

Chapter 05: The cardiovascular system

Blood vessels

1. Identify whether the following statements apply to vasoconstriction or vasodilation.

Statements	Category A	Category B
Smooth muscle in blood vessel wall is relaxed.	Vasoconstriction	Vasodilation
Lumen of blood vessel is reduced.	Vasoconstriction	Vasodilation
Decreased resistance to blood flow.	Vasoconstriction	Vasodilation
Usually caused by sympathetic stimulation.	Vasoconstriction	Vasodilation
Volume of blood flow is reduced.	Vasoconstriction	Vasodilation
Blood vessel wall thickens.	Vasoconstriction	Vasodilation
Reduces the pressure at which blood is flowing.	Vasoconstriction	Vasodilation

2. The vasa vasorum supplies blood to which of the following?
- a) The kidney
 - b) The heart muscle
 - c) The nervous system
 - d) The blood vessel walls

3. Which of the following is not an example of autoregulation?
- a) The control of the blood vessel diameter by the vasomotor centre in the medulla oblongata
 - b) Vasodilation in the leg muscles following a 10km run
 - c) Increased supply of blood to an area of inflamed tissue.
 - d) Rebound increase in blood supply to an organ following a period of hypoxia

4. Which of the following layers of the vessel wall contains the smooth muscle that allows it to adjust its diameter?

- a) Tunica intima
- b) Tunica externa
- c) Tunica media
- d) Tunica serosa

5. In health, flow along a blood vessel is determined primarily by adjustment of:

_____.

- a) Blood vessel length
- b) Blood vessel diameter
- c) Blood viscosity
- d) Blood volume

The cardiovascular system

6. Terms related to blood vessels are hidden under the tiles and so are their corresponding descriptions. Find the pairs of tiles with matching term and description.

Terms:

Arteriole: _____

Lymphatic capillary: _____

Elastic artery: _____

Capillary: _____

Sinusoid: _____

Collateral circulation: _____

Vein: _____

Venule: _____

Descriptions:

Resistance vessel

Blind-ended vessel

Large, expandable vessel

Vessel for exchange of substances

Has extremely permeable walls

Links the main arteries in an area

Possesses valves

A small vein

7. Which of the following vessels do not have the ability to constrict and dilate?
- a) Arterioles
 - b) Arteries
 - c) Capillaries
 - d) Veins

8. Both the tunica media and the tunica adventitia are absent in: ____.
- a) Arteries
 - b) Veins
 - c) Capillaries
 - d) Arterioles

9. The tissue layers of blood vessels from exterior to interior are: ____.
- a) Tunica media, tunica intima, and tunica adventitia
 - b) Tunica adventitia, tunica media, and tunica intima
 - c) Tunica intima, tunica media, and tunica adventitia
 - d) Tunica media, tunica adventitia, and tunica intima

10. Which of the following blood vessels act as blood reservoirs?
- a) Arteries
 - b) Arterioles
 - c) Capillaries
 - d) Veins

Heart

11. Identify whether the following statements correspond to a complete cardiac diastole, an atrial systole or a ventricular systole.

Statements	Category A	Category B	Category C
All heart chambers are at rest	Complete cardiac diastole	Atrial systole	Ventricular systole
Corresponds to the QRS complex of the ECG	Complete cardiac diastole	Atrial systole	Ventricular systole
Lasts for half (0.4 seconds) of the entire cardiac cycle	Complete cardiac diastole	Atrial systole	Ventricular systole
The atrioventricular valves are open	Complete cardiac diastole	Atrial systole	Ventricular systole
The atria are contracting	Complete cardiac diastole	Atrial systole	Ventricular systole
The atrioventricular valves are snapped shut as this starts	Complete cardiac diastole	Atrial systole	Ventricular systole
Atrial refilling occurs	Complete cardiac diastole	Atrial systole	Ventricular systole

12. Where in the brain is the cardiovascular centre, for regulating heart rate, located?

- a) In the cerebral cortex
- b) In the hypothalamus
- c) In the medulla oblongata
- d) In the cerebellum

13. Which of the following set of circumstances would increase the heart rate?
- a) Sympathetic activation, physical inactivity and fear
 - b) Adrenaline release, physical activity and fall in blood pressure
 - c) Parasympathetic stimulation, fall in blood pressure and thyroxine release
 - d) Rise in blood pressure, adrenaline release and physical activity.

14. Which of the following statements is true?
- a) The vagus nerve supplying the heart carries both sympathetic and parasympathetic fibres
 - b) The sympathetic supply to the heart increases both the rate and the force of the heartbeat
 - c) The sinoatrial node is supplied only by sympathetic nerve fibres
 - d) The heart rate slows during parasympathetic activity because of the release of noradrenaline.

15. Parasympathetic nerves supplying the heart release: ____.
- a) Acetylcholine
 - b) Noradrenaline
 - c) Adrenalline
 - d) Acetylcholine and noradrenaline

16. Match the terms related to cardiac output with their corresponding descriptions.

Term:

- Cardiac output
- Stroke volume
- Preload
- Afterload
- Venous return
- Heart rate
- Ventricular end-diastolic volume

Description:

- The resistance to blood leaving the heart by the arteries
- The volume of blood arriving at the right side of the heart
- When multiplied by stroke volume, gives the cardiac output
- The amount of blood expelled by the ventricle each time it beats.
- Another term for preload
- The volume of blood expelled by one ventricle in one minute.
- The amount of blood in the ventricle just before it contracts

17. Based on the clues provided, find the terms related to the conduction system of the heart from the crossword grid.

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T V C L U R J M G R W L A K X A P Q E S Q Q Y S
A S Y H Z M L E B S H V I G C C V E K E L C F V
U E H E C L E S M B B W K G O J M D B D Q K B H
T N M L L Y U I Z T Q J U E S T Y Y I O L M P L
O A U D G R W N I N V V T F C B L L O N Q U Y I
R S F N W R Y O K R R H H O F O U G K R G W P H
H C A U O R D A O F A P R G K Y V H B A N R M X
Y S M B E Q I T G J T J O I B A C O A L O H T M
T I L R S M A R U C H C E N J R I G C U I B M Z
H D K A A A S I F S E U C Q J Q T F I C T Q Y L
M D A L E N T A V J X D I H Z K E M N I A X V S
I E D U N O O L B Q H O T I H V H L W R S A H E
C T Y C V I L N A D I S E V F E T C N T I J L R
I A B I A T E O L P Q U H T N A A L P N R U O B
T L O R S A M D Q S E O T N T B P L X E A Y M I
Y A W T T S O E B Y I X A N U P M Q I V L E D F
I C T N S I J L Z S J A P F F J Y N V O O P T E
V R M E N R B F P T I R M H T V S W C I P O V J
X E G V Q A G Q A O O A Y S G I A J B R E W V N
X T O O P L K Q I L F A S C R A R X X T R W L I
N N B I R O A A A E K X T P C G A P A A R A M K
W I L R B P S W L F K B W V L Z P U Q J X W L R
C Q A T I E G U Y M I S N Q T M A Q R P O G Q U
V D R A S D P I T D E X B C P V C H H A G V P P
    
