Biology · Structure and Function in Living Organisms · Reproduction in Living Organisms

Reproduction in Humans (continued)

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Multiple choice questions — 93 questions

1 During egg formation in a human female, where does the reduction of the chromosome number take place?

(A) The ovary
(B) The funnel of the Fallopian tube
(C) The first third of the Fallopian tube
(D) The last third of the Fallopian tube

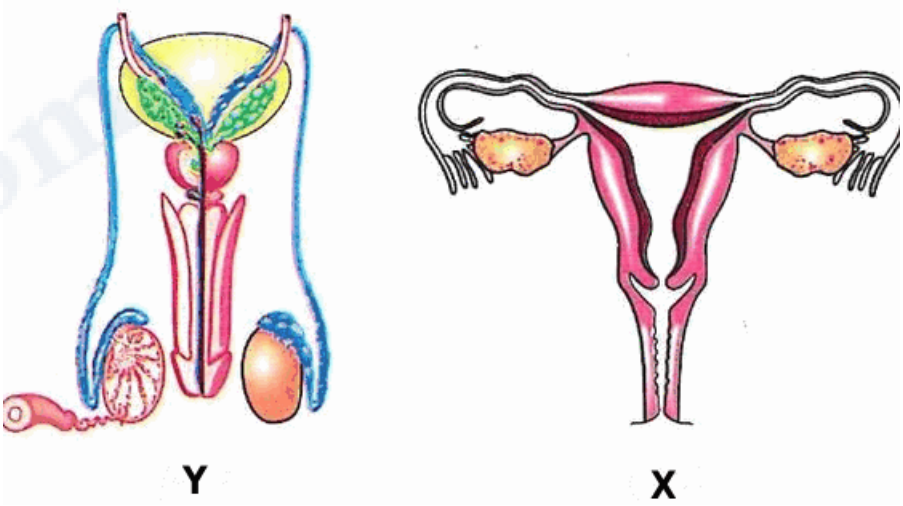
2 Until which day from the start of menstruation does the egg stay alive inside the Fallopian tube?

(A) The 14th
(B) The 15th
(C) The 17th
(D) The 20th

3 Which of the following choices shows what each of the egg and the sperm contributes to form the zygote?

(A) Egg: nuclear content + cytoplasmic content, sperm: nuclear content + middle piece content
(B) Egg: nuclear content + cytoplasmic content, sperm: nuclear content + neck content
(C) Egg: nuclear content only, sperm: nuclear content only
(D) Egg: cytoplasmic content only, sperm: nuclear content + middle piece content

4 Which of the choices in the following table is correct about the two opposite figures?



(A) To produce gametes: (X), internal fertilization takes place in it: (Y), the zygote divides mitotically in it: (X)

(B) To produce gametes: (X), (Y), internal fertilization takes place in it: (X), (Y), the zygote divides mitotically in it: (X)

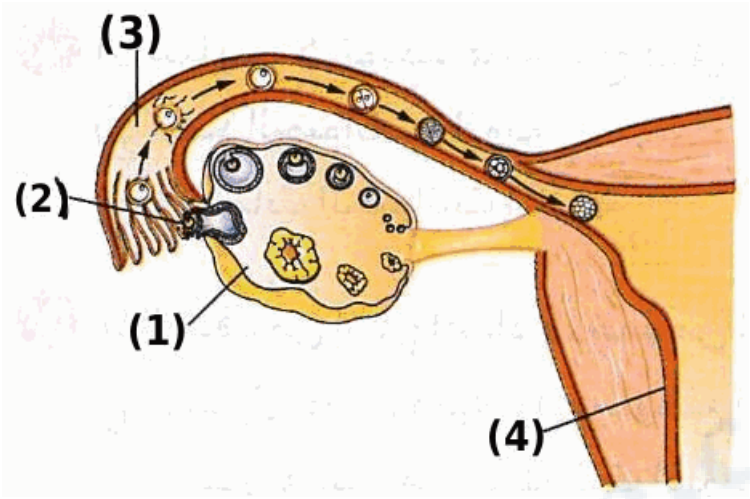
(C) To produce gametes: (X), (Y), internal fertilization takes place in it: (X), the zygote divides mitotically in it: (X)

(D) To produce gametes: (Y), internal fertilization takes place in it: (X), the zygote divides mitotically in it: (Y)

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5 The opposite figure shows some biological processes that take place in the reproductive system of a human female. Study it, then answer:

In which of the following does the second meiotic division take place?

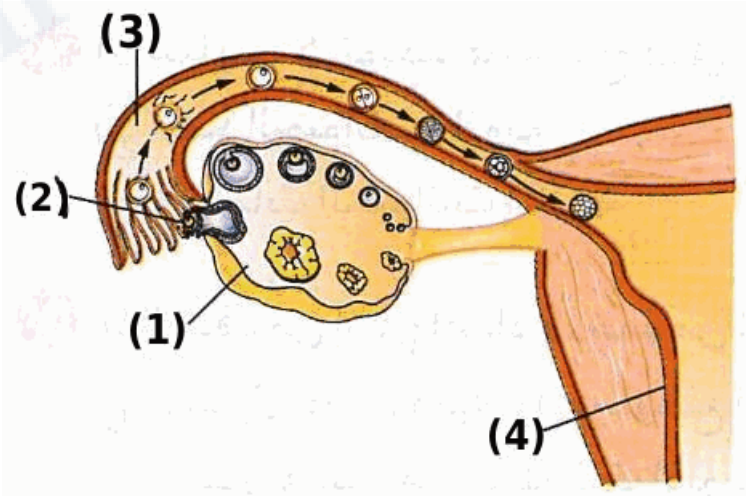


(A) (1) (B) (2) (C) (3) (D) (4)

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6 The opposite figure shows some biological processes that take place in the reproductive system of a human female. Study it, then answer:

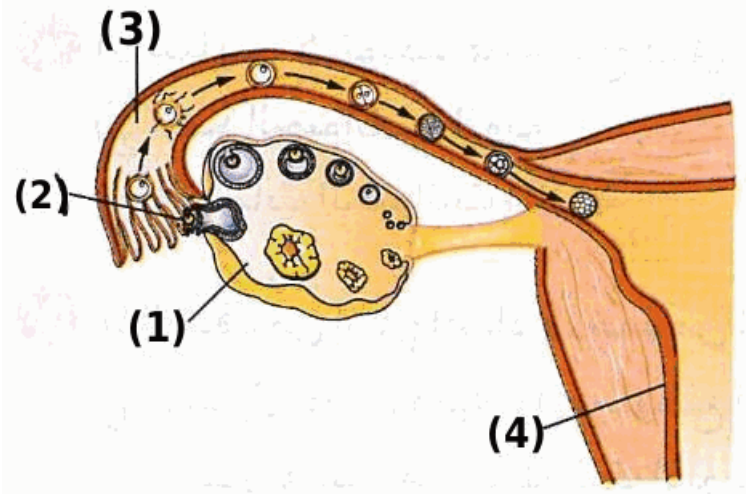
What is the cell released from structure (1) called?



(A) Primary oocyte
(B) Polar body
(C) Mature egg (ovum)
(D) Secondary oocyte

7 The opposite figure shows some biological processes that take place in the reproductive system of a human female. Study it, then answer:

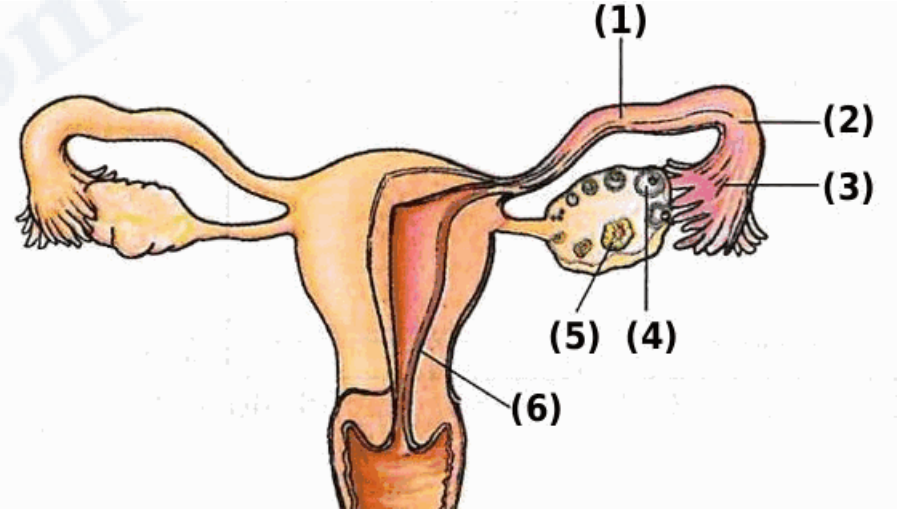
On which of the following days from the start of menstruation do you expect the process marked by number (2) to take place?



(A) Day 12
(B) Day 14
(C) Day 18
(D) Day 19

8 The opposite figure shows a front view of the reproductive system of a human female. Study it, then answer:

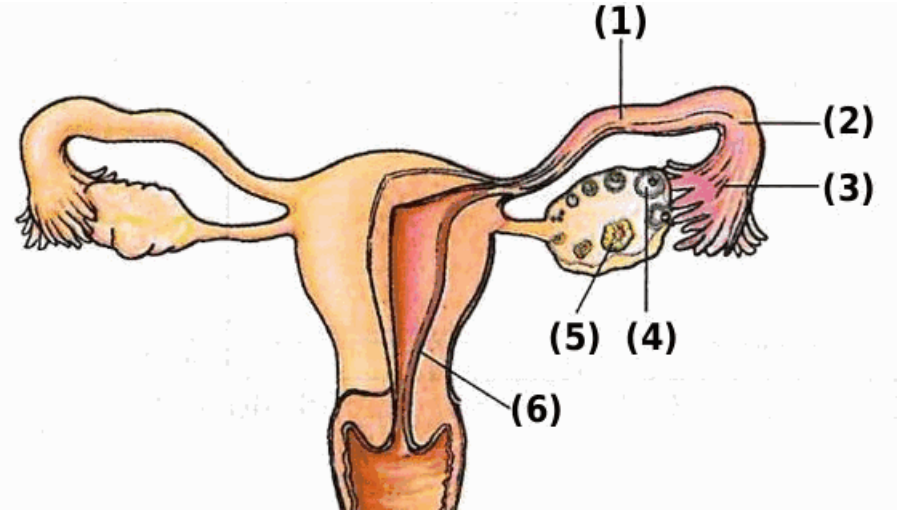
Which hormone is indirectly responsible for the growth of structure number (6)?



(A) Estrogen
(B) Progesterone
(C) Follicle-stimulating hormone (FSH)
(D) Relaxin

9 The opposite figure shows a front view of the reproductive system of a human female. Study it, then answer:

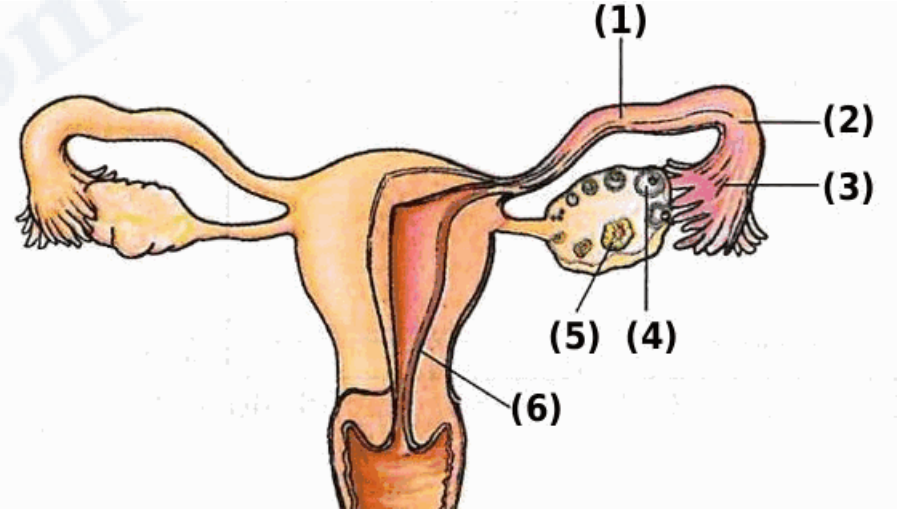
What prevents structure number (5) from degenerating on day 28 from the start of menstruation?



(A) Implantation of the blastocyst in the uterine lining
(B) Fertilization
(C) Growth of the placenta
(D) Cleavage

10 The opposite figure shows a front view of the reproductive system of a human female. Study it, then answer:

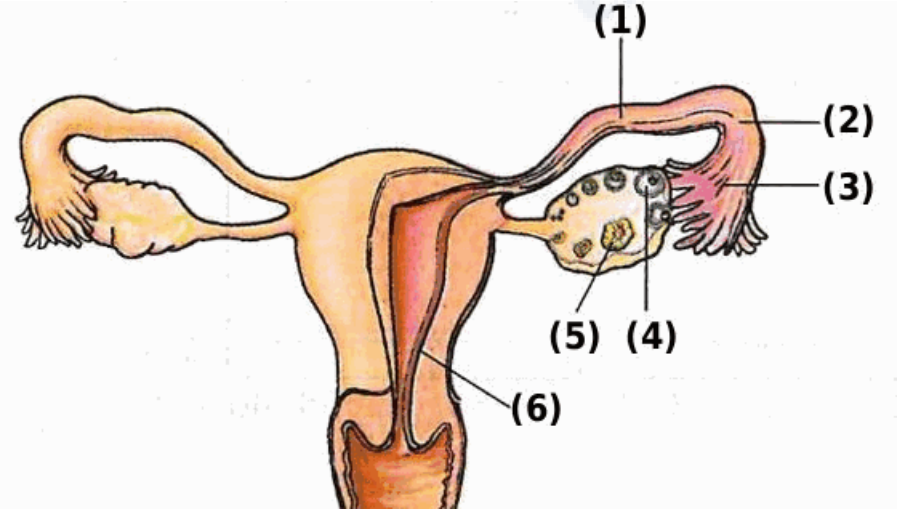
Inside which of the following parts does the primary oocyte change into a secondary oocyte?



Ⓐ (4) Ⓑ (3) Ⓒ (2) Ⓓ (1)

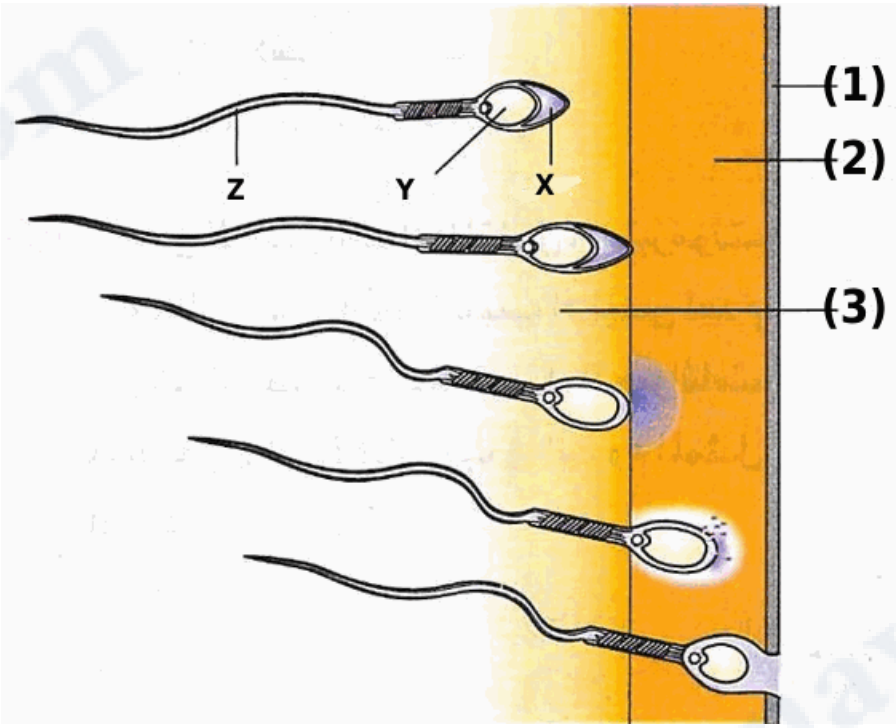
11 The opposite figure shows a front view of the reproductive system of a human female. Study it, then answer:

In which of the following parts does the effect of the enzyme hyaluronidase appear?



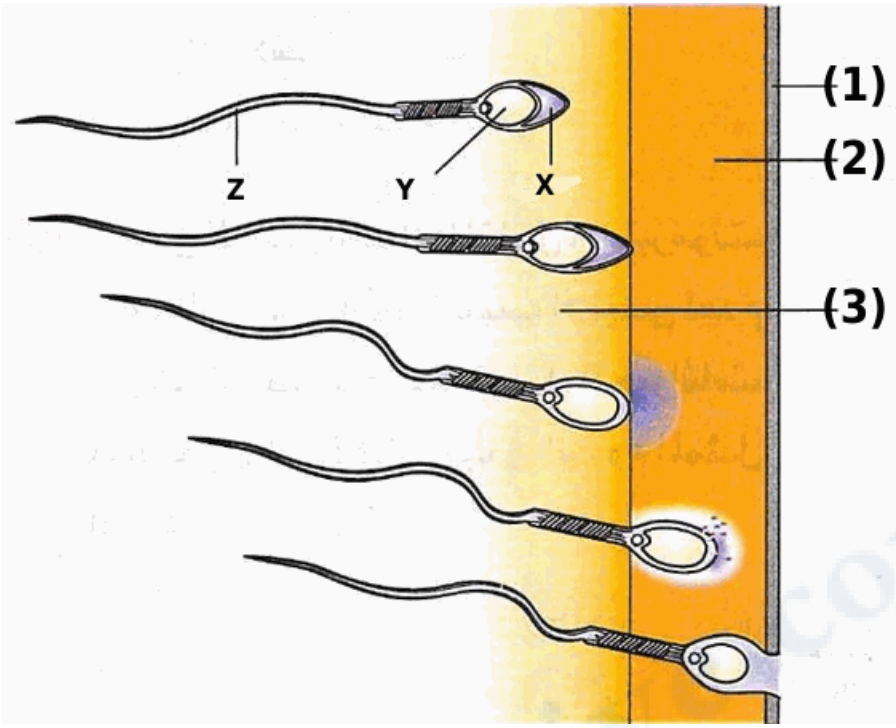
Ⓐ (1) Ⓑ (2) Ⓒ (3) Ⓓ (5)

12 In the opposite figure, which shows a sperm entering the egg in a human female:
Which of the following regions represents the layer that contains hyaluronic acid?



