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OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY 2802

Human Health and Disease

Monday **16 JANUARY 2006** Afternoon 1 hour

Candidates answer on the question paper.
Additional materials:
Electronic calculator
Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	9	
2	10	
3	12	
4	11	
5	11	
6	7	
TOTAL	60	

This question paper consists of 14 printed pages and 2 blank pages and an insert.

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Answer **all** the questions.

1 **(a)** The table below shows a number of nutrients found in a healthy diet.

Complete the table.

nutrient	one rich source	one function of nutrient
carbohydrate	potato	....
.....	butter	insulation around nerve cells
protein	meat	....
vitamin A	carrot	....
vitamin D	oily fish	....

[5]

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(b) The amount of protein needed per day to maintain the health of a young woman changes during pregnancy and breast feeding of her baby.

Fig. 1.1 is a bar chart showing the relative quantity of protein required by the young woman.

Complete the bar chart in Fig. 1.1 to indicate the relative quantity of protein required during pregnancy and breast feeding.

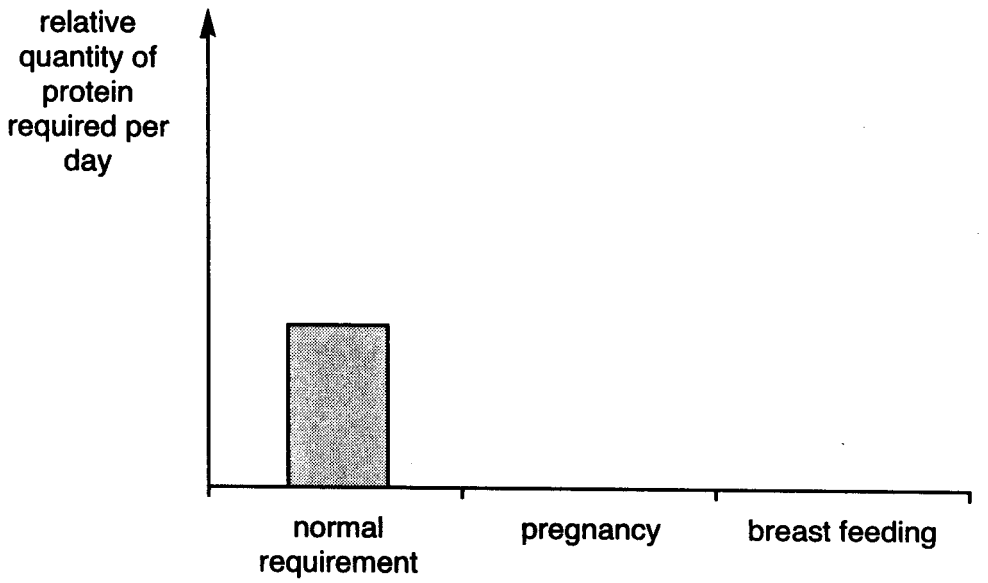

Fig. 1.1

[2]

(c) Explain why the protein requirements of the woman change as you have indicated above.

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.....

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.....[2]

[Total: 9]

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2 The Human Immunodeficiency Virus (HIV) is spread by exchange of body fluids between an infected person and an uninfected person. This often occurs as a result of unprotected sexual intercourse. HIV / AIDS is categorised as an infectious disease.

Listed below are three other categories of disease.

(a) State **one** example of a disease that fits into each category.

mental disease .....

self-inflicted disease .....

inherited disease .....[3]

Fig. 2.1 shows the percentage of people infected with HIV in different parts of the world at the end of 2002.