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Clues

1. The tiny conducting branches that make contact with the myocardial cells
2. The specialised conducting junctions between myocardial cells
3. The pacemaker of the heart
4. The secondary pacemaker of the heart
5. The conducting tissue passing through the fibrous ring separating the atria and the ventricles
6. Cardiac contraction
7. Cardiac relaxation
8. Electrical activation of a myocardial cell
9. Restoration of the myocardial cell membrane potential to its resting state
10. The branch of the autonomic nervous system that speeds up sino-atrial node discharge
11. The branch of the autonomic nervous system that slows down sino-atrial node discharge
12. The ability of the myocardium to initiate its own electrical signals

18. The saclike structure around the heart is the: ____.
- a) Epicardium
 - b) Pericardium
 - c) Myocardium
 - d) Endocardium

19. The thickest layer of tissue in the heart wall is the: ____.
- a) Epicardium
 - b) Pericardium
 - c) Myocardium
 - d) Endocardium

20. The internal layer of tissue in the heart is the: ____.
- a) Epicardium
 - b) Pericardium
 - c) Myocardium
 - d) Endocardium

21. The right atrioventricular valve is also called the: ____.
- a) Bicuspid
 - b) Tricuspid
 - c) Mitral
 - d) Aortic

22. How is the heart muscle supplied with oxygen and nutrients?
- a) From the blood flowing through the heart chambers
 - b) By the coronary arteries, which branch from the aorta
 - c) By the pulmonary arteries, which also supply the lungs
 - d) From the cardiac arteries, which are more extensive on the left side of the heart than on the right.

23. How is blood drained from the tissues of the heart?
- a) It is drained by venous channels that open into the inferior vena cava
 - b) It goes directly into the vena cava
 - c) It is drained mainly into the coronary sinus, which opens into the right atrium
 - d) It goes directly into the pulmonary artery, for oxygenation

24. What proportion of the cardiac output does the heart itself receive?
- a) 30%
 - b) 20%
 - c) 10%
 - d) 5%

25. Which chamber of the heart has the largest blood supply?
- a) Right atrium
 - b) Right ventricle
 - c) Left atrium
 - d) Left ventricle

26. Which layer of the heart wall lines its chambers?
- a) Myocardium
 - b) Serous pericardium
 - c) Endocardium
 - d) Parietal pericardium

27. Which layer of the heart wall contains muscle?
- a) Myocardium
 - b) Serous pericardium
 - c) Endocardium
 - d) Parietal pericardium

28. The pericardial space lies between which layers of the heart wall?
- a) The myocardium and the endocardium
 - b) The fibrous pericardium and the serous pericardium
 - c) The myocardium and the serous pericardium
 - d) The visceral pericardium and the parietal pericardium

29. Pericardial fluid is secreted by the: ____.
- a) Endocardium
 - b) Serous pericardium
 - c) Fibrous pericardium
 - d) Myocardium

Blood pressure

30. Identify whether the events listed below would increase or decrease systemic blood pressure.

Statements	Category A	Category B
Rising blood pH	Increased blood pressure	Decreased blood pressure
Increased heart rate	Increased blood pressure	Decreased blood pressure
Raised parasympathetic activity	Increased blood pressure	Decreased blood pressure
Generalised vasoconstriction	Increased blood pressure	Decreased blood pressure
Increased stroke volume	Increased blood pressure	Decreased blood pressure
Reduced blood oxygen levels	Increased blood pressure	Decreased blood pressure
Increased blood [H ⁺]	Increased blood pressure	Decreased blood pressure

31. Arrange the events in the correct order to describe the response to a fall in blood pressure.

Event:

- Event 1: _____
- Event 2: _____
- Event 3: _____
- Event 4: _____
- Event 5: _____
- Event 6: _____

Description:

- Cardiac output rises
- Sympathetic output from cardiovascular centre rises
- Heart rate increases
- Output from arterial baroreceptors falls
- Systemic blood pressure rises
- Input to cardiovascular centre is diminished

32. Which of the following is not a mechanism that increases blood volume and therefore the venous return of blood to the heart?

- a) Antidiuretic hormone
- b) Aldosterone
- c) Atrial natriuretic hormone
- d) Renin-angiotensin mechanism

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33. Cardiac output is determined by: ____.
- a) The return of the blood to the heart and the heart rate
 - b) The strength of contraction of the left ventricle
 - c) The stroke volume and heart rate
 - d) The systolic discharge and stroke volume

34. Which of the following events tends to increase blood viscosity?
- a) An increase in the red blood cell count
 - b) Marked anemia
 - c) An increase in the concentration of blood protein
 - d) An increase in the white blood cell count

35. Which artery in the arm is used to measure blood pressure?
- a) Brachial
 - b) Radial
 - c) Ulnar
 - d) Axillary

36. Blood pressure usually expressed as: ____.
- a) Diastolic pressure over systolic pressure
 - b) Pulse pressure over diastolic pressure
 - c) Systolic pressure over diastolic pressure
 - d) Diastolic pressure over pulse pressure

37. Which of the following events can be measured as systolic blood pressure?
- a) Atrial contraction
 - b) Ventricular contraction
 - c) Pulse pressure
 - d) Cardiac diastole

38. What are the two main factors that determine blood pressure?
- a) Cardiac output and peripheral resistance
 - b) Peripheral resistance and blood volume
 - c) Blood volume and pulse pressure
 - d) Pulse pressure and cardiac output

39. Which of the following is associated with the moment-to-moment control of blood pressure?

- a) The renin-angiotensin system
- b) Control of blood volume
- c) The baroreceptor reflex
- d) The Hering-Breuer reflex

Circulation of the blood

40. Starting from the smallest, arrange the veins in the correct order to trace the return of blood from the foot towards the heart.

