

## **Glossary of key anatomy, physiology and cardiovascular terms relevant to cardiovascular rehabilitation**

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**Acetylcholine:** main neurotransmitter released as a result of parasympathetic activity.

**Adenosine triphosphate:** (ATP) a high energy compound which transfers energy from metabolism to cell functions during its breakdown to adenosine diphosphate (ADP) and inorganic phosphate (Pi).

**Adrenaline:** an adrenergic hormone which results in actions similar to those resulting from sympathetic nervous stimulation.

**Afterload :** aortic pressure or ventricular wall stress after systole has begun.

**Aggregation:** gathering into a mass.

**All-or-none principle:** pertaining to an event that occurs maximally or not at all.

**Alpha-adrenergic:** pertaining to the effects of impulses transmitted by the adrenergic fibres of the sympathetic nervous system.

**Aneurysm:** dilation of a blood vessel, usually an artery, due to a local fault in the vessel wall, through defect, disease or injury.

**Angina pectoris:** chest pain associated with inadequate blood flow to heart muscle.

**Angiography:** demonstration of the arterial system after injection of an opaque medium.

**Angioplasty:** plastic surgery of blood vessels - see percutaneous transluminal coronary angioplasty.

**Angiotensin:** an enzyme which controls fluid balance and blood pressure in the kidneys.

**Anterior cardiac vein:** one of several small vessels that return deoxygenated blood from the myocardium of the right ventricle and the right atrium.

**Antibody:** an immunoglobulin, essential to the immune system, produced by lymphoid tissue in response to bacteria, viruses or other antigenic substances.

**Aorta:** largest artery in the body; carries blood from the left ventricle of the heart to the thorax and abdomen.

**Aortic arch** one of the four portions of the aorta giving rise to three arterial branches: the brachiocephalic trunk, the left common carotid and the left subclavian arteries.

**Aortic valve:** valve between the left ventricle of the heart and the aorta.

**Apex:** the tip or pointed end of a conical structure.

**Arrhythmia:** an abnormal heart rhythm.

**Arterial-venous oxygen difference (a-vO<sub>2</sub> diff):** the difference in oxygen content between arterial and mixed venous blood which reflects the amount of oxygen extracted or used by the tissues; usually measured or estimated as whole-body difference using mixed venous blood returning to the heart but can also be measured across smaller tissue areas such as skeletal muscle groups or the heart.

**Arteriole:** a blood vessel between an artery and a capillary; surrounded by smooth muscle; primary site of vascular resistance.

**Arteriosclerosis:** a gradual loss of elasticity in the walls of the arteries due to thickening and

calcification.

**Artery:** thick-walled, elastic vessel that carries blood away from the heart.

**Arthritis:** inflammation of the joints; see also osteoarthritis and rheumatoid arthritis.

**Asthma:** respiratory disorder, often of allergic origin, characterised by difficulty in breathing, wheezing and sense of constriction in the chest.

**Asymptomatic:** an absence of symptoms

**Atheroma:** deposition of hard yellow plaques of lipoid material in the intimal layer of the arteries.

**Atherosclerosis:** a condition in which the fatty plaques of atheroma are accompanied by arteriosclerosis, a narrowing and hardening of the vessels, often associated with the ageing process.

**Atrioventricular node (AV node):** region at the base of the right atrium near the interventricular septum containing specialised cardiac muscle cells through which electrical activity must pass to go from the atria to the ventricles.

**Atrioventricular valve (AV valve):** valve between the atrium and the ventricle of the heart; the AV valve on the right side of the heart is the tricuspid valve and that on the left is the mitral valve.

**Atrophy:** loss of size or mass of body tissue e.g. muscle atrophy arising from inactivity.

**Automaticity:** a property of specialised excitable tissue that allows self-activation through spontaneous development of an action potential, as in the pacemaker cells of the heart.

**Autonomic nervous system:** the part of the nervous system that regulates involuntary vital function; subdivided into sympathetic and parasympathetic nervous systems.

**Baroreceptor:** receptor sensitive to pressure and to rate of change in pressure.

**Base of the heart:** portion of the heart opposite the apex directed to the right side of the body.

**Beta-adrenergic:** activation of beta-adrenergic receptors cause physiological reactions such as increase in the heart rate and force of cardiac contraction and relaxation of bronchial muscles.