(A) (1) (B) (2) (C) (3) (D) (2) , (3)

13 In the opposite figure, which shows a sperm entering the egg in a human female:
Which of the following parts of the sperm, if absent, means the egg's coat is not dissolved?



(A) (X) (B) (Y) (C) (Z) (D) (X) , (Z)

14 Which of the following does the success of fertilizing the egg in the Fallopian tube NOT depend on?

(A) The number of sperms

(B) The activity of the sperms

(C) The enzymes of the sperms

(D) The type of the sperm's sex chromosome

---

15 What is the purpose of producing huge numbers of sperms in the male?

(A) For one sperm to reach the point of penetration of the egg

(B) For a number of sperms to take part in fertilizing the egg

(C) To be able to dissolve part of the egg's coat

(D) To secrete a large amount of hyaluronic acid

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16 Which of the following does the sperm transfer to the egg at fertilization?

(A) DNA and the two centrioles

(B) Mitochondria and DNA

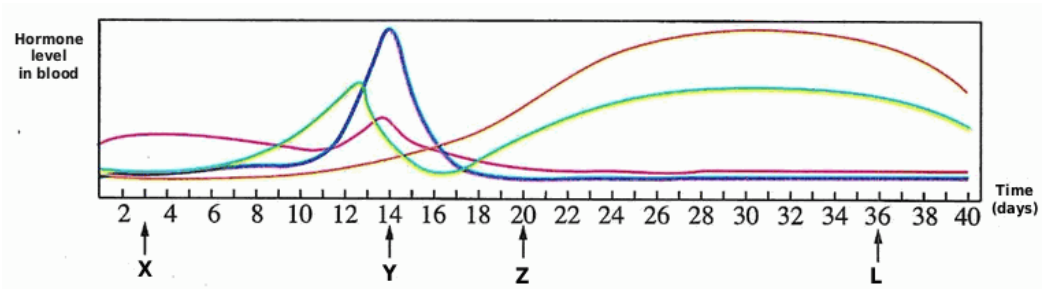
(C) Food and the two centrioles

(D) Food and mitochondria

---

17 The following graph shows the hormones that regulate the menstrual cycle of an adult human female. Study it, then answer:

Which of the following can be observed inside the ovary at (X)?



(A) Fully formed Graafian follicles

(B) A corpus luteum at its maximum growth

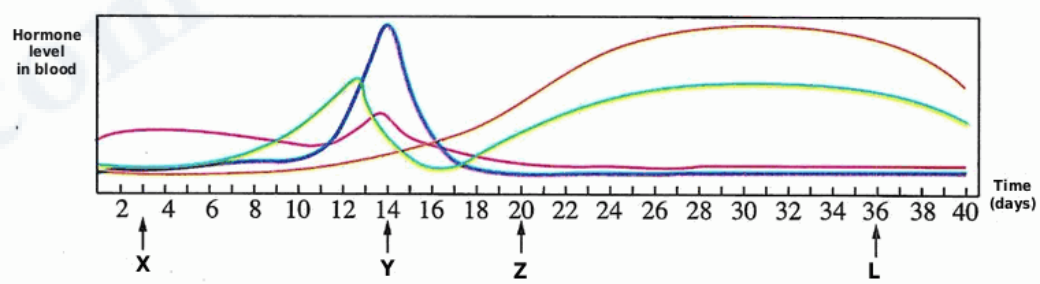
(C) Small Graafian follicles

(D) Secondary oocytes inside a Graafian follicle

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18 The following graph shows the hormones that regulate the menstrual cycle of an adult human female. Study it, then answer:

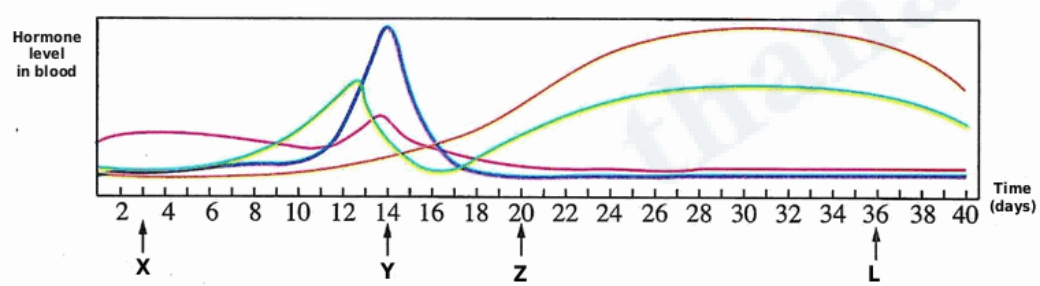
Which of the following is observed at (Z)?



(A) The blastocyst
(B) A fertilized egg
(C) The two-cell stage
(D) An embryo in the first stage of growth

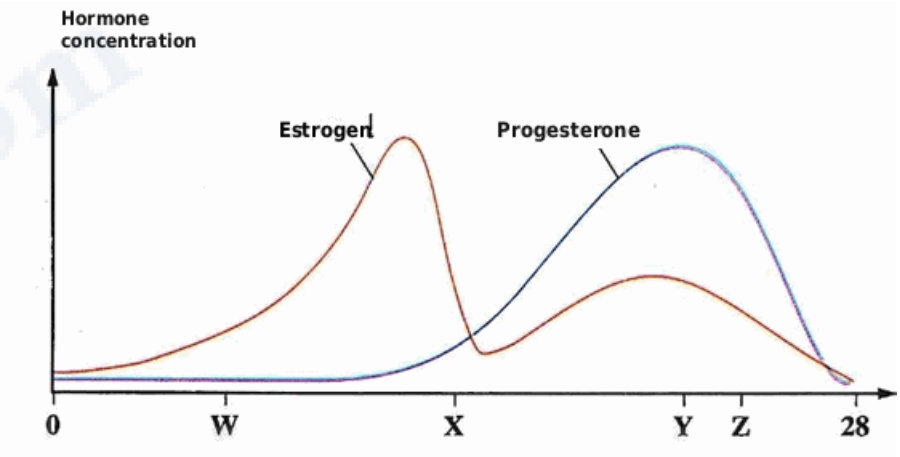
19 The following graph shows the hormones that regulate the menstrual cycle of an adult human female. Study it, then answer:

Which of the following is found in the female reproductive system at (L)?



(A) The blastocyst
(B) A fertilized egg
(C) A fully grown placenta
(D) An embryo in the first stage of growth

20 From the opposite graph, the death of the sperms is the main reason fertilization does not occur when the sperms reach the Fallopian tube on the day represented by the letter .....



(A) W (B) X (C) Y (D) Z

---

21 Study the following table, then answer: a sperm carrying the sex chromosome (X) is slow and lives longer than one carrying the chromosome (Y), and a sperm carrying the chromosome (Y) is fast and lives a shorter time than one carrying the chromosome (X).

Which of the following possibilities is the most likely when the sperms reach the Fallopian tube on the day of ovulation?

(A) No fertilization, because the sperms die before reaching the egg

(B) No fertilization, because the egg dies before the sperms reach it

(C) Fertilization occurs and the fetus is male

(D) Fertilization occurs and the fetus is female

---

22 Study the following table, then answer: a sperm carrying the sex chromosome (X) is slow and lives longer than one carrying the chromosome (Y), and a sperm carrying the chromosome (Y) is fast and lives a shorter time than one carrying the chromosome (X).

Which of the following possibilities is the most likely when the sperms reach the Fallopian tube on the 12th day from the start of menstruation?

(A) No fertilization, because the sperms die before reaching the egg

(B) No fertilization, because the egg dies before the sperms reach it

(C) Fertilization occurs and the fetus is male

(D) Fertilization occurs and the fetus is female

---

23 Pregnancy does not continue when the fertilized egg settles in the Fallopian tube. Which of the following is one of the reasons?

(A) The fetus would lie sideways in the Fallopian tube

(B) The presence of cilia in the Fallopian tube

(C) The Fallopian tube cannot bear the increasing growth of the fetus

(D) The hormones needed for the fetus to keep growing do not reach it

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24 What is the source of the food and of the energy, respectively, that the fertilized egg gets during its first three days?

(A) Cytoplasm of the sperm / mitochondria of the fertilized egg

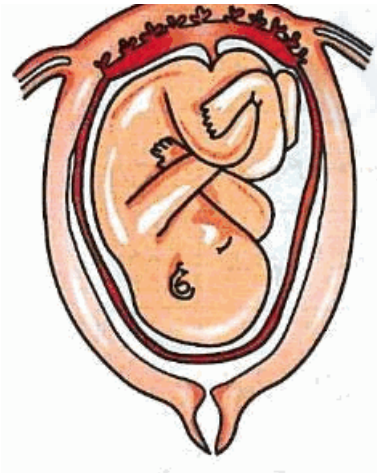
(B) Cytoplasm of the fertilized egg / mitochondria of the fertilized egg

(C) Cytoplasm of the fertilized egg / mitochondria of the sperm

(D) Cytoplasm of the sperm / mitochondria of the sperm

---

25 Which of the following describes the stage the fetus in the opposite figure is in?



(A) The end of the first stage of pregnancy

(B) The middle of the second stage of pregnancy

(C) The beginning of the third stage of pregnancy

(D) The end of the third stage of pregnancy

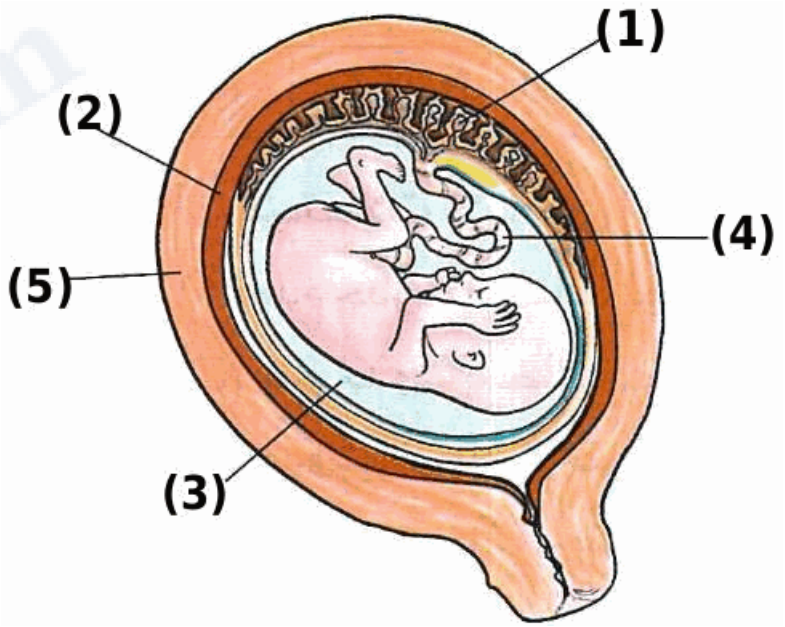
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26 Which hormone almost stops being secreted during pregnancy?

(A) FSH (B) Prolactin (C) ADH (D) Relaxin

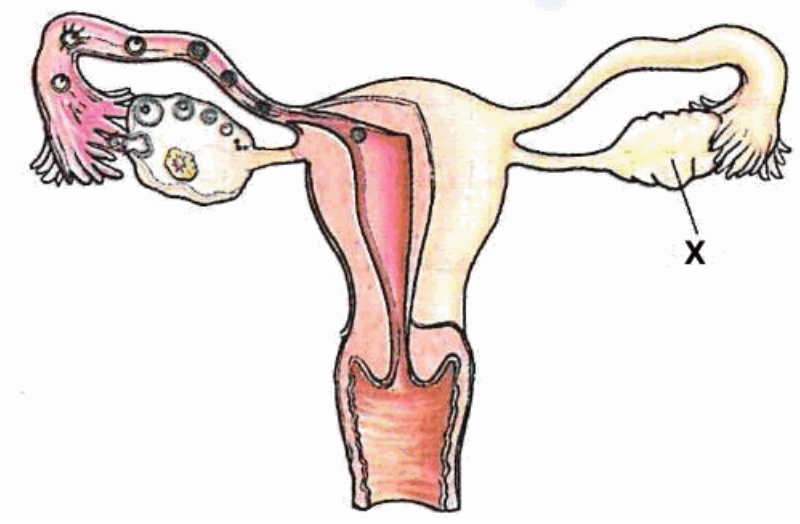
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27 From the opposite figure, which shows a human fetus, which of the following are glandular tissues?



(A) (1) , (2) (B) (1) , (3) (C) (2) , (4) (D) (1) , (5)

28 From the opposite figure, which shows fertilization and cleavage of the fertilized egg, what are the results of removing ovary (X) before the third month of pregnancy?



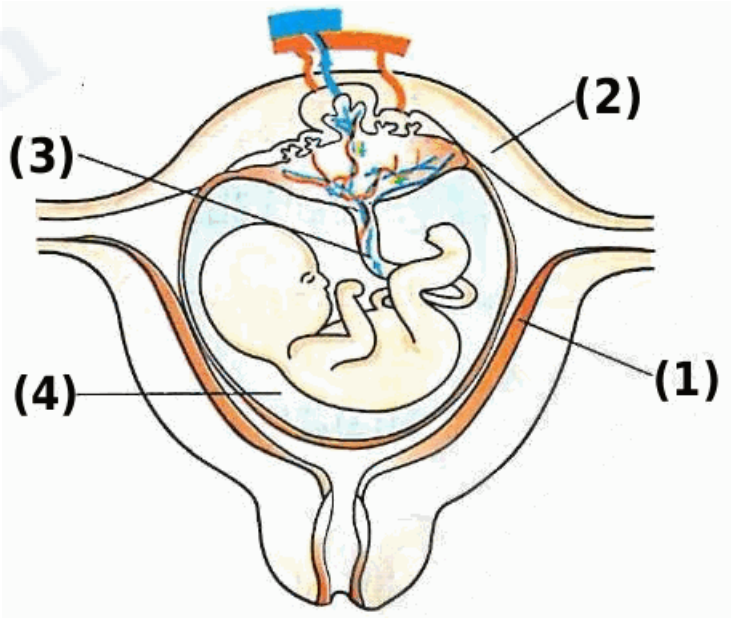
(A) Miscarriage, due to a lack of progesterone and estrogen

(B) Miscarriage, due to the absence of the corpus luteum

(C) Pregnancy continues, but the amount of food the fetus gets decreases

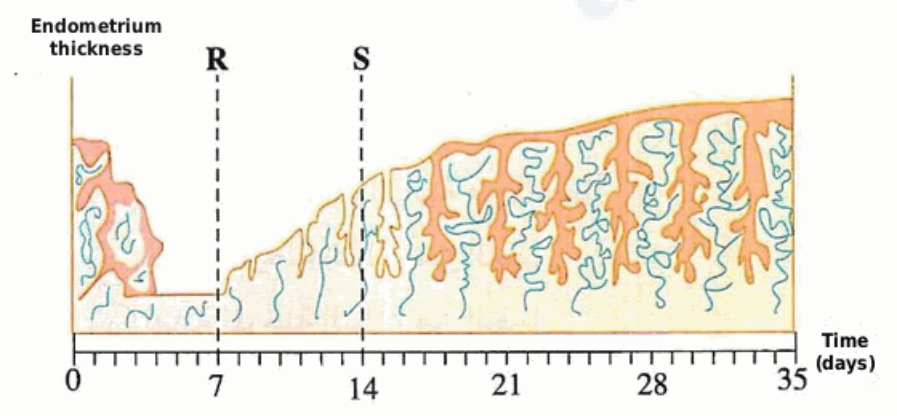
(D) Pregnancy continues normally if there are no other causes

29 From the opposite figure, in which of the following structures does progesterone stimulate an increase in blood supply?



(A) (1) (B) (2) (C) (3) (D) (4)

30 From the following figure, which shows the thickness of the uterine lining during the menstrual cycle, what do the letters (R) and (S) refer to?



(A) R: start of menstruation, S: ovulation

(B) R: end of menstruation, S: ovulation

(C) R: start of menstruation, S: end of menstruation

(D) R: end of menstruation, S: implantation of the blastocyst in the uterine lining

31 Which of the following is NOT expected to happen when the amniotic fluid leaks from the uterus during pregnancy?

(A) The mother is exposed to early (premature) birth

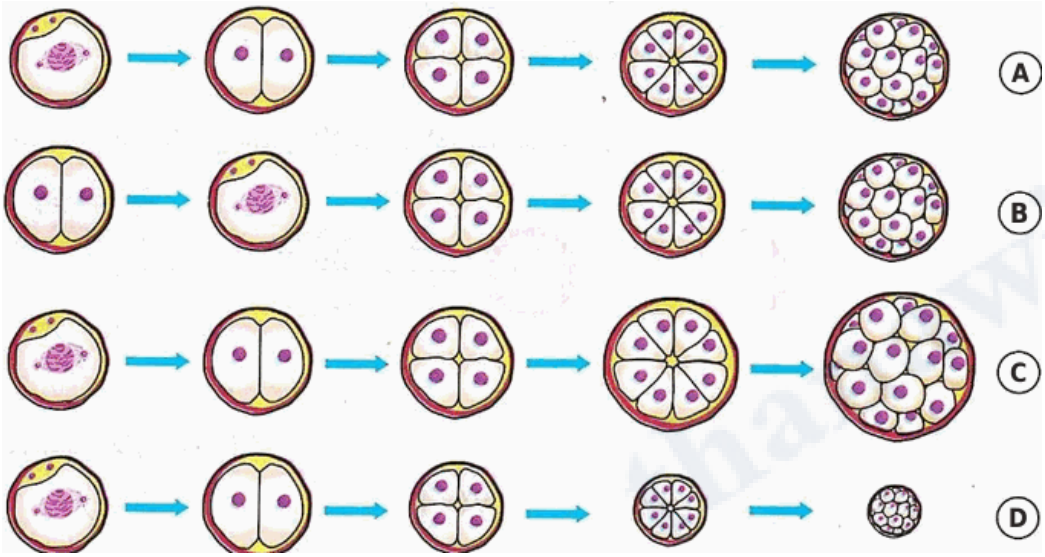
(B) The rate of oxygen reaching the fetus decreases

(C) The fetus moves slowly in the uterus

(D) The fetus is exposed to external shocks

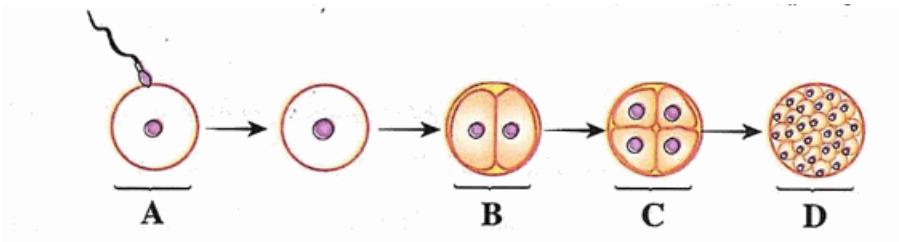
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32 Which of the following choices correctly describes the stages of division in the Fallopian tube?