Title:

- Stage 1: _____
- Stage 2: _____
- Stage 3: _____
- Stage 4: _____
- Stage 5: _____
- Stage 6: _____

Vein:

- External iliac vein
- Femoral vein
- Common iliac vein
- Saphenous vein
- Dorsal venous arch
- Inferior vena cava

41. Where do the coronary arteries arise?
- a) The aortic arch
 - b) The ascending aorta
 - c) The descending aorta
 - d) The aortic valve

42. Which is the most important artery in the supply to the circulus arteriosus (circle of Willis)?

- a) The internal carotid
- b) The external carotid
- c) The anterior cerebral
- d) The anterior communicating

43. Which artery is most important in supplying the superficial tissues of the head and neck?

- a) The internal carotid
- b) The external carotid
- c) The anterior cerebral
- d) The anterior communicating

44. From which artery does the vertebral artery arise?
- a) The internal carotid
 - b) The aorta
 - c) The brachiocephalic
 - d) The subclavian

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45. Which is the major vein draining the tissues of the head and upper body?
- a) The anterior jugular
 - b) The superior vena cava
 - c) The inferior vena cava
 - d) The internal jugular

46. Which of the following do the right and the left brachiocephalic veins unite to form?

- a) Brachial vein
- b) Internal jugular vein
- c) Superior vena cava
- d) Subclavian vein

47. Which of the following does the right axillary vein run into?
- a) The right subclavian vein
 - b) The right brachial vein
 - c) The superior vena cava
 - d) The right basilic vein

48. The superior vena cava is formed when which two veins unite?
- a) The jugular vein and the right brachiocephalic vein
 - b) The right subclavian vein and the jugular vein
 - c) The jugular vein and the brachiocephalic vein
 - d) The right and left brachiocephalic veins

49. Match the artery with its corresponding description.

Artery:

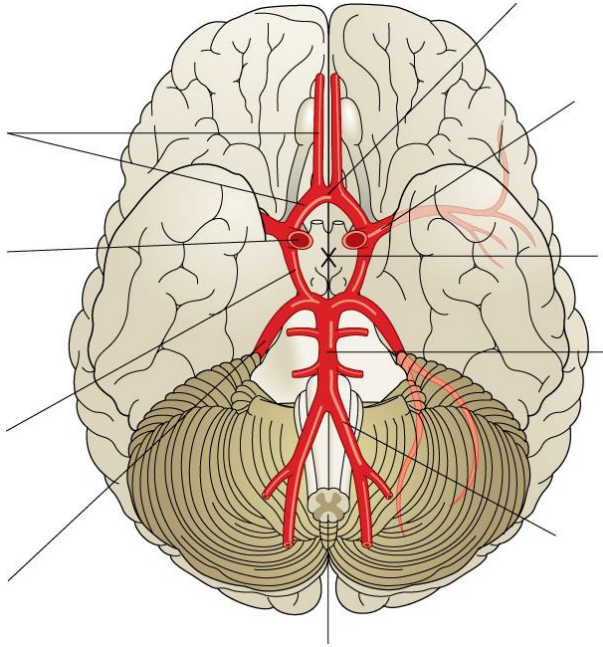
- Lingual artery
- Facial artery
- Left common carotid artery
- Carotid sinuses
- Temporal artery
- Carotid bodies
- Circulus arteriosus
- Basilar artery
- Right common carotid artery

Description:

- Arises directly from the arch of the aorta
- Contain baroreceptors that monitor blood pressure
- Supplies most of the brain
- Supplies the tongue
- A pulse can be felt where this artery passes over the lower jaw bone
- Formed from the union of two vertebral arteries
- Arises from the subclavian artery
- A pulse can be felt where this artery passes close to the front of the ear
- Contain chemoreceptors that monitor blood gases

50. Label the arteries forming the circulus arteriosus.

Arteries forming the circulus arteriosus (Circle of Willis) and its main branches to the brain.



The cardiovascular system

51. Arrange the names of arteries in the right hand in the correct sequence starting from the largest artery.

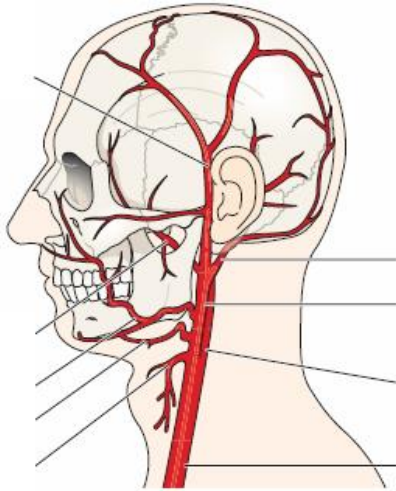
Label:

- Stage 1: _____
- Stage 2: _____
- Stage 3: _____
- Stage 4: _____
- Stage 5: _____
- Stage 6: _____

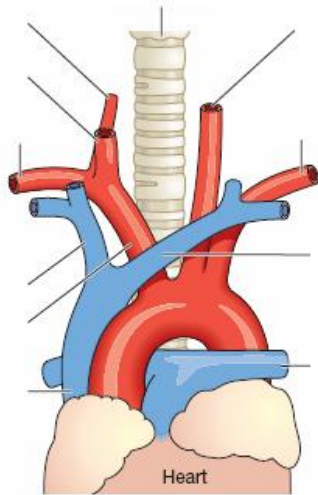
Arteries:

- Ulnar artery
- Subclavian artery
- Deep palmar arch
- Brachial artery
- Radial artery
- Axillary artery

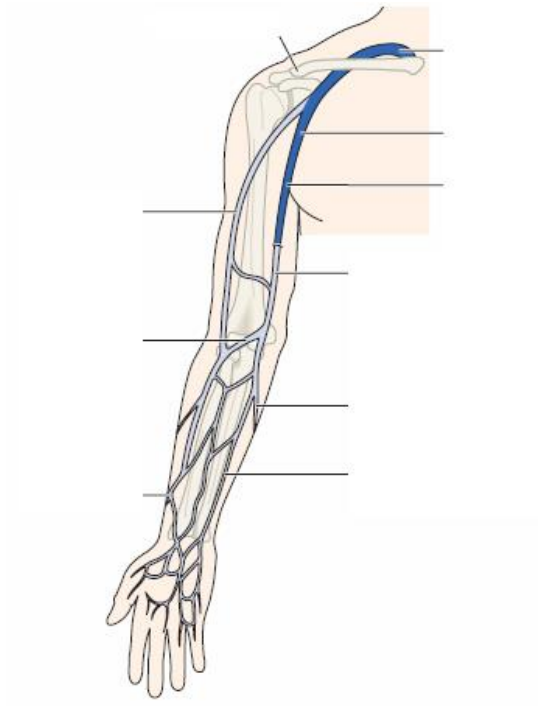
52. Label the main arteries of the head and neck.
Main arteries of the head and neck



