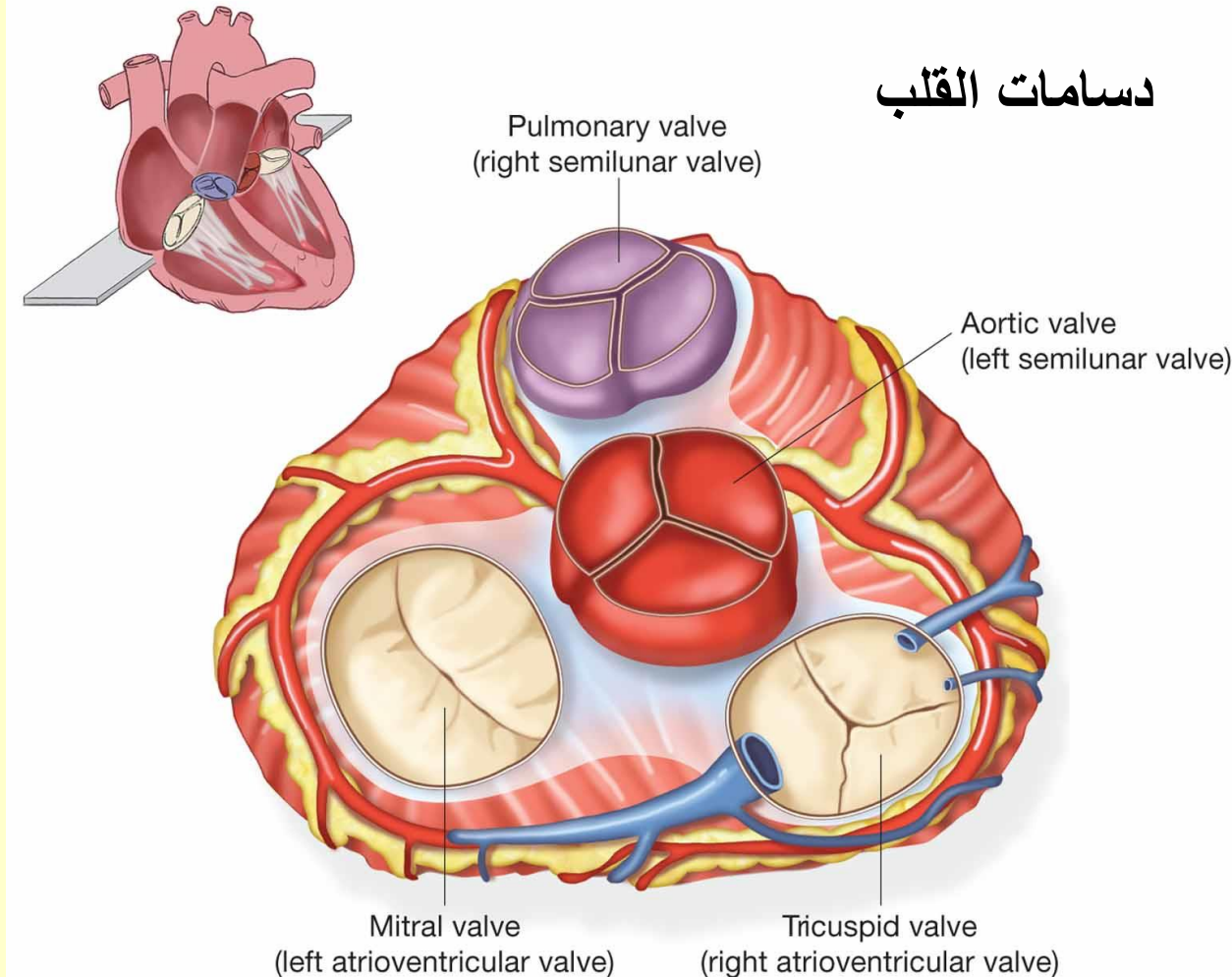
- Left and right lower chambers
- Pumping chambers
 - Thick myocardium
- Blood exits ventricles into arteries
 - **Aorta**
 - **Pulmonary artery**





Internal view of the heart illustrating the heart chambers, heart layers, and major blood vessels associated with the heart.

دسامات القلب

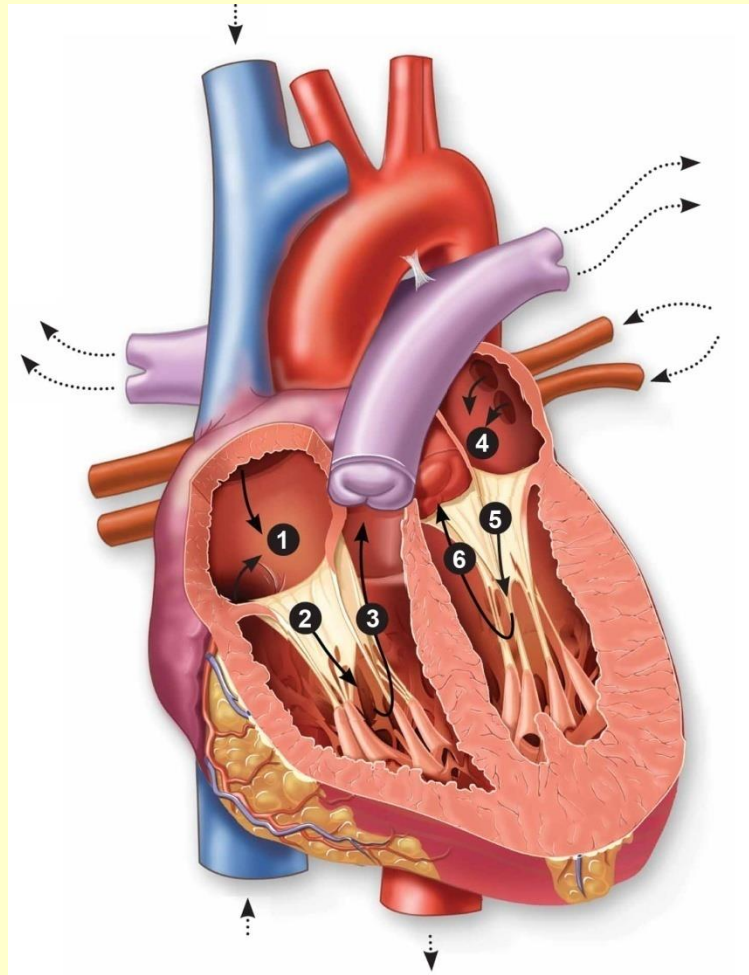


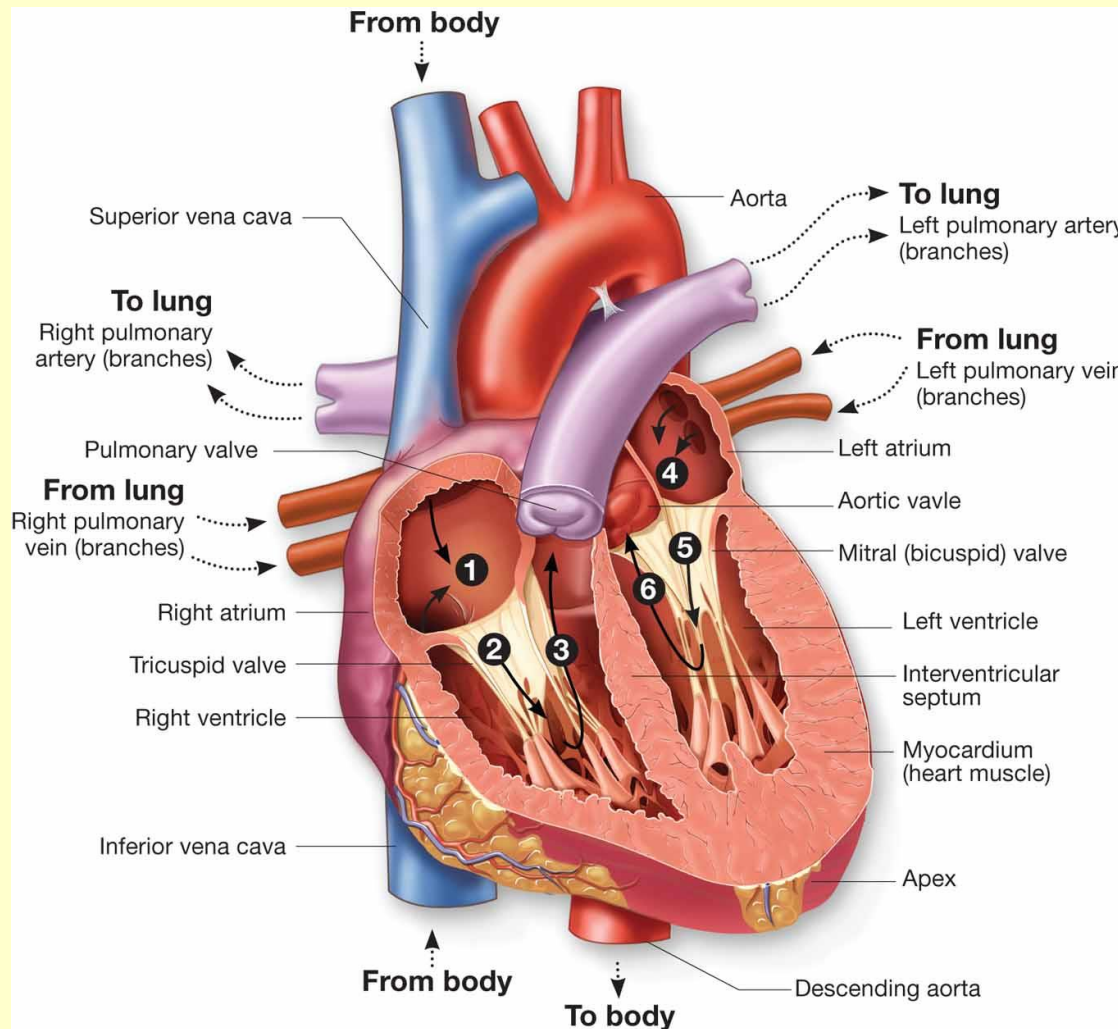
Superior view of heart valves illustrating position, size, and shape of each valve.

Path of Blood Flow Through Heart

1. Deoxygenated blood from body enters relaxed right atrium via two large veins called:

- **Superior vena cava**
- **Inferior vena cava**





The path of blood flow through the chambers of the left and right side of the heart.

Systole & Diastole انقباض وانبساط القلب

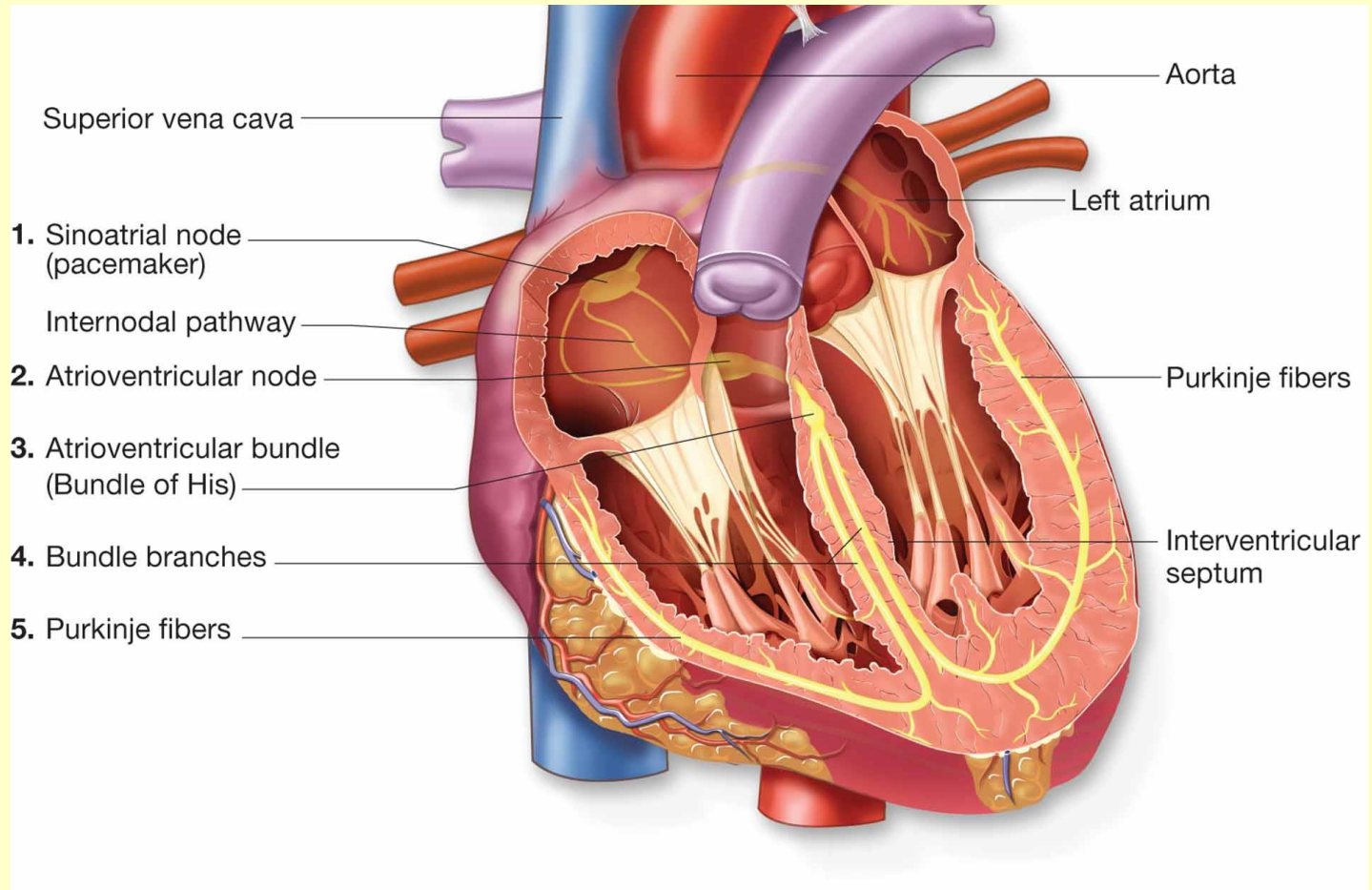
- Heart chambers alternate between:
 - Relaxing to fill
 - Contracting to push blood forward
- Relaxation phase is **diastole**
- Contraction phase is **systole**

Conduction System of the Heart

الجملة الناقلة للقلب

- Autonomic nervous system controls heart rate
 - جملة عصبية ذاتية تسيطر على عمل القلب
- Special heart tissue conducts electrical impulses
 - Stimulate different chambers to contract in correct order

العقدة الجيبية الأذينية
العقدة الأذينية - البطينية
حزمة هيس
فروع حزمة هيس
ألياف بوركنج