**Body mass index:** a measurement of bodyweight or obesity determined by dividing weight (in kilograms) by height (in metres) squared.

**Borg scale** a scale for rating perceived exertion developed by Gunnar Borg, in which the number 6 is associated with no exertion and the number 20 with maximal exertion. For practical purposes, ratings of perceived exertion measured with the Borg scale are considered reliable and valid estimates of effort. The CR-10 scale utilises a scale of 0-10. See 'Rating of perceived exertion' below.

**Bradycardia:** a slow heart rate.

**Bronchitis:** inflammation of the bronchi.

**Bundle of His:** a single pathway of specialised conduction tissue which allows rapid conduction from the AV node to the Purkinje fibres.

**Capillaries:** smallest type of blood vessel.

**Cardiac cycle:** the period that includes all events between consecutive heartbeats.

**Cardiac output:** the blood volume pumped by each ventricle per minute (not total output pumped by both ventricles).

**Carotid sinus:** a dilation of the arterial wall at the bifurcation of the common carotid artery containing vagus nerve sensory nerve endings responsive to changes in blood pressure.

**Catecholamines:** a group of compounds released during increased sympathetic activity which include

dopamine, adrenaline and noradrenaline.

**Central obesity:** fat which is deposited around the trunk, abdomen and internal organs.

**Cerebral infarction:** death of brain tissue that results from insufficient blood supply due to blockage or damage of a cerebral vessel usually from a stroke.

**Cerebrovascular accident (CVA = Stroke):** occlusion by embolus or cerebrovascular haemorrhage resulting in ischaemia of brain tissue normally perfused by the damaged vessels.

**Cholesterol:** a type of fat found in nervous tissue, red blood cells, animal fats, and bile.

**Circumflex artery:** a subdivision of the left coronary artery.

**Cirrhosis:** the late effects of chronic damage to tissue which results in fibrosis and loss of function.

**Congenital heart disease:** heart disease existing at or before birth.

**Contractile (cells):** possessing the ability to shorten, usually when stimulated; special property of muscle tissue.

**Contractility:** the force of a myocardial contraction when preload and afterload are constant.

**Coronary sinus** a wide venous channel (2.25cms) situated on the posterior surface of the heart into which drain five coronary veins.

**Coronary circulation:** the blood vessels supplying the heart muscle with oxygenated blood via the coronary arteries and removing deoxygenated blood via the coronary sinus.

**Coronary artery bypass grafts:** open heart surgery in which a section of a blood vessel is grafted onto one of the coronary arteries and connected to the ascending aorta to improve blood flow beyond the obstructed area.

**Coronary heart disease:** disease usually arising from progressive narrowing of the coronary arteries.

**Defibrillation:** procedure to correct life-threatening arrhythmia using direct current shock to the heart.

**Depolarisation:** the reduction of a membrane potential to a less negative value.

**Diastole:** the period of the cardiac cycle when the ventricles are not contracting.

**Diastolic pressure:** the minimum level of blood pressure measured between contractions of the heart.

**Direct current cardioversion:** the restoration of the heart's normal sinus rhythm by delivery of a synchronised electric shock through two metal paddles placed on the patient's chest.

**Double product:** the product of HR and SBP used as an index of myocardial workload; also referred to as RPP.

**Dynamic balance:** the ability to control equilibrium when movement is involved, e.g. in walking.

**Dyspnoea:** shortness of breath.

**ECG exercise test:** an exercise test performed whilst monitoring the electrical activity of the heart.

**Echocardiography** the use of ultrasound as a diagnostic tool for studying the structure and motion of the heart.

**Ectopic beat:** a premature contraction of the atria or ventricles which is initiated somewhere outside the normal conduction system.

**Efficiency:** the ratio of external work performed to total energy expended.

**Ejection fraction:** the fraction of blood pumped out of the left ventricle with each contraction, determined by dividing stroke volume by end diastolic volume, then multiplying by 100.

**Electrocardiogram:** a recording of the electrical activity of the heart on a moving paper strip, made by

an electrocardiograph which records the electrical activity from electrodes on the limbs and chest.

**Electrolytes:** an element or compound that when melted/dissolved dissociates into ions and is able to conduct an electric current.