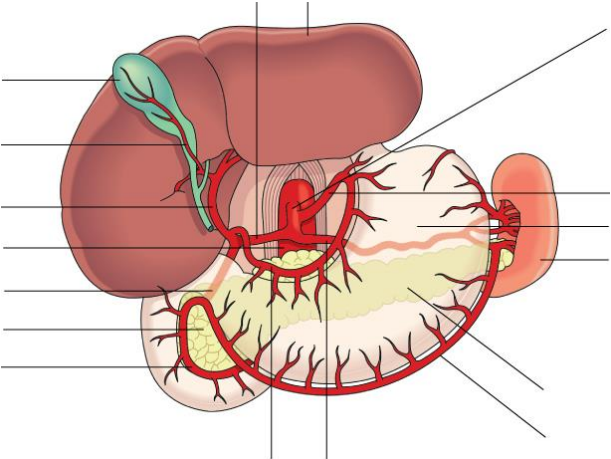
53. Label the main blood vessels associated with the aortic arch.
The arch of the aorta and its branches



54. Label the main veins of the right arm.
The main veins of the right arm



55. Label the main arteries of the upper abdominal organs.
The coeliac artery and its branches, and the inferior phrenic arteries



Fetal circulation

56. Match the following structures related to fetal circulation with their corresponding descriptions.

Structure:

- Foramen ovale
- Placenta
- Ductus arteriosus
- Umbilical artery
- Umbilical vein
- Ductus venosus
- Umbilical cord

Description:

- Diverts blood from the nonfunctional fetal lungs
- Links the placenta and fetus
- Diverts blood from the nonfunctional fetal liver
- Hole in the septum between the fetal atria
- Carries deoxygenated fetal blood to the placenta
- Carries oxygenated blood to the fetus
- Brings maternal and fetal blood into close proximity

57. Fill in the blanks to complete the paragraph on the placenta
The placenta develops from the _____ and usually weighs about _____. It allows the exchange of substances between the maternal and fetal circulation, mainly by _____. It confers passive immunity on the fetus by allowing the transfer of maternal _____ into the fetal circulation. It acts as a selective barrier and prevents many harmful materials from accessing the baby's circulation. The name given to a substance that can cause abnormal fetal development is a _____. In addition, the placenta secretes hormones that maintain pregnancy, including the hormone _____ which maintains the corpus luteum in early pregnancy and _____ thereafter.

Module review

58. Based on the clues provided, find the terms related to the pathology of blood vessels from the crossword grid.

K	Z	Z	U	X	B	A	U	J	Q	A	K	V	Y	Z	A	E	B
P	V	P	Z	R	R	E	J	B	G	N	T	C	Y	R	N	A	S
F	X	R	G	M	E	M	H	Q	A	G	H	S	X	K	E	H	I
A	A	A	N	Q	N	B	B	K	O	I	R	B	D	D	Y	V	S
I	C	Q	W	L	O	O	E	G	C	O	O	F	A	O	C	A	O
M	H	E	B	A	I	L	G	T	C	M	M	T	L	G	N	R	R
E	A	U	B	Y	T	U	A	Y	L	A	B	Q	M	S	O	I	E
A	K	P	N	E	C	S	H	T	U	F	O	S	P	D	L	C	L
H	V	O	I	L	R	X	R	H	S	S	P	X	A	I	K	O	C
C	Q	M	X	Z	A	W	R	R	I	R	H	A	I	O	W	S	S
S	D	S	J	R	F	E	O	O	O	E	L	T	H	H	S	E	O
I	Q	Y	J	C	N	R	M	M	N	K	E	H	Q	R	A	V	I
Y	L	R	E	J	I	G	E	B	Z	P	B	E	T	R	A	E	R
I	M	U	C	W	R	F	A	U	X	K	I	R	E	O	J	I	E
T	A	E	C	U	I	B	H	S	D	P	T	O	K	M	A	N	T
F	E	N	L	I	M	O	K	F	F	H	I	M	V	E	B	O	R
P	U	A	X	C	T	R	K	Y	I	Q	S	A	A	A	A	Q	A
B	M	J	M	M	Q	Y	D	X	Y	J	G	B	I	H	C	N	L

Clues

1. Fatty deposit within a blood vessel wall
2. Tissue death due to interrupted blood supply
3. A blood clot
4. Mass of material travelling in the bloodstream
5. Tissue damage due to interrupted blood supply
6. The term for blockage of a blood vessel
7. Bleeding
8. Varicose veins of the rectum
9. A vein that has become stretched and dilated because of faulty valves
10. Inflammation of a vein
11. Benign tumour of a blood vessel
12. Local weakness of arterial wall, allowing bulging and dilation
13. Progressive hardening and degeneration of blood vessel walls, usually due to ageing

59. Match the terms related to heart rhythm with their corresponding descriptions.

Term:

- Heart block
- Ventricular fibrillation
- Atrial fibrillation
- Sinus bradycardia
- Complete heart block
- Asystole
- Sinus tachycardia
- QRS complex

Description:

- Complete independence of atrial and ventricular activity
- ECG wave corresponding to ventricular systole
- Varying degree of dissociation of atrial and ventricular activity
- Chaotic electrical activity in the ventricles
- Gives a flat line on the ECG
- Chaotic electrical activity in the atria
- Heart rate at rest below 60bpm but normal rhythm
- Heart rate at rest above 120bpm, but normal rhythm

60. Terms related to blood vessels are listed below. Identify the terms using the given clues.

- A weakness in the wall of a blood vessel, usually a large artery: _____
- Structure in a large vein to maintain one-way flow of blood: _____
- The vein carrying blood from the intestines to the liver: _____
- Commonest complication of a deep venous thrombosis: _____
- Tiny aneurysm, usually in the brain: _____
- Varicose veins of the oesophagus: _____
- Varicose vein of the scrotum: _____
- A blood clot: _____
- Event associated with interruption of blood supply to the brain: _____
- Pain associated with ischaemia of the heart muscle: _____
- Blackening of necrotic tissue: _____
- Pain associated with interruption of blood supply to a limb: _____

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61. Terms related to heart failure are hidden under the tiles and so are their corresponding descriptions. Find the pairs of tiles with matching term and description.