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33 In which of the following stages do the cell nuclei contain half the genetic set?



---

34 Some women suffer from incomplete pregnancy and a miscarriage during the first stage of pregnancy. What causes this condition?

(A) A lack of placental hormones

(B) Blockage of the Fallopian tube

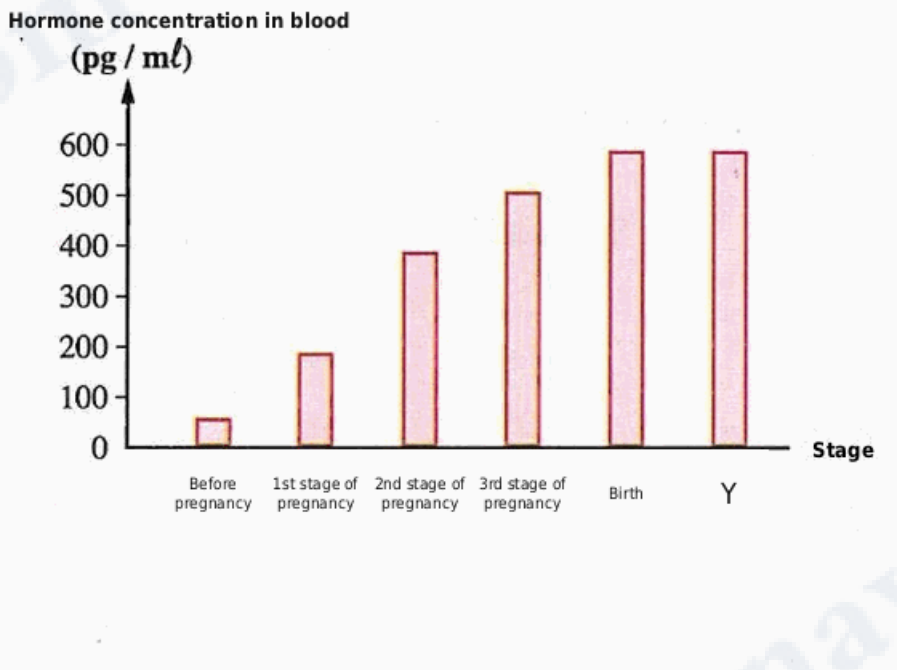
(C) A defect in the work of the Fallopian tube's cilia

(D) A lack of ovarian hormones

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35 The opposite graph shows the concentration of one of the hormones secreted into a woman's blood during different periods of her life. Study it, then answer:

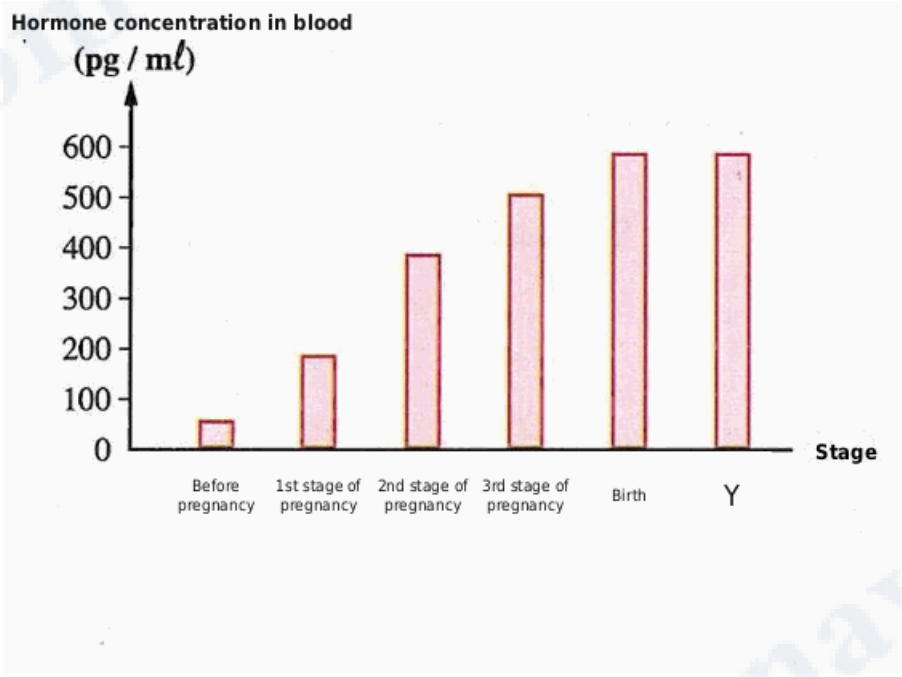
Which hormone does the graph represent?



(A) Estrogen (B) Progesterone (C) FSH (D) Oxytocin

36 The opposite graph shows the concentration of one of the hormones secreted into a woman's blood during different periods of her life. Study it, then answer:

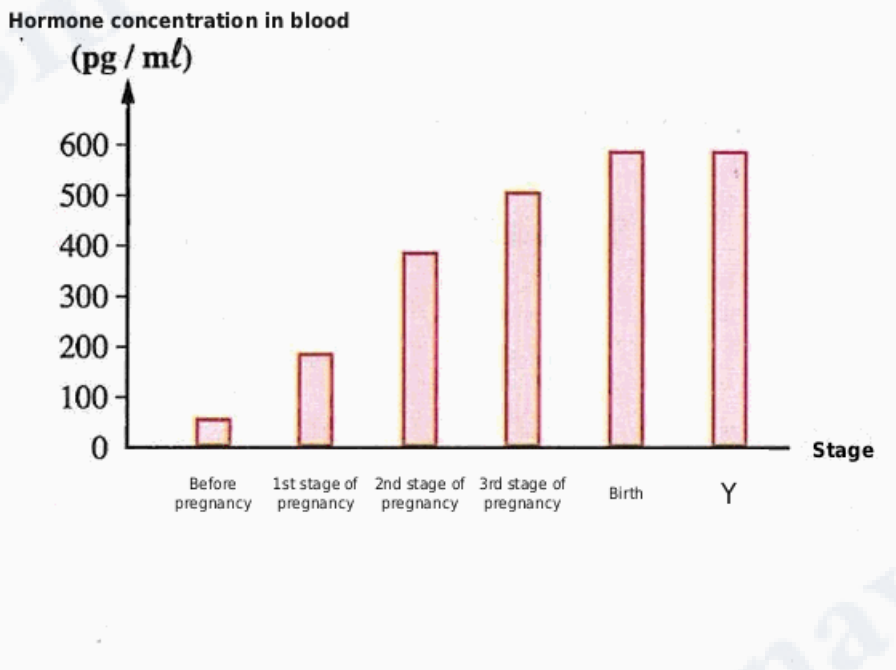
What is the source of this hormone?



(A) The anterior lobe of the pituitary gland
(B) The placenta
(C) Nerve cells in the hypothalamus
(D) The corpus luteum

37 The opposite graph shows the concentration of one of the hormones secreted into a woman's blood during different periods of her life. Study it, then answer:

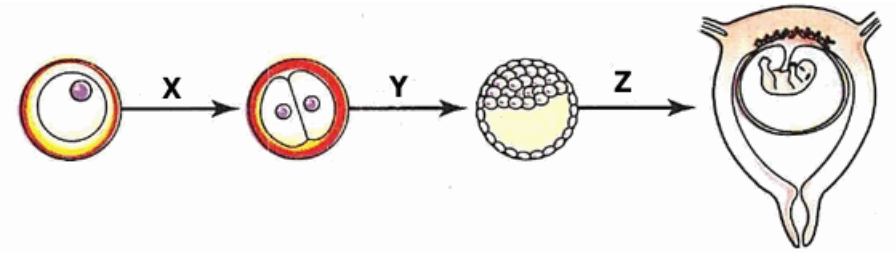
What is the role of this hormone at stage (Y)?



(A) Making birth easier
(B) Relaxing the pubic symphysis
(C) Ejection (flow) of milk
(D) Formation of the corpus luteum

38 The following figure shows some stages in the formation of a human embryo. Study it, then answer:

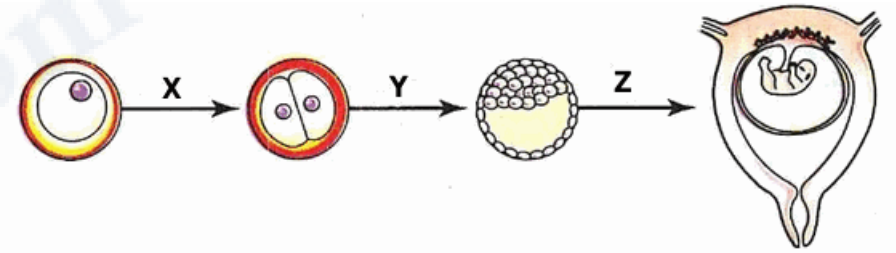
How many days does period (Y) represent?



(A) 2
(B) 6
(C) 7
(D) 9

39 The following figure shows some stages in the formation of a human embryo. Study it, then answer:

Which of the following processes does this figure show?



(A) Fertilization and tissue differentiation

(B) Fertilization and growth

(C) Growth and tissue differentiation

(D) Fertilization, growth and tissue differentiation

---

40 Which of the following statements describes the relationship between the fetus and the mother?

(A) The blood circulations of the two are connected until the placenta is fully formed

(B) Blood passes directly from the mother to the fetus throughout pregnancy

(C) The blood circulations of the two are separate and no substances are exchanged between them

(D) The blood circulations of the two are separate, but some substances pass between them

---

41 When are the two ovaries formed in a human female fetus?

(A) In the first month

(B) After a month and a half

(C) At the beginning of the second month

(D) At the end of the third month

---

42 When is the sex of the fetus determined in humans?

(A) At the moment the egg is fertilized

(B) In the sixth week of pregnancy

(C) In the twelfth week of pregnancy

(D) At birth

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43 What is the source of nutrition for a crocodile embryo?

(A) The placenta

(B) The corpus luteum

(C) The yolk

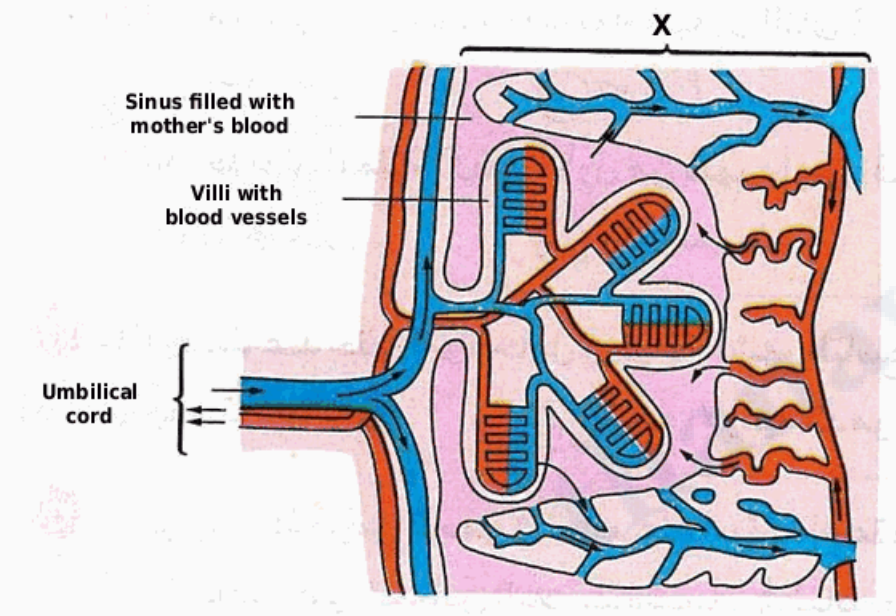
(D) The mother's uterus

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44 When a genetic defect affects the formation of the finger-like villi in the mother's uterine lining, this defect is certainly in the genes of .....

(A) The mother only
(B) The fetus only
(C) The father only
(D) The mother and the fetus

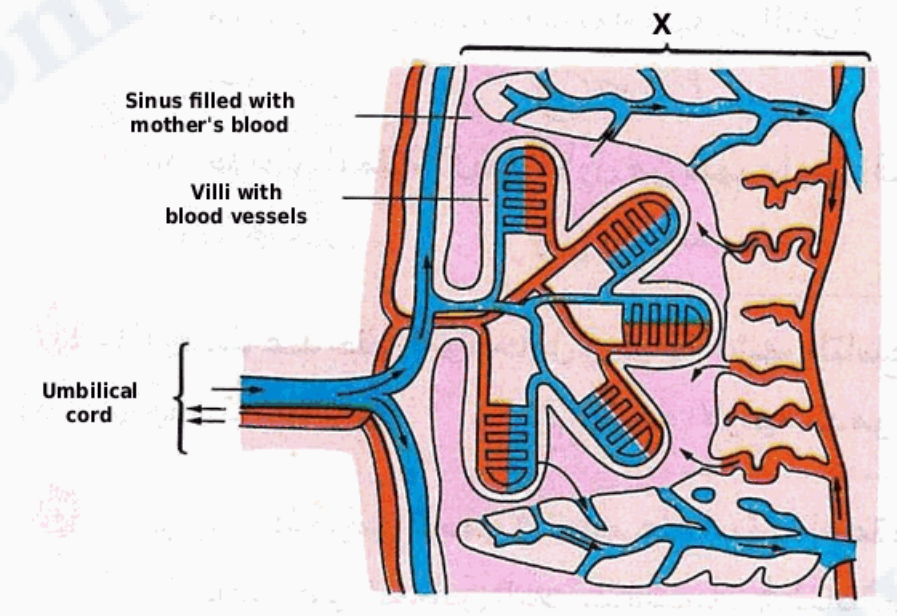
45 The opposite figure shows the exchange of substances by diffusion between the mother's blood and the fetus's blood. Study it, then answer:
What does structure (X) represent?



(A) Part of the uterine wall
(B) Part of the amniotic fluid
(C) Part of the placenta
(D) Part of the amnion

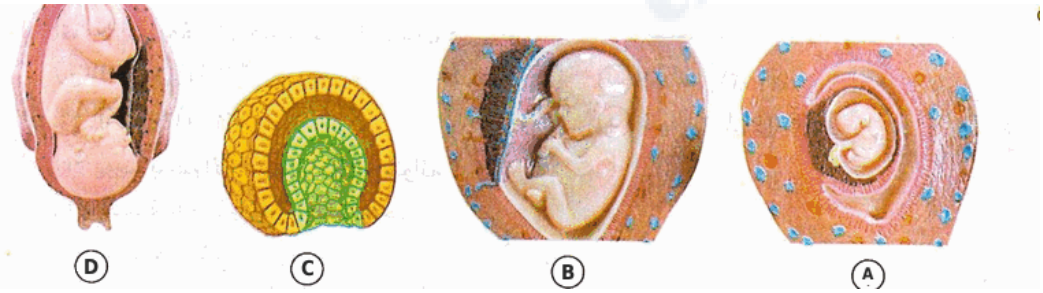
46 The opposite figure shows the exchange of substances by diffusion between the mother's blood and the fetus's blood. Study it, then answer:

Which hormone is NOT secreted by structure (X)?



(A) Estrogen (B) Relaxin (C) Progesterone (D) Prolactin

47 Which figure shows the stage at which the secretion of the hormone relaxin increases?

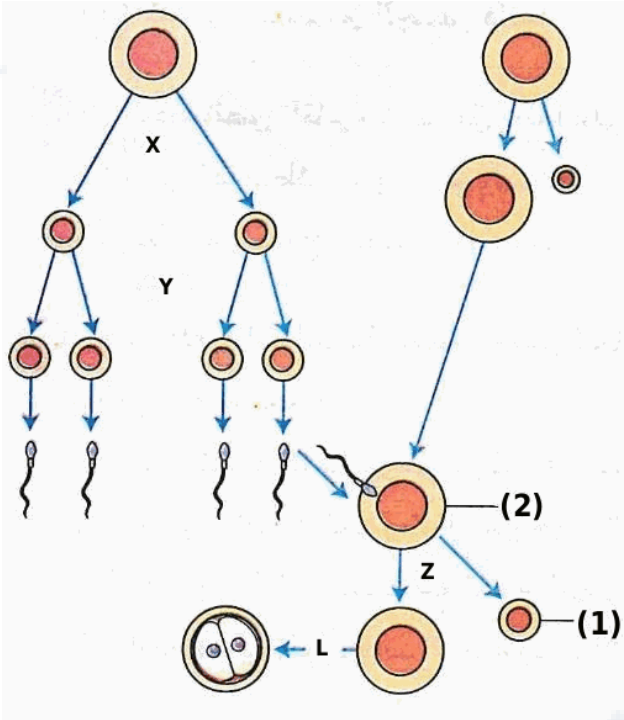


48 When does the secretion of progesterone decrease in a pregnant woman?

(A) When estrogen decreases
(B) At the end of the ninth month
(C) When estrogen increases
(D) At the end of the second month

49 Study the opposite figure, then answer:

What do cell (1) and cell (2) represent, respectively?



(A) Polar body / primary oocyte

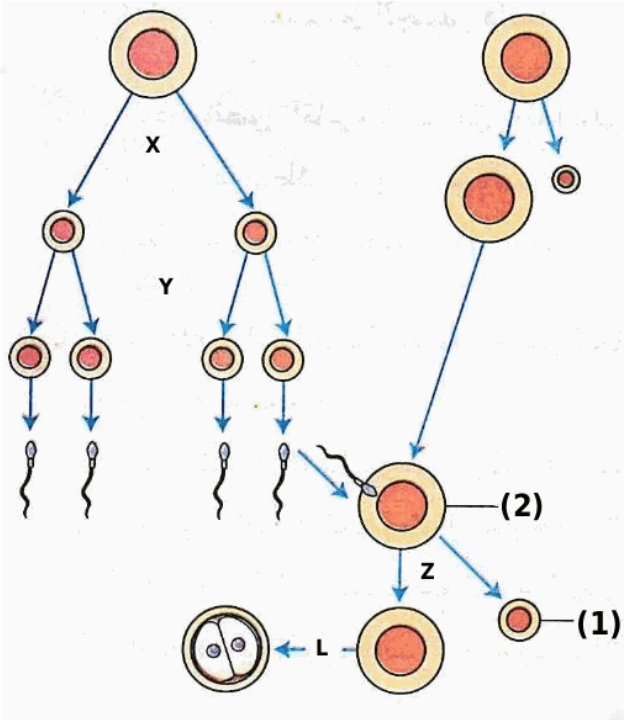
(B) Secondary oocyte / polar body

(C) Polar body / mature egg (ovum)

(D) Primary oocyte / secondary oocyte

50 Study the opposite figure, then answer:

Where does process (Z) take place?