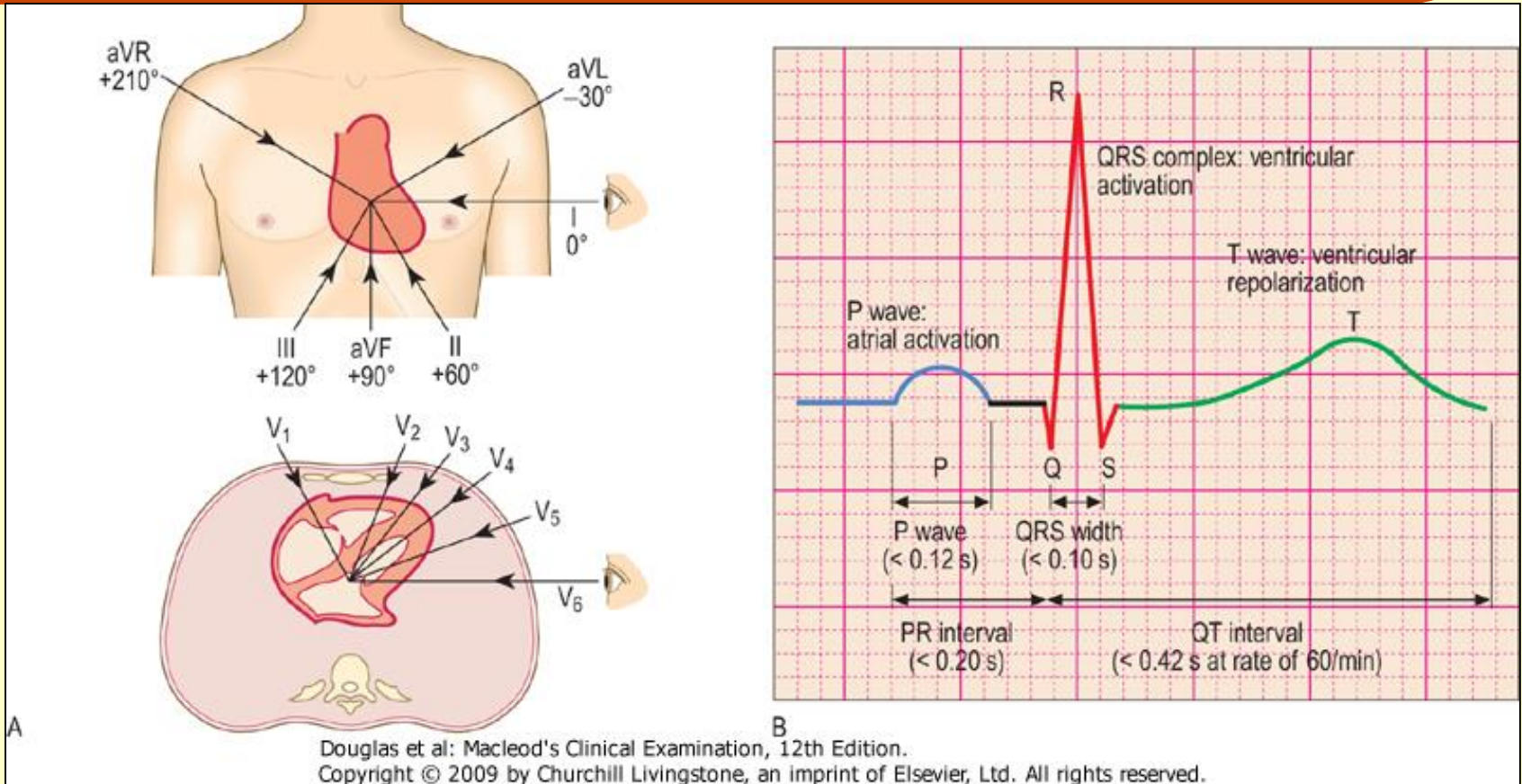


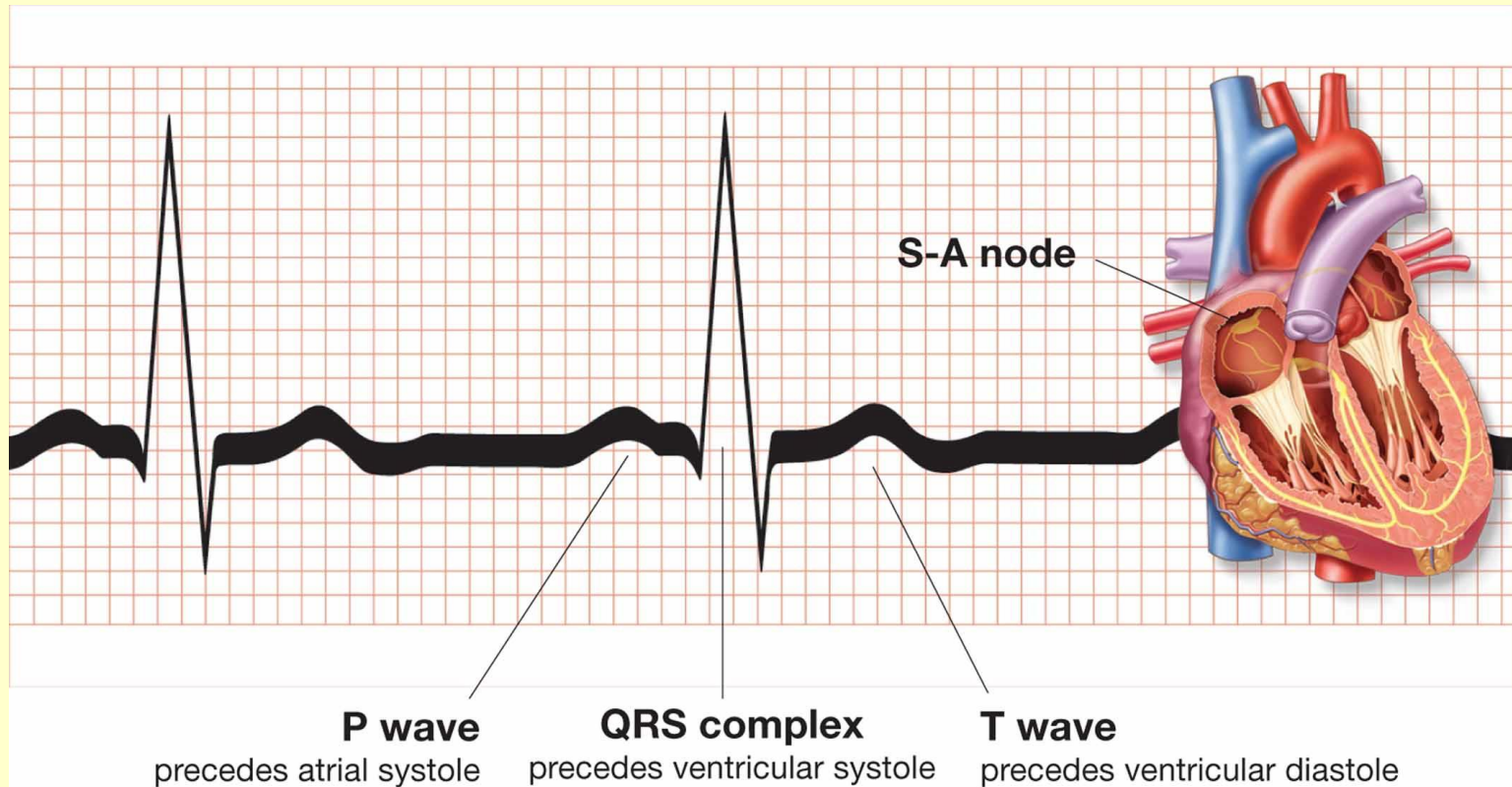
The conduction system of the heart.

الجملة الناقلة للقلب

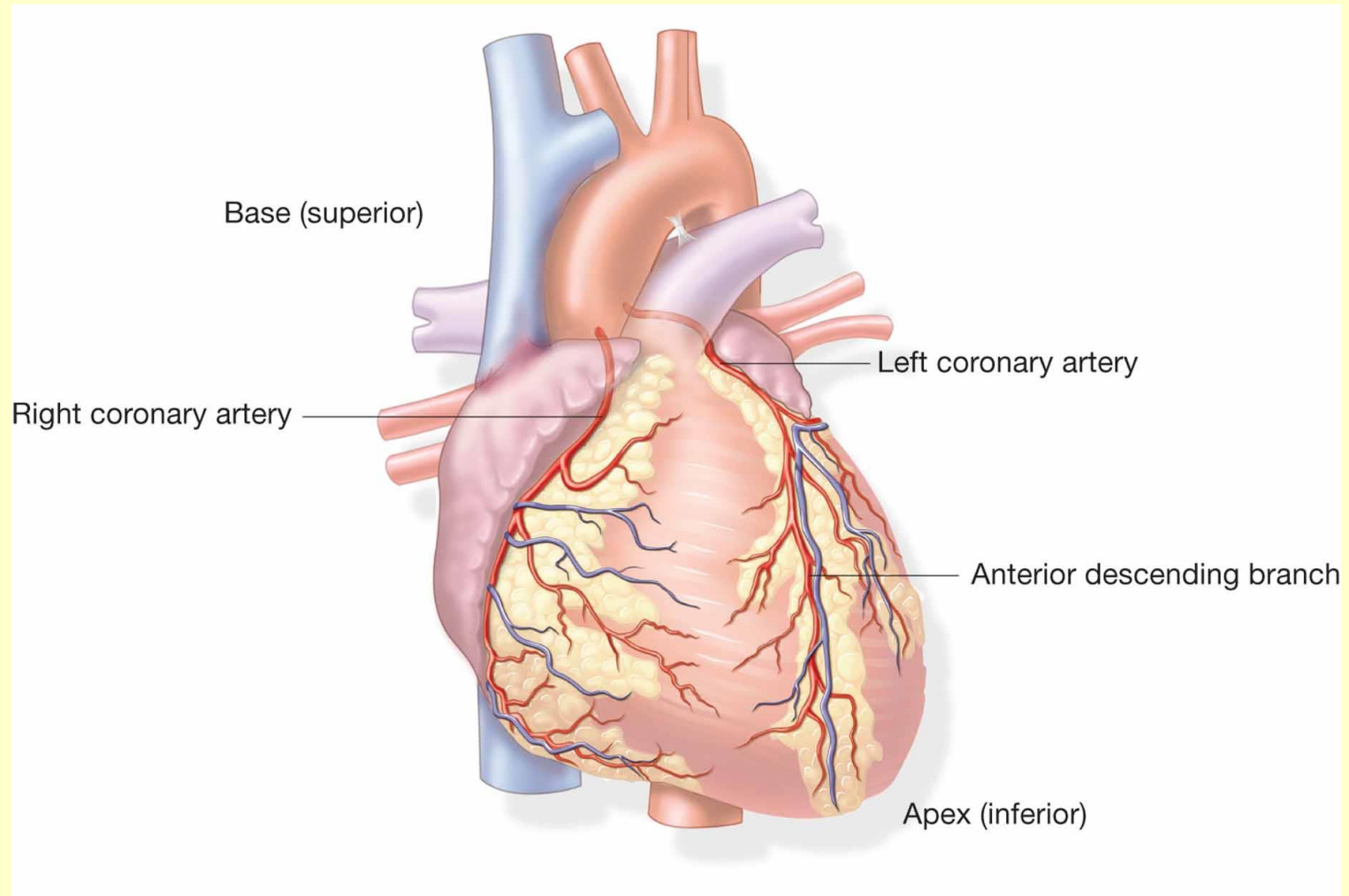
Electro/cardio/gram

تخطيط القلب الكهربائي

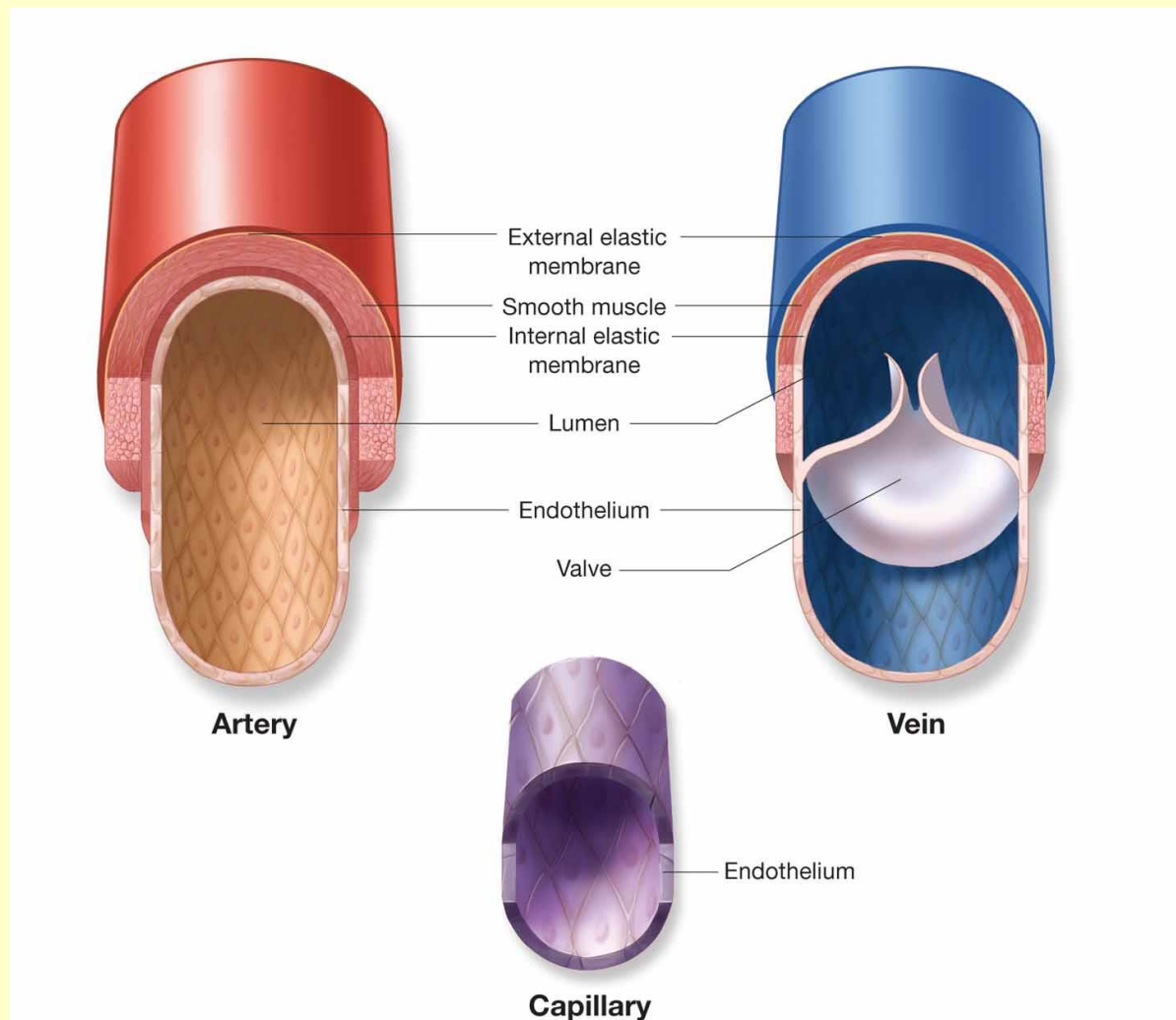




An electrocardiogram (EKG) wave.