Terms:

Ascites: _____

Pleural effusion: _____

Oedema: _____

Heart attack: _____

Left sided heart failure: _____

Right sided heart failure: _____

Dyspnoea: _____

Hypertension: _____

Descriptions:

Collection of fluid in abdomen

Collection of fluid in pleural cavity

Collection of fluid in tissues

Myocardial infarction

Leads to pulmonary hypertension

Also termed congestive cardiac failure

Difficult/painful breathing

Increases afterload

62. Which of the following statements is true?

- The vagus nerve releases acetylcholine at the myocardium.
- Myocardial contraction is speeded up by acetylcholine.
- Noradrenaline is a parasympathetic neurotransmitter.
- Adrenaline is the main sympathetic neurotransmitter in the heart.

63. The chemoreceptors in the carotid bodies are particularly sensitive to: ____.
- a) Hypercapnia
 - b) Hypoxia
 - c) A decrease in blood pH
 - d) An increase in the hydrogen ion concentration of the blood

64. Which part of the QRS complex represents the repolarisation of the atria?
- a) The Q wave
 - b) The R wave
 - c) The S wave
 - d) None of the above

65. When you take a blood pressure reading, the first sound that you hear (top reading) is:

- a) The systolic sound which indicates the relaxation of the ventricles
- b) The systolic sound which indicates the contraction of the ventricles
- c) The diastolic sound which indicates the contraction of the atria
- d) The diastolic sound which indicates the relaxation of the ventricles

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The cardiovascular system

Answers:

1. Identify whether the following statements apply to vasoconstriction or vasodilation.

Statements	Category A	Category B
Smooth muscle in blood vessel wall is relaxed.		✓
Lumen of blood vessel is reduced.	✓	
Decreased resistance to blood flow.		✓
Usually caused by sympathetic stimulation.	✓	
Volume of blood flow is reduced.	✓	
Blood vessel wall thickens.	✓	
Reduces the pressure at which blood is flowing.		✓

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2. The vasa vasorum supplies blood to which of the following?

- The blood vessel walls

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3. Which of the following is not an example of autoregulation?

- The control of the blood vessel diameter by the vasomotor centre in the medulla oblongata

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Correct answer feedback: Autoregulation means local control of blood flow, adjusting blood vessel diameter to meet the immediate needs of the tissues, and without requiring the input of the nervous system.

4. Which of the following layers of the vessel wall contains the smooth muscle that allows it to adjust its diameter?

- Tunica media

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5. In health, flow along a blood vessel is determined primarily by adjustment of: _____

- Blood vessel diameter

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6. Terms related to blood vessels are hidden under the tiles and so are their corresponding descriptions. Find the pairs of tiles with matching term and description.

The cardiovascular system

- Arteriole: Resistance vessel
- Lymphatic capillary: Blind-ended vessel
- Elastic artery: Large, expandable vessel
- Capillary: Vessel for exchange of substances
- Sinusoid: Has extremely permeable walls
- Collateral circulation: Links the main arteries in an area
- Vein: Possesses valves
- Venule: A small vein

7. Which of the following vessels do not have the ability to constrict and dilate?

- Capillaries

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8. Both the tunica media and the tunica adventitia are absent in: _____

- Capillaries

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9. The tissue layers of blood vessels from exterior to interior are: _____

- Tunica adventitia, tunica media, and tunica intima

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10. Which of the following blood vessels act as blood reservoirs?

- Veins

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Formatted: Bullets and Numbering

11. Identify whether the following statements correspond to a complete cardiac diastole, an atrial systole or a ventricular systole.

Statements	Category A	Category B	Category C
All heart chambers are at rest	✓		
Corresponds to the QRS complex of the ECG			✓
Lasts for half (0.4 seconds) of the entire cardiac cycle	✓		
The atrioventricular valves are open		✓	
The atria are contracting		✓	
The atrioventricular valves are snapped shut as this starts			✓
Atrial refilling occurs	✓		

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12. Where in the brain is the cardiovascular centre, for regulating heart rate, located?

The cardiovascular system

•In the medulla oblongata

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13. Which of the following set of circumstances would increase the heart rate?

•Adrenaline release, physical activity and fall in blood pressure

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14. Which of the following statements is true?

•The sympathetic supply to the heart increases both the rate and the force of the heartbeat

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Correct answer feedback: Adrenaline is a circulating hormone and both adrenaline and noradrenaline increase heart rate and are associated with sympathetic activation. The parasympathetic neurotransmitter at the target organ is acetylcholine.

15. Parasympathetic nerves supplying the heart release: _____.

•Acetylcholine

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16. Match the terms related to cardiac output with their corresponding descriptions:

•Cardiac output: The volume of blood expelled by one ventricle in one minute.

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•Stroke volume: The amount of blood expelled by the ventricle each time it beats.

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•Preload: The amount of blood in the ventricle just before it contracts

•Afterload: The resistance to blood leaving the heart by the arteries

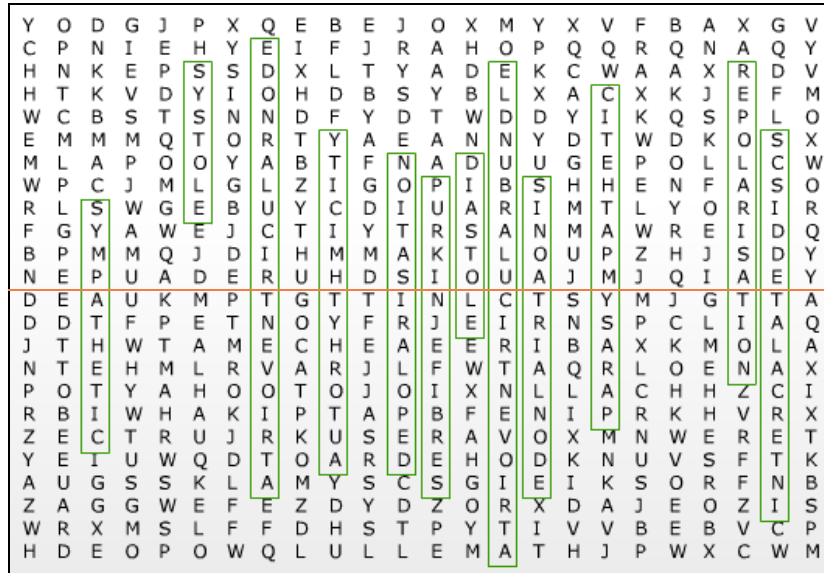
•Venous return: The volume of blood arriving at the right side of the heart

