

Flexible Education Assignment
Pharmacy Tech

Week #1

Use the attached pages to copy down your Key terms into your assignment notebook.

Make review flashcards over the copied Key terms.

Take a photo of your completed work and attach it to an email to receive credit for your work.

Week #2

Drug Review

Use the pages copied from the book to make up a review game of the drugs.

Take a photo of your completed work and attach it to an email to receive credit for your work.

Therapeutic Agents for the Cardiovascular System

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OBJECTIVES

Upon completing this chapter, you should be able to do the following:

1. Describe the major components of the cardiovascular system.
2. List the primary symptoms of conditions associated with dysfunction of the cardiovascular system.
3. Recognize drugs used to treat the conditions associated with the cardiovascular system discussed in this chapter.
4. Write the generic and trade names for the drugs discussed in this chapter.
5. List appropriate auxiliary labels when filling prescriptions for drugs discussed in this chapter.

TERMS AND DEFINITIONS

Aldosterone A steroid hormone secreted by the adrenal cortex that regulates the salt and water balance in the body

Aneurysm A balloonlike bulge or dilation of an artery due to weakening of the arterial wall

Angina Chest pain due to an inadequate supply of oxygen to the heart muscle

Angiotensin II A peptide hormone that causes vasoconstriction and a subsequent increase in blood pressure

Anticoagulant An agent used to prevent the formation of blood clots

Antihyperlipidemics A diverse group of pharmaceuticals used in the treatment of hyperlipidemia

Aorta The great arterial trunk that carries blood from the heart to be distributed to tissues of the body

Arrhythmia An abnormal or irregular heart rhythm

Arteriosclerosis A condition characterized by thickening, loss of elasticity (hardening), and calcification of the arterial walls

Artery A vessel that carries oxygenated blood from the heart to the tissues of the body

Atherosclerosis A process of progressive thickening and hardening of the walls of medium-sized and large arteries as a result of fat deposits on their inner lining

Atrium The entry chamber on both sides of the heart

Blood pressure The pressure of the blood within the arteries

Capillary An extremely small vessel that connects the ends of the smallest arteries (arterioles) to the smallest veins (venules), where

exchange of nutrients, waste products, oxygen (O_2), and carbon dioxide (CO_2) occurs

Cardiac muscle A type of muscle tissue found only in the heart

Cardiac output (CO) The amount of blood the heart pumps through the circulatory system in a minute

Coagulation Solidification or change from a fluid state to a solid state, as in the formation of a blood clot

Coronary artery Either of two arteries that arise from the aorta (one from the left side and one from the right side) and supply the tissues of the heart itself

Diastole The period when the heart is in a state of relaxation and dilation

Embolus A clump of material, often a blood clot, that travels from one part of the body to another and obstructs a blood vessel; an embolus can consist of any material, including bacteria or air

Endocardium The thin membrane that lines the interior of the heart; the inner layer of the heart wall

Enzyme A protein that accelerates a reaction by reducing the amount of energy required to initiate the reaction

Epicardium The outer layer of the heart wall; the inner layer of the pericardium

Essential hypertension The most common form of hypertension; it occurs in the absence of any evident cause

Fibrates A class of antihyperlipidemic drugs primarily effective at lowering triglycerides

Heart failure (HF) Inability of the heart to keep up with the demands on it and, specifically, failure of the heart to pump blood with normal efficiency

High-density lipoprotein (HDL) A lipoprotein of blood plasma that is composed of a high proportion of protein with little triglyceride and cholesterol; it is associated with a decreased probability of developing atherosclerosis

Hyperlipidemia Also known as *hypercholesterolemia*—a condition marked by an increase in cholesterol in the bloodstream that can lead to atherosclerosis, or hardening of the arteries

Hypertension High blood pressure

Hypotension Low blood pressure

Low-density lipoprotein (LDL) A molecule that is a combination of lipid (fat) and protein; it is associated with an increased probability of developing atherosclerosis

Lumen A channel within a tube (e.g., a blood vessel)

Myocardial infarction (MI) The death of myocardial tissue due to sudden deprivation of oxygenated blood flow, often as a result of a blood clot plugging a coronary artery; also known as a *heart attack*

Myocardium The middle muscular layer of the heart wall; it consists of cardiac muscle tissue

Nicotinic acid A member of the vitamin B complex; also known as *niacin*

Nitrates A class of drugs used to treat heart conditions, such as angina

Orthostatic hypotension A temporary lowering of blood pressure, usually related to standing up suddenly

Pericardium A fluid-filled membrane that surrounds the heart; also called the *pericardial sac*

Peripheral resistance Vascular resistance to the flow of blood in peripheral arterial vessels