The coronary arteries الشرايين الاكليلية

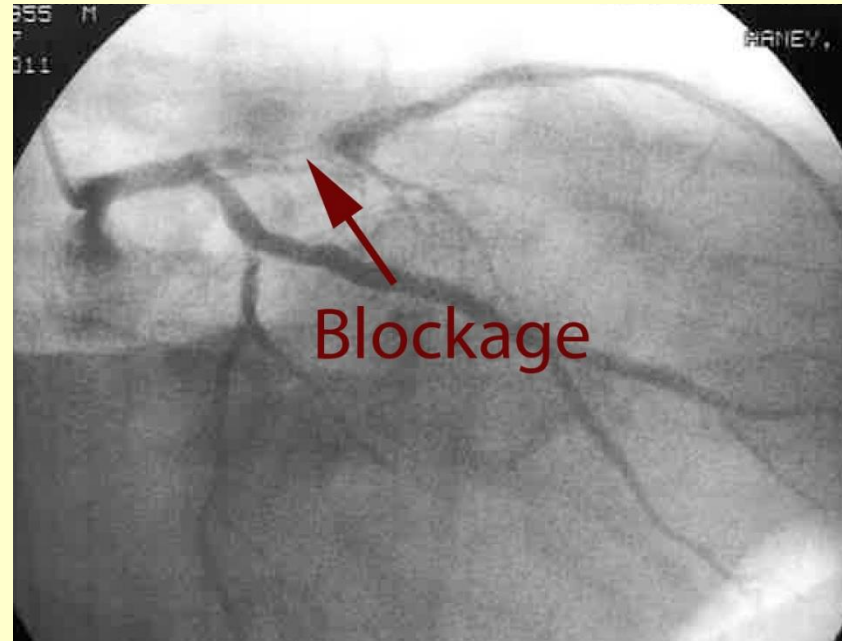
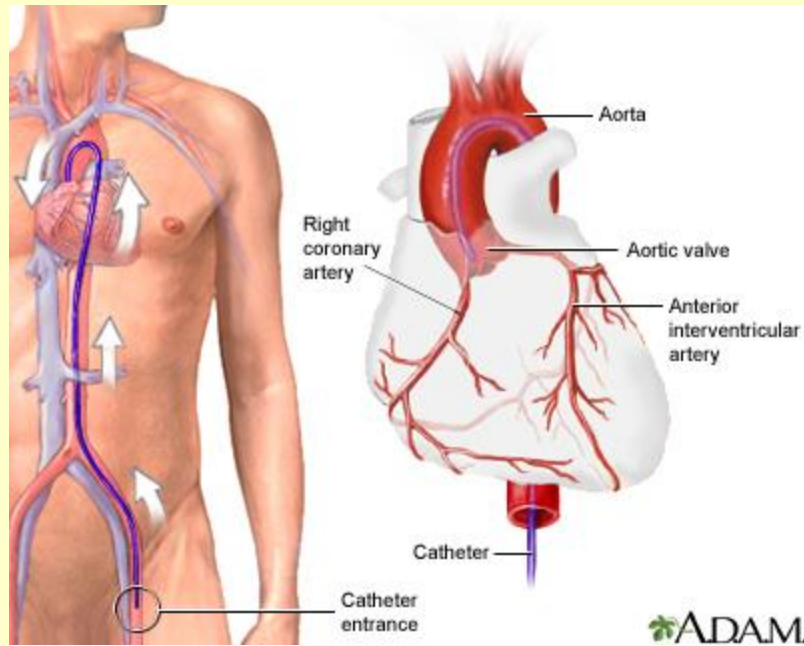


Comparative structure of arteries, capillaries, and veins.

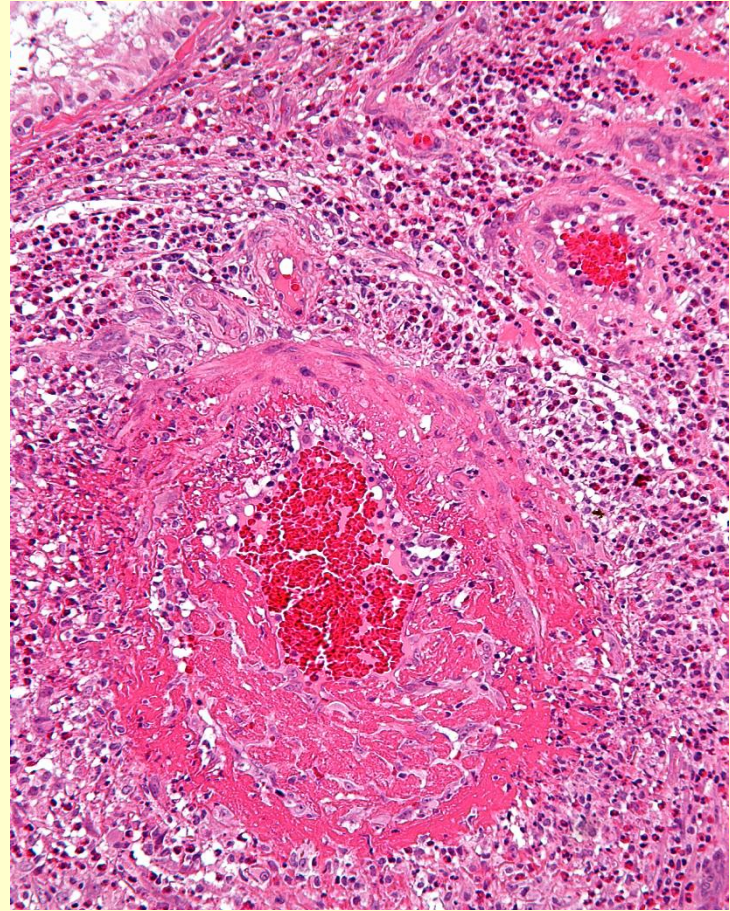
Word Building with angi/o

–gram	angiogram	record of a vessel تسجيل
–itis	angiitis	inflammation of a vessel التهاب
–plasty	angioplasty	surgical repair of vessel تصنيع
–spasm	angiospasm	involuntary muscle تشنج contraction in a vessel
–stenosis	angiostenosis	narrowing of a vessel تضيق

Angio/gram تصوير الأوعية

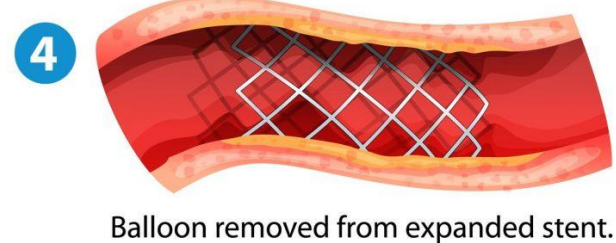
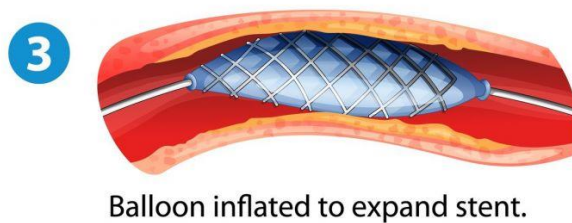
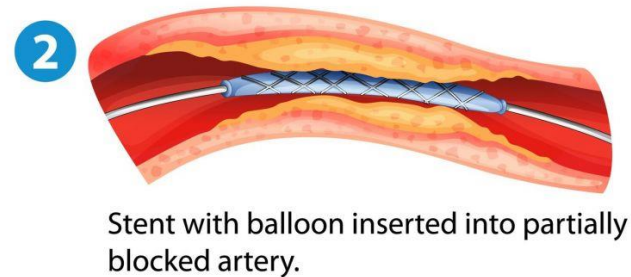
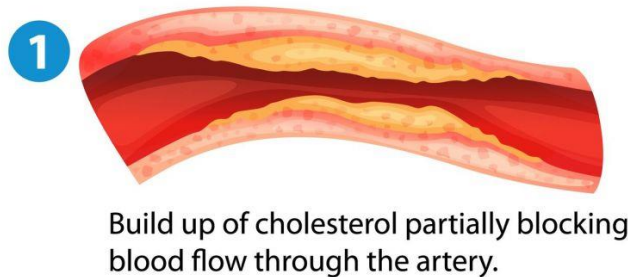


Angi/itis التهاب الأوعية



Angio/plasty تصنيع الأوعية

Stent with Balloon Angioplasty



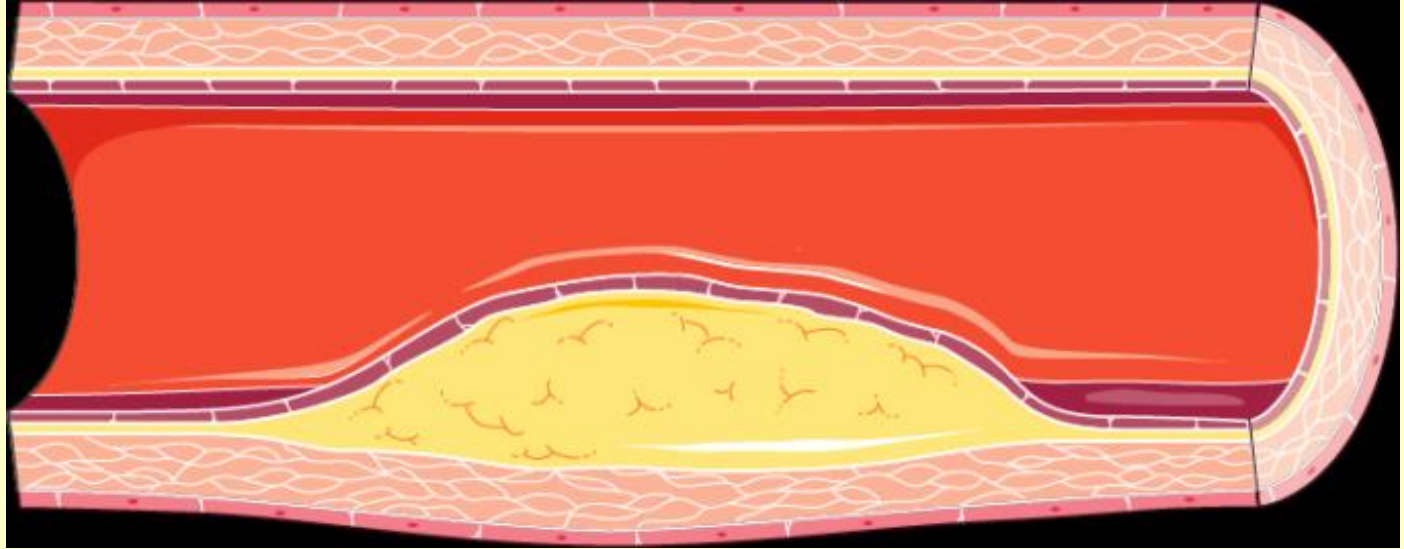
Word Building with aort/o & arteri/o

-ic	Aortic أبهري	pertaining to the aorta
-al	Arterial شرياني	pertaining to an artery
-ole	Arteriole شرييني	small artery

Word Building with ather/o & atri/o

–ectomy	atherectomy	surgical removal of fatty substance استئصال
–oma	atheroma	fatty substance tumor/growth عصيدة شريانية
–al	atrial	pertaining to the atrium أذيني
inter– –al	interatrial	pertaining to between the atrium بين الأذنتين

Atheroma العَصيدة الشريانية



العَصيدة أو العَصِيد هي طبق عربي من الدقيق المخلوط بالماء مع مُحلٍّ، عادةً ما يكون سُكَّرًا أو دبساً أو عسلاً

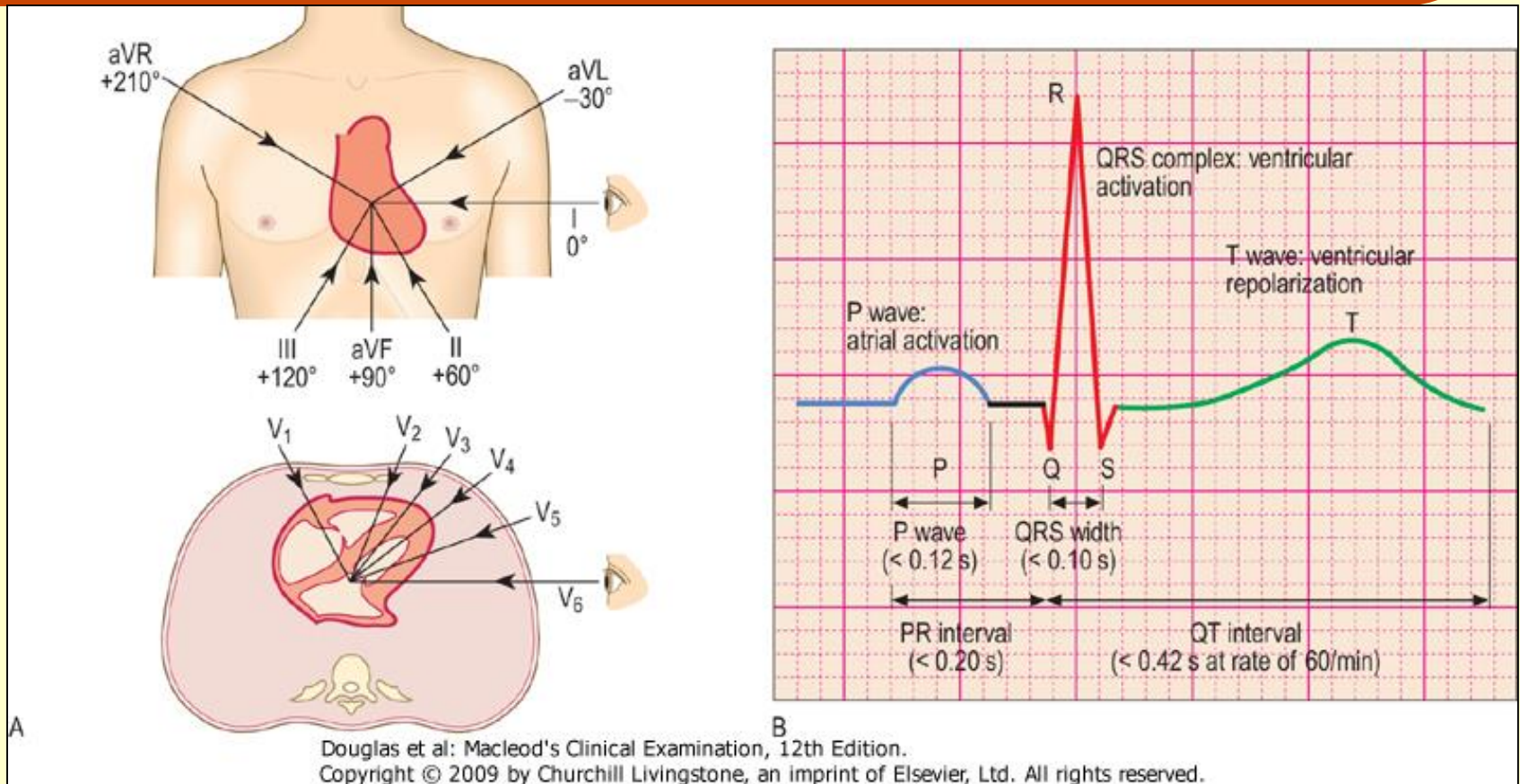
Ather/ectomy استئصال العصيدة



Word Building with cardi/o

–ac	Cardiac قلبي	pertaining to the heart
brady– –ia	Bradycardia ببطء قلب	state of slow heart
electr/o –gram	electrocardiogram تخطيط	record of heart's electricity
–megaly	Cardiomegaly ضخامة قلبية	enlarged heart
my/o –al	Myocardial عضلة قلبية	pertaining to heart muscle
–ologist	Cardiologist أخصائي قلبية	heart specialist
tachy– –ia	Tachycardia تسرع قلب	state of fast heart