•Heart rate: When multiplied by stroke volume, gives the cardiac output

•Ventricular end-diastolic volume: Another term for preload

17. Based on the clues provided, find the terms related to the conduction system of the heart from the crossword grid.

The cardiovascular system



1. The tiny conducting branches that make contact with the myocardial cells: Purkinje fibres
2. The specialised conducting junctions between myocardial cells: Intercalated discs
3. The pacemaker of the heart: Sino-atrial node
4. The secondary pacemaker of the heart: Atrioventricular node
5. The conducting tissue passing through the fibrous ring separating the atria and the ventricles: Atrioventricular bundle
6. Cardiac contraction: Systole
7. Cardiac relaxation: Diastole
8. Electrical activation of a myocardial cell: Depolarisation
9. Restoration of the myocardial cell membrane potential to its resting state: Repolarisation
10. The branch of the autonomic nervous system that speeds up sino-atrial node discharge: Sympathetic
11. The branch of the autonomic nervous system that slows down sino-atrial node discharge: Parasympathetic
12. The ability of the myocardium to initiate its own electrical signals: Autorhythmicity

18. The saclike structure around the heart is the: _____.

- Pericardium

19. The thickest layer of tissue in the heart wall is the: _____.

- Myocardium

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The cardiovascular system

Correct answer feedback: The myocardium is composed of specialised cardiac muscle found only in the heart, which are cross-striated. Each fibre (cell) has a nucleus and one or more branches. The ends of the cells and their branches are in very close contact with the ends and branches of adjacent cells. Microscopically these 'joints', or intercalated discs, can be seen as thicker, darker lines than the ordinary cross-stripes. This arrangement gives cardiac muscle the appearance of being a sheet of muscle.

20. The internal layer of tissue in the heart is the: _____.

- Endocardium

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21. The right atrioventricular valve is also called the: _____.

- Tricuspid

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22. How is the heart muscle supplied with oxygen and nutrients?

- By the coronary arteries, which branch from the aorta

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23. How is blood drained from the tissues of the heart?

- It is drained mainly into the coronary sinus, which opens into the right atrium

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24. What proportion of the cardiac output does the heart itself receive?

- 5%

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25. Which chamber of the heart has the largest blood supply?

- Left ventricle

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26. Which layer of the heart wall lines its chambers?

- Endocardium

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27. Which layer of the heart wall contains muscle?

- Myocardium

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28. The pericardial space lies between which layers of the heart wall?

- The visceral pericardium and the parietal pericardium

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The cardiovascular system

29. Pericardial fluid is secreted by the: _____.

- Serous pericardium

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30. Identify whether the events listed below would increase or decrease systemic blood pressure.

Statements	Category A	Category B
Rising blood pH		✓
Increased heart rate	✓	
Raised parasympathetic activity		✓
Generalised vasoconstriction	✓	
Increased stroke volume	✓	
Reduced blood oxygen levels	✓	
Increased blood [H ⁺]	✓	

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31. Arrange the events in the correct order to describe the response to a fall in blood pressure.

- Event 1: Output from arterial baroreceptors falls
- Event 2: Input to cardiovascular centre is diminished
- Event 3: Sympathetic output from cardiovascular centre rises
- Event 4: Heart rate increases
- Event 5: Cardiac output rises
- Event 6: Systemic blood pressure rises

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32. Which of the following is not a mechanism that increases blood volume and therefore the venous return of blood to the heart?

- Atrial natriuretic hormone

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33. Cardiac output is determined by: _____.

- The stroke volume and heart rate

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34. Which of the following events tends to increase blood viscosity?

- An increase in the red blood cell count

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35. Which artery in the arm is used to measure blood pressure?

The cardiovascular system

•Brachial

36. Blood pressure usually expressed as: ____.

•Systolic pressure over diastolic pressure

37. Which of the following events can be measured as systolic blood pressure?

•Ventricular contraction

38. What are the two main factors that determine blood pressure?

•Cardiac output and peripheral resistance

39. Which of the following is associated with the moment to moment control of blood pressure?

•The baroreceptor reflex

40. Starting from the smallest, arrange the veins in the correct order to trace the return of blood from the foot towards the heart.

•Stage 1: Dorsal venous arch

•Stage 2: Saphenous vein

•Stage 3: Femoral vein

•Stage 4: External iliac vein

•Stage 5: Common iliac vein

•Stage 6: Inferior vena cava

41. Where do the coronary arteries arise?

•The aortic arch

42. Which is the most important artery in the supply to the circulus arteriosus (circle of Willis)?

•The internal carotid

43. Which artery is most important in supplying the superficial tissues of the head and neck?

•The external carotid

44. From which artery does the vertebral artery arise?

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The cardiovascular system

•The subclavian

45. Which is the major vein draining the tissues of the head and upper body?

•The superior vena cava

46. Which of the following do the right and the left brachiocephalic veins unite to form?

•Subclavian vein

47. Which of the following does the right axillary vein run into?

•The right subclavian vein

48. The superior vena cava is formed when which two veins unite?

•The right and left brachiocephalic veins

49. Match the artery with its corresponding description.

- Lingual artery: Supplies the tongue
- Facial artery: A pulse can be felt where this artery passes over lower jaw bone
- Left common carotid artery: Arises directly from the arch of the aorta
- Carotid sinuses: Contain baroreceptors that monitor blood pressure
- Temporal artery: A pulse can be felt where this artery passes close to the front of the ear
- Carotid bodies: Contain chemoreceptors that monitor blood gases
- Circulus arteriosus: Supplies most of the brain
- Basilar artery: Formed from the union of two vertebral arteries
- Right common carotid artery: Arises from the subclavian artery

50. Label the arteries forming the circulus arteriosus.

Arteries forming the circulus arteriosus (Circle of Willis) and its main branches to the brain:

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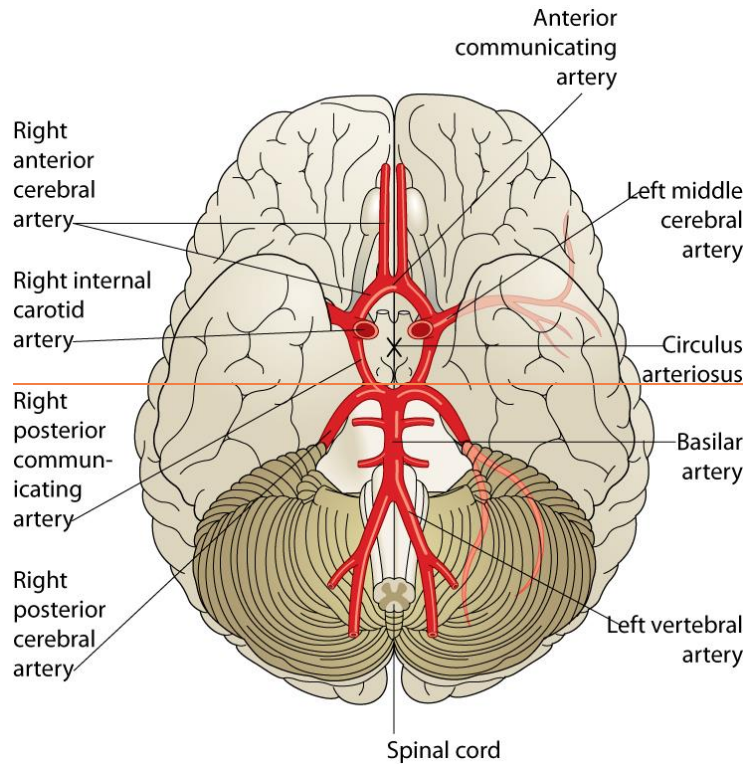
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51. Arrange the names of arteries in the right hand in the correct sequence starting from the largest artery.

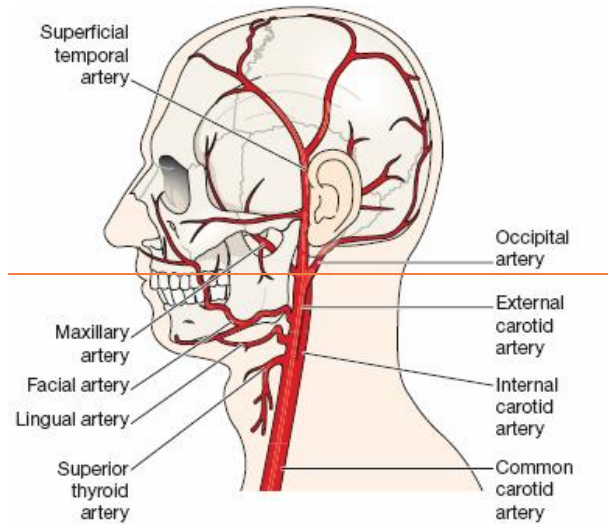
- Stage 1: Subclavian artery
- Stage 2: Axillary artery
- Stage 3: Brachial artery
- Stage 4: Ulnar artery
- Stage 5: Radial artery
- Stage 6: Deep palmar arch

52. Label the main arteries of the head and neck.

Main arteries of the head and neck

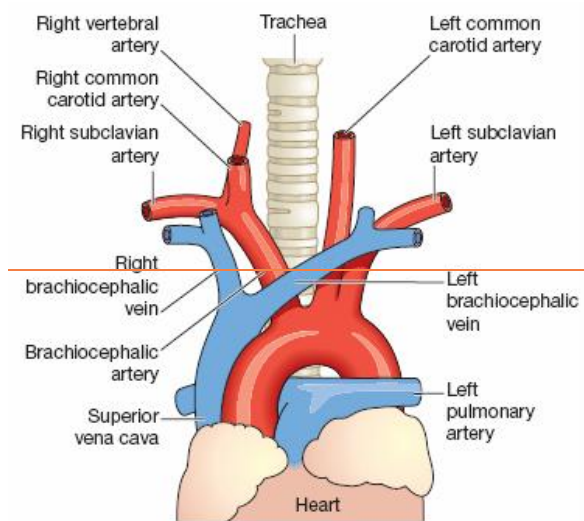
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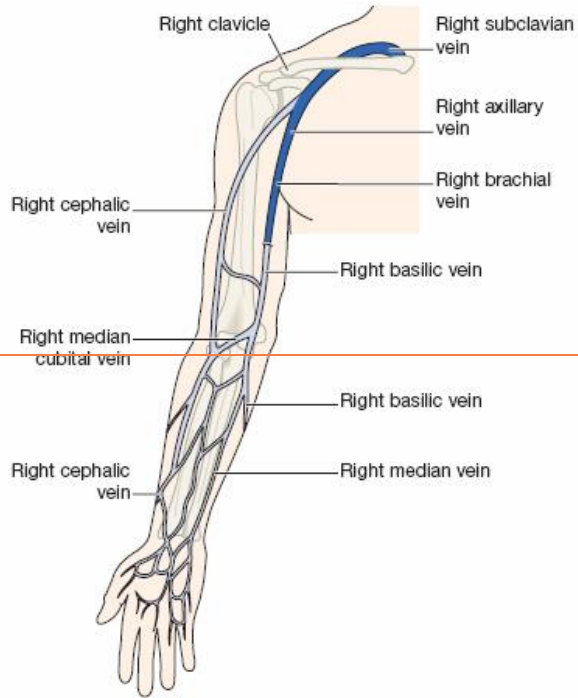
53. Label the main blood vessels associated with the aortic arch.

The arch of the aorta and its branches



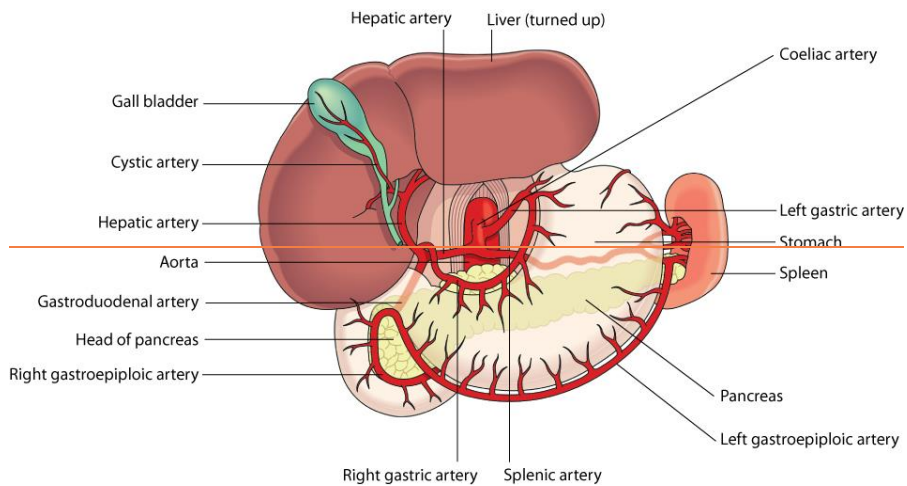
54. Label the main veins of the right arm.