(A) In the Graafian follicle

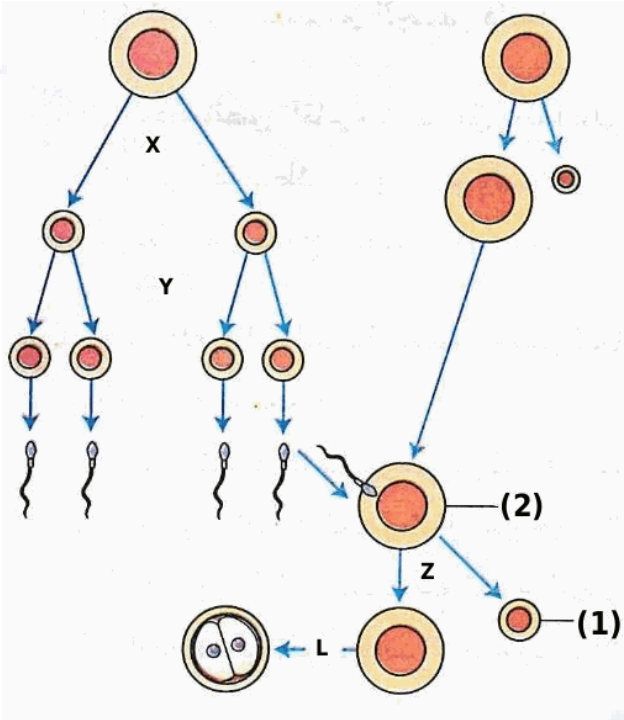
(B) In the uterine cavity

(C) In the ovary

(D) In the first third of the Fallopian tube

51 Study the opposite figure, then answer:

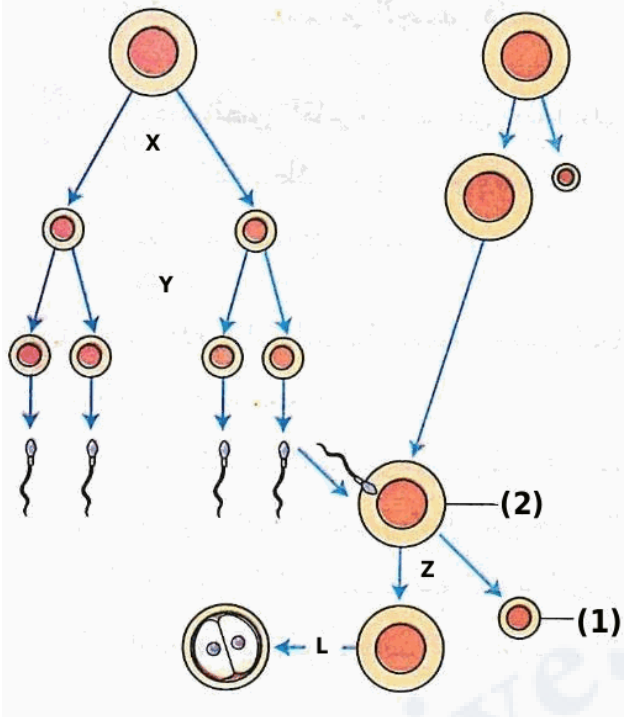
Which of the following represents the second meiotic division?



(A) (X) , (Y) (B) (Y) , (Z) (C) (Z) , (L) (D) (X) , (Z)

52 Study the opposite figure, then answer:

If process (L) took place on the first of March, when can natural birth take place?



(A) 1 November (B) 24 November (C) 24 December (D) 30 December

53 What happens when a pregnant woman at the end of the ninth month is injected with oxytocin?

(A) Urine concentration decreases
(B) Blood vessels widen
(C) Birth is made easier
(D) Miscarriage

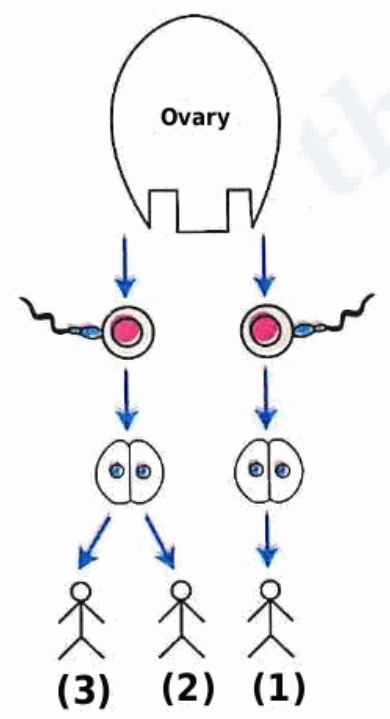
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54 Why do the chances of a twin pregnancy increase when fertility drugs are used in a human female?

(A) They help the blastocyst implant in the folds of the uterine lining
(B) They delay menstruation
(C) They increase the effect of progesterone on the uterine lining
(D) They stimulate the growth of many Graafian follicles in the ovary

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55 Study the opposite figure, then answer:
Which of the following may be joined (conjoined) together?

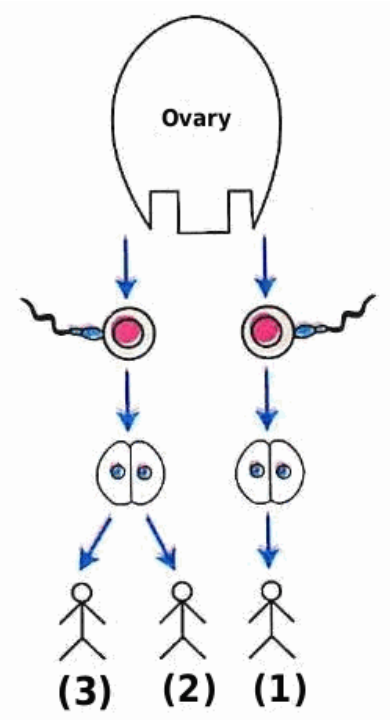


(A) Twins (1) , (2)
(B) Twins (2) , (3)
(C) Twins (1) , (3)
(D) Triplets (1) , (2) , (3)

---

56 Study the opposite figure, then answer:

What is found in the uterus of the mother pregnant with these twins?



(A) One placenta and one amniotic sac
(B) Two placentas and one amniotic sac
(C) One placenta and three amniotic sacs
(D) Two placentas and two amniotic sacs

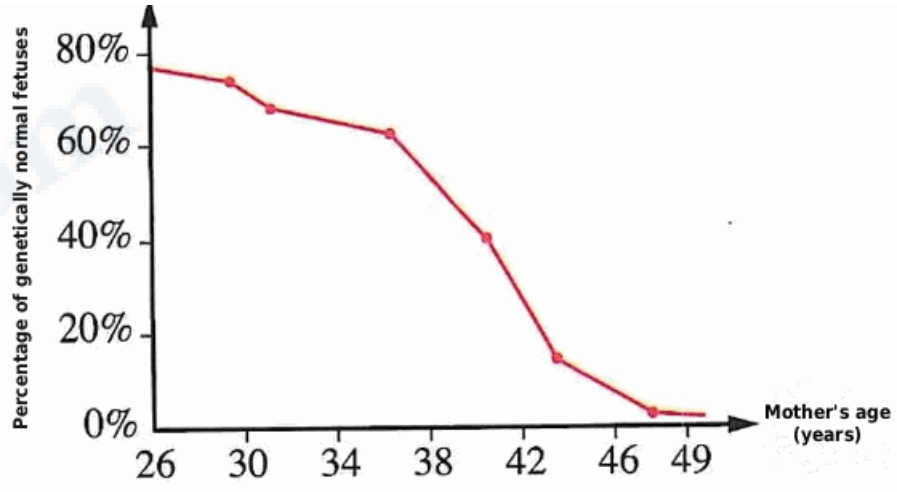
57 Which of the following statements is correct about twins?

(A) Fraternal twins always have the same sex
(B) Identical twins always have the same sex
(C) Fraternal twins always differ in sex
(D) Identical twins always differ in sex

58 Which of the following characteristics does NOT always apply to identical twins?

(A) Their formation needs one sperm
(B) Their formation needs one egg
(C) They result from the cleavage of the fertilized egg
(D) They are joined at some parts of the body

59 Which of the following statements correctly explains the opposite graph?



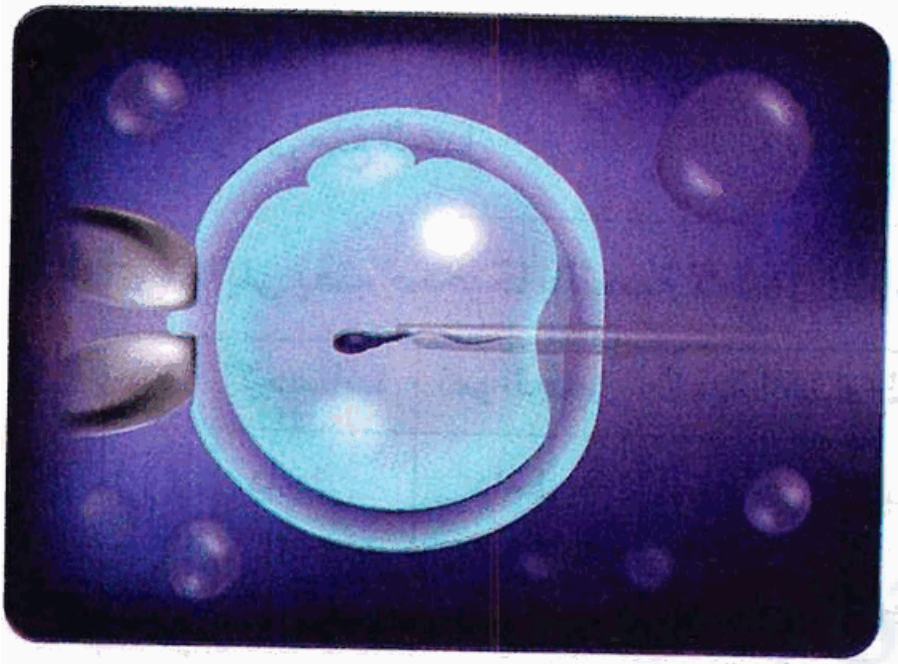
(A) The efficiency of the uterine lining decreases with age

(B) The best age for pregnancy is 38 years

(C) The quality of the eggs decreases with age

(D) The relationship between fetal deformities and the mother's age is inverse

60 The opposite figure shows one of the techniques used to treat infertility, in which a sperm is injected into the egg in the laboratory. What may happen if more than one sperm is injected into the cytoplasm of the egg?



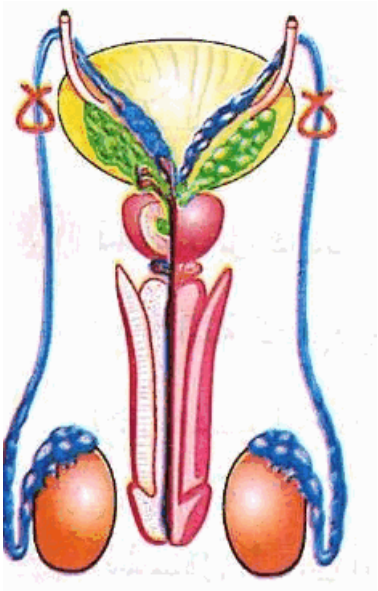
(A) Identical twins are formed

(B) Fraternal twins are formed

(C) Siamese twins are formed

(D) The fertilized egg dies

61 The opposite figure shows one of the procedures used as a method of preventing childbearing. Which of the following processes is affected by this procedure?



(A) Secretion of the sex hormones

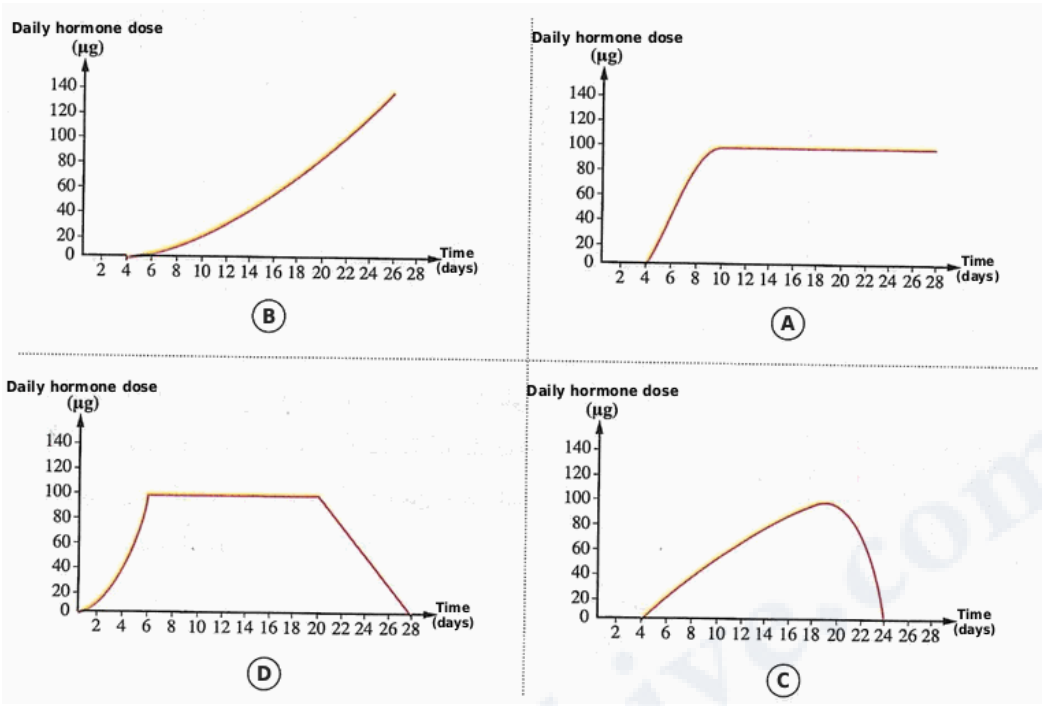
(B) Production of sperms

(C) The second meiotic division of the secondary spermatocytes

(D) The passage of sperms out to the urethra

---

62 Which of the following graphs shows the concentration of progesterone during the period in which a married woman uses contraceptive pills?



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63 Which of the following contraceptive methods is preferred when pregnancy is dangerous for the wife?

(A) The IUD
(B) The male condom
(C) Contraceptive pills
(D) Surgical sterilization

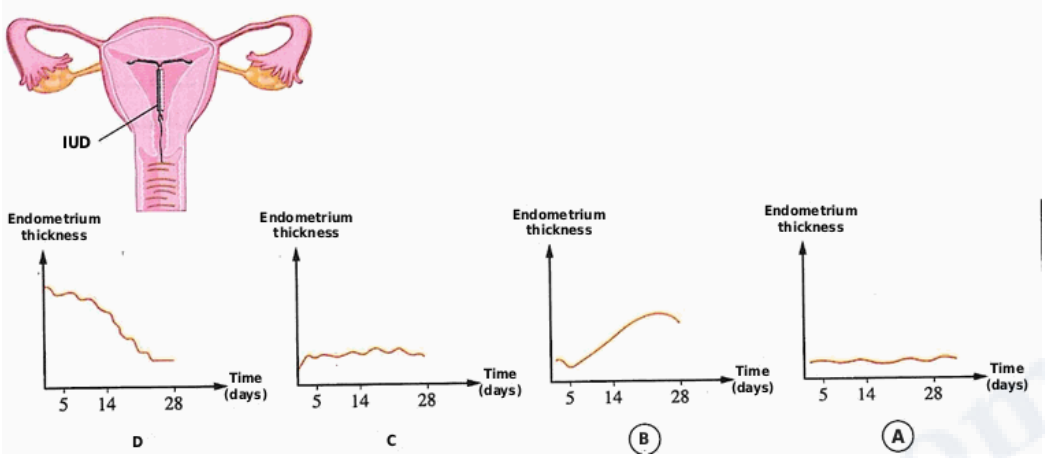
64 Which of the following is correct about test-tube babies?

(A) Fertilization: internal, fetal growth: internal, amount of food stored in the egg: large
(B) Fertilization: internal, fetal growth: internal, amount of food stored in the egg: small
(C) Fertilization: external, fetal growth: internal, amount of food stored in the egg: small
(D) Fertilization: external, fetal growth: external, amount of food stored in the egg: large

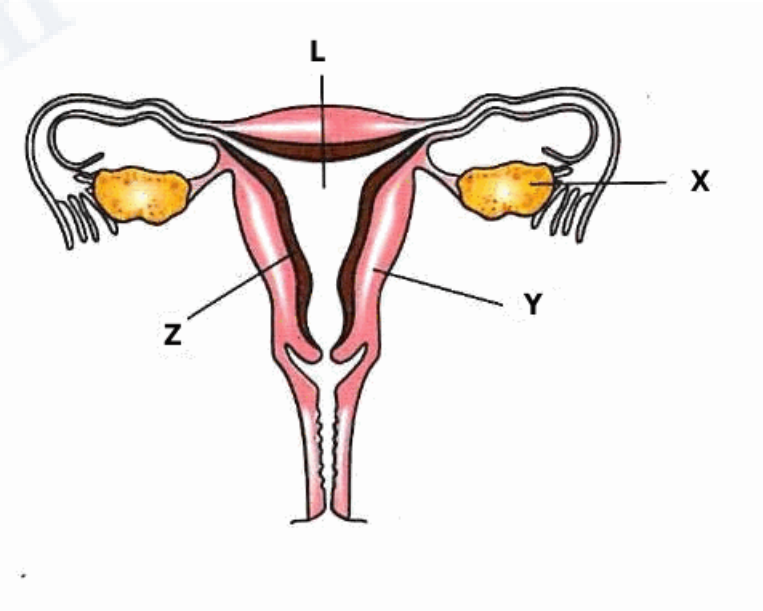
65 Why do the chances of successful childbearing by the test-tube baby technique decrease as the mother gets older?

(A) Because the efficiency of the uterine lining decreases
(B) Because estrogen increases
(C) Because the two Fallopian tubes are blocked
(D) Because relaxin increases

66 The figure in front of you shows one of the contraceptive methods for a human female. Which of the following graphs shows the changes in this female's uterine lining after using this method?