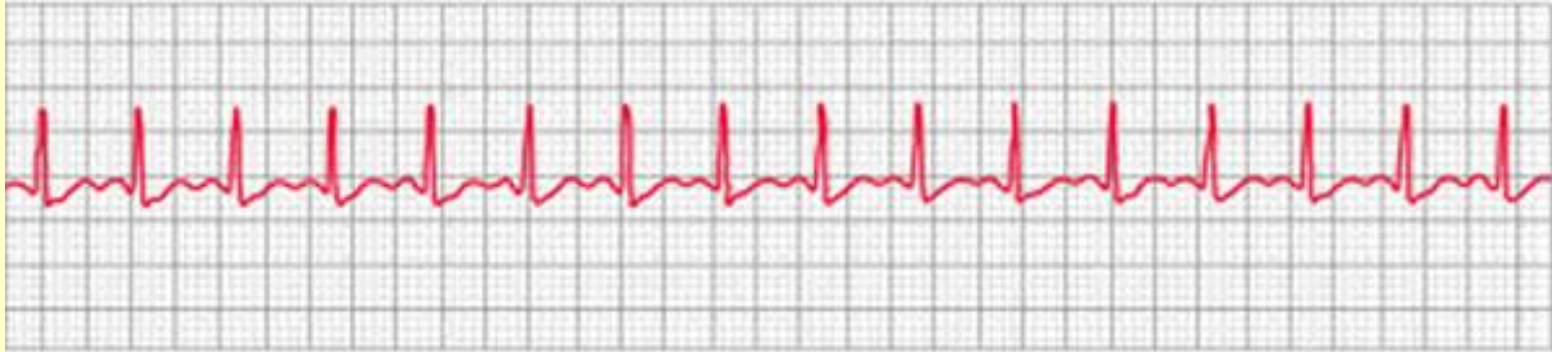
Electro/cardio/gram



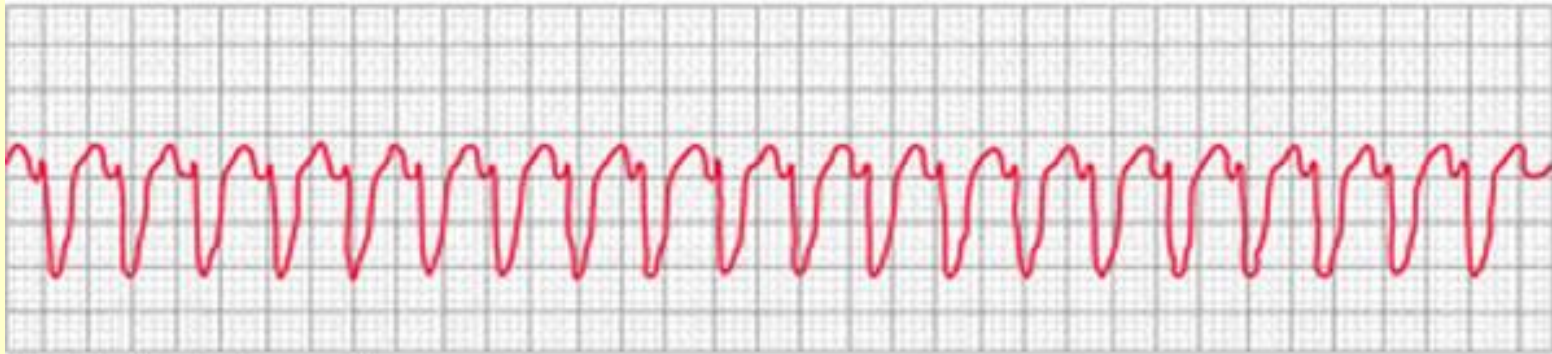
بطء قلب Brady/cardia



تسرع قلب Tachy/cardia

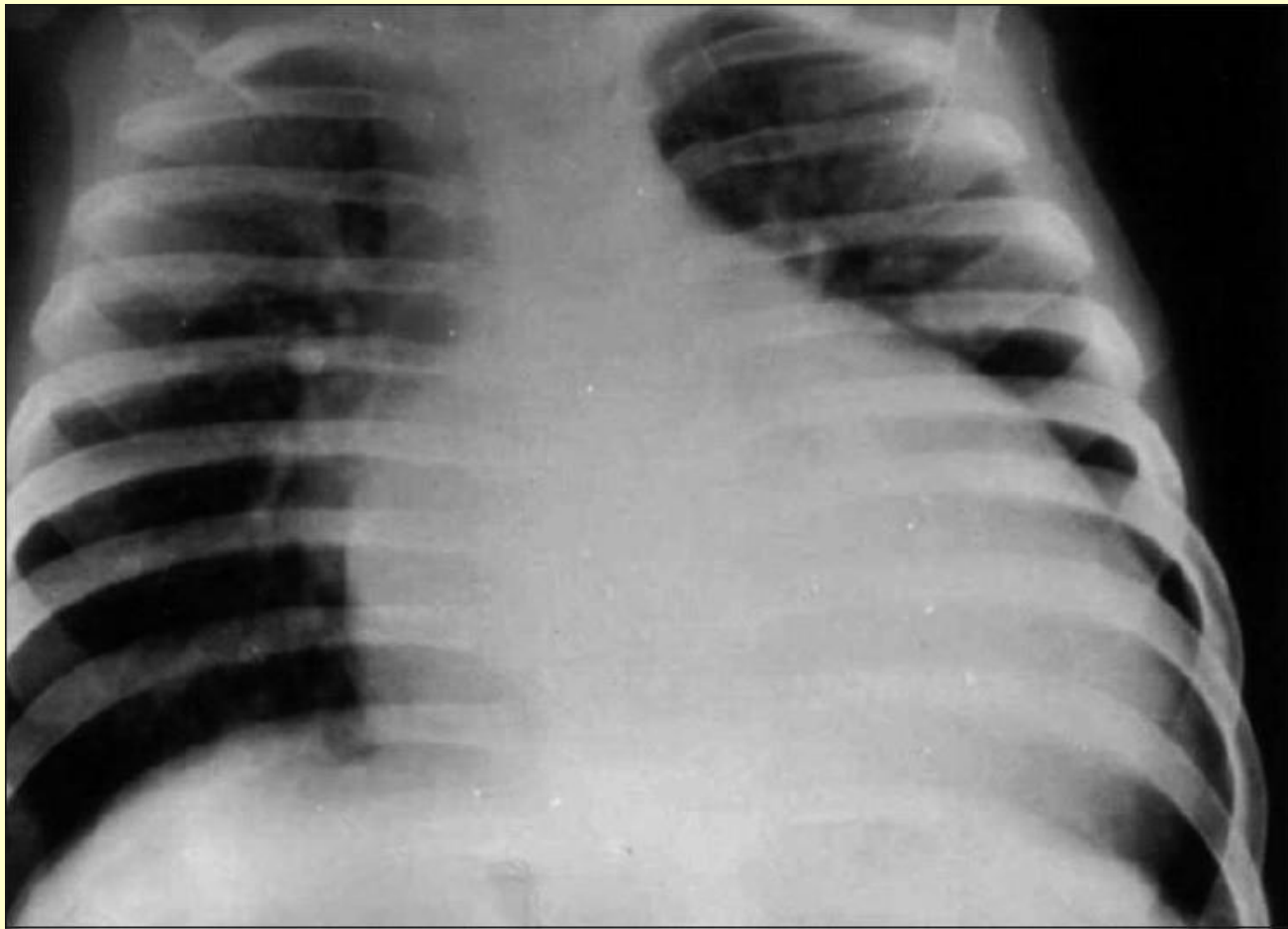


Sinus tachycardia



Ventricular tachycardia

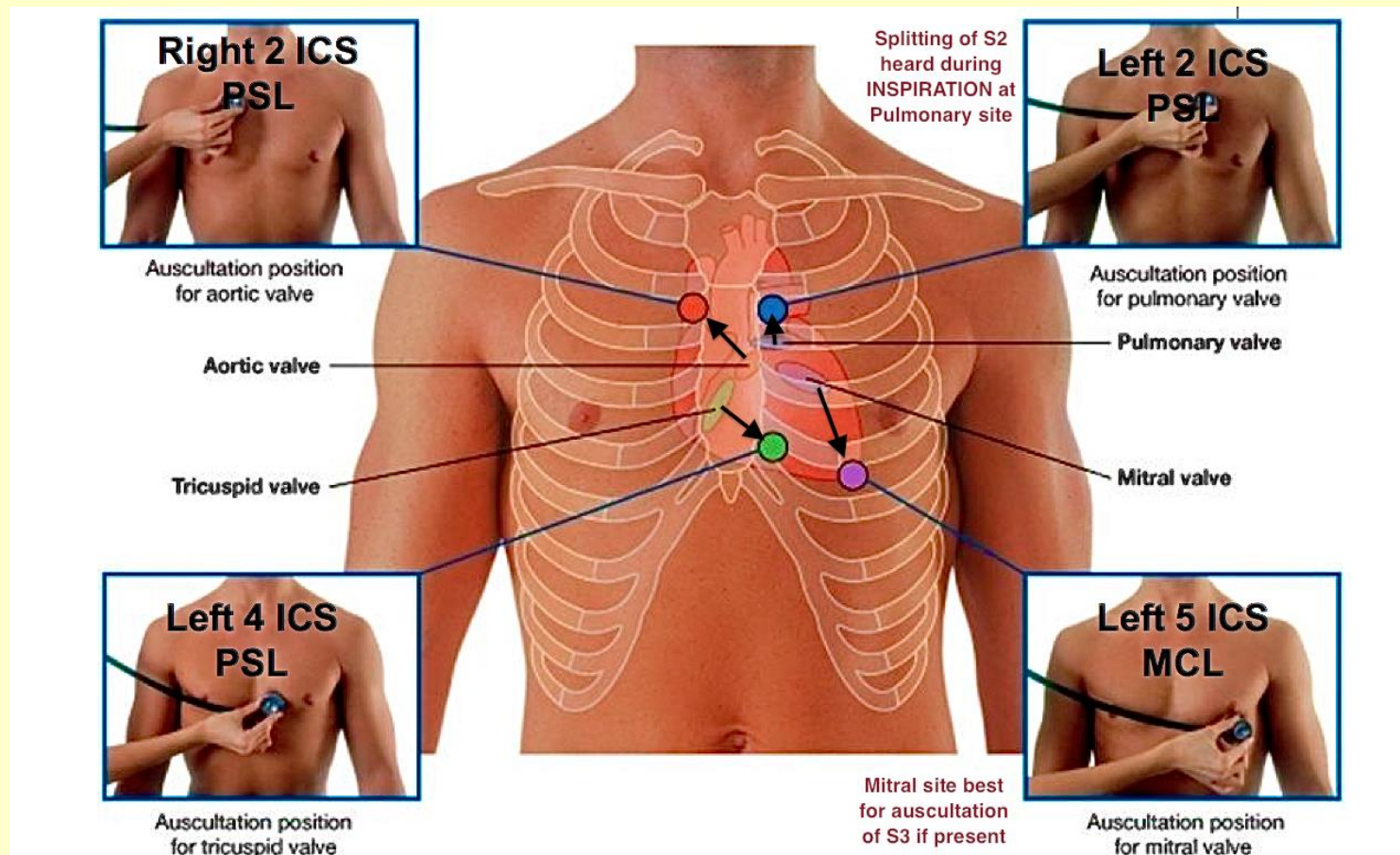
Cardio/megaly ضخامة قلب



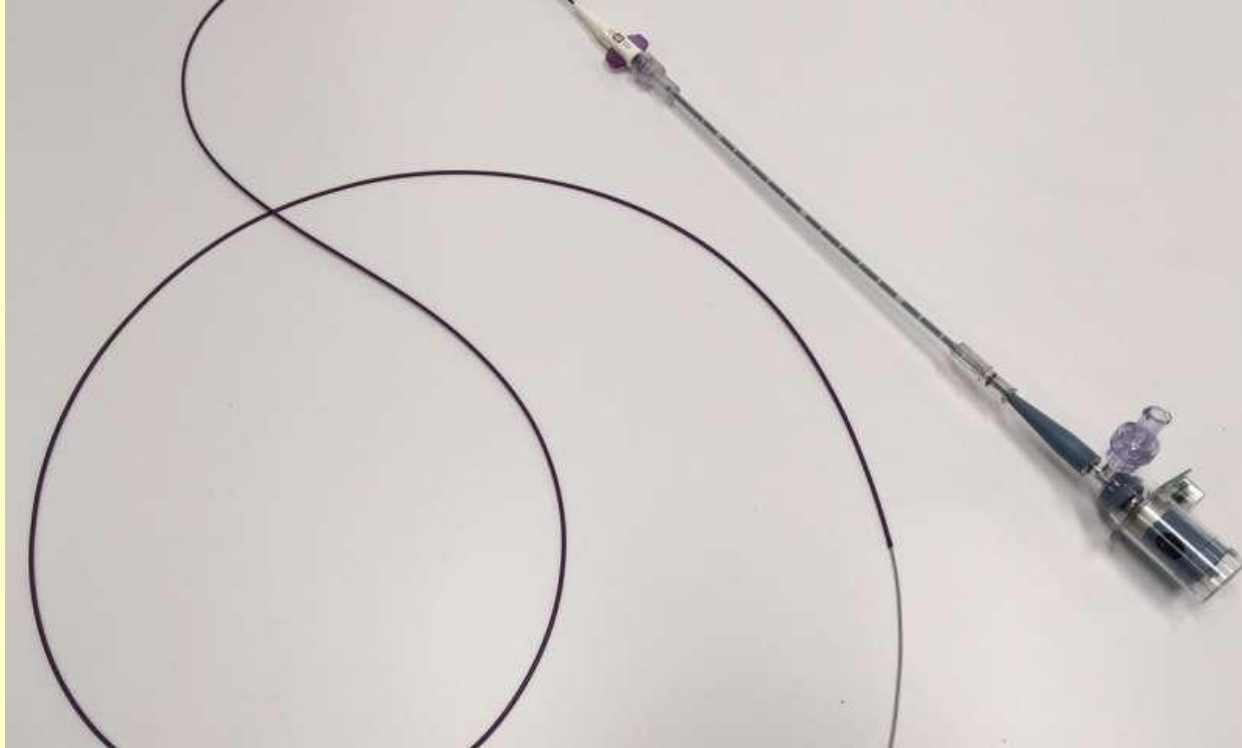
Cardiovascular Vocabulary

auscultation	listening to sounds within body using a stethoscope اصغاء القلب
cardiology	branch of medicine for diagnosis and treatment of cardiovascular disease; physician is a cardiologist قلبية
catheter	flexible tube inserted in body to move fluids into or out of body; may be used to place dye into a vein to view blood vessels قثطرة