The main veins of the right arm



55. Label the main arteries of the upper abdominal organs.

The coeliac artery and its branches, and the inferior phrenic arteries



The cardiovascular system

56. Match the following structures related to fetal circulation with their corresponding descriptions:

- Foramen ovale: Hole in the septum between the fetal atria
- Placenta: Brings maternal and fetal blood into close proximity
- Ductus arteriosus: Diverts blood from the nonfunctional fetal lungs
- Umbilical artery: Carries deoxygenated fetal blood to the placenta
- Umbilical vein: Carries oxygenated blood to the fetus
- Ductus venosus: Diverts blood from the nonfunctional fetal liver
- Umbilical cord: Links the placenta and fetus

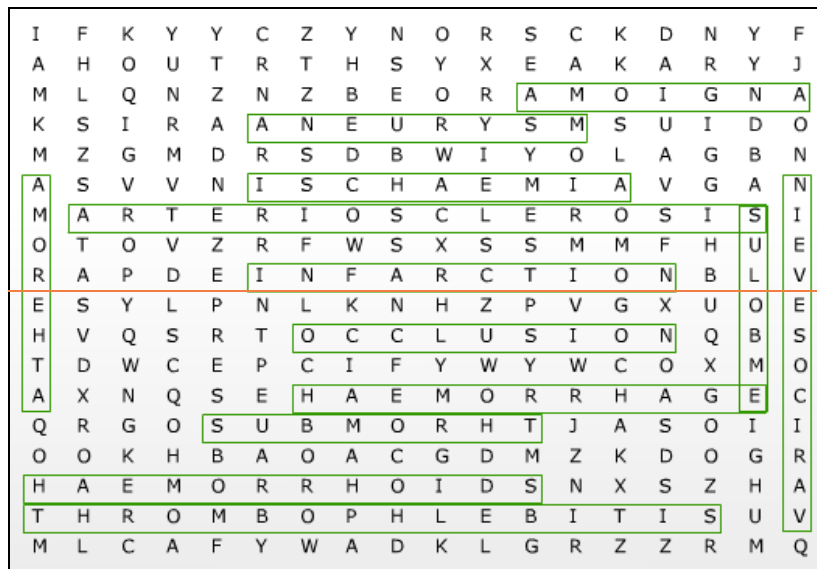
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57. Fill in the blanks to complete the paragraph on the placenta

The placenta develops from the **fertilised ovum** and usually weighs about **500g**. It allows the exchange of substances between the maternal and fetal circulation, mainly by **diffusion**. It confers passive immunity on the fetus by allowing the transfer of maternal **antibodies** into the fetal circulation. It acts as a selective barrier and prevents many harmful materials from accessing the baby's circulation. The name given to a substance that can cause abnormal fetal development is a **teratogen**. In addition, the placenta secretes hormones that maintain pregnancy, including the hormone **human chorionic gonadotrophin** which maintains the corpus luteum in early pregnancy and **oestrogen and progesterone** thereafter.

58. Based on the clues provided, find the terms related to the pathology of blood vessels from the crossword grid:



The cardiovascular system

1. Fatty deposit within a blood vessel wall: Atheroma
2. Tissue death due to interrupted blood supply: Infarction
3. A blood clot: Thrombus
4. Mass of material travelling in the bloodstream: Embolus
5. Tissue damage due to interrupted blood supply: Ischaemia
6. The term for blockage of a blood vessel: Occlusion
7. Bleeding: Haemorrhage
8. Varicose veins of the rectum: Haemorrhoids
9. A vein that has become stretched and dilated because of faulty valves: Varicose vein
10. Inflammation of a vein: Thrombophlebitis
11. Benign tumour of a blood vessel: Angioma
12. Local weakness of arterial wall, allowing bulging and dilation: Aneurysm
13. Progressive hardening and degeneration of blood vessel walls, usually due to ageing: Arteriosclerosis

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59. Match the terms related to heart rhythm with their corresponding descriptions.

- Heart block: Varying degree of dissociation of atrial and ventricular activity
- Ventricular fibrillation: Chaotic electrical activity in the ventricles
- Atrial fibrillation: Chaotic electrical activity in the atria
- Sinus bradycardia: Heart rate at rest below 60bpm but normal rhythm
- Complete heart block: Complete independence of atrial and ventricular activity
- Asystole: Gives a flat line on the ECG
- Sinus tachycardia: Heart rate at rest above 120bpm, but normal rhythm
- QRS complex: ECG wave corresponding to ventricular systole

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60. Terms related to blood vessels are listed below. Identify the terms using the given clues.

- A weakness in the wall of a blood vessel, usually a large artery: Aneurysm
- Structure in a large vein to maintain one way flow of blood: Valve
- The vein carrying blood from the intestines to the liver: Hepatic portal
- Commonest complication of a deep venous thrombosis: Pulmonary embolism
- Tiny aneurysm, usually in the brain: Microaneurysm
- Varicose veins of the oesophagus: Oesophageal varices
- Varicose vein of the scrotum: Scrotal varicocele
- A blood clot: Thrombus
- Event associated with interruption of blood supply to the brain: Stroke
- Pain associated with ischaemia of the heart muscle: Angina
- Blackening of necrotic tissue: Gangrene
- Pain associated with interruption of blood supply to a limb: Intermittent claudication

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61. Terms related to heart failure are hidden under the tiles and so are their corresponding descriptions. Find the pairs of tiles with matching term and description.

- Ascites: Collection of fluid in abdomen
- Pleural effusion: Collection of fluid in pleural cavity

The cardiovascular system

Oedema: Collection of fluid in tissues
Heart attack: Myocardial infarction
Left-sided heart failure: Leads to pulmonary hypertension
Right-sided heart failure: Also termed congestive cardiac failure
Dyspnoea: Difficult/painful breathing
Hypertension: Increases afterload

62. Which of the following statements is true?

- The vagus nerve releases acetylcholine at the myocardium.

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63. The chemoreceptors in the carotid bodies are particularly sensitive to: _____.

- Hypercapnia

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64. Which part of the QRS complex represents the repolarisation of the atria?

- None of the above

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65. When you take a blood pressure reading, the first sound that you hear (top reading) is:

- The systolic sound which indicates the contraction of the ventricles

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