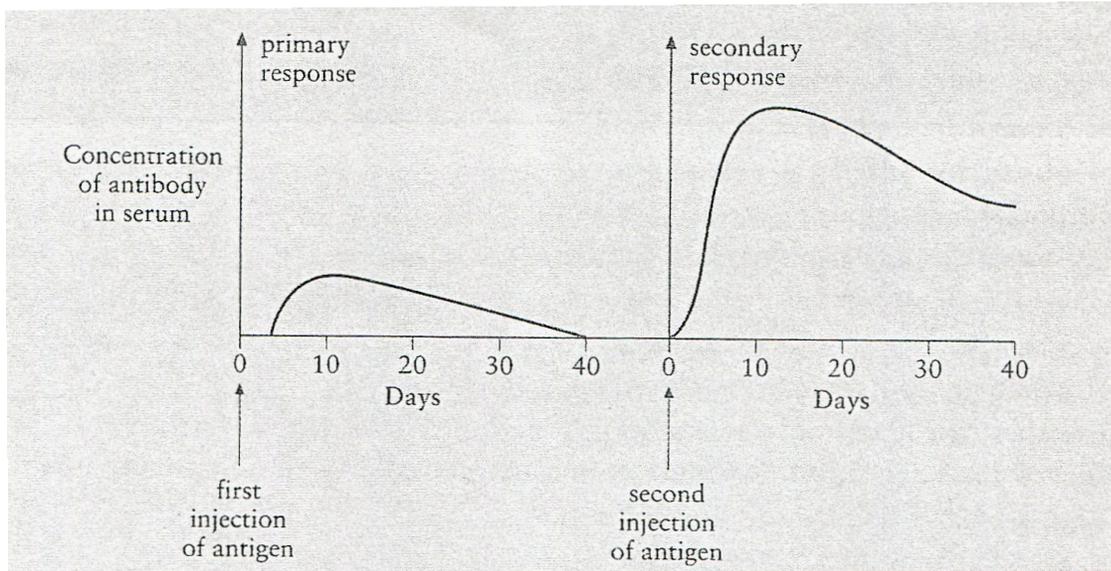
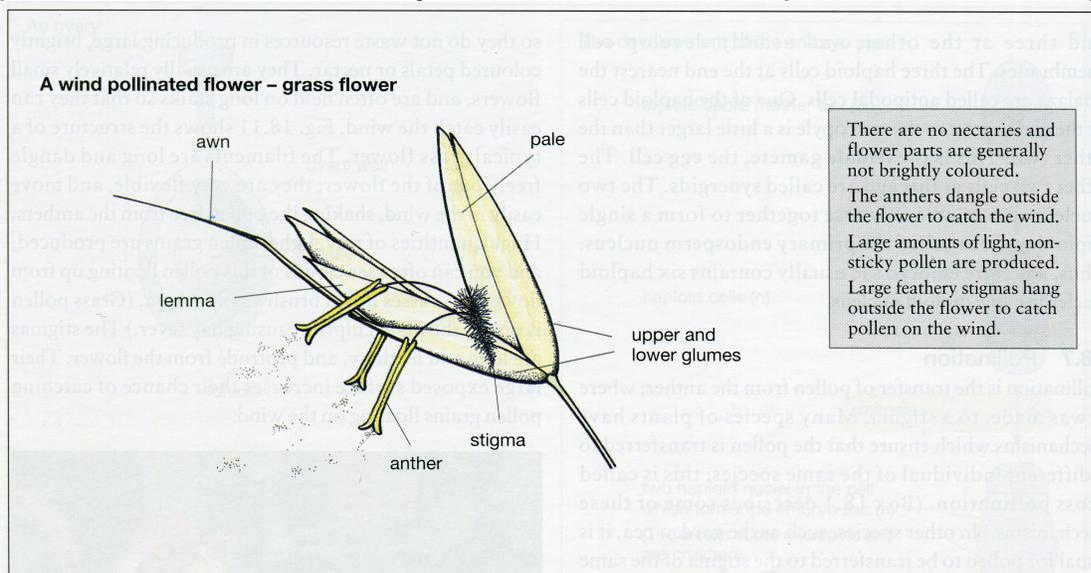