**Embolus:** solid body or air bubble transported in the circulation, e.g. pulmonary embolus.

**Emphysema:** condition in which the air sacs of the lungs are grossly enlarged, causing breathlessness and wheezing.

**End diastolic volume:** amount of blood in ventricle just prior to systole.

**Endarterectomy:** surgical removal of an atheromatous core from an artery.

**Endocardium:** the endothelial lining of the heart chambers and valves.

**Endothelium:** the layer of tissue which forms the thin inner lining of blood vessels and heart chambers.

**Enzymes:** protein catalyst that accelerates specific chemical reactions but does not itself undergo net change during the reaction.

**Epicardium:** a thin, outer layer of the heart; also called the visceral pericardium.

**Erythrocytes:** red blood cells.

**Essential hypertension:** hypertension of unknown cause.

**Exercise:** a type of physical activity; planned, structured and repetitive bodily movement done to improve or maintain physical fitness. See 'physical fitness'.

**Extracellular fluid :** fluid outside cells

**Fibrinogen:** a plasma protein which is involved in blood clotting.

**Fibrinolysis:** the process in which clots are broken down.

**Forced expiratory volume:** the volume of air exhaled in the first second after maximal inhalation.

**Generic:** the approved shorter name of a drug which may be accepted internationally.

**Fibrosis:** thickening or scarring of connective tissue

**GTN:** glyceryl trinitrate; a drug which dilates blood vessels to relieve angina.

**Haemodynamics:** the forces involved in circulating blood round the body

**Haemoglobin:** a complex protein - iron compound in the blood that carries oxygen to the cells from the lungs and carbon dioxide away from the cells to lungs.

**Haematocrit:** the ratio of packed red blood cells to total blood volume, expressed as a percentage.

**Heart failure:** a condition in which the heart cannot pump enough blood in relation to the venous return and the metabolic requirements of body tissues.

**Heart murmur:** abnormal heart sound caused by turbulent blood flow through narrowed or leaky valves, or through a hole in the interventricular or the interatrial septum.

**Heart sounds:** noise that results from vibrations due to closure of the atrioventricular valves (first heart sound), and then the pulmonary and aortic valves (second heart sound).

**High-density lipoprotein:** a carrier protein for lipids such as cholesterol which appears to offer some protection against atherosclerosis.

**Holter monitoring:** ECG monitoring over a 24-hour period.

**Hormone:** chemical messenger synthesised by a specific endocrine gland in response to certain stimuli, and secreted into the blood which carries it to target cells.

**Hyperglycaemia:** abnormally large amount of glucose in the blood.

**Hyperlipidaemia :** excess fat or lipids in the bloods ; usually defined by measures of cholesterol or triglycerides

**Hypertension:** abnormally high blood pressure. There is no universal agreement about what constitutes normal levels, but a resting systolic blood pressure of 160mmHg and/or resting diastolic blood pressure of 90mmHg is usually regarded as hypertensive. Recommended levels for BP vary between healthy individuals and individuals with established CHD or at high risk of developing CHD.

**Hypertrophy** enlargement of a tissue or an organ due to an increase in the size of its cells, rather than an increase in the number of cells.

**Hypoxia:** deficiency of oxygen at tissue level.

**Hypoglycaemia:** abnormally small amount of glucose in the blood.

**Hypotension:** lower than normal arterial blood pressure.

**Implantable Cardioverter Defibrillators (ICDs) :** a battery driven device, similar to a pacemaker, that is programmed to detect and then stop life threatening ventricular arrhythmias by delivering a shock directly to the heart

**Incidence:** the number of new events or cases that arise in a defined population during a specified time interval

**Inferior vena cava:** large vein that carries blood from the lower half of the body to the right atrium of heart.

**Insulin:** a naturally occurring hormone, secreted by the pancreas in response to increased levels of glucose in the blood, which assists glucose entry into cells.

**Intermittent claudication:** limping caused by interference with blood supply to the legs which occurs at intervals.

**Interstitial fluid :** fluid surrounding tissues cells

**Intracellular fluid** fluid inside cells

**Ischaemia:** a rate of blood supply to an organ that is inadequate to supply sufficient oxygen and maintain aerobic respiration in that organ.

**Left anterior descending artery:** subdivision of the left coronary artery supplying the anterior and lateral walls of the left ventricle.

**Left atrium:** the left upper chamber of the heart which receives oxygenated blood via the pulmonary vein.

**Left ventricle:** the left lower muscular chamber of the heart which pumps blood into the systemic circulation via the aorta.