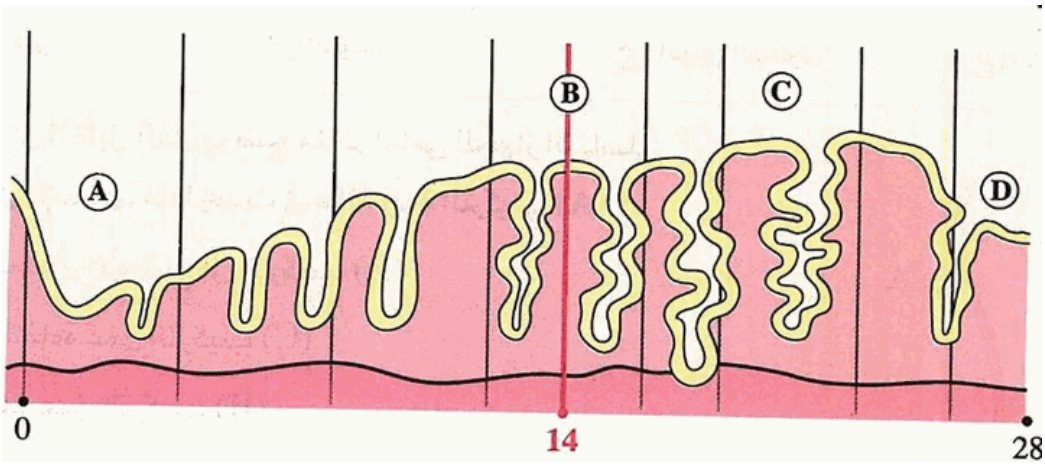


67 The opposite figure shows a front view of the reproductive system of a human female. In which of the following structures is the blastocyst, produced by fertilization using the test-tube baby technique, implanted?



(A) X (B) Y (C) Z (D) L

68 Which of the following is the best time to implant the blastocyst produced by fertilization using the test-tube baby technique?



69 What is the main role of contraceptive pills?

(A) Stimulating the secretion of progesterone and estrogen

(B) Breaking down the egg

(C) Blocking the sperm receptors on the egg's surface

(D) Inhibiting the secretion of FSH and LH

70 From the opposite table, which of the following may represent the contraceptive methods (1), (2), (3), respectively?

Fertilization occurs	Ovulation occurs	
✗	✗	(1)
✓	✓	(2)
✗	✓	(3)

(A) Contraceptive pills / male condom / IUD

(B) Male condom / IUD / contraceptive pills

(C) IUD / contraceptive pills / male condom

(D) Contraceptive pills / IUD / male condom

71 Which of the following distinguishes using pills for contraception from surgical sterilization?

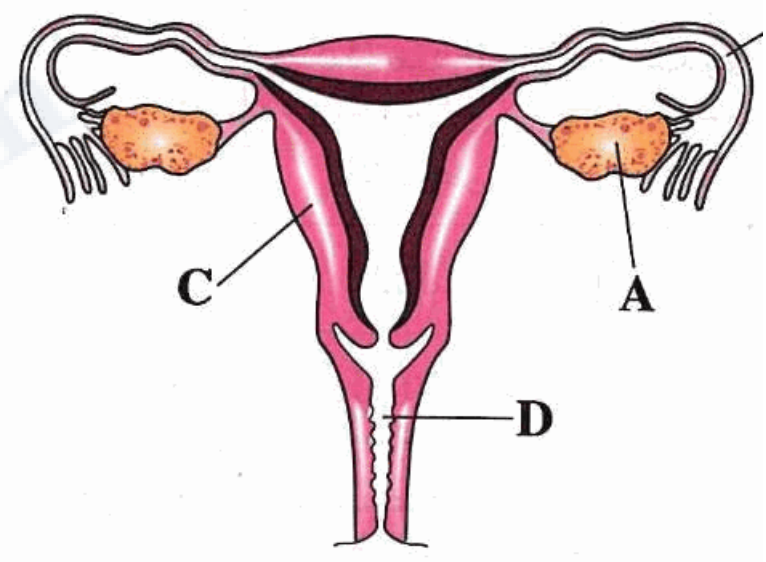
(A) No ovulation

(B) Menstruation stops

(C) Regular hormonal activity of the ovary

(D) The uterine lining does not grow

72 From the opposite figure, which of the following alternatives is correct?



(A) FSH affects structure (A), while LH affects structure (C)

(B) Fertilization takes place and the embryo forms in structure (B)

(C) Estrogen and progesterone are secreted from structure (A) to build up the inner layer of structure (C)

(D) The IUD prevents sperms from reaching structure (D)

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73 Which method disrupts the work of the pituitary gland to prevent pregnancy?

(A) Pills

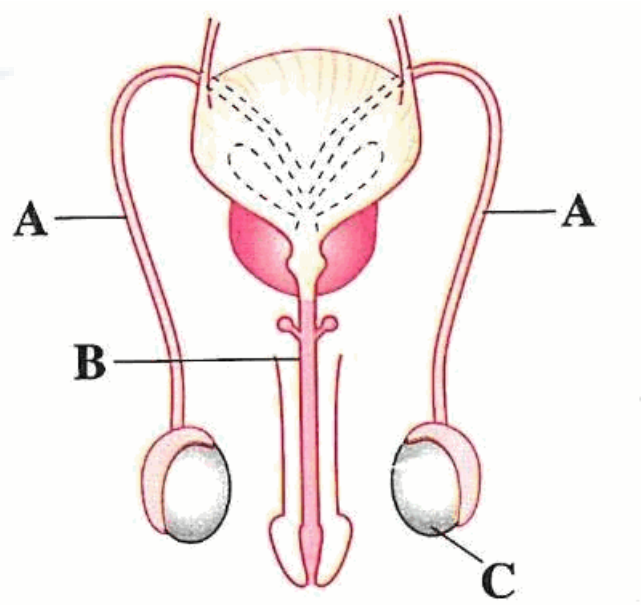
(B) IUD

(C) Male condom

(D) Surgical sterilization

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74 From the figure, which shows a front view of the human male reproductive system, what happens if structure (A) is tied?



(A) Gametes will not be transferred to structure (B)

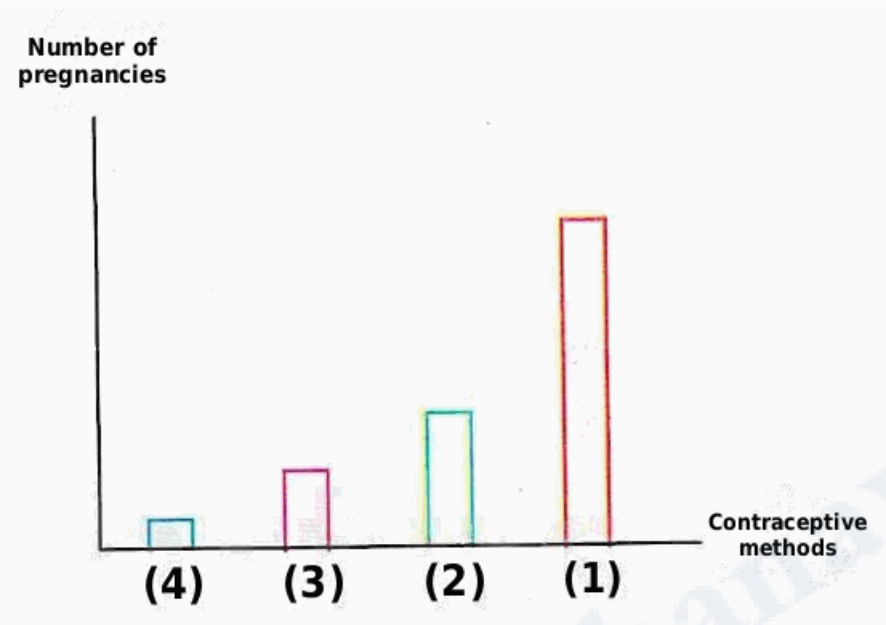
(B) The efficiency of structure (C) increases

(C) Structure (B) stops working

(D) Blood flow to structure (C) decreases

75 Some married couples use a certain period of the wife's menstrual cycle, known as the safe period, as a contraceptive method instead of the known methods. In light of this, answer: the opposite graph shows the number of pregnancies in four groups of women, each of 100 women, who used different contraceptive methods.

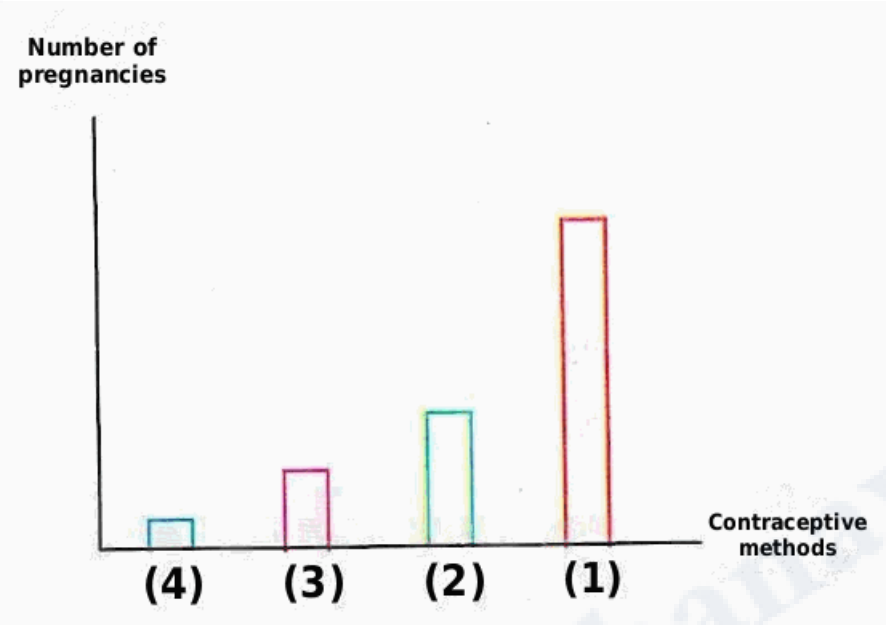
Which bar do you expect to represent using the safe period?



A (1) B (2) C (3) D (4)

76 Some married couples use a certain period of the wife's menstrual cycle, known as the safe period, as a contraceptive method instead of the known methods. In light of this, answer: the opposite graph shows the number of pregnancies in four groups of women, each of 100 women, who used different contraceptive methods.

Which of the following days of a woman's menstrual cycle can represent this period?



(A) From 13 to 15 (B) From 12 to 14 (C) From 12 to 16 (D) From 18 to 25

77 Which of the following does NOT stop the activity of the two ovaries in a human female?

(A) Pregnancy reaching the fourth month
(B) The female reaching the age of 60
(C) Taking contraceptive pills
(D) Tying the two Fallopian tubes

78 Which of the following is correct about contraceptive methods?

(A) Pills: ovulation (✓), fertilization (✗), menstruation (✗)
(B) IUD: ovulation (✓), fertilization (✓), menstruation (✓)
(C) Male condom: ovulation (✓), fertilization (✗), menstruation (✗)
(D) Surgical sterilization: ovulation (✗), fertilization (✗), menstruation (✓)

79 Which of the following statements is correct about surgical sterilization by cutting the two Fallopian tubes of the female?

(A) It permanently prevents natural pregnancy

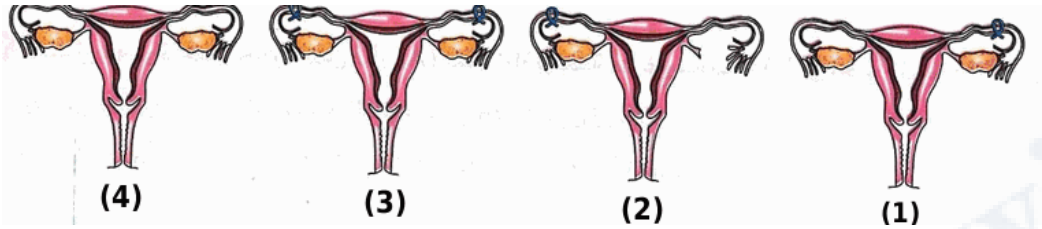
(B) It prevents the growth of the uterine lining

(C) It stops the menstrual cycle

(D) It prevents ovulation

---

80 The following figures show the reproductive systems of a number of females. Which of them can have children naturally?



(A) (1) , (2) (B) (1) , (4) (C) (2) , (3) (D) (1) , (3)

---

81 «PESA» is a technique a doctor uses to draw sperms from the epididymis to use them in the ICSI (micro-injection) technique. Which of the following cases is a reason for drawing sperms from the epididymis?

(A) One of the testes is in the abdominal cavity

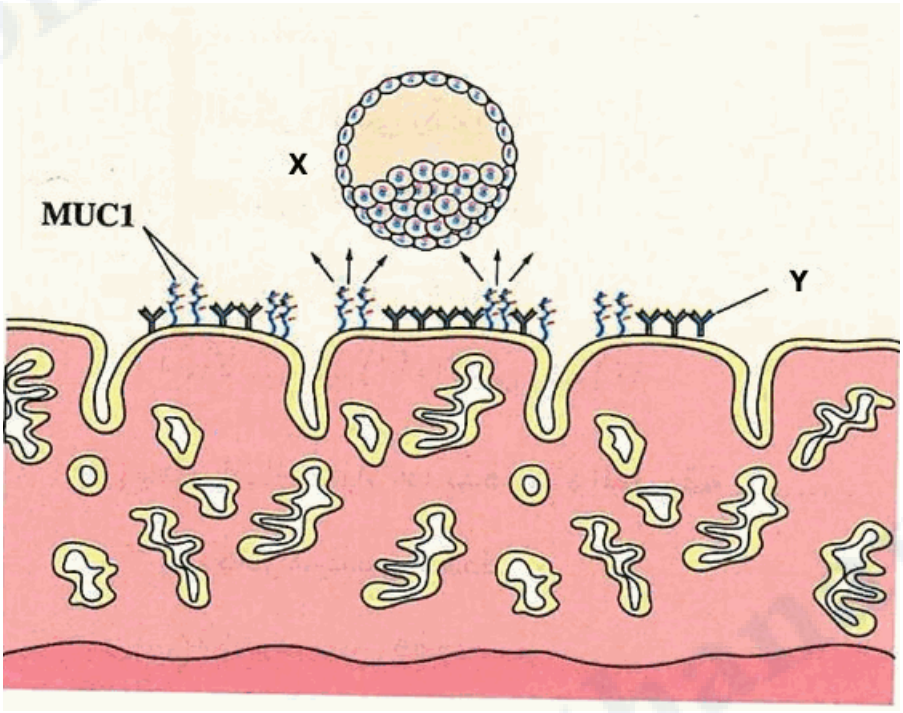
(B) Absence of sperms from the testis

(C) A blockage in the two vasa deferentia

(D) The pH of the semen in the vas deferens is 7.4

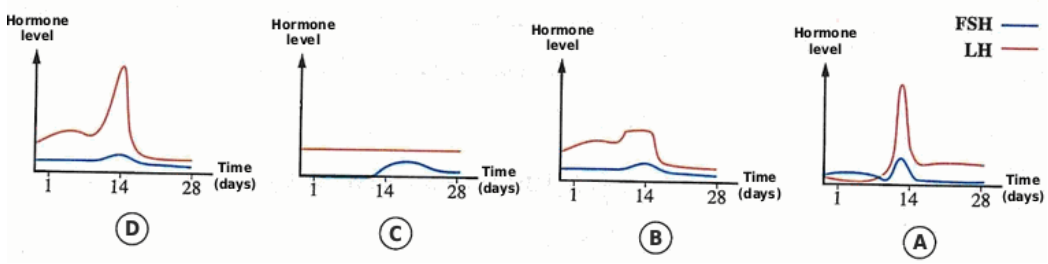
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82 The opposite figure shows one of the stages a human embryo passes through during its formation and growth inside the uterus. If you know that an increase in the protein «MUC1» prevents structure (X) from sticking to part (Y), which of the following methods works like this protein?



(A) Pills
(B) IUD
(C) Male condom
(D) Surgical sterilization of the male

83 The following graphs show the levels of FSH and LH in 4 women. Which of them uses an IUD?



84 Which of the following statements is NOT correct about ovulation?

(A) Menstruation may occur without ovulation
(B) Ovulation may occur without being followed by menstruation
(C) Ovulation is linked to the second meiotic division
(D) Ovulation occurs due to hormonal activity

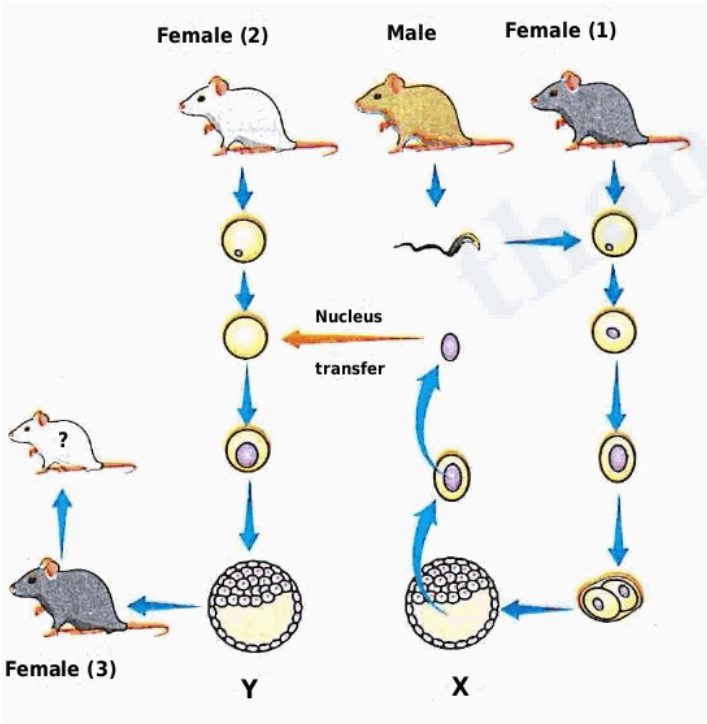
85 When the nucleus of one of the cells of a mouse embryo (A) is transplanted in place of the nucleus of an unfertilized egg of a mouse (B) in the uterus of a third mother (C), it grows and gives a new individual. To which of the following mice does this embryo belong genetically?