Auscultation اصغاء القلب

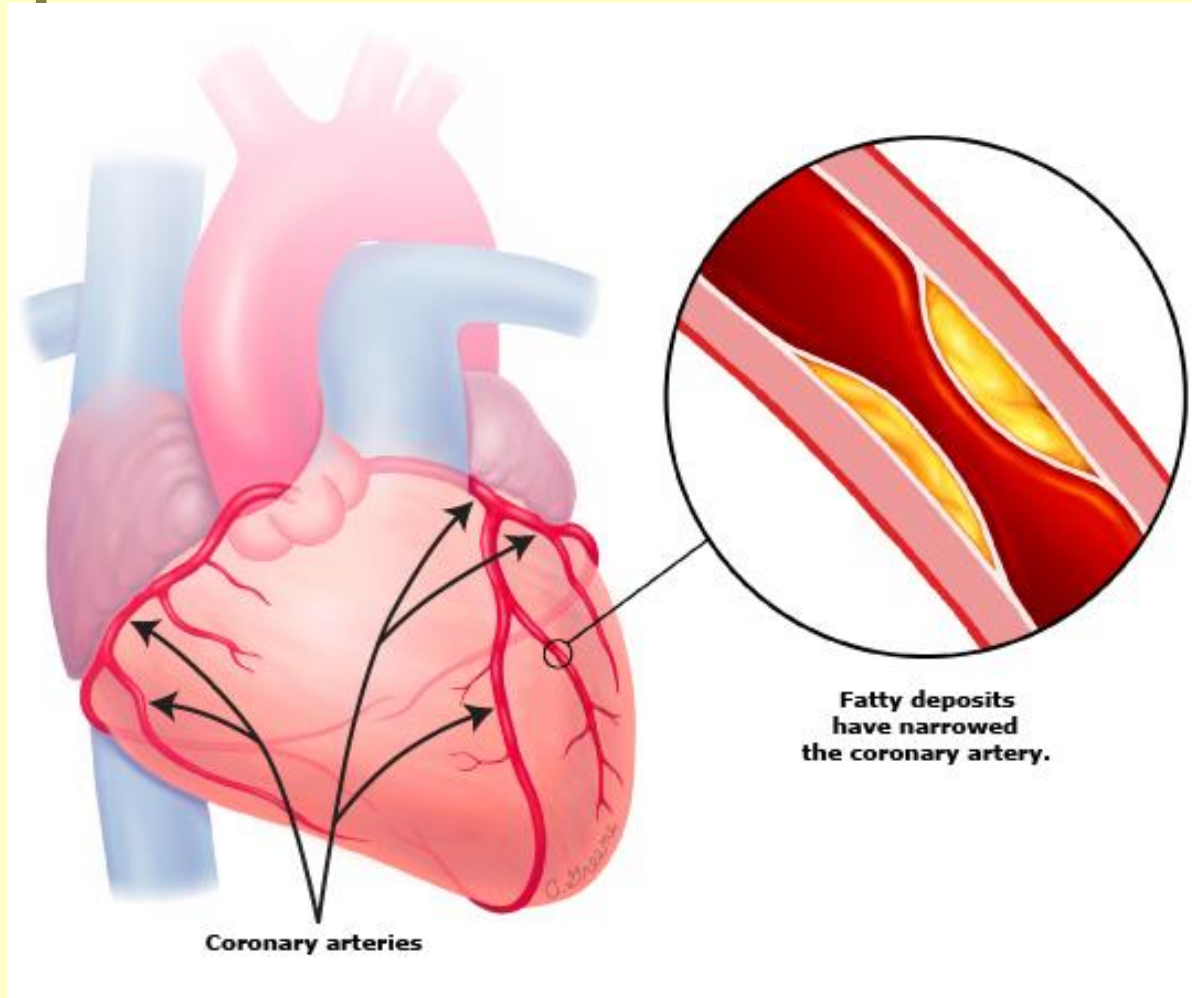


Catheter قثطرة قلبية



Ischemic Heart Disease

مرض القلب بنقص التروية

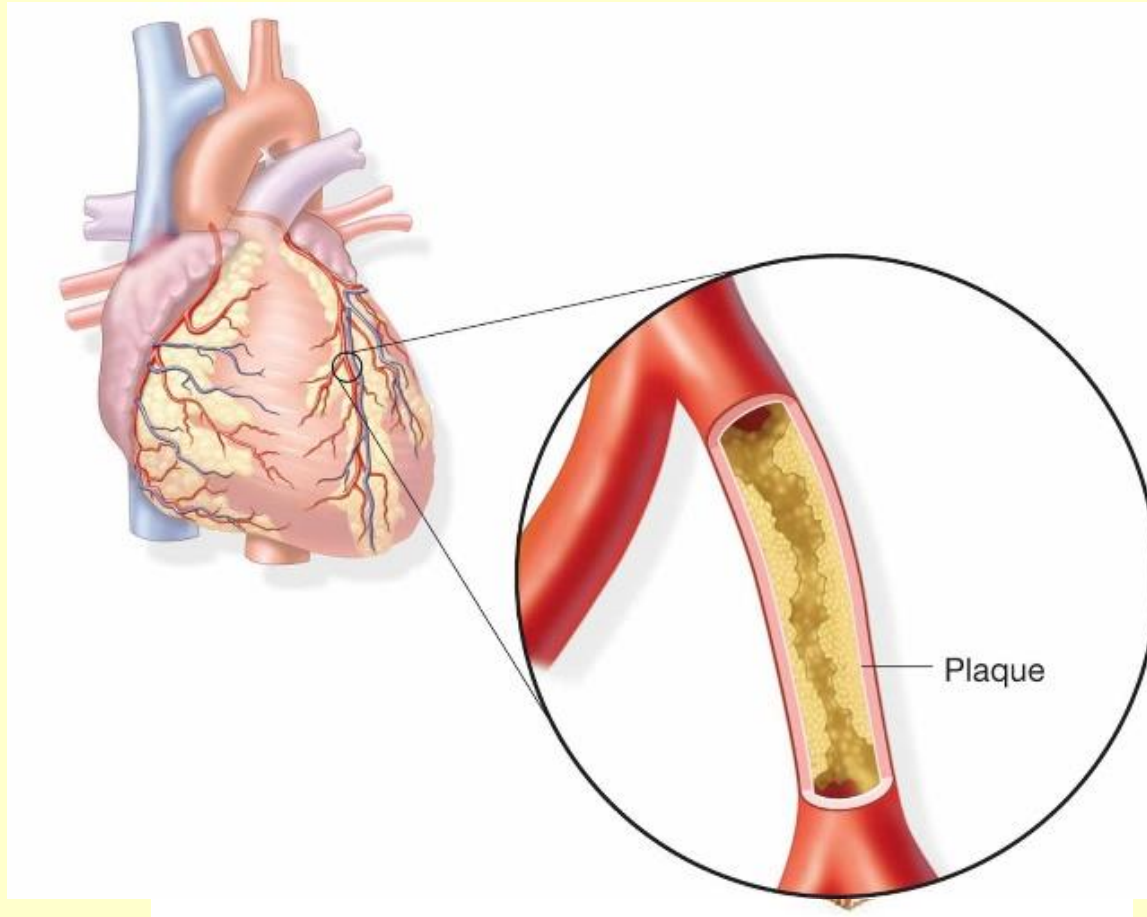


مرض العصر

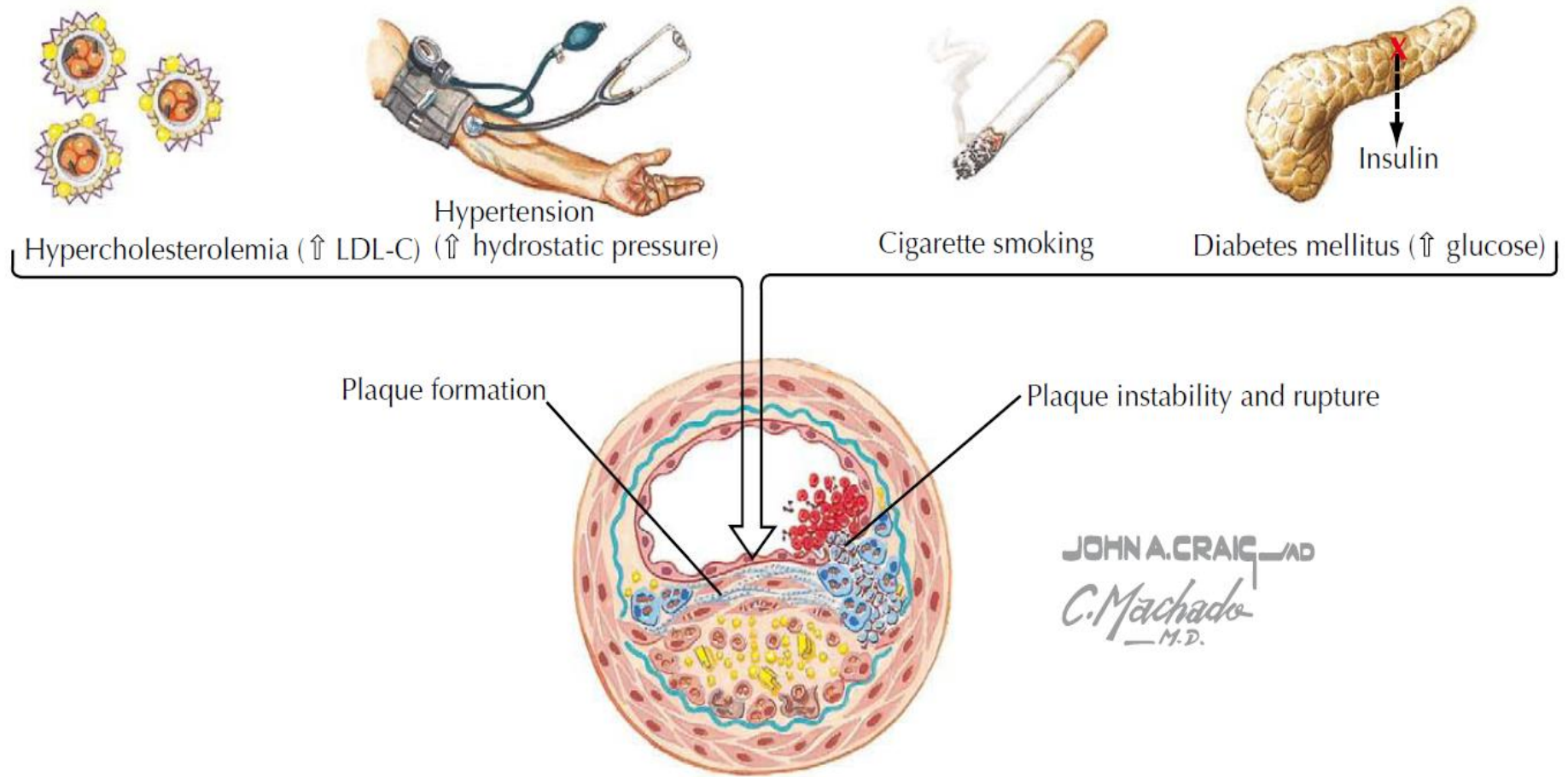
السبب: التصلب العصيدي Athero/sclerosis



التصلب العصيدي Athero/sclerosis



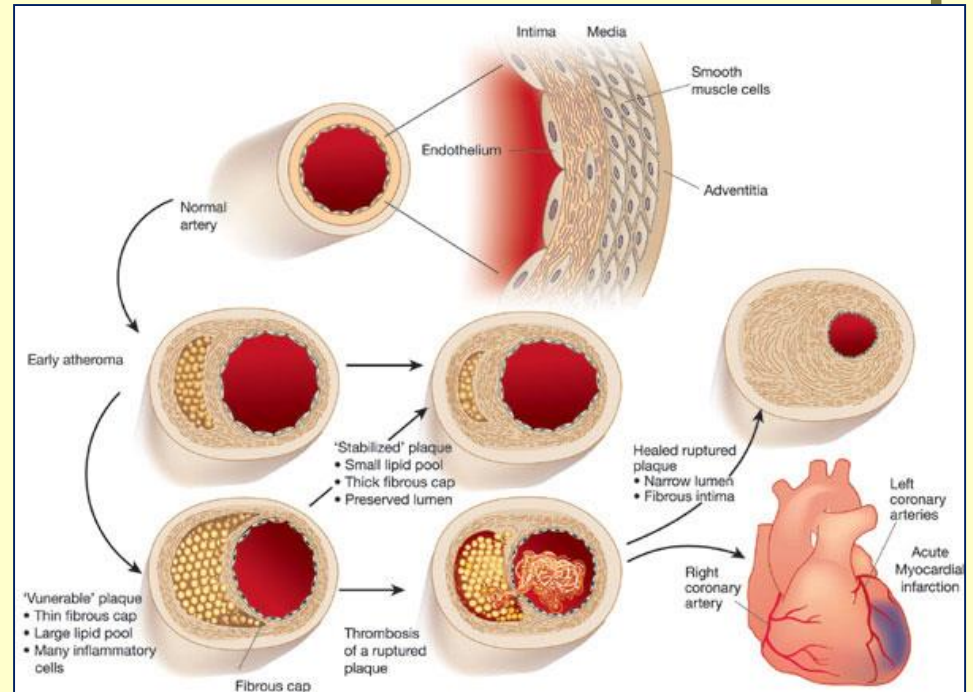
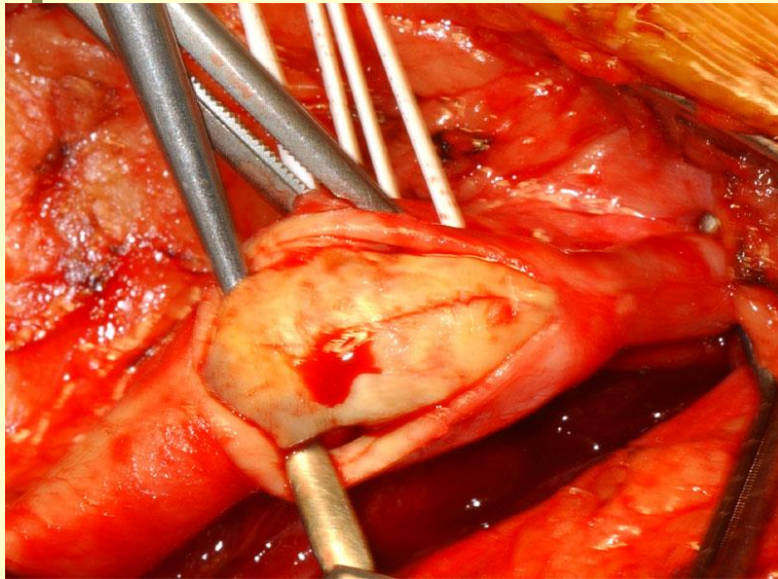
Risk Factors in Coronary Artery Disease



Stressful life + Smoking + Obesity



العصيدة الشريانية Ather/oma

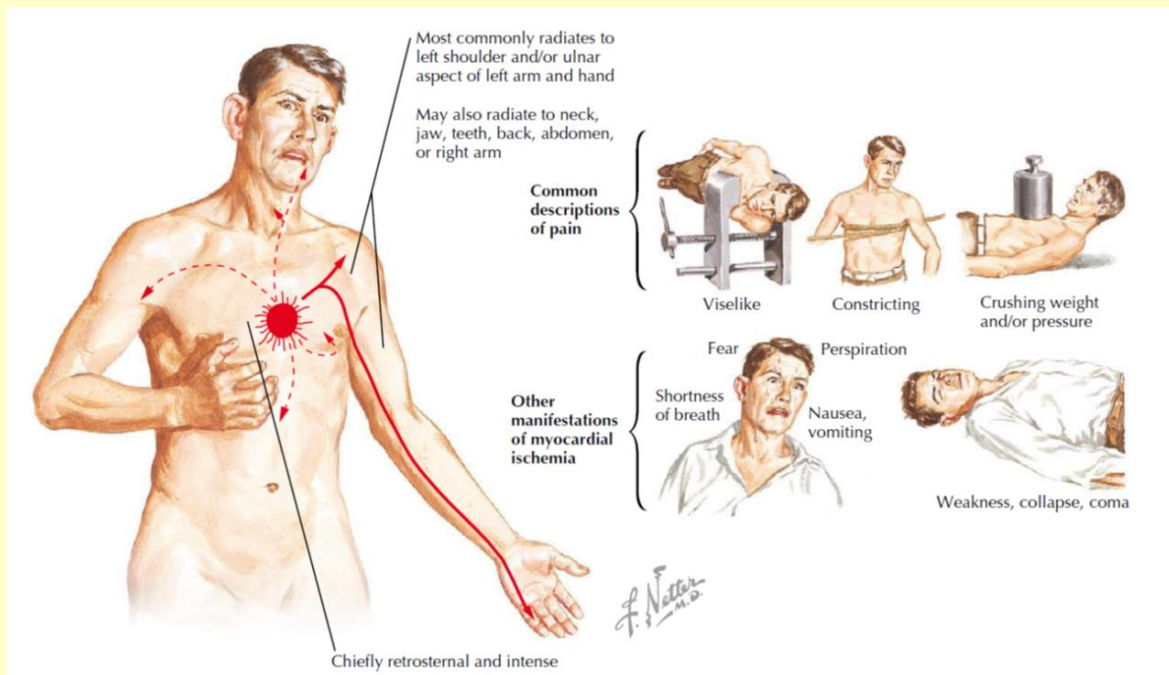


Pain of myocardial ischemia

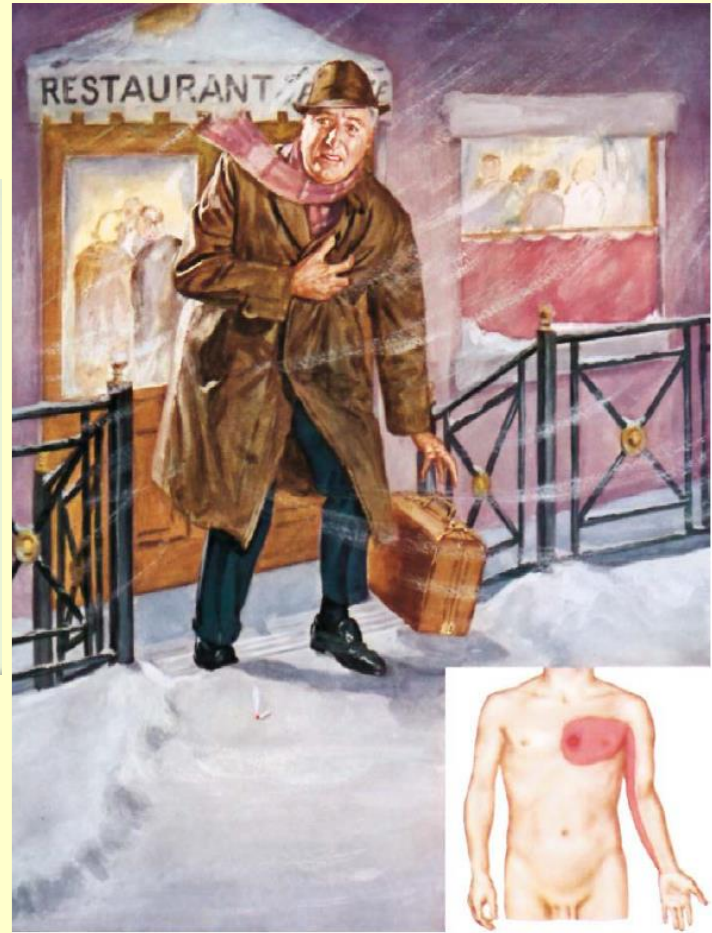
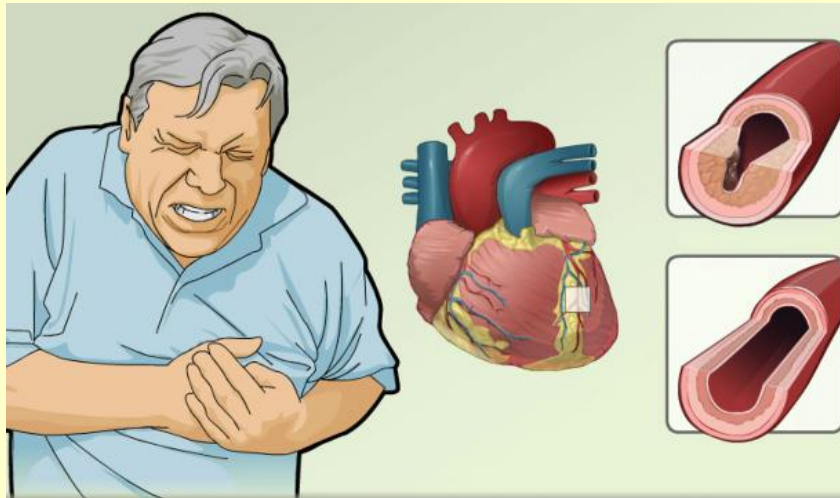
angina pectoris