**Leukocytes:** white blood cells.

**Lipids:** any of the free fatty acid fractions in the blood. They are stored in the body and serve as an energy reserve but may be elevated in various diseases.

**Low-density lipoprotein:** a plasma protein containing relatively more cholesterol and triglycerides than protein; it is believed to contribute to atherosclerosis.

**Lumen (vessel):** a cavity or channel within any organ or structure of the body.

**Maximal heart rate:** the highest heart rate value attainable during an all-out effort to the point of

exhaustion.

**Maximal oxygen uptake (VO<sub>2</sub>max):** the maximal capacity for oxygen consumption by the body during maximal exertion.

**Meta-analysis:** combined statistical analysis.

**Metabolic syndrome:** a term that has been used used to link coronary heart disease, hypertension, type 2 diabetes and central obesity to insulin resistance. The syndrome has also been referred to as syndrome X.

**Metabolic by-products:** substances occurring secondary to chemical changes taking place within cells.

**Metabolic rate:** total body energy expenditure per unit of time.

**MET:** metabolic equivalent unit - a unit used to estimate the metabolic cost (oxygen consumption) of physical activity. One MET equals oxygen consumption at rest which is approximately 3.5 millilitres of oxygen per kg of body weight per minute (3.5ml/kg<sup>-1</sup>/min<sup>-1</sup>).

**Metarterioles:** blood vessels that directly connect arterioles and venules.

**Mitral valve:** valve between the left atrium and the left ventricle of the heart.

**Morbidity:** the state of being diseased

**Motor unit:** a single motor neuron and the muscle fibres it innervates.

**Myocardium:** the muscle of the heart.

**Myocardial infarction:** death of heart tissue that results from insufficient blood supply to part of the myocardium.

**Myocardial oxygen consumption:** the rate at which oxygen is utilised by the heart muscle in aerobic metabolism.

**Myocardial ischaemia:** a rate of blood flow to the heart muscle which is inadequate to supply sufficient oxygen to maintain aerobic respiration in myocardial tissue.

**Myoglobin:** muscle-fibre protein that binds oxygen.

**Necrosis:** localised death of tissue.

**Neuropathy:** disease of the nervous system.

**Neurotransmitters:** any one of numerous chemicals that result in or modify the transmission of nerve impulses between synapses.

**Noradrenaline:** a neurotransmitter which is released from sympathetic nerve endings and a hormone released from the adrenal medulla; depending upon the target tissues its effect can be inhibitory of excitatory.

**Nutrients:** substances serving as or providing nourishment.

**Occlusion:** the closure of an opening.

**Oedema:** swelling of tissue due to fluid retention.

**Orthopnoea:** breathlessness which requires an upright (e.g. sitting) position for its relief.

**Orthostatic hypotension (postural hypotension):** lower than normal arterial blood pressure occurring when an individual assumes an upright posture.

**Osteoarthritis:** a degenerative joint disease.

**Osteoblasts:** bone cells which synthesise new bone tissue.

**Osteoclasts:** bone cells which resorb or break down the bone matrix.

**Osteocytes:** mature bone cells.

**Osteoporosis:** porosity and brittleness of the bones resulting from a decrease in bone formation and an increase in bone resorption.

**Overload:** stressing the metabolic system beyond that which is usual in order to provide a stimulus for change.

**Oxidation:** the process by which a substance combines with or is combined with oxygen.

**P wave:** component of electrocardiogram (comprising P, Q, R, S and T waves) which reflects atrial depolarisation

**Pacemaker:** an electronic device which delivers short pulses of electricity to promote contraction of the heart muscle; used in patients who have a defect in the heart's conduction system.

**Palpitations:** uncomfortable awareness of heart beating.

**Parasympathetic nervous system:** a division of the autonomic nervous system concerned with activities that, in general, oppose or inhibit the effects of the sympathetic nervous system.

**Pathological Q-wave:** the development of a new Q-wave, not previously present on the ECG, which is one of the indicators confirming the diagnosis of myocardial infarction.

