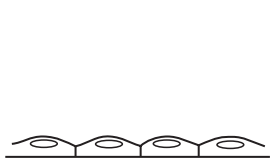
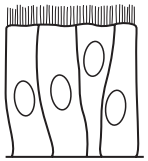
34 Two types of epithelial cells, 1 and 2, occur in the mammalian gas exchange system in a healthy human.



1



2

Which row shows the function and distribution of these types of epithelial cells?

	cell type 1	cell type 2
A	absorption in bronchi	secrete mucus in alveoli
B	exchange surface in alveoli	secrete mucus in bronchi
C	absorption in bronchi	move mucus in alveoli
D	exchange surface in alveoli	move mucus in bronchi

35 Which tissues would be seen in a photomicrograph of the wall of the trachea?

	elastic fibres	smooth muscle
A	✗	✓
B	✓	✗
C	✓	✓
D	✗	✗

key

✓ = present

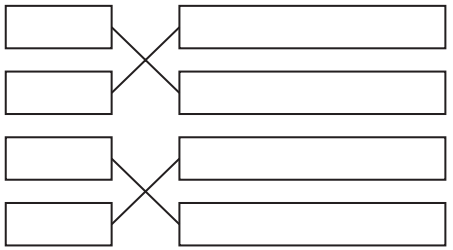
✗ = **not** present

36 The diagram shows parts of the gas exchange system in humans and the associated cells or structures.

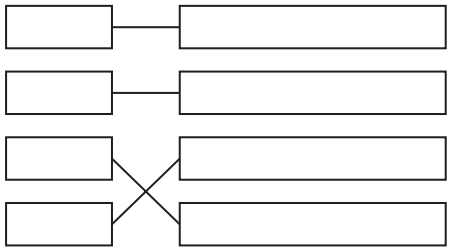
alveolus	ciliated cells
bronchiole	squamous epithelial cells
bronchus	C-shaped rings of cartilage
trachea	ciliated cells and goblet cells

Which diagram shows the lines that correctly match the parts to their cells or structures?