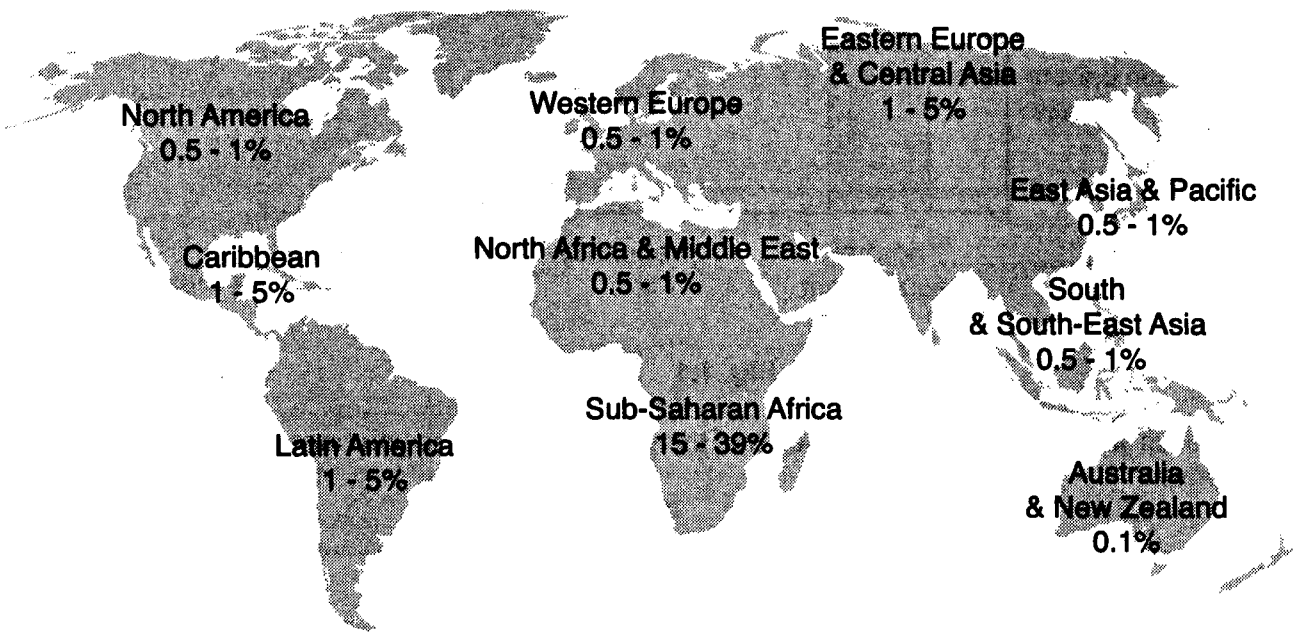

Fig. 2.1

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(b) (i) Explain why it is useful to collect information, such as that shown in Fig. 2.1.

.....

.....

.....

.....

.....

.....

.....[3]

(ii) The percentage of people infected with HIV is much higher in Sub-Saharan Africa than in much of Europe.

Suggest why the percentages are so much higher in Sub-Saharan Africa.

.....

.....

.....

.....[2]

(c) At present there is no cure for HIV/AIDs. Efforts to reduce the spread of HIV infection are centred on reducing the chances of a person carrying HIV passing it on to others.

Suggest how information gained from the Human Genome Project might be used to help reduce the spread of HIV.

.....

.....

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.....[2]

[Total: 10]

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3 Fig. 3.1 shows stages in the immune response to invading bacteria.