(A) (A) only
(B) (A) , (B) together
(C) (C) only
(D) (B) only

86 Which of the following methods ensures the survival of the panda and prevents its extinction?

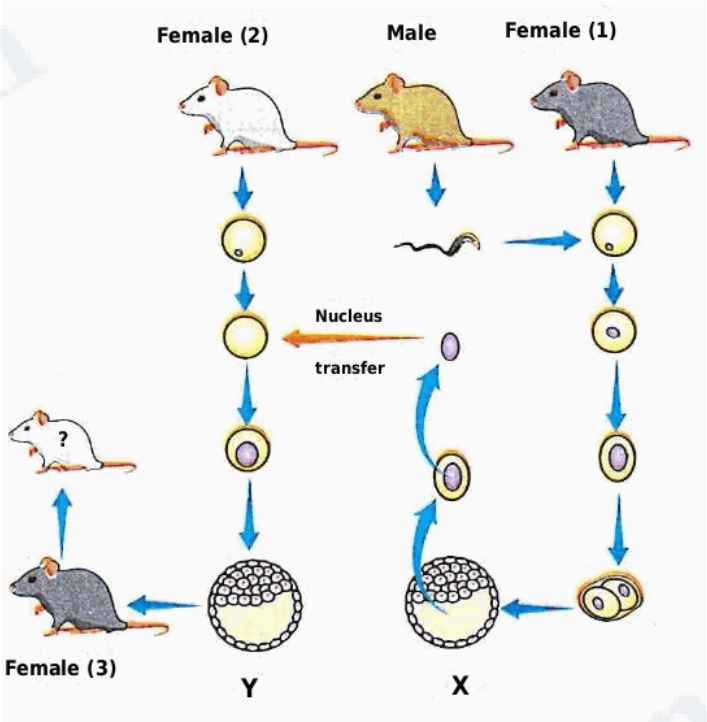
(A) Using the test-tube baby technique
(B) Caring for breeding these animals
(C) Keeping gametes in gamete banks
(D) Fighting infectious diseases

87 A researcher carried out an experiment as shown in the opposite figure. Study it, then answer:
The newborn mouse combines the characteristics of .....



(A) The male and female number (3)
(B) The male and female number (1)
(C) The male and female number (2)
(D) Female number (1) and female number (2)

88 A researcher carried out an experiment as shown in the opposite figure. Study it, then answer:
Producing new individuals in this way is considered .....



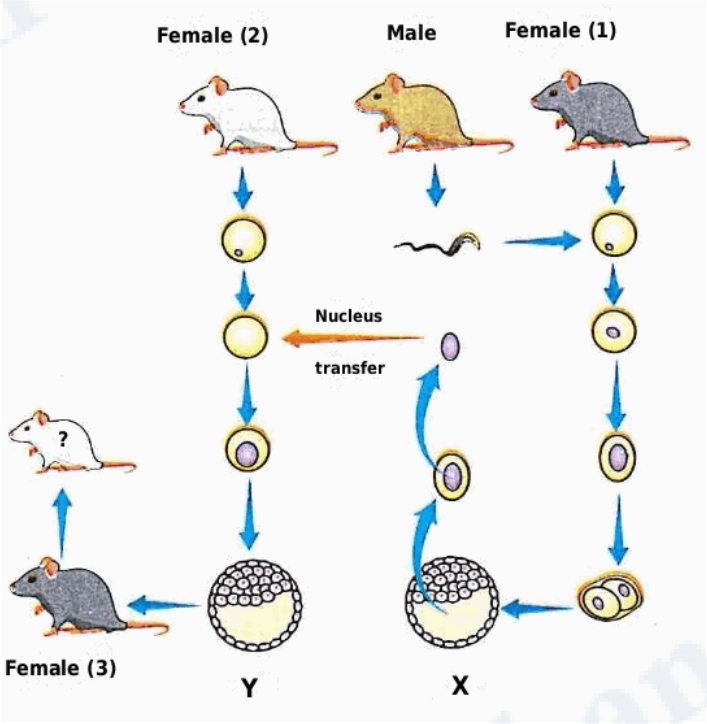
(A) Asexual reproduction only

(B) Sexual reproduction only

(C) Asexual reproduction preceded by sexual reproduction

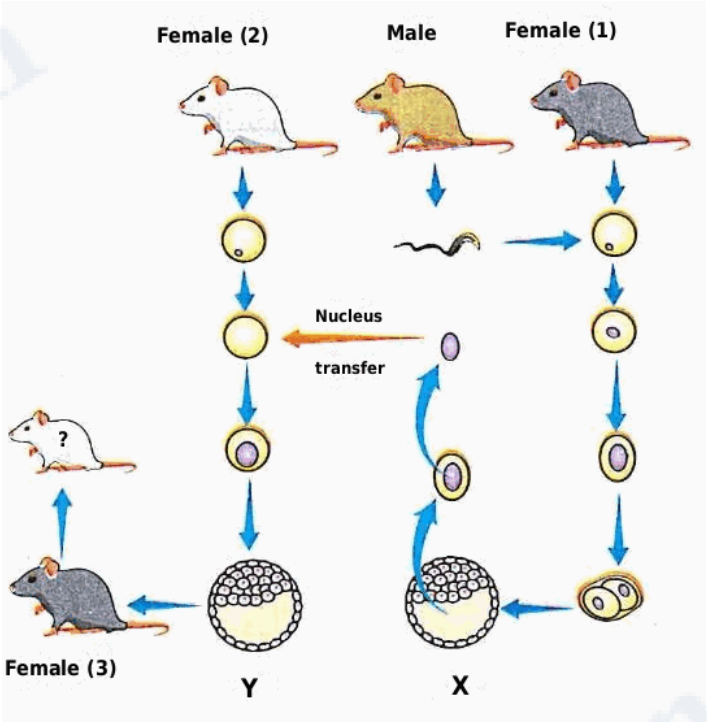
(D) Sexual reproduction preceded by asexual reproduction

89 A researcher carried out an experiment as shown in the opposite figure. Study it, then answer: Comparing the genetic material in the nucleus of a cell of tissue (X) with the genetic material in the nucleus of a cell of tissue (Y), what is the percentage of similarity between them?



(A) 100% (B) 75% (C) 50% (D) 25%

90 A researcher carried out an experiment as shown in the opposite figure. Study it, then answer: What is the source of the mitochondria found in all cells of the resulting mouse?

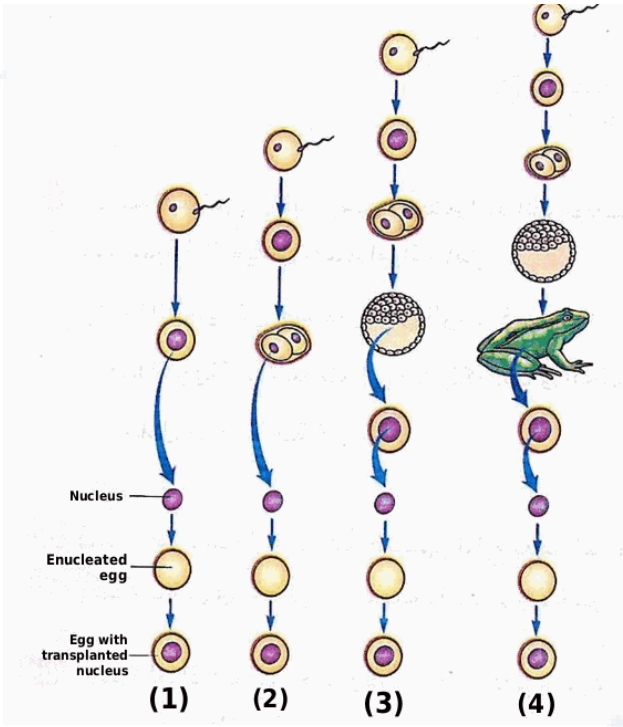


(A) The male
(B) Female number (1)
(C) Female number (2)
(D) Female number (3)

91 To solve the problem of decreasing meat, scientists are trying to use certain techniques to increase meat production. Which of these techniques achieves this purpose?

(A) Separating and using sperms carrying the chromosome (Y)
(B) Separating and using sperms carrying the chromosome (X)
(C) Separating and using eggs
(D) Gamete banks

92 From the opposite figure, in the first cloning experiments, which of the following eggs is the least able to grow into a new individual?



(A) (1) (B) (2) (C) (3) (D) (4)

93 Which of the choices in the opposite table shows the sex of the individuals produced by each of cloning and artificial parthenogenesis?

(A) Cloning: males only, artificial parthenogenesis: females only

(B) Cloning: males or females, artificial parthenogenesis: females only

(C) Cloning: males or females, artificial parthenogenesis: males or females

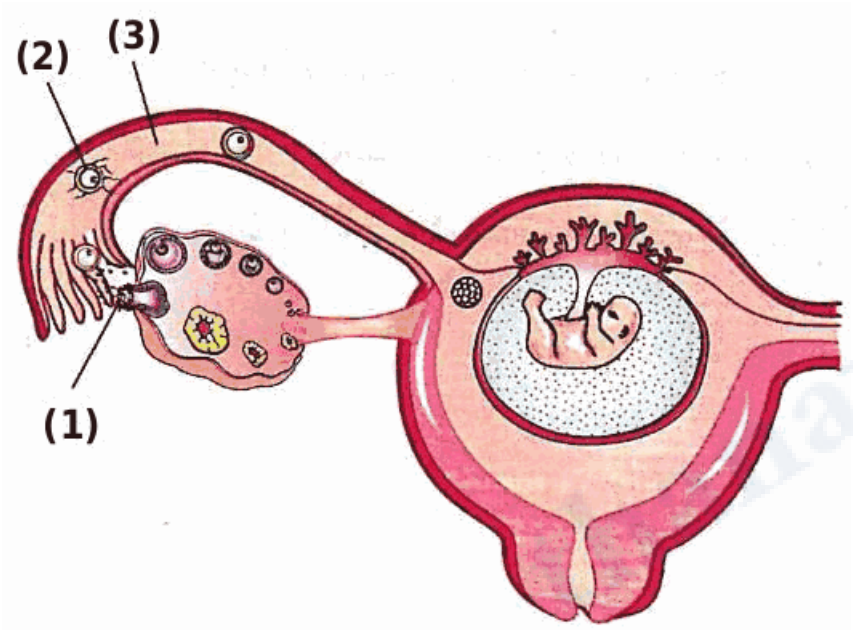
(D) Cloning: females only, artificial parthenogenesis: males only

Essay questions — 7 questions

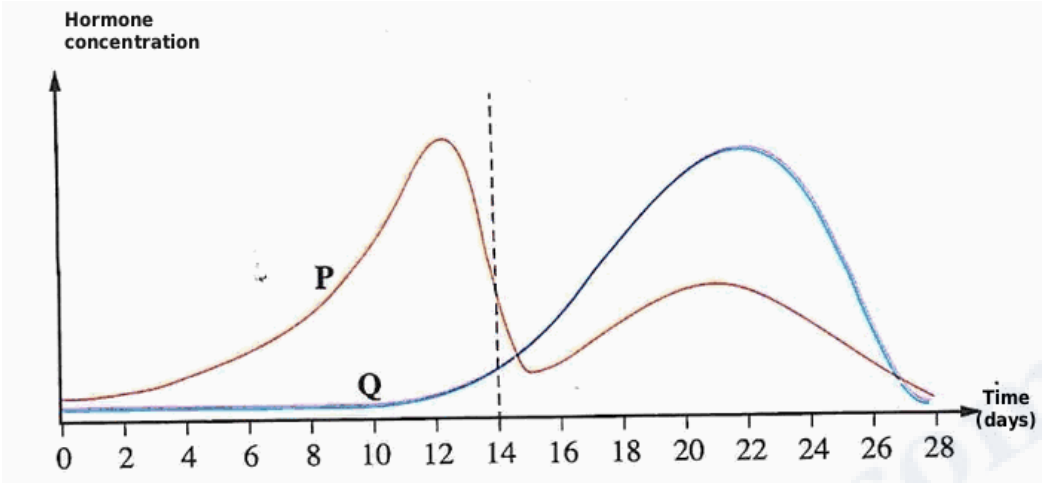
1 Study the opposite figure, which shows the stages of formation of a human embryo, then answer:

(1) Name the two processes represented by the numbers (1) and (2).

(2) What happens when structure (3) is blocked on both sides? What technique is used to treat the effects of that?



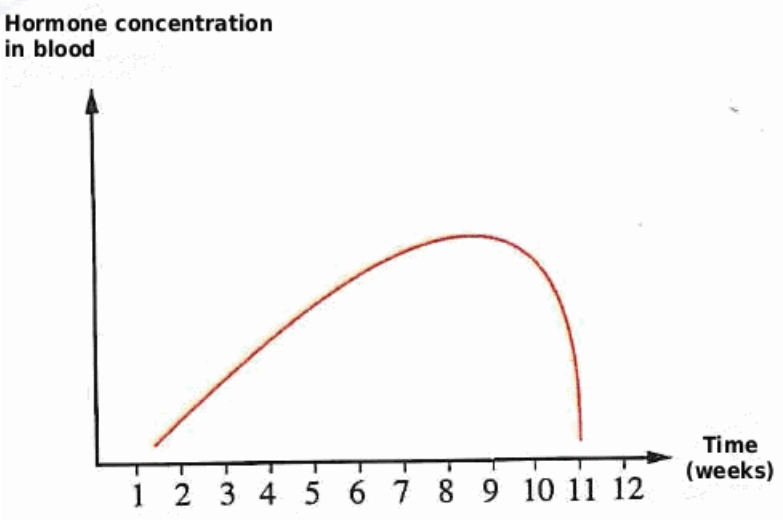
2 The opposite graph shows the hormonal changes in the blood of a married woman. What is the result of the absence of hormone (Q)?



3 The opposite graph shows the concentration of one of the female sex hormones in the body of a pregnant woman:

(1) What can be concluded from the graph?

(2) What systems / organs start to form in the fetus during this stage?



4 A woman pregnant with twins had an ultrasound scan in the fourth month to know the sex of the fetus, and the doctor told her she was pregnant with two children, one male and the other female. In light of this, state the type of twins formed, with explanation.

5 A woman gave birth to 4 twins: Ahmed, Hind, Mostafa and Mariam. What is the least number of fertilized eggs that could produce these twins? Explain.

6 The following table shows the meiotic divisions of a woman's eggs over several successive months. Study it, then answer:

First meiotic division: month 1 ✓ , month 2 ✗ , month 3 ✗ , month 4 ✓ , month 5 ✓ , month 6 ✗

Second meiotic division: month 1 ✗ , month 2 ✗ , month 3 ✗ , month 4 ✗ , month 5 ✓ , month 6 ✗

(1) In which month of the table is pregnancy expected?

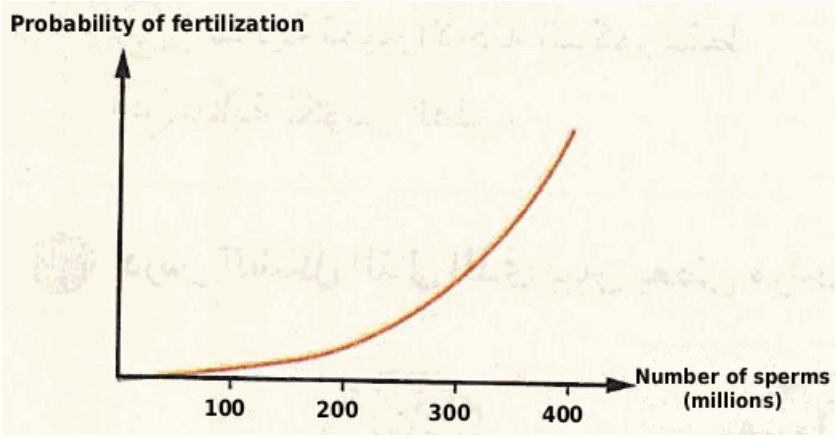
(2) Why did the first meiotic division not occur in each of the second, third and sixth months?

7 The opposite picture shows a ewe produced by modern cloning experiments. What type of cells were used in this experiment? And how were they kept?



Past exam questions — 51 questions

1 The opposite graph shows the relationship between the number of sperms and the probability of fertilizing the egg in a human female. Which of the following can be concluded from the graph? (Trial exam / May 2021)



(A) As the number of sperms increases beyond a certain limit, the probability of fertilizing the egg decreases

(B) As the number of sperms increases, the amount of the enzyme hyaluronidase increases

(C) For infertility to occur, the number of sperms must reach zero

(D) There is no relationship between the number of sperms and the probability of fertilization

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2 What is the result of only the head of the sperm entering the egg? (2nd session 2021)

(A) Fertilization occurs but the zygote does not divide

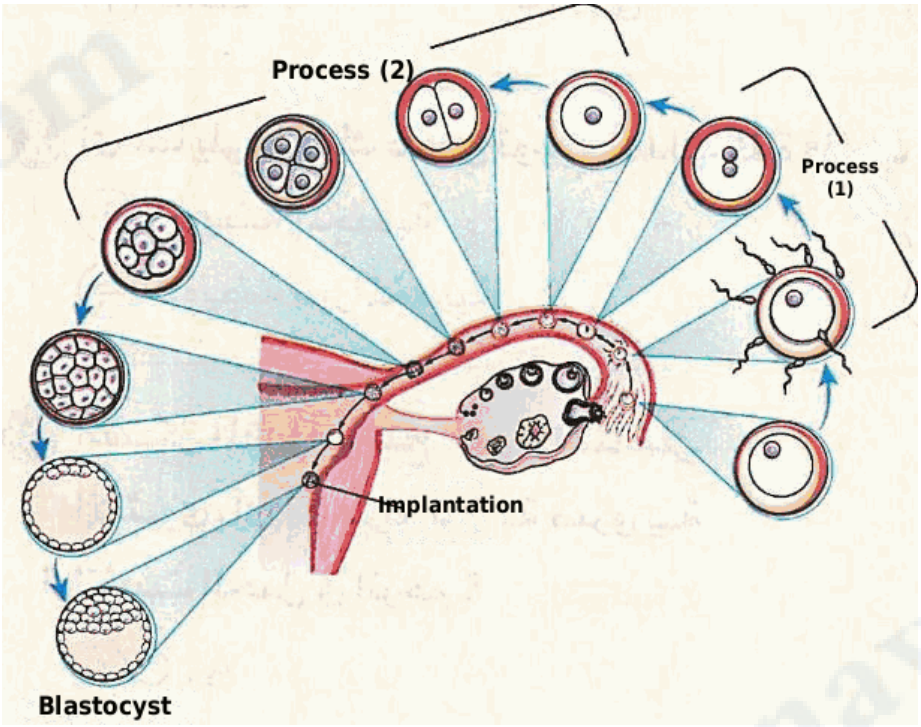
(B) Fertilization occurs and the embryo forms

(C) Fertilization does not occur and menstruation occurs

(D) Miscarriage

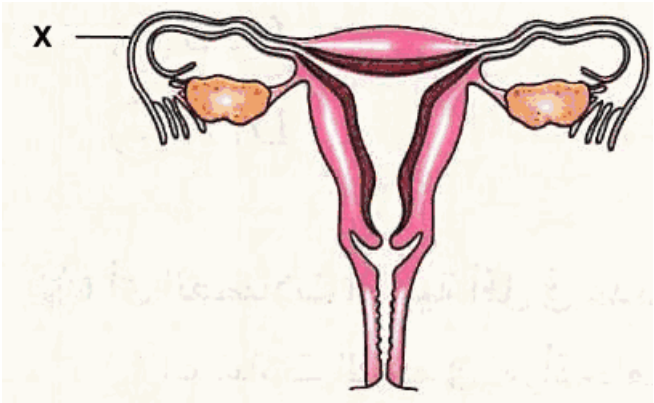
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3 Study the opposite figure, then deduce: how many times does mitotic division take place in process (2)? (Sample exam 2025)