الذبحة الصدرية

severe pain and sensation of constriction around heart; caused by myocardial ischemia



Angina Pectoris الذبحة الصدرية

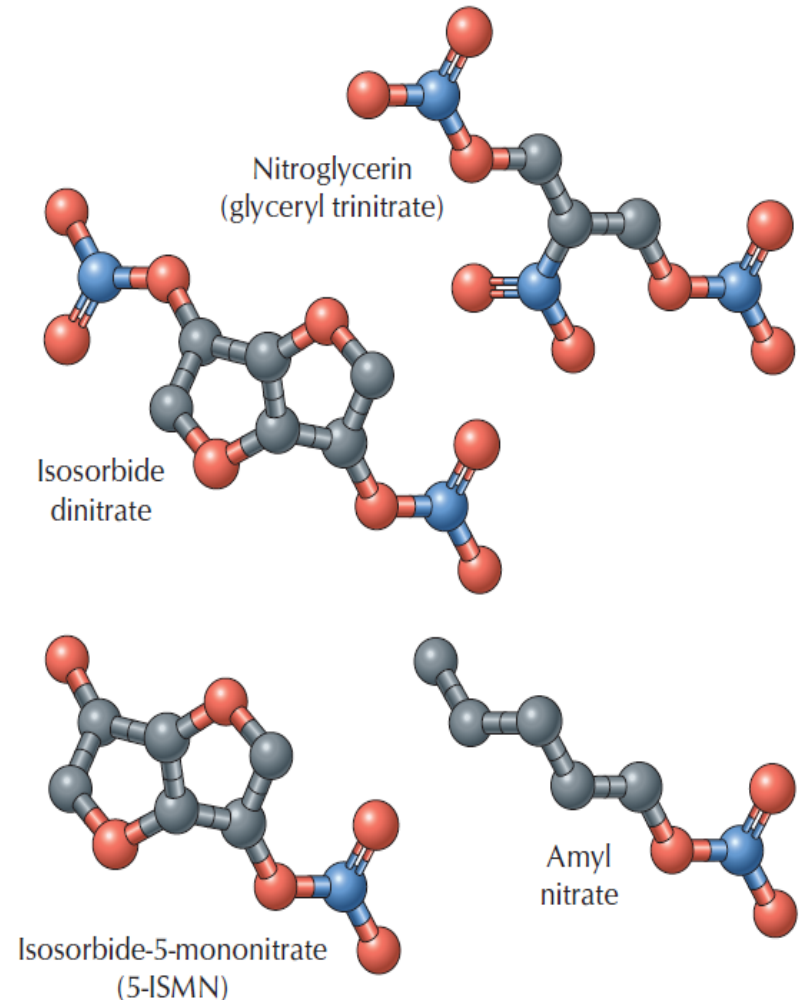


Nitroglycerin



Nitroglycerin

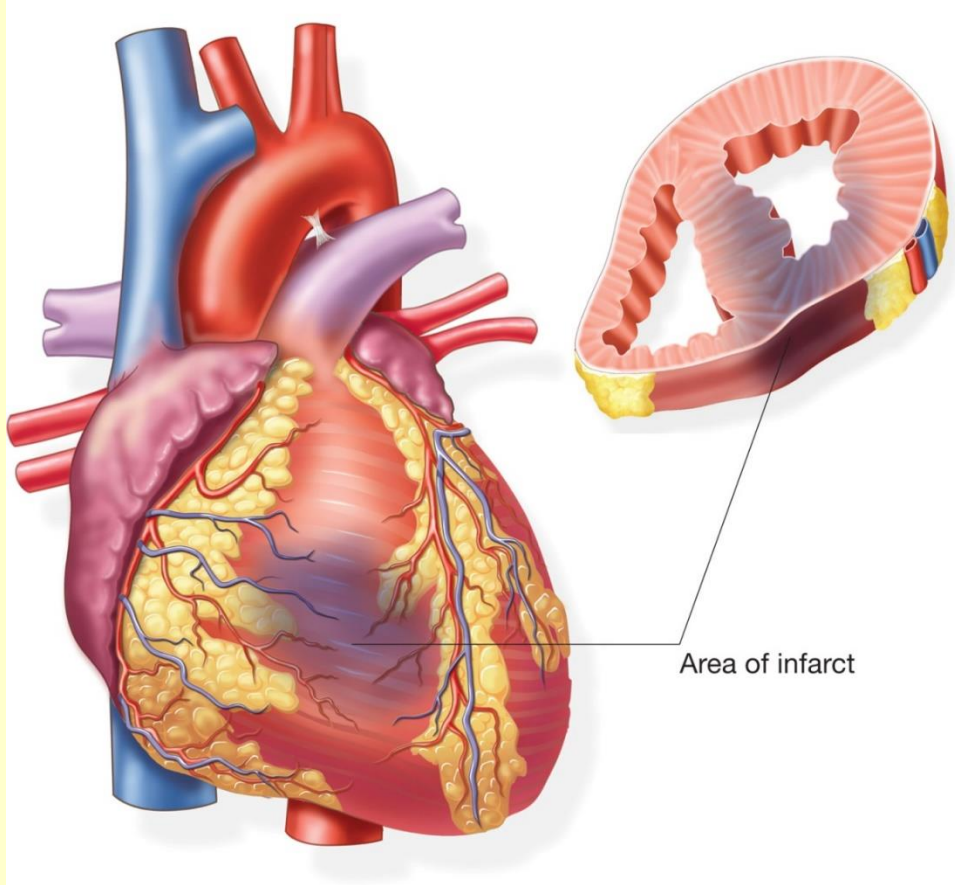
Nitrate Drugs	
Drug	Duration of Action
<i>"Short acting"</i> Nitroglycerin, sublingual Isosorbide dinitrate, sublingual Amyl nitrate, inhalant	10-30 minutes 10-60 minutes 3-5 minutes
<i>"Long acting"</i> Nitroglycerin, oral sustained-action Nitroglycerin, 2% ointment Nitroglycerin, slow release, buccal Nitroglycerin, slow release, transdermal Isosorbide dinitrate, sublingual Isosorbide dinitrate, oral Isosorbide dinitrate, chewable Isosorbide mononitrate	6-8 hours 3-6 hours 3-6 hours 8-10 hours 1.5-2 hours 4-6 hours 2-3 hours 6-10 hours
Side Effects	
Headache, tachycardia (abnormal elevation in heart rate), orthostatic hypotension, facial flushing, and tolerance; contraindicated with sildenafil	



Cardiovascular Vocabulary

Infarct احتشاء	area of necrotic tissue due to loss of blood supply
Ischemia نقص تروية	local and temporary deficiency of blood supply due to a circulatory obstruction
orthostatic hypotension هبوط توتر انتصابي	sudden drop in blood pressure when standing up suddenly

احتشاء Infarct



الاحتشاء : منطقة متموتة في
العضلة القلبية بسبب انقطاع
الارواء الدموي

Myocardial infarction احتشاء العضلة القلبية

Diabetes mellitus

High BMI
(↑ insulin resistance)

Smoking

Elevated
blood
pressure

↑ Clotting factors

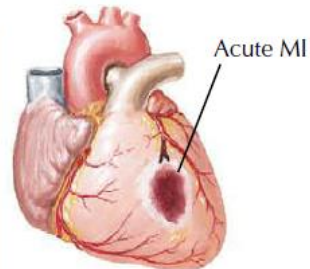
↑ Hgb A_{1c}

↑ LDL-C and triglycerides

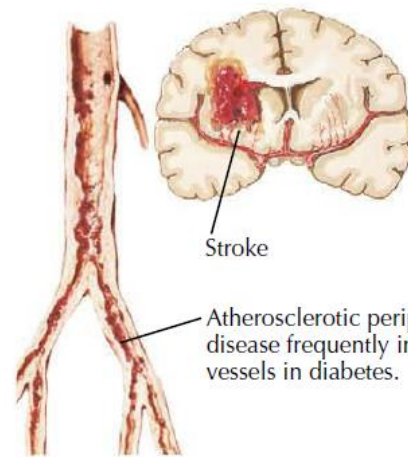
↓ HDL-C

Microalbuminuria
(↑ risk of loss of renal
function and CHD)

Diabetic patient with high-risk factors for cardiovascular disease



Acute MI is often
first symptom of
cardiovascular disease.



Stroke

Atherosclerotic peripheral vascular
disease frequently involves distal
vessels in diabetes.

Morbidity and mortality from cardiovascular and other atherosclerotic diseases involving cerebral and peripheral vessels are 2 to 3 times higher among persons with diabetes.



Increased incidence of type II diabetes in children and adolescents raises the likelihood premature CHD will develop.

Orthostatic hypotension هبوط التوتر الانتصابي



Cardiovascular Vocabulary

palpitations

pounding, racing heartbeats خفقان

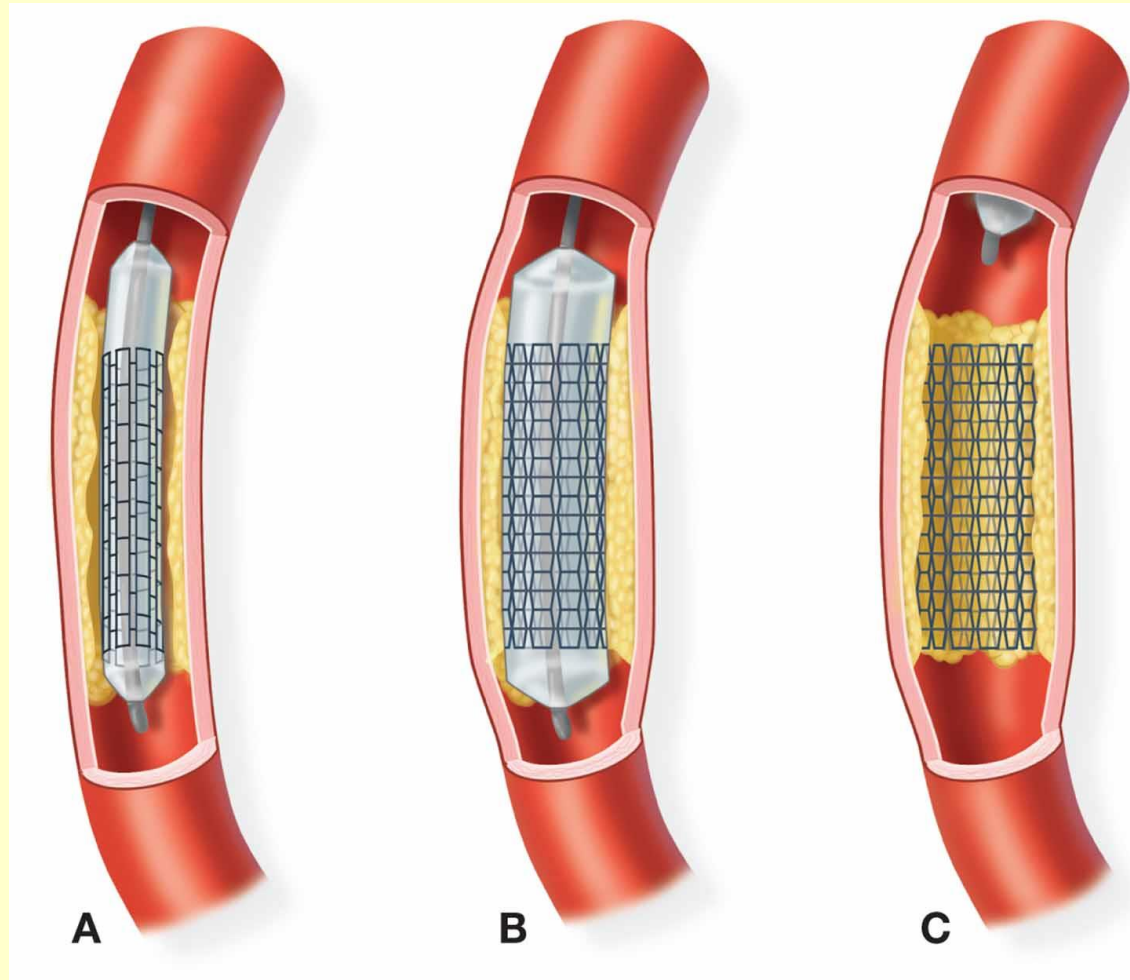


Cardiovascular Vocabulary

Sphygmomanometer مقياس الضغط	blood pressure cuff; measures blood pressure
Stent شبكة	stainless steel tube placed within blood vessel to widen the lumen
Stethoscope سماعة طبية	instrument for listening to body sounds



Using a sphygmomanometer
to measure blood pressure.