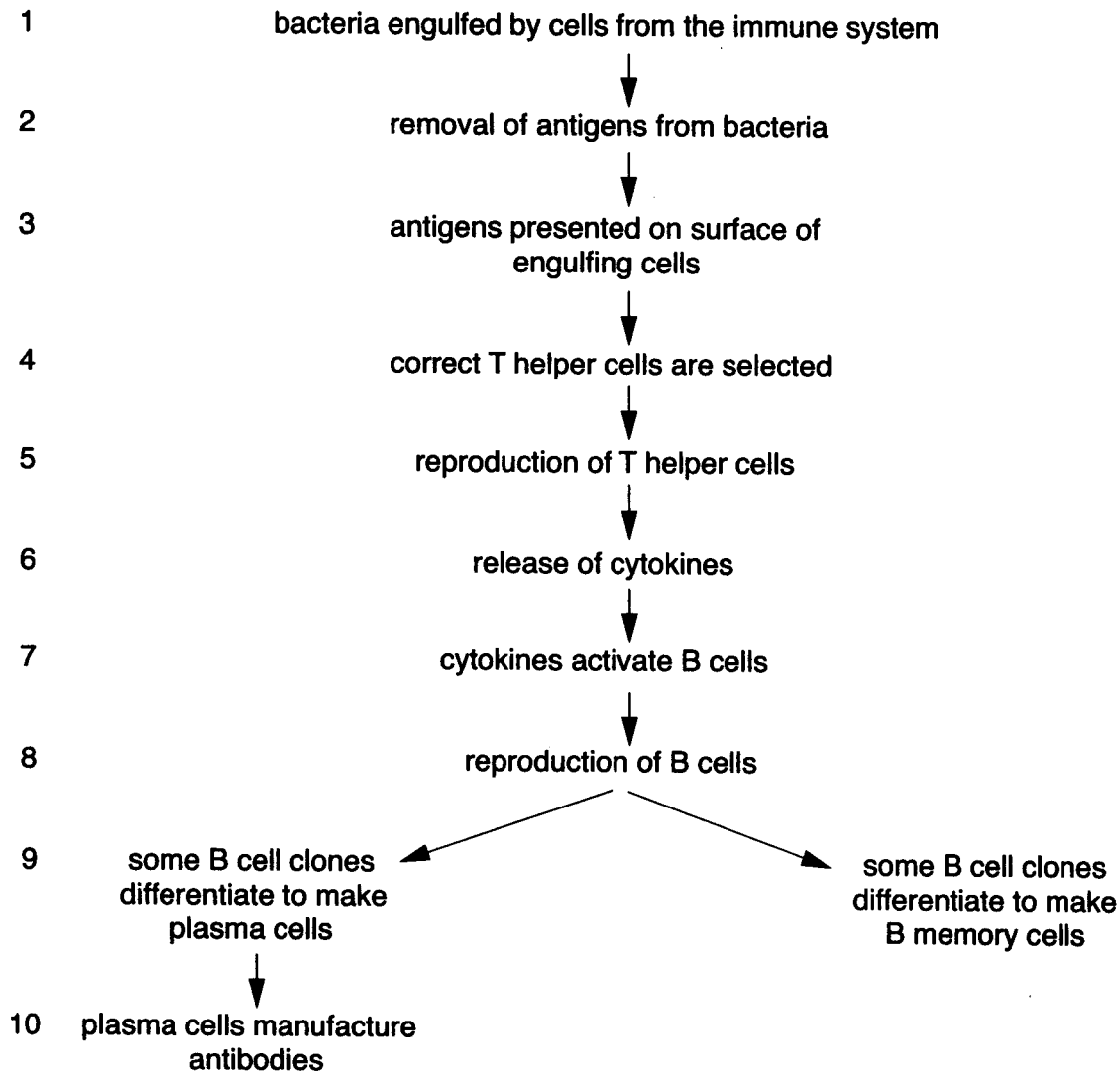

Fig. 3.1

(a) (i) Name the type of cell that engulfs the bacteria in stage 1.

.....[1]

(ii) Suggest how the antigens are removed from the bacteria in stage 2.

.....

.....

.....

.....[2]

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(iii) Explain how the correct T helper cells are selected in stage 4.

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.....[2]

(iv) Name the type of cell division used for reproduction of the T helper cells in stage 5.

..... [1]

(v) Explain the importance of B memory cells in immunity.

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.....[4]

(b) Describe how antibodies act on invading pathogens, such as bacteria or viruses.

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..... [2]

[Total: 12]

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4 Fig. 4.1 and Fig. 4.2 are provided for you on an insert.

Both Fig. 4.1 and Fig. 4.2 are photographs of lung tissue taken through a light microscope at the same magnification.

Fig. 4.1 shows healthy lung tissue.
Fig. 4.2 shows lung tissue damaged by tuberculosis.

(a) Name the organism that causes tuberculosis.

.....[1]

(b) State **three** features of the lung, **visible in Fig. 4.1**, that permit efficient exchange of gases.

1 .....

.....

2 .....

.....

3 .....

..... [3]

(c) Suggest how damage to lung tissue in tuberculosis, as seen in Fig. 4.2, is likely to affect a person with this disease.

.....

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.....[2]

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For Examiner's Use

(d) Outline the reasons why tuberculosis has not been eradicated.

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.....[5]

[Total: 11]

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5 **(a)** Name **two** diseases that may be caused by many years of cigarette smoking.

1 .....

2 .....[2]

(b) In this question, one mark is available for the quality of use and organisation of scientific terms.

Fig. 5.1 shows three components inhaled as a result of smoking a cigarette.

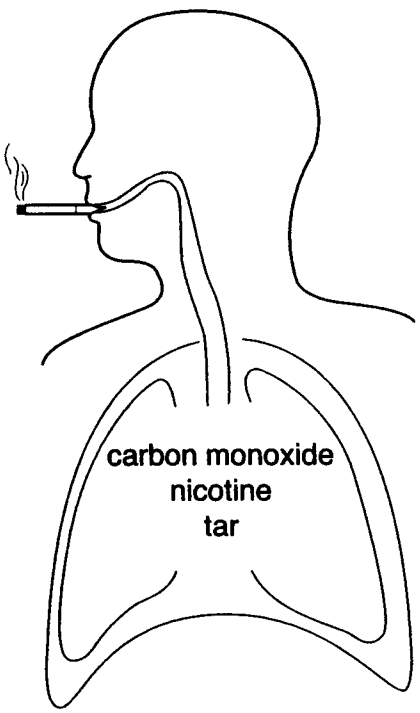

Fig. 5.1

Describe the effects of these three components of cigarette smoke on the body.