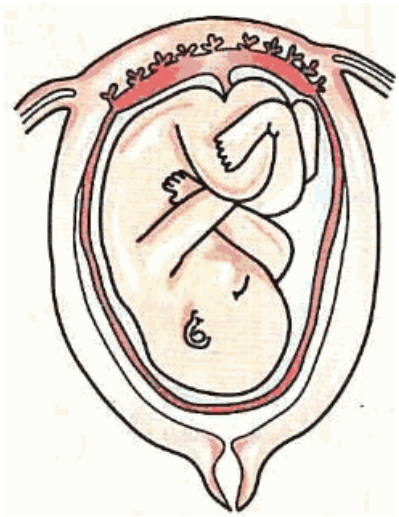
(A) Once (B) Twice (C) 3 times (D) 4 times

4 From the opposite figure, which stage of embryonic development does the embryo NOT pass through while it travels through structure (X)? (1st session 2025)



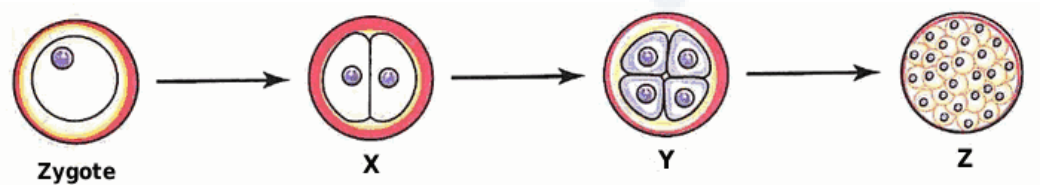
(A) The two-cell stage (B) The 4-cell stage
(C) The morula (D) The blastocyst

5 Look at the figure in front of you, then state what distinguishes this stage of the embryo's formation. (Trial exam / May 2021)



(A) The growth of the fetus slows down
(B) The growth of the ear is completed
(C) Only male fetuses can be distinguished
(D) The heart starts to form

6 Study the following figure, which shows some stages in the development of the zygote: Where is the cell mass (Z) inside the female reproductive system before the end of the first week after fertilization? (Trial exam / June 2021)



(A) The end of the Fallopian tube
(B) The first third of the Fallopian tube
(C) The second third of the Fallopian tube
(D) The uterine lining

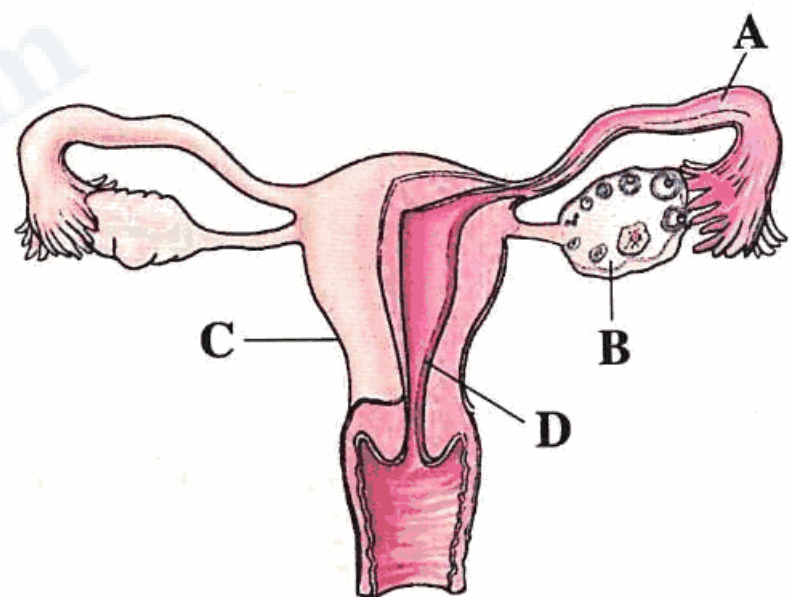
7 In which month of pregnancy do the fibrous joints of the fetus's skull start to form? (1st session 2021)

(A) The third
(B) The second
(C) The seventh
(D) The fifth

8 Which of the following moves against the direction of the cilia of the Fallopian tube? (1st session 2021)

(A) The fertilized egg
(B) The sperms
(C) The unfertilized egg
(D) The morula stage

9 The opposite figure shows the female reproductive system. Which of the following parts are necessary to establish pregnancy in the uterus? (2nd session 2021)



(A) A , C (B) B , D (C) C , B (D) D , A

10 Which of the following muscles contracts the fewest times during one year? (1st session 2022)

(A) The uterine muscles of a pregnant woman

(B) The uterine muscles of an adult girl

(C) The wall of the urinary bladder

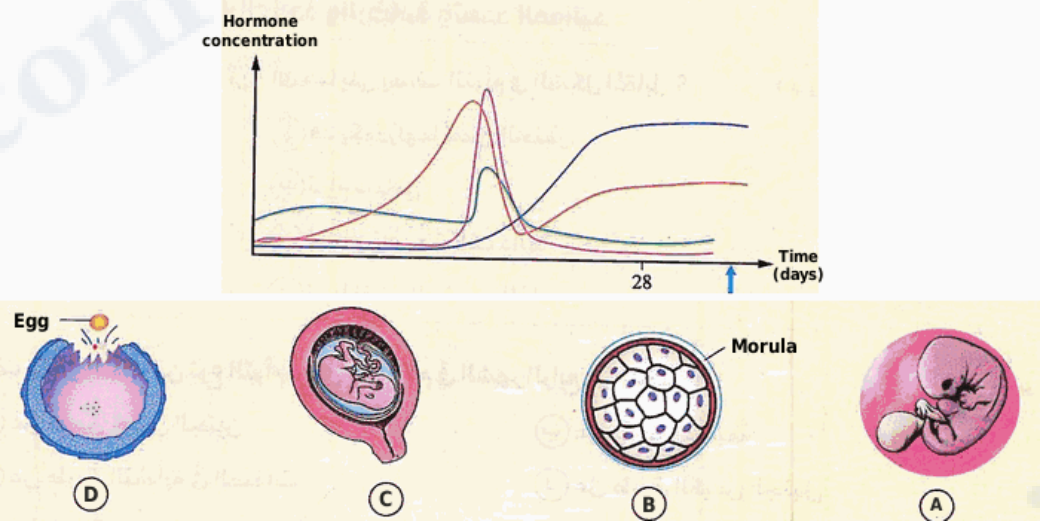
(D) The gastrocnemius muscle

11 In which of the following periods do the muscles start to develop and the sense organs become complete in the fetus? (2nd session 2022)

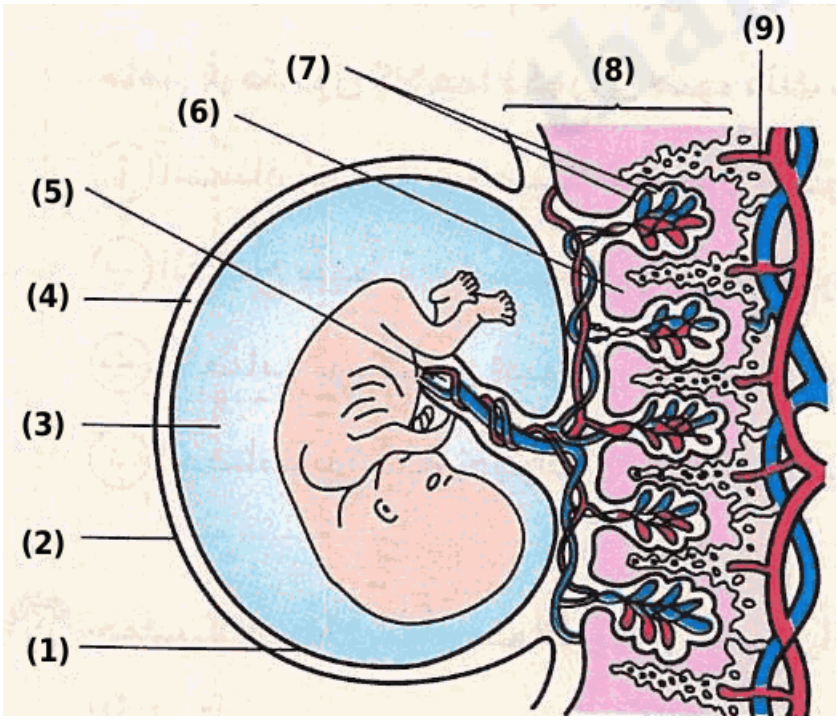
(A) The beginning of the first stage (B) The end of the first stage

(C) The end of the second stage (D) The beginning of the third stage

12 The opposite graph shows the concentration of 4 hormones in an adult woman. What can be observed inside the female reproductive system at the time the arrow points to? (2nd session 2022)



13 Study the opposite figure, then deduce which numbers refer to the placenta. (1st session 2023, Sample exam 2025)



A (1) , (2) B (6) , (7) C (5) , (6) , (7) D (6) , (7) , (9)

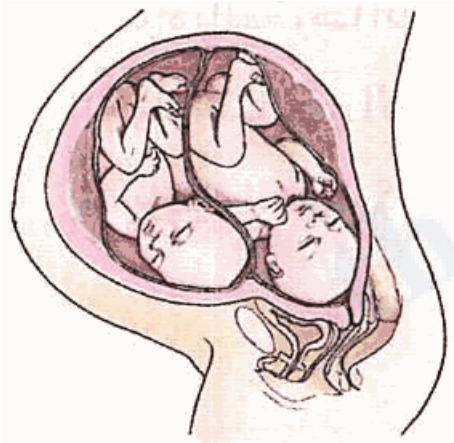
14 Which system forms in the early stages of embryonic growth even though the fetus does not use it inside the uterus? (2nd session 2023)

(A) The digestive system
(B) The reproductive system
(C) The urinary system
(D) The respiratory system

15 Which of the following body systems do their main function only after birth and do not work during embryonic development? (2nd session 2024)

(A) The digestive and respiratory systems
(B) The circulatory and nervous systems
(C) The skeletal and muscular systems
(D) The hormonal and nervous systems

16 Which of the following describes the twins in the opposite figure? (Trial exam / May 2021, 2nd session 2022)



(A) They may have the same sex
(B) Siamese twins
(C) They always have different sexes
(D) They always have the same sex

17 How can the type of twins inside the mother's uterus be confirmed in the fourth month of pregnancy? (Trial exam / June 2021)

(A) By the sex of the fetus
(B) By the placenta
(C) By the similarity of characteristics
(D) By the amniotic sac

18 A woman pregnant with twins had an ultrasound scan in the second month to know the sex of the fetus, and the doctor told her she was pregnant with two children, both male. In light of this, what caused the twins in this woman? (Trial exam / June 2021)

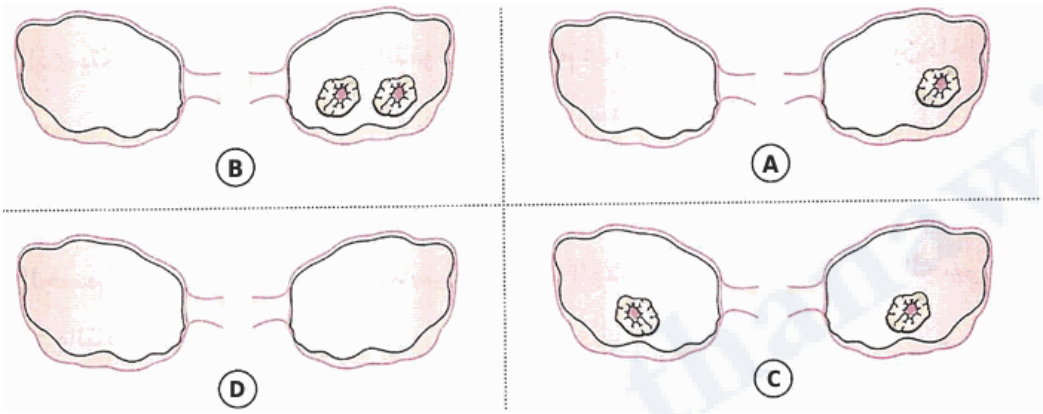
(A) Division of an egg fertilized by one sperm

(B) Division of an egg fertilized by two sperms

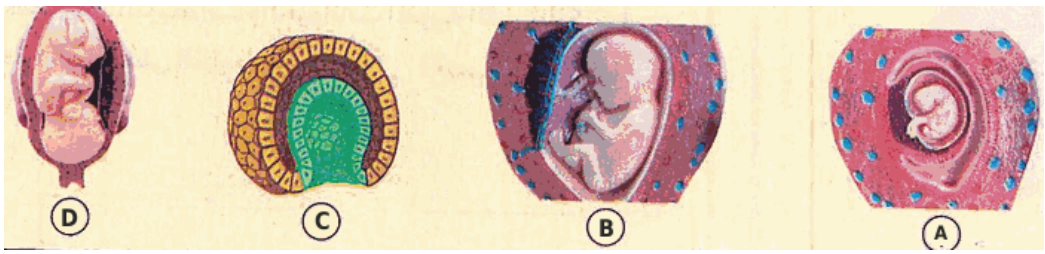
(C) Fertilization of two eggs by two sperms with different sex chromosomes

(D) Fertilization of one egg by two sperms with the same sex chromosome

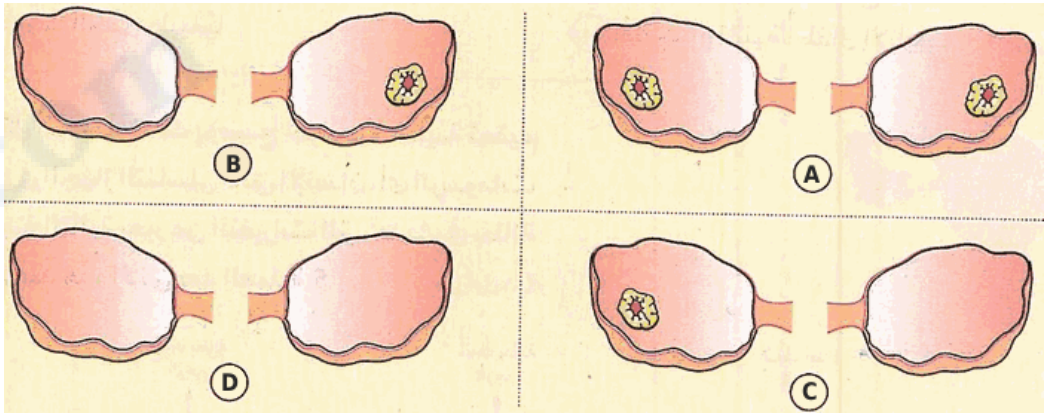
19 A woman became pregnant with identical twins. Which of the following pictures shows the state of her two ovaries during the first three months? (1st session 2021)



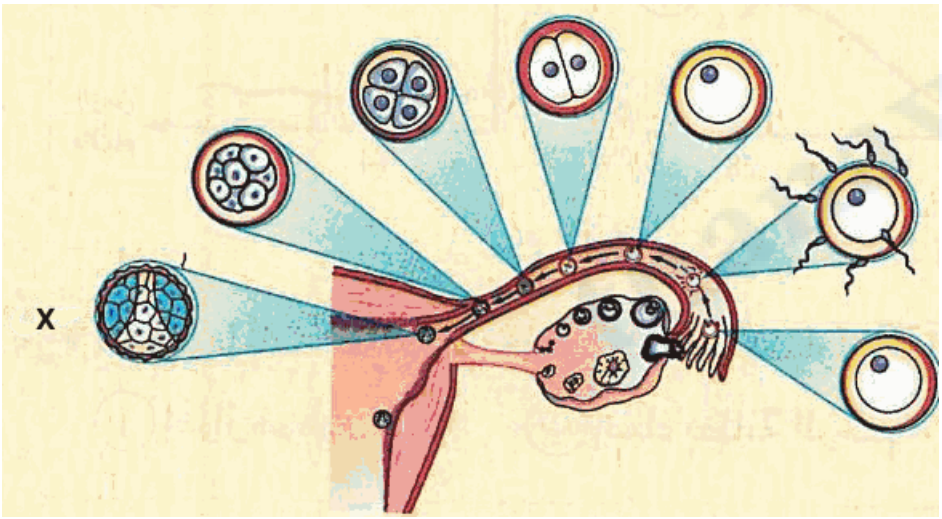
20 Which figure shows the stage in which the secretion of progesterone decreases? (2nd session 2021)



21 A woman became pregnant with non-identical twins. Which of the following figures shows the state of her two ovaries during the first three months? (2nd session 2021)

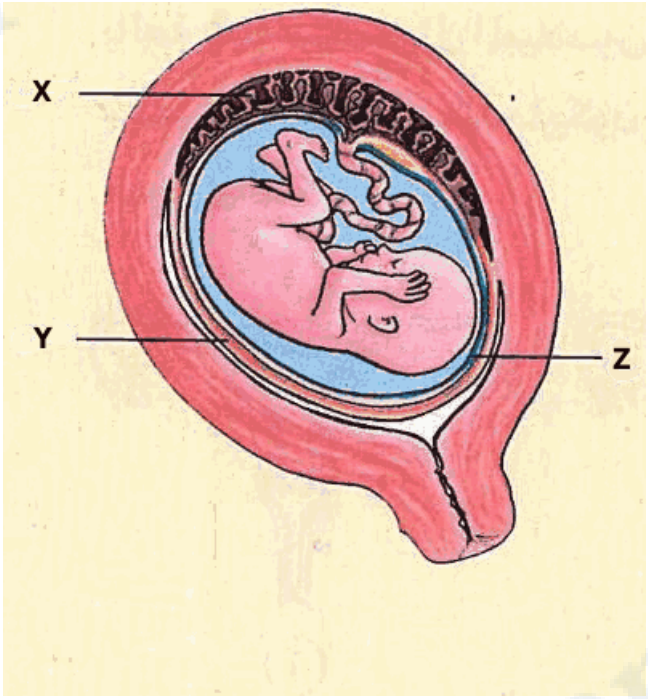


22 From the opposite figure, which of the following does (X) refer to? (1st session 2022)



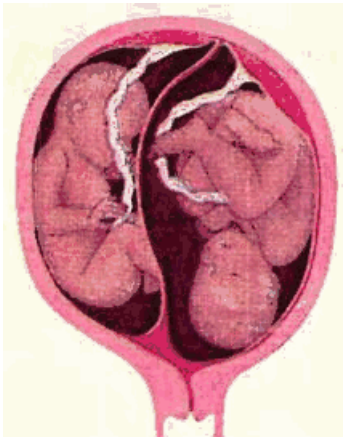
(A) Two genetically different girls
(B) A boy and a girl of the same age
(C) A conjoined boy and girl
(D) Two fetuses sharing the placenta