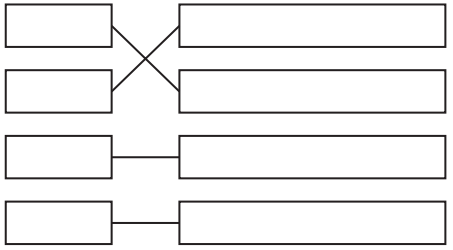
A



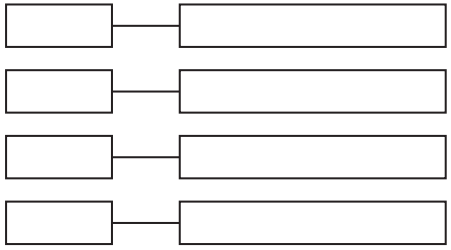
B



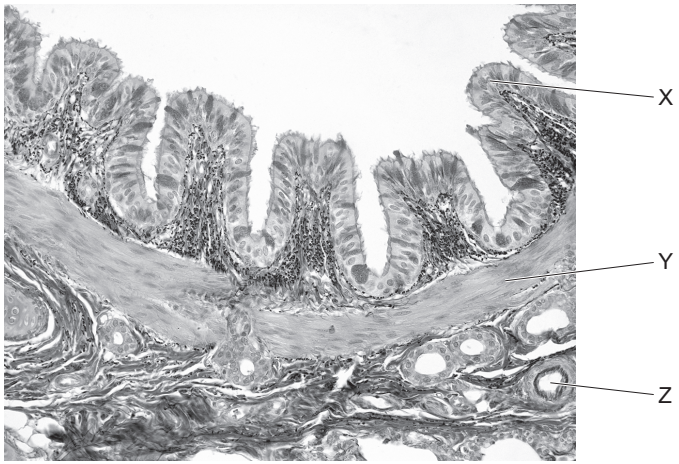
C



D



37 The photomicrograph shows the wall of a bronchus as seen with a light microscope.

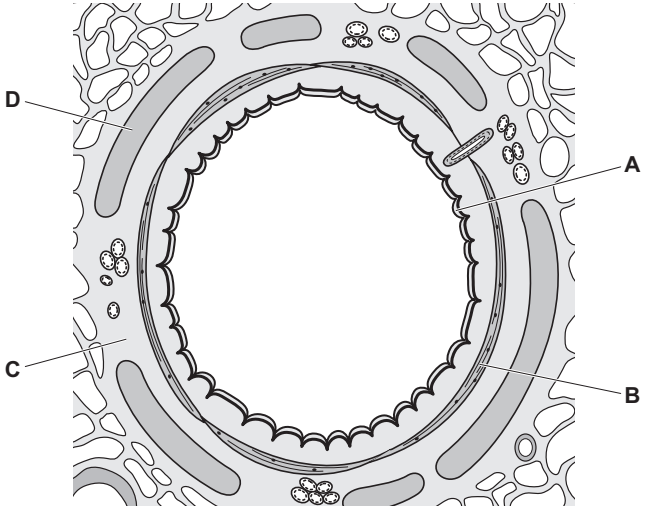


Which row correctly identifies the structures labelled?

	X	Y	Z
A	epithelium	elastic fibres	bronchiole
B	endothelium	smooth muscle	bronchiole
C	epithelium	smooth muscle	blood vessel
D	endothelium	elastic fibres	blood vessel

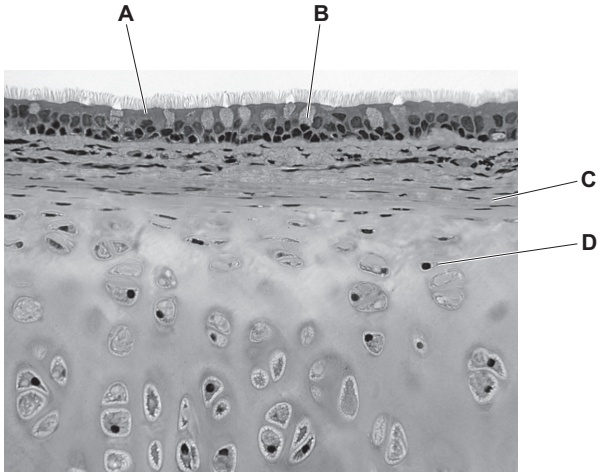
34 The diagram shows a transverse section through a human bronchus.

Which labelled tissue is the cartilage?



35 The photomicrograph shows a transverse section of part of the human gas exchange system.

Which row shows the correct name and function of one of the labelled structures in the photomicrograph?



	name	function
A	ciliated epithelial cell	traps particles
B	goblet cell	secretes mucus
C	cartilage	prevents collapse of trachea
D	smooth muscle	contracts to expand airways

6 **(a)** Alveolar macrophages are phagocytes found in the human gas exchange system. They produce hydrolytic enzymes, such as lysozyme, to digest pathogens entering the alveolus.

(i) State the term used to describe the sequence of nucleotides in the DNA of the alveolar macrophage that codes for a protein, such as lysozyme.

..... [1]

(ii) Synthesis of lysozyme occurs in two stages. The first stage occurs in the nucleus using one strand of DNA to synthesise mRNA.

State the name of the strand of DNA that is used to synthesise mRNA.

..... [1]

(iii) Name the organelle where the translation of mRNA takes place to produce lysozyme.

..... [1]

(iv) Lysozyme destroys bacterial cells by hydrolysing bonds in peptidoglycan.

Explain how the hydrolysis of bonds in peptidoglycan leads to the destruction of bacterial cells.

.....

.....

.....

..... [2]

(b) (i) Alveolar macrophages are found in contact with squamous epithelial cells in the walls of alveoli.

Explain how the cells lining the alveoli are adapted for gas exchange.