1. The graph below shows the responses to two identical doses of the same antigen.

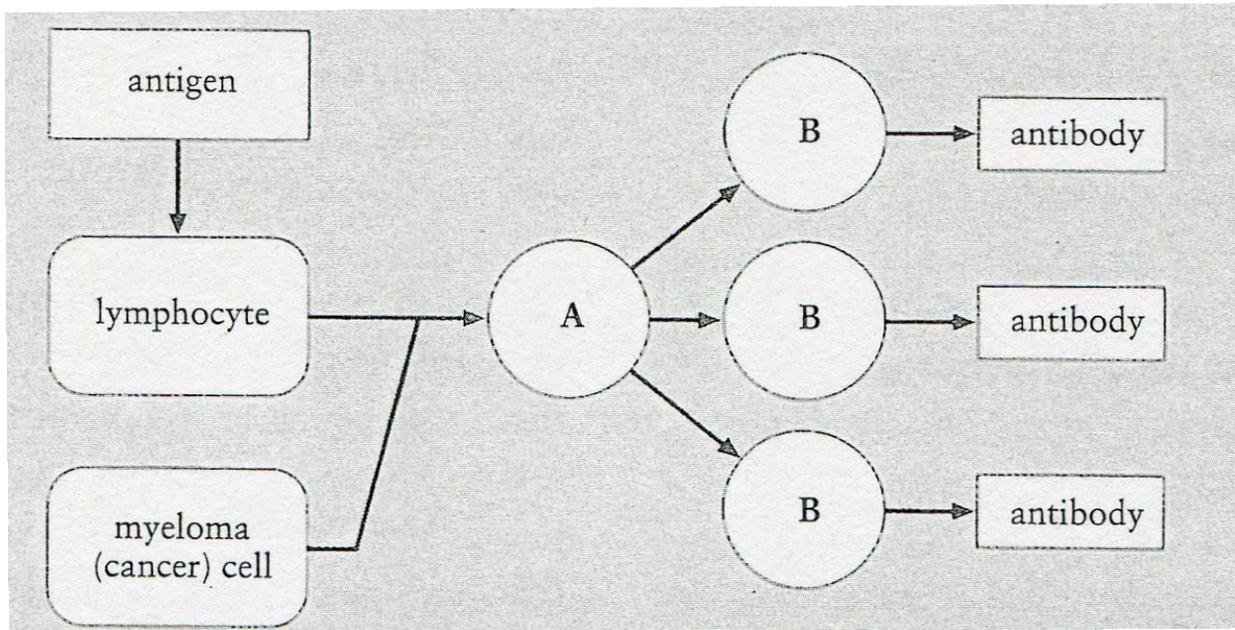


- (a) (i) Identify two differences between the responses shown.
 (ii) Briefly explain the mechanism which accounts for these differences.
- (b) How many days after the first injection should the second injection be given? Explain your answer.

2. Give an account of the adaptations of flowers to insect and wind pollination as illustrated by the flowers of the Papilionaceae and a grass.



3. The diagram below illustrates the process of producing monoclonal antibodies.



(a) (i) Name the type of cell labeled A in the diagram

(ii) State the process by which the cells labeled B are produced.

(b) Monoclonal antibodies can be used to locate specific molecules. Describe one use of monoclonal antibodies.