**Percutaneous coronary intervention (PCI):** a revascularisation procedure including angioplasty with or without stenting

**Percutaneous transluminal coronary angioplasty (PTCA):** a balloon is passed into a 'blocked' coronary artery and inflated; it presses the atheroma against the vessel wall, thereby increasing the lumen

**Perfuse:** cause a fluid to pass through e.g. blood perfusing an organ of the body

**Pericardium:** connective-tissue sac surrounding the heart.

**Peripheral vascular disease:** any abnormal condition that affects the blood vessels outside the heart and lymphatic vessels.

**Phlebitis:** inflammation of a vein.

**Physical activity:** bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure. See 'exercise'.

**Physical fitness:** a set of attributes that people possess that relates to the ability to perform physical activity. Health related components of physical fitness include cardiovascular (aerobic) endurance, muscular strength and endurance, flexibility and body composition.

**Pitting oedema:** swollen tissue due to fluid retention which leaves an indentation when compressed.

**Plasma:** liquid portion of the blood; component of extracellular fluid.

**Platelets:** a particle found in the blood stream that binds fibrinogen to begin the blood clotting process.

**Pleural effusion:** fluid around the pleura of the lungs.

**Popliteal artery:** a continuation of the femoral artery supplying various muscles of the thigh, leg and foot.

**Postprandial :** angina as a consequence of eating a main meal

**Precapillary sphincter:** smooth muscle ring around the capillary where it exits from an arteriole.

**Preload:** end diastolic pressure, volume or ventricular wall stress.

**Prevalence:** The number of cases or events in a defined population at a fixed point in time.

**Prophylactic:** protecting from or preventing disease (as in a drug or device).

**Proprietary:** a brand or trade name given to a drug by the manufacturing company.

**Proprioceptive Neuromuscular Facilitation:** a method of stretching in which the patient / client contracts a muscle against resistance (usually from an external source e.g. the physiotherapist) followed by relaxation of the muscle group while it is stretched.

**Pulmonary:** pertaining to the lungs.

**Pulmonary circulation:** blood flow from the heart to the lungs, and from the lungs back to the heart.

**Pulmonary embolus (PE):** blockage of a pulmonary artery by foreign matter, e.g. fat, air, tumour tissue or a thrombus.

**Pulmonary valve:** valve between the right ventricle of the heart and the pulmonary trunk.

**Pulmonary veins:** the blood vessels which return oxygenated blood from the lungs to the left atrium of the heart.

**Pulse:** the regular, recurrent expansion and contraction of an artery produced by the ejection of blood from the left ventricle of the heart on contraction.

**Purkinje fibres:** specialised myocardial cell that constitutes part of the conducting system of the heart; conveys excitation from bundle branches to ventricular muscle.

**QRS complex:** component of electrocardiogram (comprising P, Q, R, S and T waves) which reflects atrial depolarisation

**Radioisotope :** radioactive form of an element

**Rate pressure product:** the product of HR and SBP divided by 100 that is used as an index of myocardial workload; also referred to as double product.

**Rating of perceived exertion (RPE):** quantification of the subjective intensity of physical effort (see Borg scale).

**Refractory period:** the time during which an excitable membrane does not respond to a stimulus, the magnitude of which would normally be sufficient to elicit a response.

**Regression:** reversion to an earlier stage of development.

**Repolarisation:** the process by which the cell is restored to its resting potential.

**Residual ischaemia:** persisting diminished blood supply to a body organ or part.

**Residual volume:** amount of air left in lungs which cannot be exhaled.

**Respiratory pump:** effect on venous return of changing intra-thoracic and intra-abdominal pressures associated with respiration.

**Revascularisation:** surgical procedure to restore blood supply to an area.

**Rheumatoid arthritis:** an inflammatory, multi-joint, multi-system disease which arises from pathological activity of the immune system against joint tissue.

**Right atrium:** the right upper chamber of the heart which receives deoxygenated blood via the superior and inferior vena cavae.

**Right coronary artery:** the artery which supplies blood to the right ventricle and part of the posterior left ventricle.

**Right ventricle:** the right lower chamber of the heart which ejects deoxygenated blood into the pulmonary circulation via the pulmonary artery.

**Risk Stratification:** the process by which the possibility of an individual having a further cardiac event is graded, e.g. low, medium or high risk.