.....

.....

.....

..... [2]

(ii) Describe the role of elastic fibres in the wall of an alveolus.

.....

.....

.....

..... [2]

[Total: 9]

4 In mammals, the gas exchange system includes a set of branching airways that carry air to and from the gas exchange surface.

Air from the external atmosphere passes through different types of airway to reach the gas exchange surface.

(a) Name the type of airway of the gas exchange system that branches into airways known as bronchioles.

..... [1]

(b) Fig. 4.1 is a photomicrograph of a section through a bronchiole.

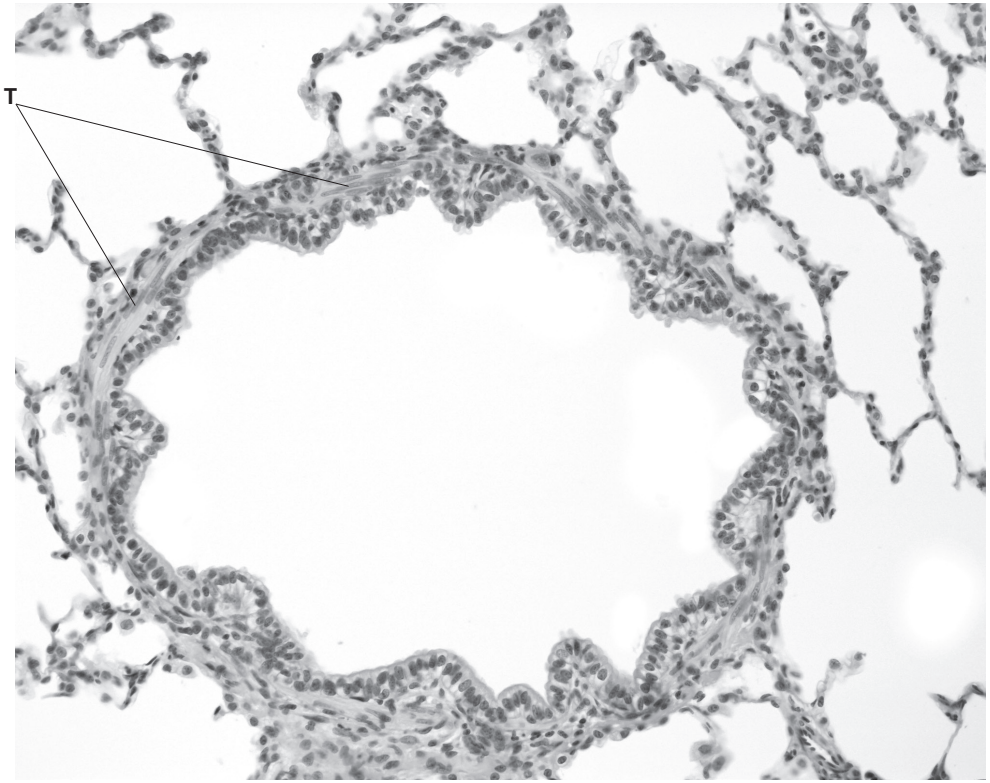


Fig. 4.1

(i) The bronchiole shown in Fig. 4.1 is **not** part of the gas exchange surface.

Name **one** structure in the gas exchange system, **visible in Fig. 4.1**, where gas exchange is carried out.

..... [1]

(ii) Name the type of cell found in the tissue labelled **T** in Fig. 4.1.

..... [1]

(iii) State the features that help to identify the type of airway shown in Fig. 4.1 as a bronchiole and **not** the other types of airway present in the gas exchange system.

.....

.....

.....

.....

.....

.....

..... [3]

(c) Blood is pumped to the lungs in the pulmonary circulation.

The lungs also receive a supply of blood from the systemic circulation.

Explain why the pulmonary circulation **and** the systemic circulation need to supply blood to the lungs.

.....

.....

.....

.....

..... [2]

[Total: 8]