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.....[8]

Quality of Written Communication [1]

[Total: 11]

[Turn over

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6 Fig. 6.1 shows the trace from a spirometer. A spirometer is a device designed to measure the volume of air entering and leaving the lungs. A chamber in the spirometer contains soda lime to absorb the carbon dioxide released from respiration. The measurements shown were recorded from a healthy 16 year old student at rest.

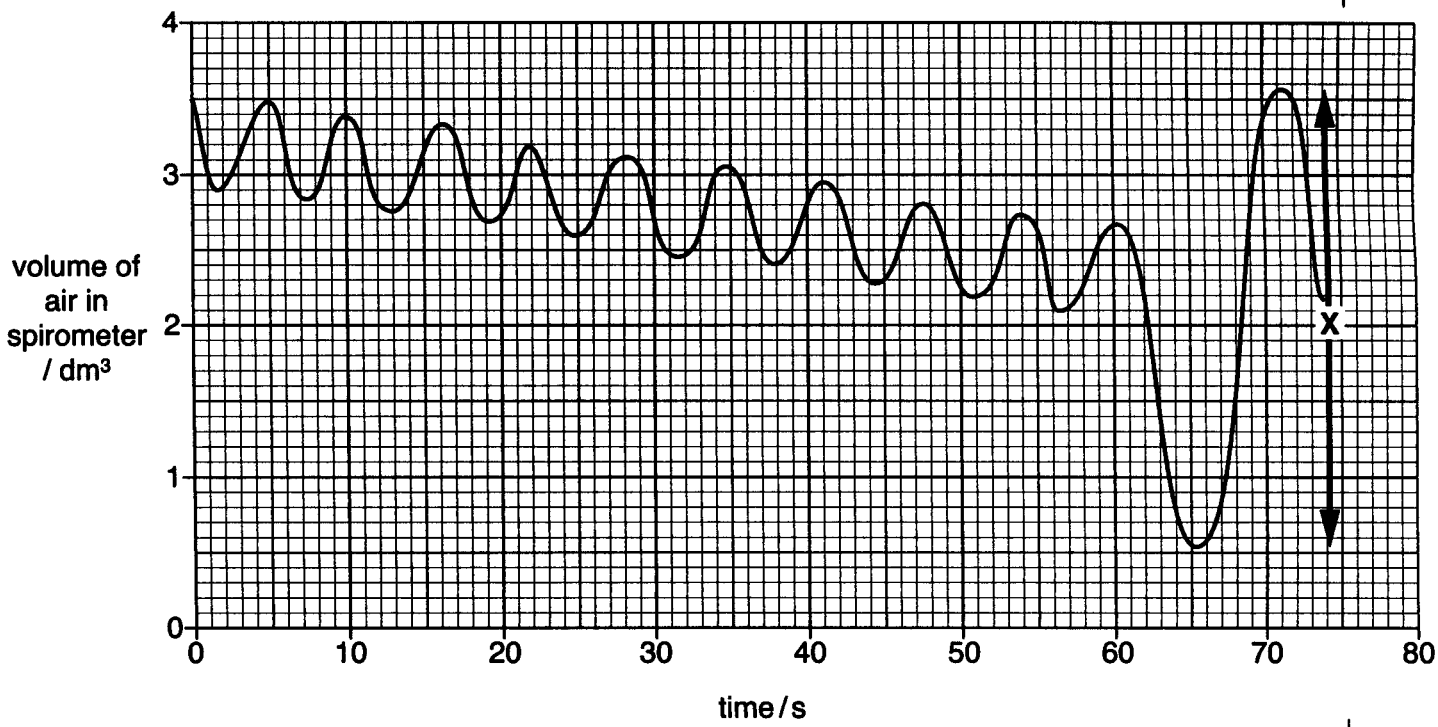

Fig. 6.1

(a) (i) Calculate the mean tidal volume in the first 20 seconds.
Express your answer to two decimal places. Show your working

Answer = ... dm^3 [2]

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(ii) At a certain point, the student was asked to breathe in as deeply as possible and then breathe out as much as possible. The resulting change in the trace is shown in Fig. 6.1 as **X**.