**Semilunar valves:** crescent-shaped valves positioned at the entrances to the aorta and the pulmonary trunk.

**Septum:** a membranous or fleshy wall dividing two cavities.

**Shear stress:** the force exerted by blood flow on the endothelium

**Silent ischaemia:** ischaemia that does not give rise to symptoms.

**Sinoatrial node (SA node):** region in the right atrium of the heart containing specialised cardiac muscle cells that depolarise spontaneously and faster than other cells in the conducting system; determines heart rate.

**Sinus rhythm:** normal rhythm of the heart in which electrical activity is originated at the sinoatrial node.

**Skeletal muscle pump:** pumping effect of contracting skeletal muscles on blood flow through underlying vessels; aids venous return.

**Sliding filament mechanism:** process of muscle contraction in which shortening occurs by thick and thin filaments sliding past each other.

**ST segment:** the period between ventricular contraction and the return of the ventricles to a resting electrical state (repolarisation) prior to the next wave of depolarisation.

**Static balance:** the ability to maintain equilibrium when no movement is involved, e.g. when standing still.

**Steady state exercise:** exercise in which physiological responses remain constant.

**Stenosis:** a narrowing.

**Stent:** device to support body openings/cavities.

**Striated fibres:** muscle tissue (skeletal) that appears microscopically to consist of striated or striped myofibrils.

**Stroke:** brain damage due to blood stoppage because of occlusion or rupture of a cerebral vessel.

**Stroke volume:** the volume of blood ejected by a ventricle during one heartbeat i.e. the difference between the end-diastolic volume and the end-systolic volume.

**Superior vena cava:** large vein that carries blood from the upper half of the body to the right atrium of the heart.

**Sympathetic nervous system:** a division of the autonomic nervous system which is concerned with activities which, in general, arouse the body for physical activity.

**Syndrome:** a group of symptoms which, occurring together, produce a pattern typical of a particular disease.

**Synovial membrane:** the inner layer of an articular capsule surrounding a freely moveable joint.

**Systemic circulation:** circulation from the left ventricle through all the organs except the lungs, and then back to the heart.

**Systole:** period of ventricular contraction.

**Systolic blood pressure:** maximum arterial blood pressure during the cardiac cycle.

**T wave:** part of the cardiac cycle comprising P, Q, R, S and T waves.

**Tachycardia:** a fast heart rate.

**Thallium scanning:** scan of heart muscle used to study blood supply.

**Thrombocytes (or platelet):** smallest cell in the blood; essential for coagulating the blood.

**Thrombolytics:** pertaining to the dissolution of blood clots.

**Thrombus:** blood clot.

**Total peripheral resistance :** total resistance to flow in the systemic blood vessels from the beginning of aorta to ends of vena cavae

**Transient ischaemic attack (TIA):** reversible disturbances of cerebral function which lasts less than 24 hours, often due to lack of oxygen to the brain as a result of temporary arterial occlusion.

**Tricuspid valve:** valve between the right atrium and the right ventricle of the heart.

**Triglycerides:** a subclass of lipids composed of glycerol and 3 fatty acids.

**Tunica media:** the middle muscular coat of an artery.

**Unstable angina:** angina (anoxia of myocardium) occurring at rest or with unpredictable onset.

**Vagus nerve:** the major parasympathetic nerve which originates in the cardio-inhibitory centre of the brain; vagal stimulation slows the heart.

**Valsalva manoeuvre:** any forced expiratory effort against a closed airway, e.g. an individual holds their breath and tightens muscles to exert effort to move an object.

**Valvotomies:** the incision into a valve to correct a defect and allow proper opening/closure.

**Varicose veins:** dilated veins, the valves of which become incompetent so that blood flow can be reversed.

**Vasodilator:** a drug which will widen the lumen of blood vessels by dilation.

**Vasoconstriction:** decrease in blood-vessel diameter due to vascular smooth-muscle contraction.

**Vasodilation:** increase in blood-vessel diameter due to vascular smooth-muscle relaxation.

**Vein:** any vessel that returns blood to the heart.

**Venous return:** blood volume flowing to the heart per unit of time.

**Ventricular fibrillation:** cardiac arrhythmia marked by rapid, disorganised depolarisations of the ventricular myocardium; complete lack of organised electrical impulse, conduction and ventricular contraction.

**Venule:** small vessel that carries blood from the capillary network to the veins.

**Viscosity:** measure of friction between adjacent layers of flowing liquid; property of fluid that makes it resist flow.

**Vital capacity:** the total volume of air expelled from the lungs after maximal inhalation.