4. Which of the following statements about the female reproductive system are true or false.

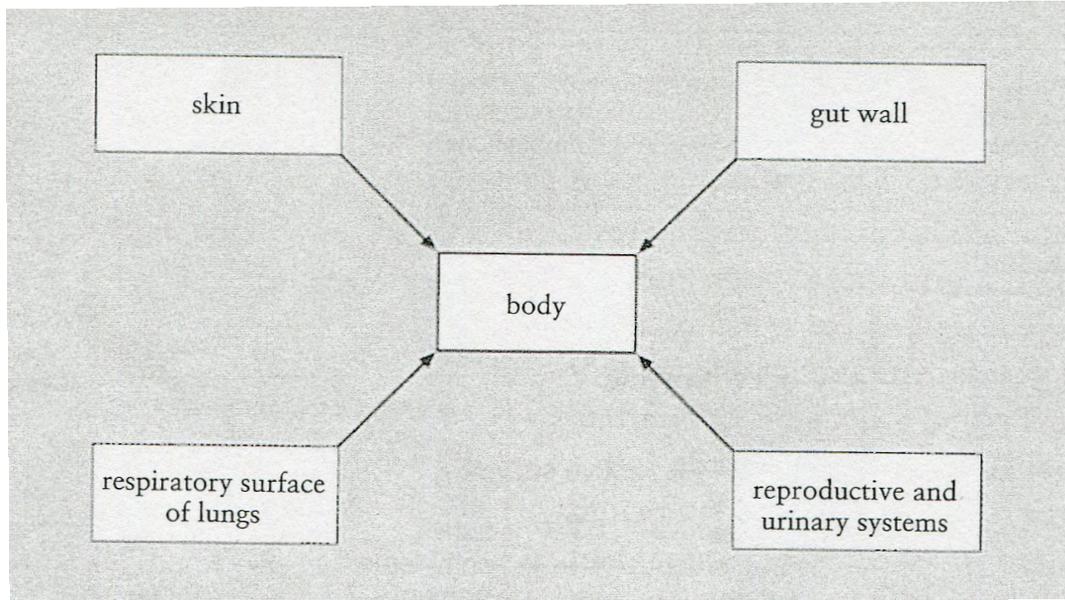
Indicate your views by putting + (true) or – (false) in the margin.

- 1 Both estrogen and progesterone are necessary for ovulation to take place;
- 2 Estrogen tends to inhibit the production of FSH by the anterior pituitary gland;
- 3 Fertilization of the ovum by the spermatozoon normally takes place in the uterus;
- 4 Progesterone production is largely under the control of Lh;
- 5 Throughout the part of the menstrual cycle that follows ovulation, there is a slight rise in body temperature.

Briefly explain each answer choice.

5. Describe two ways in which the activity of viruses can give rise to disease symptoms.

Disease-causing microorganisms gain access to the body via one of its interfaces with the environment. These are shown in the diagram below.

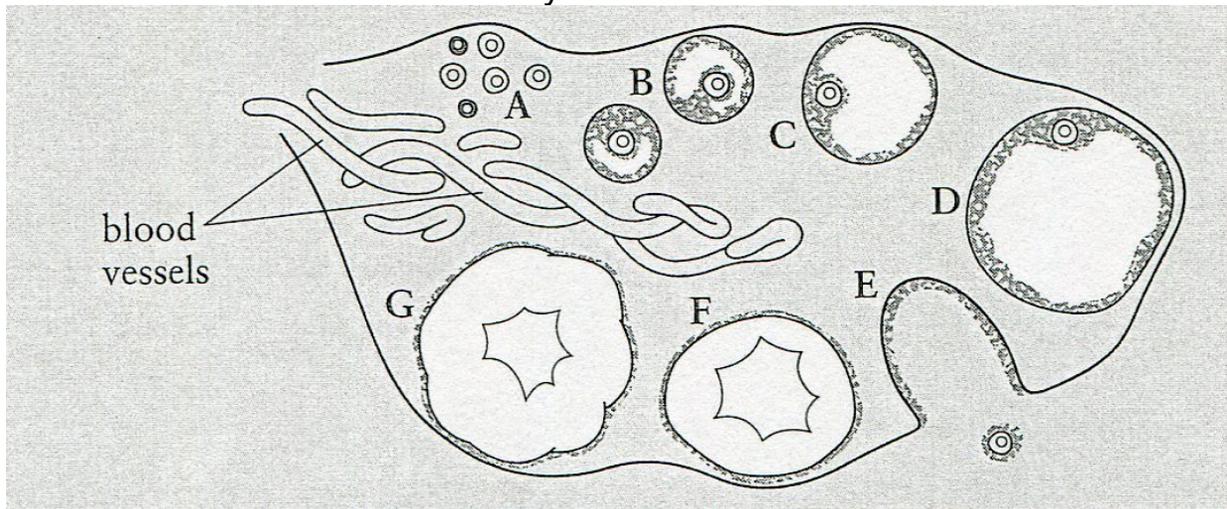


(b) Through which of these interfaces do the following gain access to the body:

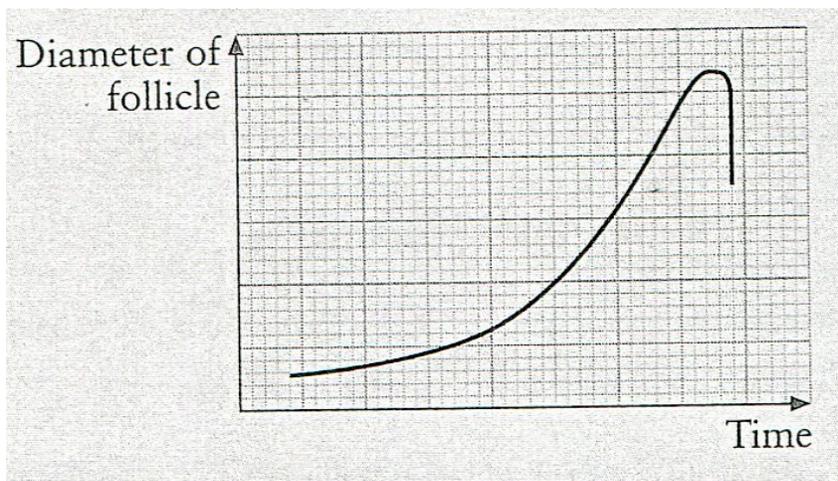
- (i) an influenza virus?
- (ii) a Salmonella bacterium?

(c) How does the human body normally limit the access of microorganisms to the respiratory surface of the lungs?

6. The diagram below shows the production of follicles, ovulation and the formation of a corpus luteum in a human ovary. The stages in the cycle are shown clockwise round the ovary from **A** to **G**.



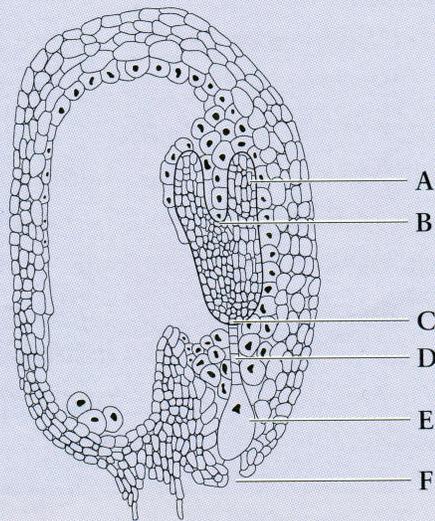
- Which of the lettered structures would you expect to produce the largest quantity of progesterone?
- The 'combined' pill is an oral contraceptive containing both estrogen and progesterone. How would you expect the stages in the ovary to differ from those shown in the diagram in a woman who had been taking the combined pill for the previous year? Explain your answer.
- The graph below shows that changes which took place in the diameter of a follicle during part of a menstrual cycle.



Copy the graph and mark with an arrow the time when ovulation occurred.

7.

The figure below shows a section through a seed containing a developing embryo.



(a) Name the structures A–F.

Developing seeds may contain cotyledons and/or endosperm.

- (b) (i) Describe **one similarity** in the role of these two structures.
(ii) State **one difference** in the genetic make up of these structures.
- (c) State **one** function of each of the following structures.
testa
micropyle
- (d) Describe the structural changes that occur after fertilisation when
(i) an ovule develops into a seed;
(ii) an ovary develops into a fruit.

8.

Reproduction can be either asexual or sexual.

- (a) Using a specific example, **describe** how organisms can reproduce asexually. **Discuss** TWO evolutionary advantages of asexual reproduction.
- (b) **Identify** THREE ways that sexual reproduction increases genetic variability. For each, **explain** how it increases genetic diversity among the offspring.
- (c) **Discuss** TWO prezygotic isolating mechanisms that prevent hybridization between two species. Include in your discussion an example of each mechanism.