State the term given to measurement **X**.

.....[1]

(b) (i) The student was asked to perform two minutes of **aerobic** exercise.

Describe **two** ways in which you would expect the trace recorded during exercise to differ from that shown in Fig. 6.1.

1 .....

.....

2 .....

..... [2]

(ii) State **two** ways in which the student's **cardiovascular system** may respond to the exercise.

1 .....

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2 .....

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.....[2]

[Total: 7]

END OF QUESTION PAPER

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INSERT

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INSTRUCTIONS TO CANDIDATES

This insert contains Fig. 4.1 and Fig. 4.2.

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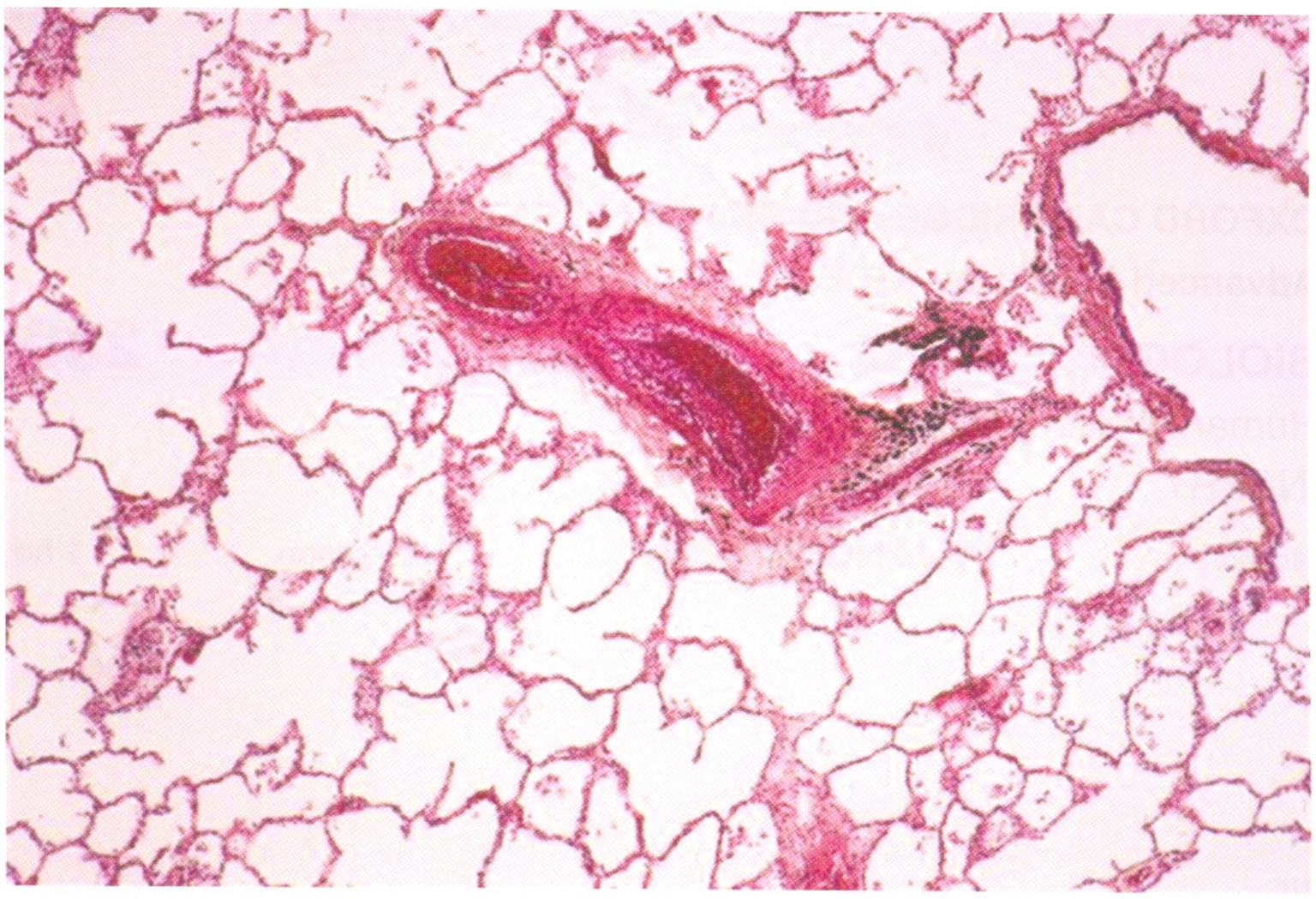