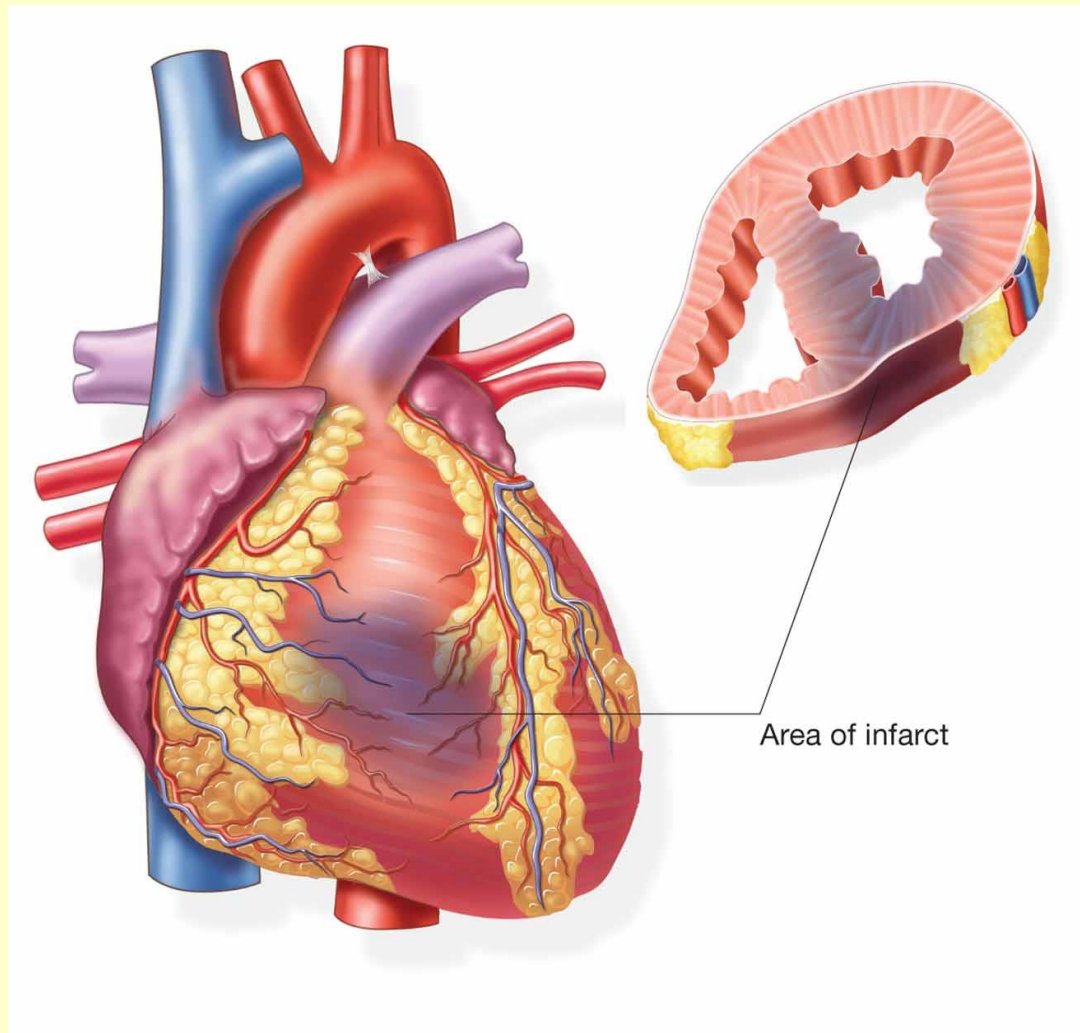
A catheter is used to place a collapsed stent next to an atherosclerotic plaque; B) stent is expanded; C) catheter is removed, leaving the expanded stent behind.

Stethoscope



Heart Pathology

myocardial infarction (MI)	occlusion of coronary artery; results in a myocardial infarct; a heart attack
Myocarditis التهاب العضلة القلبية	inflammation of heart muscle layer
Pericarditis التهاب التامور	inflammation of pericardial sac

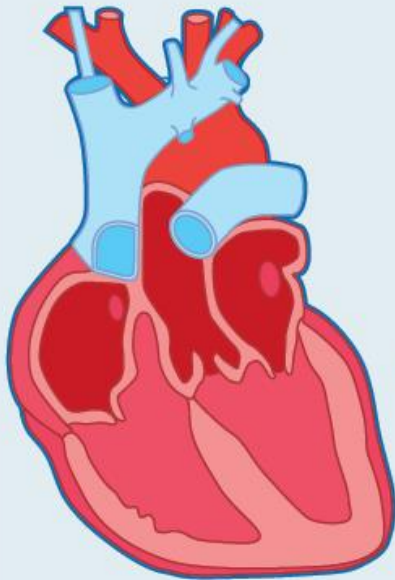


External and cross-sectional view of an infarct caused by a myocardial infarction احتشاء العضلة القلبية

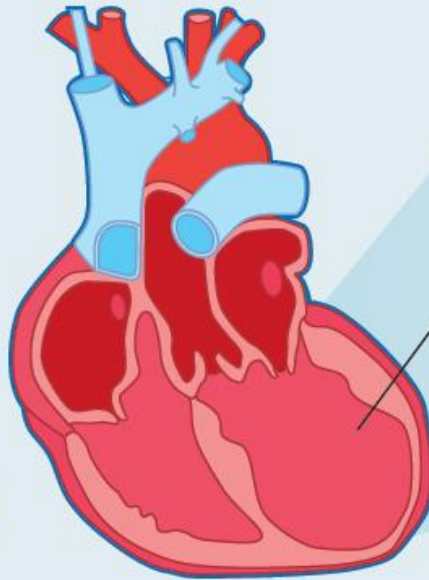
Broken Heart Syndrome



BROKEN HEART SYNDROME



Normal heart



"Broken" heart

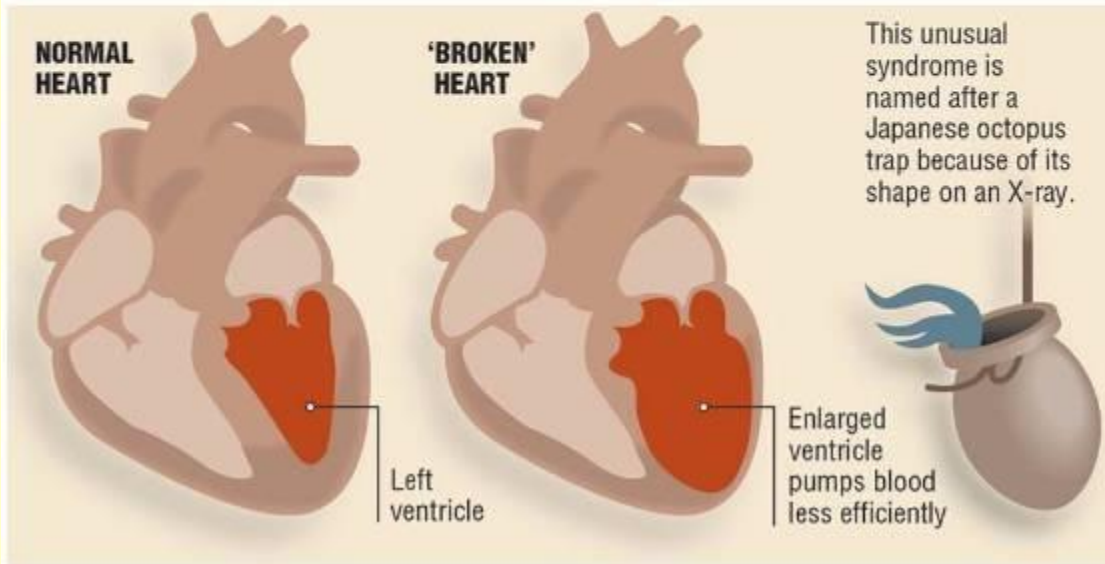
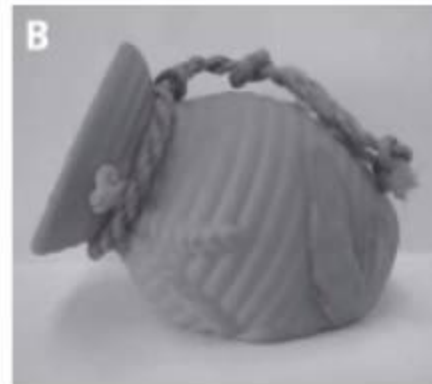
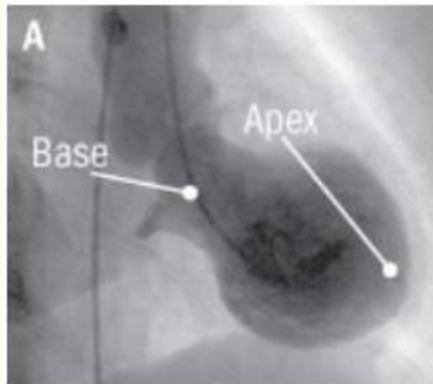
Left
ventricle
changes
shape



Takotsubo octopus trap

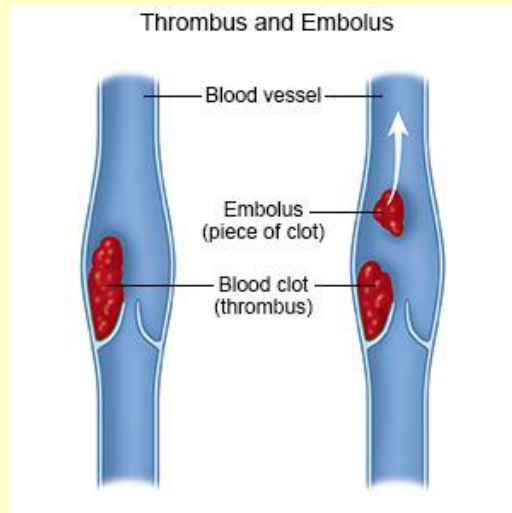
In stress-induced heart failure, one part of the heart moves in a ballooning pattern, and it resembles a typical ceramic Japanese octopus trap (above).

Broken Heart Syndrome



Blood Vessel Pathology

Embolus صمة	obstruction of blood vessel by blood clot that has broken off from a thrombus in another site
Hemorrhoid بواسير	varicose veins in anal region



Doppler Guided Hemorrhoidal Artery Ligation



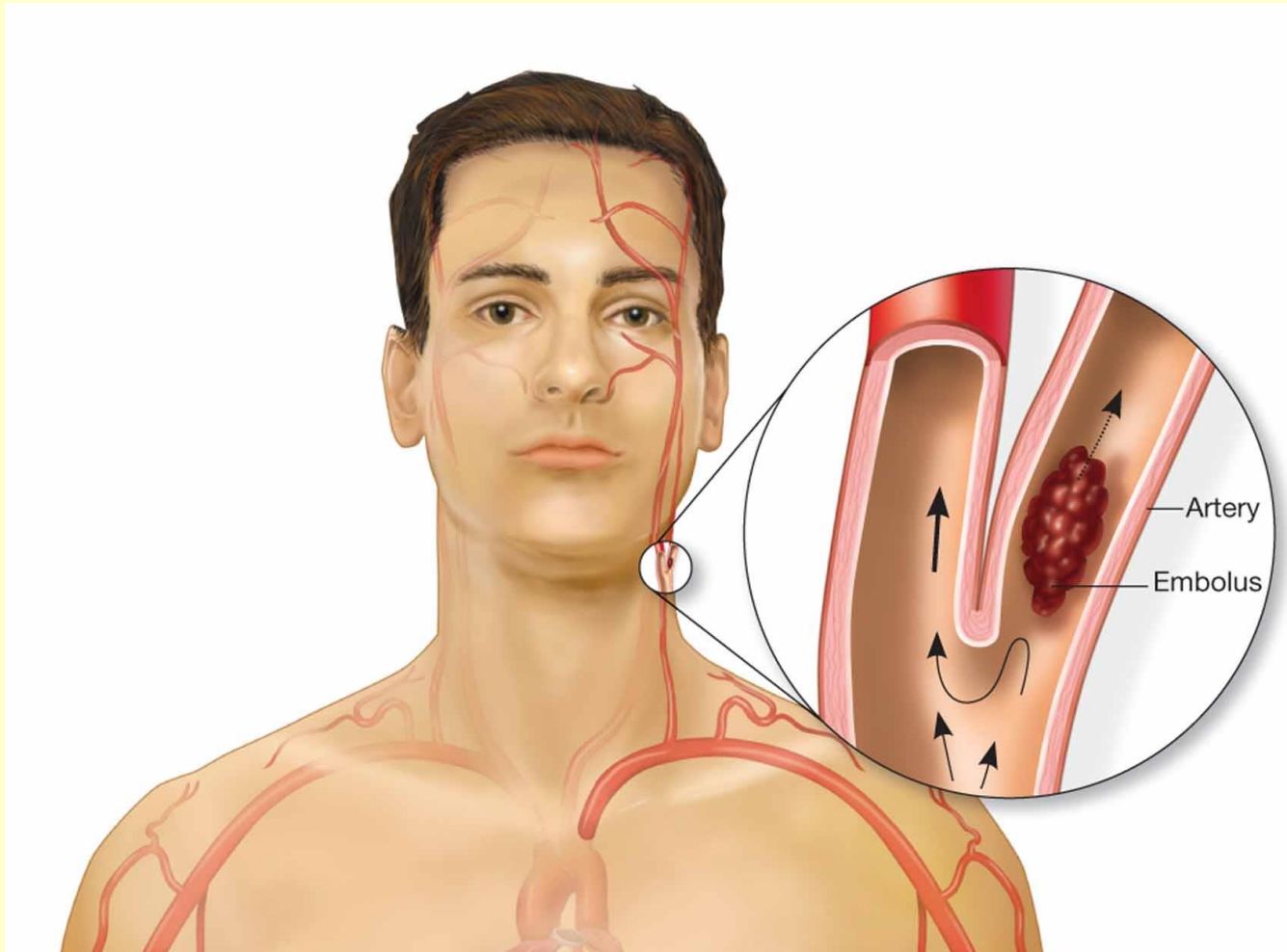


Illustration of an embolus floating in an artery. The embolus will become lodged in a blood vessel that is smaller than it is, resulting in occlusion of that artery.

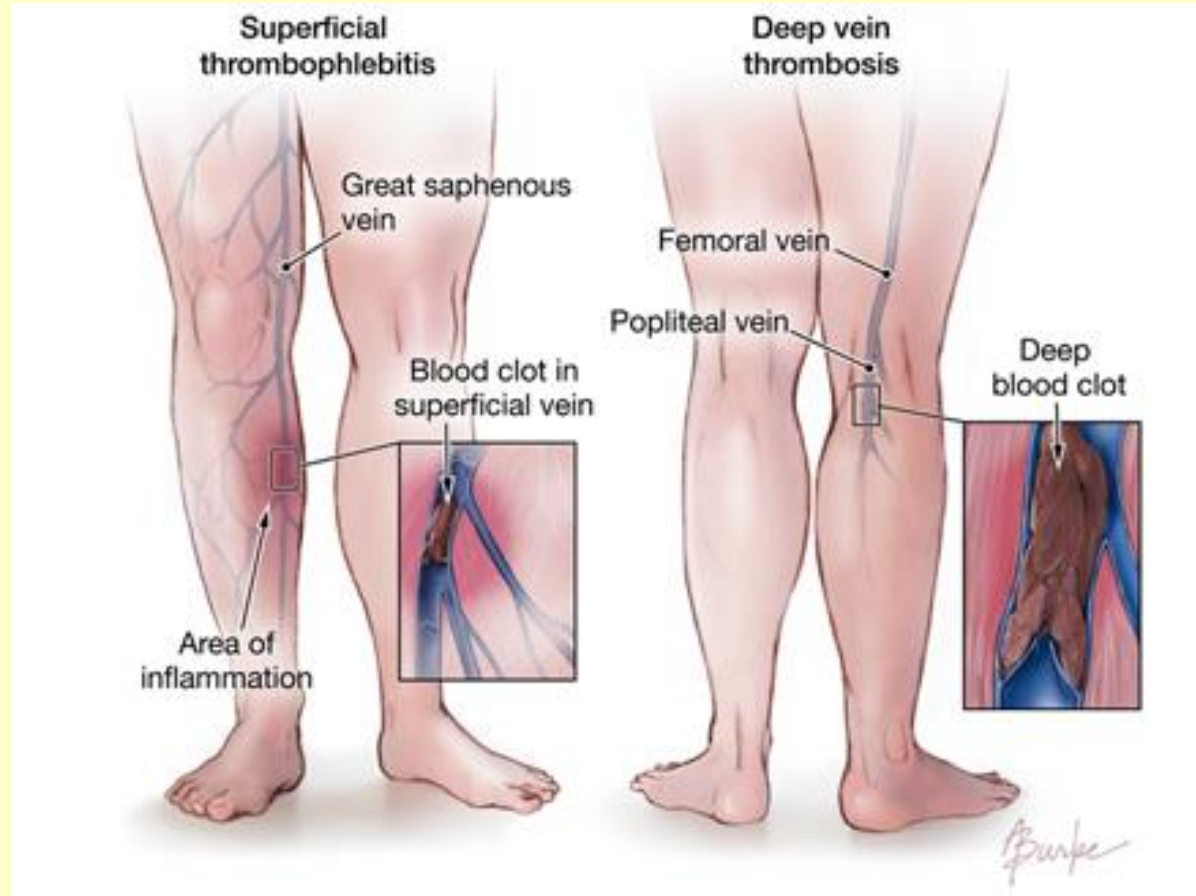
Blood Vessel Pathology

hypertension (HTN) ارتفاع الضغط	high blood pressure; essential or primary hypertension is due to CV disease; secondary hypertension results from another disease
Hypotension هبوط الضغط	decrease in blood pressure; may be due to shock or anemia