Pulmonary artery One of the two vessels formed as terminal branches of the pulmonary trunk; they convey unaerated blood to the lungs

Renin A protein released by the kidney in response to low sodium levels or blood volume

Secondary hypertension Hypertension that results from an underlying identifiable cause

Statin An informal term for HMG-CoA reductase inhibitors, which are used for the treatment of hyperlipidemia, primarily to lower LDL cholesterol

Stent A tube designed to be inserted into a vessel or passageway to keep it open

Stroke The sudden death of some brain cells due to lack of oxygen when blood flow to the brain is impaired by blockage (ischemic stroke) or rupture (hemorrhagic stroke) of an artery to the brain

Syndrome A set of conditions that occur together

Systole The period when the heart is contracting; specifically, when the left ventricle of the heart contracts

Tachycardia A rapid heart rate, usually defined as greater than 100 beats per minute

Thrombin An enzyme formed in coagulating blood from prothrombin; thrombin reacts with fibrinogen and converts it to fibrin, which is essential in the formation of blood clots; thrombin levels are tested by performing a prothrombin time or partial thromboplastin time blood test

Thrombolytic A medication used to break up a thrombus or blood clot

Thrombosis The formation or presence of a blood clot in a blood vessel

Transient ischemic attack (TIA) A neurological event in which the signs and symptoms of a stroke appear but resolve within a short time

Triglyceride The major form of fat stored by the body; it consists of three molecules of fatty acid combined with a molecule of the alcohol glycerol

Vasoconstriction Narrowing of the blood vessels that results from contraction of the muscular walls of the vessels

Vasodilation Widening of blood vessels that results from relaxation of the muscular walls of the vessels

Vein A vessel that carries deoxygenated blood to or toward the heart

Vena cava One of the two large veins that carry deoxygenated blood from the upper (superior vena cava) and lower (inferior vena cava) parts of the body to the right atrium of the heart

Ventricle One of the two lower chambers of the heart

Select Common Drugs Prescribed for Cardiovascular Conditions

Trade Name	Generic Name	Pronunciation
Alpha-Blockers		
Cardura	doxazosin	(dok-sah-zoh-sin)
Hytrin	terazosin	(tur-ah-zoh-sin)
Minipress	prazosin	(pra-zoh-sin)
Antiarrhythmics		
Betapace, Betapace AF	sotalol	(soe-ta-lol)
Cordarone, Pacerone	amiodarone	(a-mi-oh-da-rone)
Norpace	disopyramide	(dye-so-peer-a-mide)
Pronestyl, Procanbid	procainamide	(pro-cane-ah-mide)
Quinidex	quinidine	(kwin-ah-deen)
Rythmol	propafenone	(proe-pa-feen-none)
Tikosyn	dofetilide	(doe-fet-ah-lide)

Select Common Drugs Prescribed for Cardiovascular Conditions—cont'd

Trade Name	Generic Name	Pronunciation
ACE Inhibitors		
Accupril	quinapril	(kwín-ah-príl)
Altace	ramipril	(rah-mí-príl)
Capoten	captopril	(cap-tow-príl)
Lotensin	benazepril	(ben-ayz-ah-príl)
Monopril	fosinopril	(foe-sín-oh-príl)
Prinivil, Zestril	lisinopril	(lih-sín-oh-príl)
Vasotec	enalapril	(eh-nal-ah-príl)
Angiotensin Receptor Blockers (ARBs)		
Atacand	candesartan	(kan-de-sar-tan)
Avapro	irbesartan	(erb-ba-sar-tan)
Cozaar	losartan	(low-sar-tan)
Diovan	valsartan	(val-sar-tan)
Micardis	telmisartan	(tel-meh-sar-tan)
Teveten	eprosartan	(eh-pro-sar-tan)
Beta-Blockers (BBs)		
Brevibloc	esmolol	(es-mo-lol)
Inderal	propranolol	(pro-pran-oh-lol)
Lopressor	metoprolol	(meh-toe-pro-lol)
Tenormin	atenolol	(uh-ten-oh-lol)
Trandate	labetalol	(lah-bet-ah-lol)
Visken	pindolol	(pin-doe-lol)
Calcium Channel Blockers (CCBs)		
Calan, Isonitin	verapamil	(ver-ap-ah-mill)
Cardene	nicardipine	(nye-kar-di-peen)
Cardizem	diltiazem	(dill-tie-ah-zem)
Norvasc	amlodipine	(am-low-di-peen)
Plendil	felodipine	(fe-low-di-peen)
Procardia	nifedipine	(nye-feh-di-peen)
Anticoagulants		
Coumadin	warfarin	(war-far-in)
Heparin	heparin	(heh-par-in)
Direct Thrombin Inhibitor		
Pradaxa	dabigatran	(da-bi-gat-ran)
Low-Molecular-Weight Heparins (LMWHs)		
Fragmin	dalteparin	(dal-te-par-in)
Lovenox	enoxaparin	(ee-nox-ap-a-rin)
Antiplatelet Agents		
Aggrenox	aspirin/dipyridamole	(as-pir-rin/dye-peer-id-a-mole)
Ecotrin	aspirin	(as-pir-rin)
Plavix	clopidogrel	(kloh-pid-oh-grel)
Nitrates		
Imdur, Monoket	isosorbide mononitrate	(eye-soe-sor-bide mon-oh-nye-trate)
Isordil	isosorbide dinitrate	(eye-soe-sor-bide dye-nye-trate)
Nitrostat, Tridil	nitroglycerin	(nye-troe-glis-sir-rin)
Antihyperlipidemic Agents		
Lovaza	omega-3-acid ethyl esters	(oh-may-ga 3 as-id eth-il es-ters)
Niacor	niacin	(nye-a-sin)