Fig. 4.1 healthy lung tissue

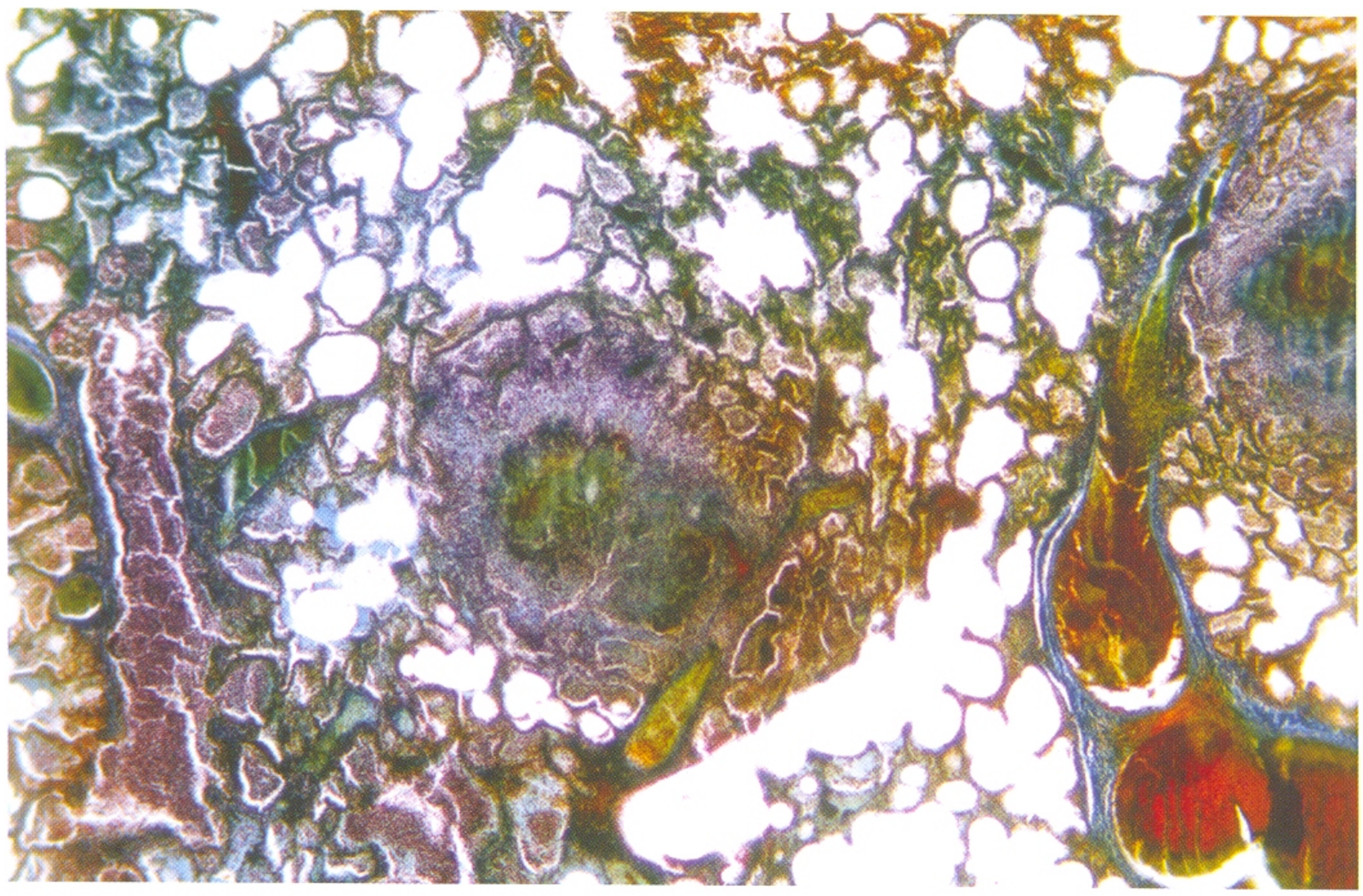

Fig. 4.2 lung tissue damaged by tuberculosis