Blood Vessel Pathology

Thrombophlebitis التهاب الوريد الخثري	inflammation of vein resulting in blood clots within a vein
Thrombus خثرة	blood clot within a blood vessel; may partially or completely occlude blood vessel
varicose veins	swollen and distended veins; often in the legs

التهاب الوريد الخثري Thrombo/phleb/itis



Varicose veins دوالي أوردة الطرفين السفليين



Clinical Laboratory Tests

cardiac enzymes	blood test determines level of enzymes specific to heart muscle in blood; an increase may indicate heart muscle damage such as a myocardial infarction
serum lipoprotein level	blood test measures amount of cholesterol and triglycerides in blood; indicator of atherosclerosis risk

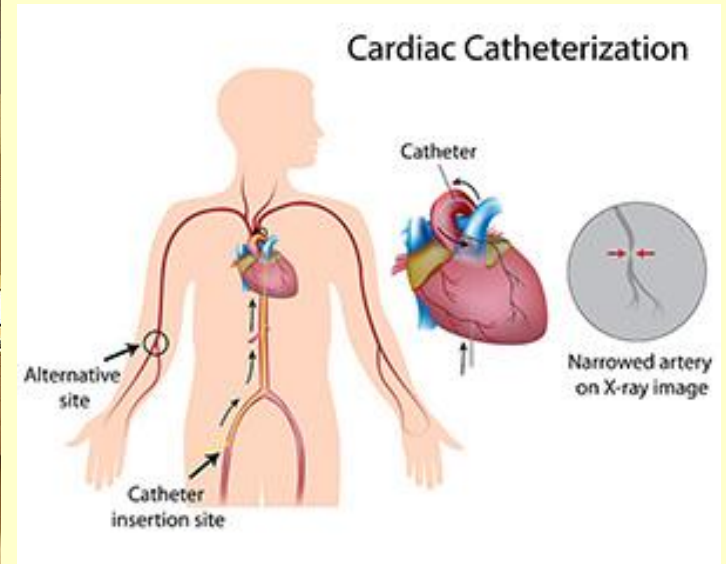
Cardiac Function Tests

cardiac
catheterization

قثطرة قلبية

catheter is threaded through blood vessel to heart; detects abnormalities, collects cardiac blood samples, and determines blood pressure inside heart

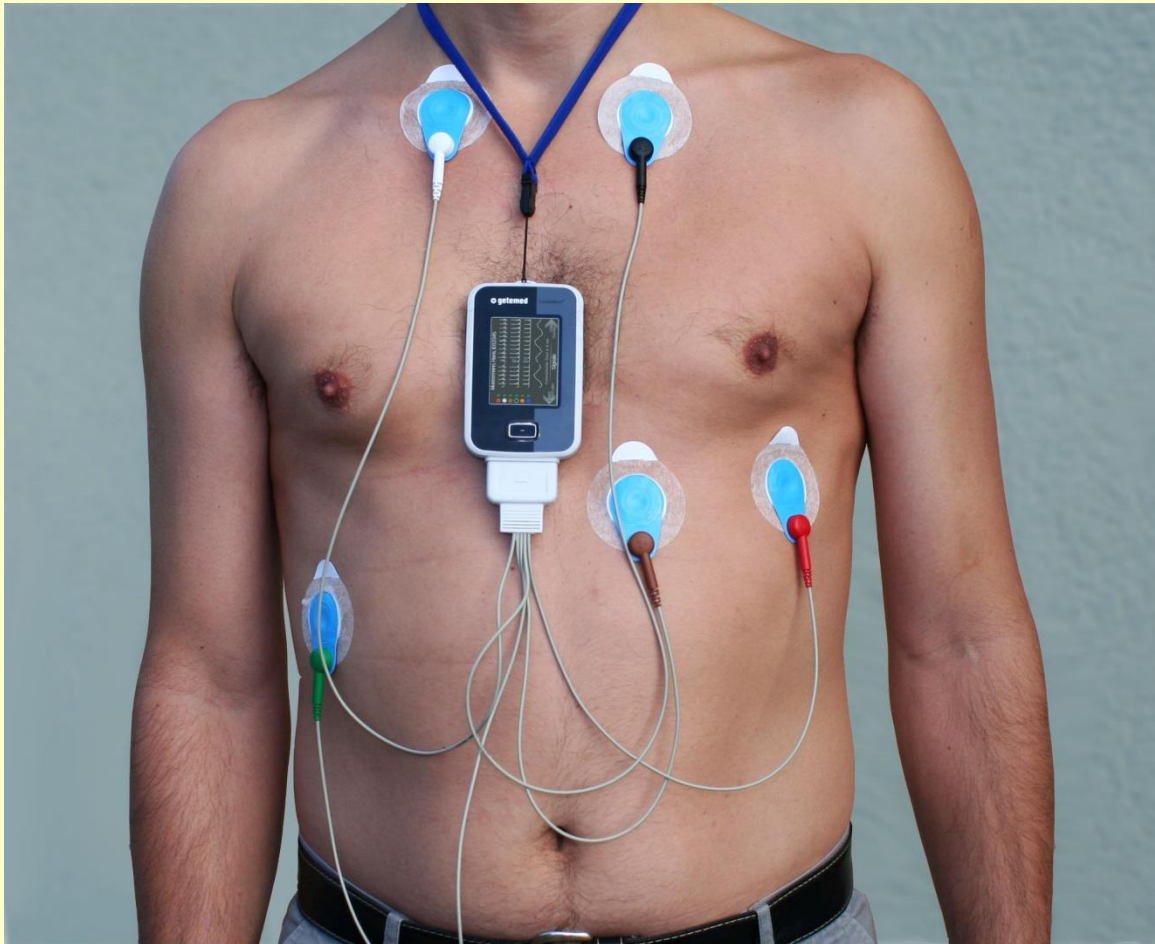
cardiac catheterization قثطرة قلبية



Cardiac Function Tests

Holter monitor	portable ECG monitor worn by patient up to a few days to assess heart activity as person goes through daily activities
stress testing اختبار الجهد	evaluates cardiovascular fitness; patient exercises on treadmill or bicycle with a steadily increasing work load; EKG and oxygen levels are monitored throughout the test

Holter monitor





Man undergoing stress test on a treadmill . اختبار الجهد

Medical Procedures

cardiopulmonary
resuscitation
(CPR)

الإنعاش القلبي التنفسي

procedure to restore cardiac output and oxygenate air for person in cardiac arrest; uses chest compressions and artificial respiration

cardiopulmonary resuscitation (CPR)

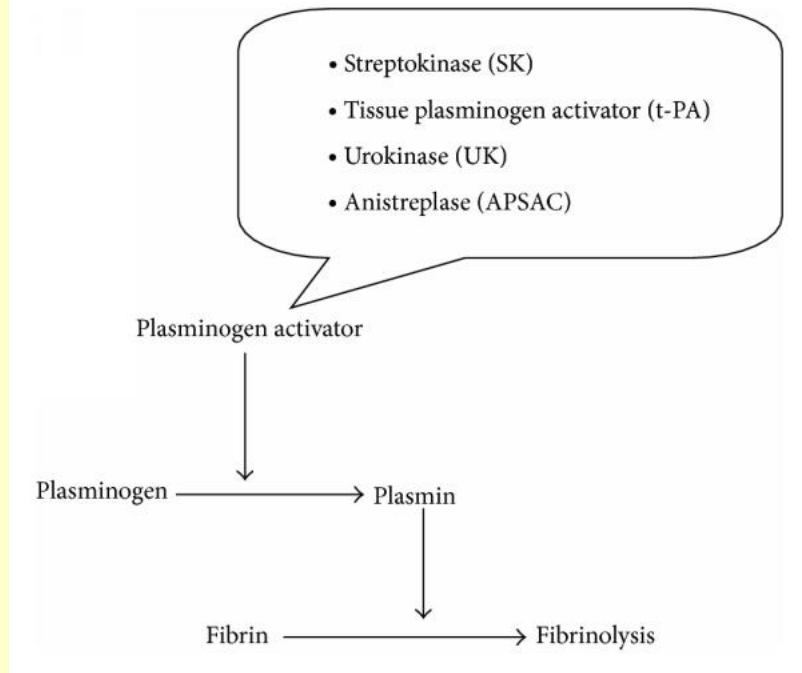
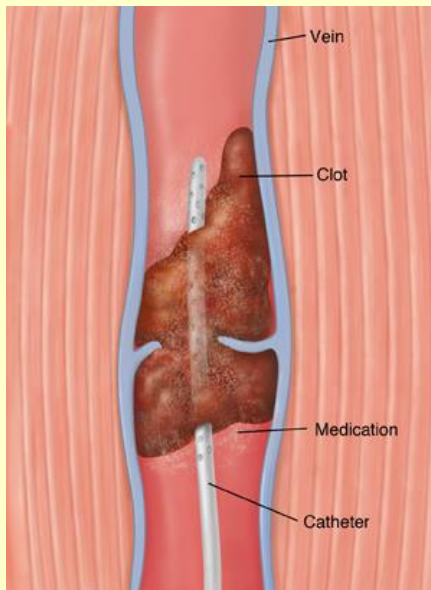


Medical Procedures

thrombolytic
therapy

العلاج الحال للخرثرة

use of drugs, such as streptokinase or tissue-type plasminogen activator, to dissolve clots and restore blood flow

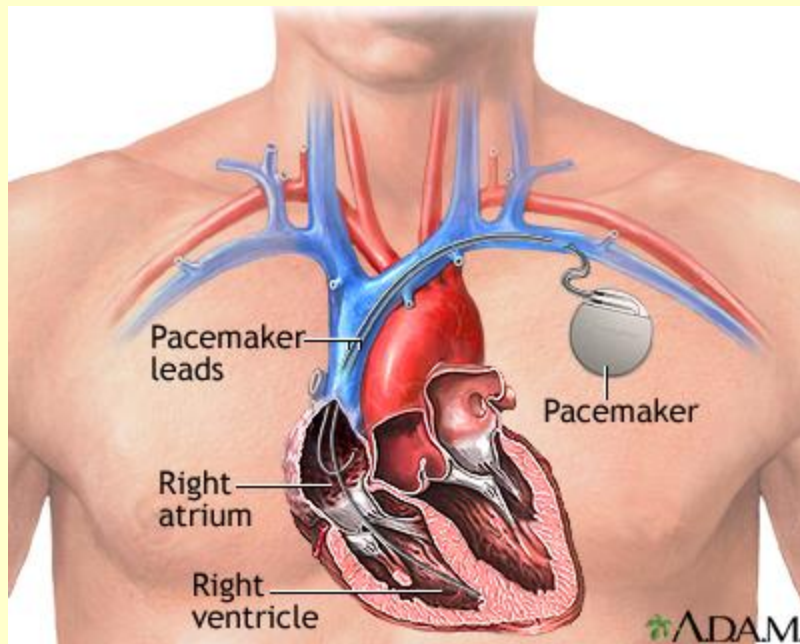


Cardiovascular Pharmacology

Antiarrhythmic مضاد اضطراب نظم	reduces or prevents cardiac arrhythmias	Tambocor, Corvert
Anticoagulant مضاد تخثر	prevents blood clot formation	Warfarin, Coumadin
Antilipidemic خافض لشحوم الدم	reduces blood cholesterol level	Lipitor, Zocor

Artificial cardiac pacemaker

ناظم الخطى القلبي



Cardiovascular Pharmacology

Beta-blocker	lowers heart rate to treat hypertension and angina pectoris	Lopressor, Inderal
Calcium channel blocker	decreases force of heart beat to treat hypertension, angina pectoris, and congestive heart failure	Cardizem, Procardia
cardiotonic	increases force of heart contraction to treat congestive heart failure	Lanoxin

Cardiovascular Pharmacology

Cardiotonic drugs

- Drugs which increase the force of contraction of the heart, are called cardiotonic drugs.
- **Classification:**
 1. Cardiac glycosides
 - Digoxin
 - Digitoxin
 2. Sympathetic drug
 - Adrenaline
 - Dopamine
 - Isoprenaline
 3. Anticholinergic drugs
 - Atropine
 - Scopolamine
 4. Xanthines
 - Theophylline
 - Theobromine

Cardiovascular Pharmacology

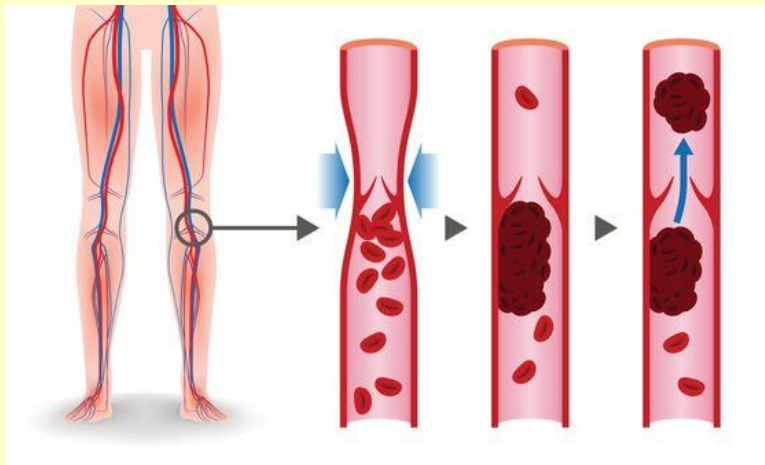
Diuretic مدر	increases urine production to reduce plasma volume to lower blood pressure	Lasix
Thrombolytic حال للخرثرة	dissolves existing blood clot	Plavix, Activase

Cardiovascular Pharmacology

Vasoconstrictor مقلص وعائي	contracts smooth muscle in wall of blood vessel to raise blood pressure	Aramine
Vasodilator موسع وعائي	relaxes smooth muscle in wall of blood vessel to reduce blood pressure and increase blood flow to ischemic area	Nitro-Dur, Vasodilan

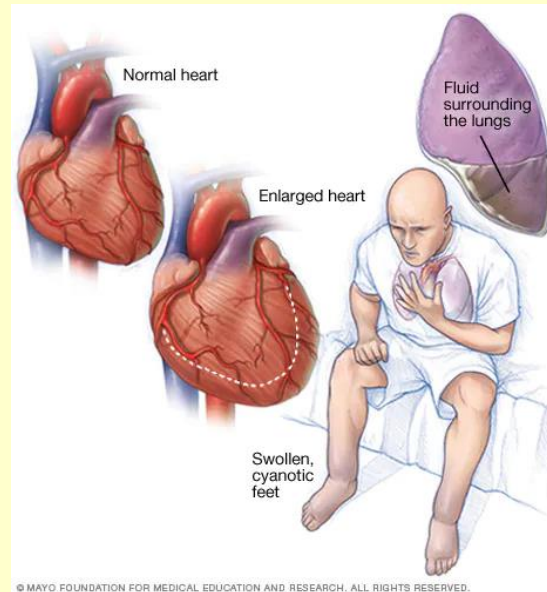
Cardiovascular Abbreviations

CPK	creatine phosphokinase
CPR	cardiopulmonary resuscitation
CV	cardiovascular
DVT	deep vein thrombosis



Cardiovascular Abbreviations

LDH	lactate dehydrogenase
HTN	hypertension
CHF	Congestive Heart failure قصور قلب احتقاني



Thank You