Continued

Select Common Drugs Prescribed for Cardiovascular Conditions—cont'd

Trade Name	Generic Name	Pronunciation
Zetia	ezetimibe	(eh-zet-eh-mibe)
Lopid	gemfibrozil	(gem-fib-row-zil)
Antara, Lipofen, Tricor	fenofibrate	(fen-no-fye-brate)
TriLipix, Fibracor	fenofibric acid	(fen-oh-fye-brik as-id)
Zocor	simvastatin	(sym-vah-stat-in)
Lipitor	atorvastatin	(a-tor-vah-stat-in)
Mevacor	lovastatin	(low-vah-stat-in)
Pravachol	pravastatin	(pra-vah-stat-in)
Crestor	rosuvastatin	(row-soo-vah-stat-in)
Lescol	fluvastatin	(floo-vah-stat-in)
Colestid	colestipol	(koe-les-ti-pole)
Questran	cholestyramine	(koe-les-teer-a-meen)
WelChol	colesevelam	(koe-le-sev-e-lam)
Diuretics		
Aldactone	spironolactone	(spear-on-oh-lak-tone)
Ezride, Microzide	hydrochlorothiazide	(hye-dro-klor-o-thy-zide)
Bumex	bumetanide	(byew-met-ah-nide)
Demadex	torsemide	(tore-se-mide)
Diamox	acetazolamide	(ah-see-ta-zole-a-mide)
Diuril	chlorothiazide	(klor-oh-thye-a-zide)
Dyrenium	triamterene	(try-am-tur-reen)
Lasix	furosemide	(feur-oh-sah-myde)
Zaroxolyn	metolazone	(meh-tole-uh-zone)
Thrombolytics		
Activase	alteplase (t-PA)	(al-teh-place)
Retavase	reteplase	(reh-teh-place)
TNKase	tenecteplase	(ten-ek-teh-place)

The cardiovascular system is a network of many complex interactions. These interactions involve the blood, lungs, kidneys, arteries, and veins of the body and the heart muscle itself. We begin with an overview of the anatomy of the heart, followed by the most common conditions that affect the heart. The last section of the chapter discusses the treatments available for heart conditions, with particular emphasis on the medications used. Pharmacy technicians fill many prescriptions for heart medications over their careers, and it is important to learn basic information about the classifications to assist the pharmacist.

Anatomy of the Heart and Vasculature System

The heart is located in the chest cavity between the lungs. The heart is a large muscle that initiates systemic arterial pulse waves, causing blood to circulate throughout the body and supply it with nutrition and oxygen (Figure 18-1). The muscle that composes the heart is called **cardiac muscle**. Extending from the heart are large blood vessels called **arteries**. These

arteries flow into smaller vessels called **arterioles** and ultimately into very small blood vessels called **capillaries**. From the capillaries, oxygen and nutrients are exchanged throughout the tissues of the body.

A normal heart beats 60 to 100 times per minute and is about the size of a person's fist. The heart is surrounded by connective tissue called the **pericardium**, which in turn is anchored by ligaments to the chest wall and diaphragm. The heart wall is composed of three main layers:

1. **Endocardium** (inner layer): The endocardium has a smooth, accordion pleat-like surface, which allows the heart wall to collapse when it contracts.
2. **Myocardium** (middle muscular layer): The myocardium is the heart muscle that contracts to facilitate a heartbeat.
3. **Epicardium** (outer layer): The epicardium is the outer layer of the heart wall. The coronary arteries that supply the heart with oxygenated blood and the coronary veins that return deoxygenated blood to the heart are located in the epicardium.