23 Look at the opposite picture, which shows a human fetus inside the mother's uterus, and identify structures (X), (Y), (Z), then deduce at which stage of the fetus's growth structure (X) separates from the uterine wall. (Trial exam 2023, Sample exam 2025)



(A) The third month of the third stage
(B) The third month of the second stage
(C) The second month of the third stage
(D) The second month of the second stage

24 Examine the opposite picture, which shows fetuses forming inside a female's uterus, then state how many eggs and sperms, respectively, took part in forming this case. (Trial exam 2023, Sample exam 2025)



(A) One egg, one sperm
(B) One egg, two sperms
(C) Two eggs, two sperms
(D) Two eggs, one sperm

25 A woman had surgical sterilization by cutting her two Fallopian tubes, and after a while she was able to have a child. How can this be explained? (Trial exam / June 2021)

(A) The two Fallopian tubes can be reopened

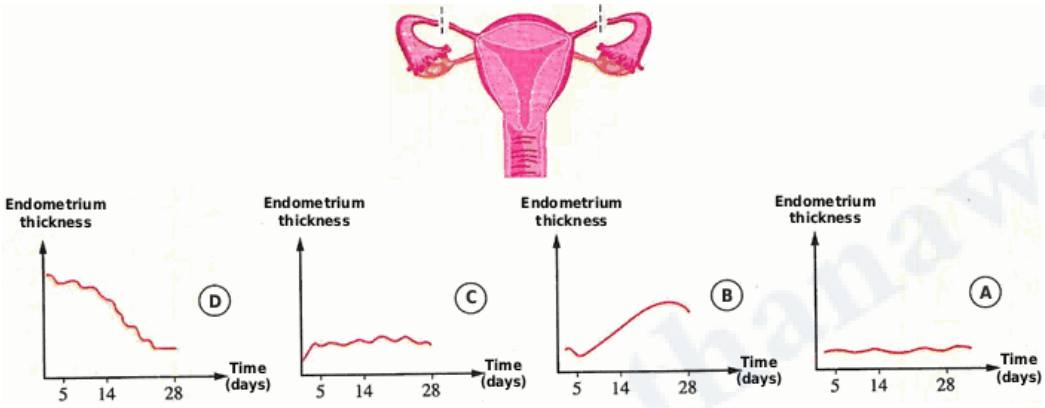
(B) Relying on cloning

(C) Pregnancy occurred naturally

(D) Using the test-tube baby technique

---

26 The figure in front of you shows surgical sterilization performed on the reproductive system of a human female. Which of the following graphs shows the changes in this female's uterine lining after the operation? (1st session 2021)



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27 Which of the following processes stops in a woman who takes contraceptive pills? (1st session 2021)

(A) Secretion of GH

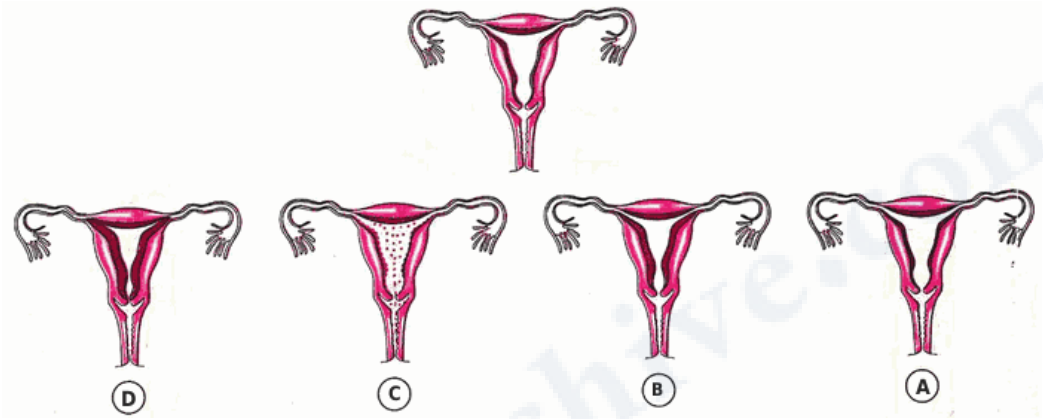
(B) Growth of the uterine lining

(C) Formation of the corpus luteum

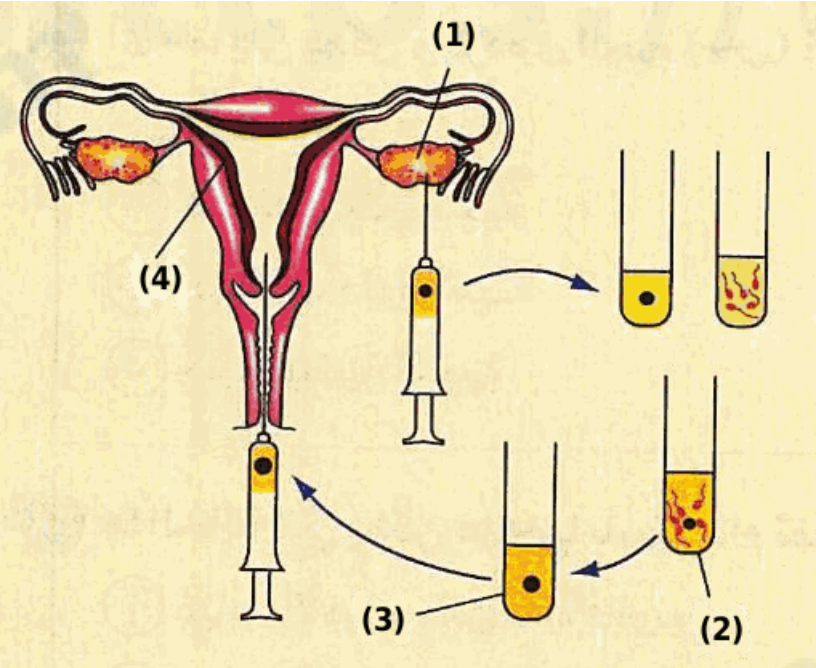
(D) Menstruation

---

28 The figure in front of you shows the reproductive system of an adult human female after the two ovaries were removed surgically. Which of the following figures shows the uterine lining when the level of FSH in this female is at its highest? (2nd session 2021)



29 The figure in front of you shows one of the techniques used to help childbearing. Where is the meiotic division completed? (2nd session 2021)

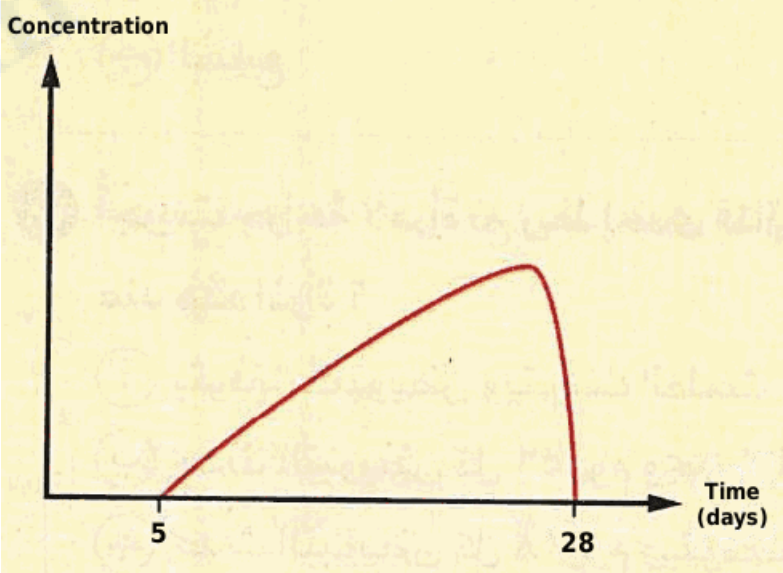


(A) (1) (B) (2) (C) (3) (D) (4)

30 Which method does NOT suit a woman who wants to prevent pregnancy for five years? (2nd session 2021)

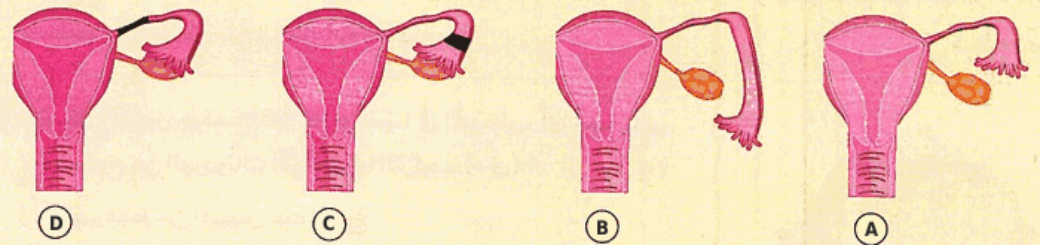
(A) Pills
(B) IUD
(C) Male condom
(D) Surgical sterilization

31 The opposite graph shows the concentration of progesterone in an adult human female after her last menstruation. Study it, then state the scientific explanation for the change in the hormone's concentration. (1st session 2022)



(A) Pregnancy occurring naturally
(B) Taking contraceptive pills
(C) Infertility
(D) Using an IUD

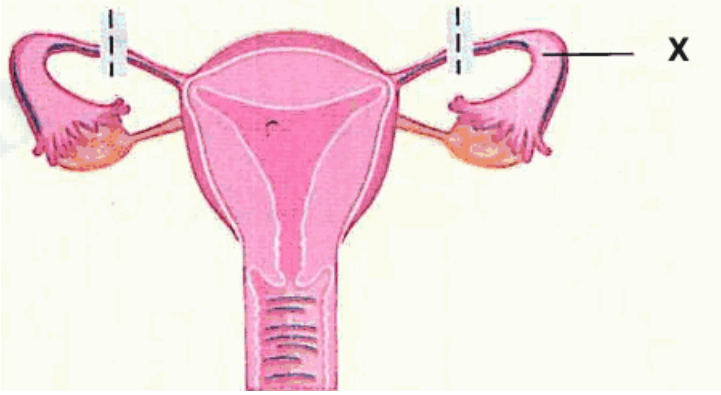
32 In which of the following cases can the Fallopian tube catch the egg but fertilization does not occur? (1st session 2022)



33 Which of the following distinguishes using the IUD from the other contraceptive methods? (1st session 2022)

(A) It affects ovulation
(B) It does not affect the menstrual cycle
(C) It does not prevent the second meiotic division of the secondary oocyte
(D) It prevents sperms from reaching the egg

34 Which of the following can be found in part (X)? (2nd session 2022)



(A) A zygote
(B) Living sperms
(C) Dead sperms
(D) A secondary oocyte

---

35 Which condition can be treated using the test-tube baby technique? (Trial exam 2023)

(A) Absence of cilia from the Fallopian tube
(B) Removal of the mother's uterus
(C) The mother reaching menopause
(D) Removal of the two ovaries

---

36 If a woman's menstruation started on the first day of the month and she wanted to use contraceptive pills, on which day of that month can she start using the pills? (Trial exam 2023, Sample exam 2025)

(A) The first
(B) The fifth
(C) The seventh
(D) The fourteenth

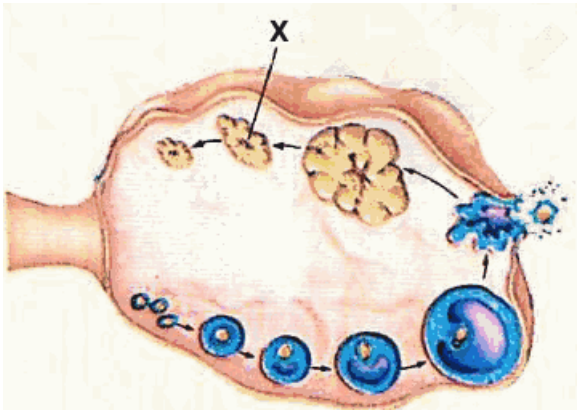
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37 A woman had an operation in which one of her two Fallopian tubes was tied. What is the effect of this operation on ovulation and menstruation in this woman? (Sample exam 2025)

(A) Ovulation stops and menstruation stops
(B) Ovulation occurs every 56 days and menstruation every two months
(C) Ovulation occurs every 28 days and menstruation stops
(D) Ovulation and menstruation occur every 28 days

---

38 The opposite figure shows a cross-section of the ovary. Which of the following is NOT correct about the hormones secreted by structure (X)? (1st session 2025)



(A) They are secreted only by the ovary at puberty

(B) Their secretion increases after ovulation

(C) They are made of steroids

(D) They are the main components of contraceptive pills

---

39 In the test-tube baby technique, embryonic development starts inside ..... (Sample exam 2026)

(A) A test tube only

(B) The mother's uterus only

(C) A test tube and the mother's uterus

(D) A test tube and a nutrient medium

---

40 Which cell's nuclei can be used in the cloning technique? (1st session 2021)

(A) A secondary spermatocyte

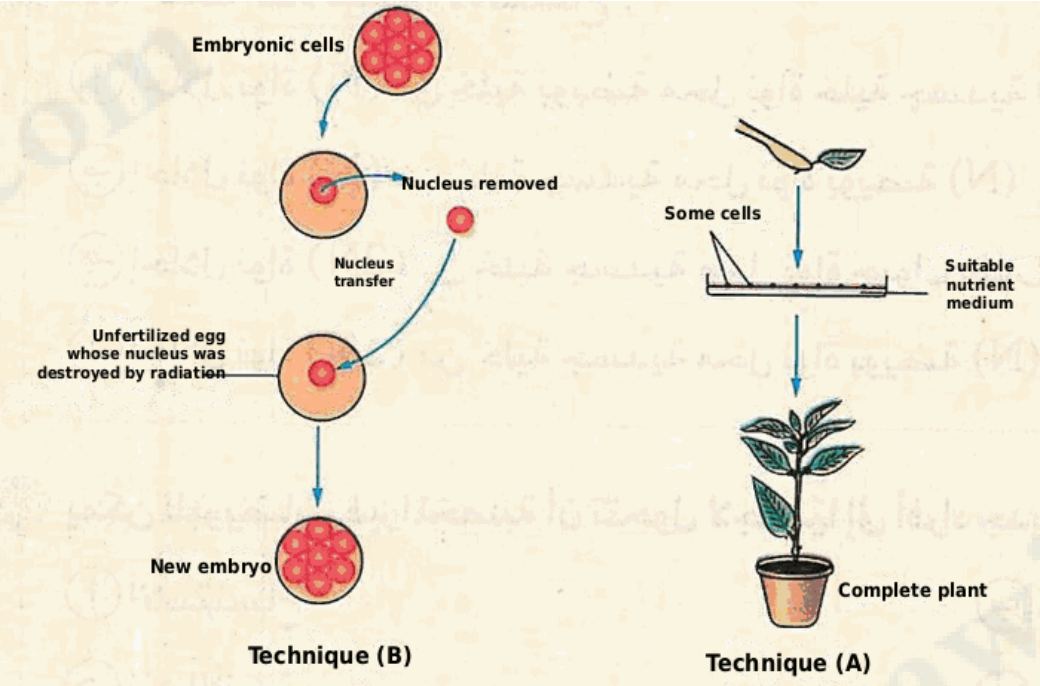
(B) A secondary oocyte

(C) A red blood cell

(D) A cell from the morula

---

41 Study the two opposite techniques (A) and (B). What is the scientific basis that each of them depends on? (2nd session 2021)



(A) Producing new, more developed strains

(B) Reproductive cells are active and divide quickly

(C) The nuclei of body cells contain all the genetic information

(D) Activating gametes to become diploid

---

42 If the first cloning experiments were carried out on both frogs and mice until a fully grown new individual was obtained, which step could be dispensed with when forming a new individual in frogs? (1st session 2022)

(A) Fixing the embryos in the mother's uterus

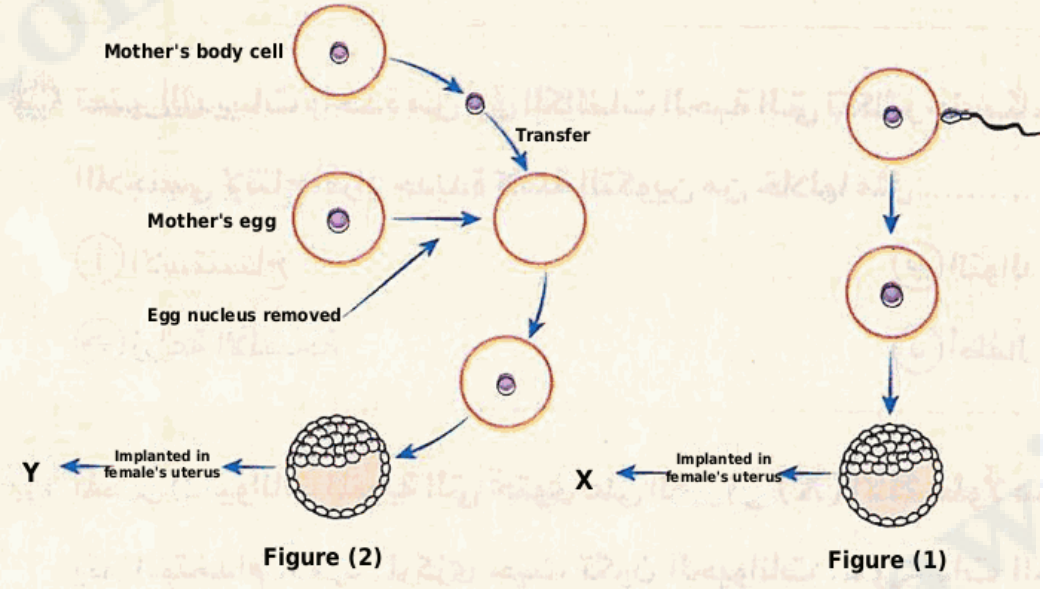
(B) Removing the nuclei from unfertilized eggs

(C) Obtaining the nuclei from embryos at different stages

(D) Transplanting the nuclei into enucleated eggs

---

43 One kind of animal was threatened with extinction, but one female remained, along with sperms kept in a gamete bank. Two teams of scientists carried out the experiments shown in the two opposite figures (1) and (2). What is the sex of the individuals produced from (X) and (Y)? (2nd session 2022)



(A) (X) female, (Y) female

(B) (X) male or female, (Y) male or female

(C) (X) male or female, (Y) female

(D) (X) female, (Y) male

---

44 What is the main difference between artificial parthenogenesis and cloning in frogs? (2nd session 2024)

(A) The source of the embryo's nutrition

(B) The number of chromosomes of the resulting individuals

(C) The place of embryonic growth

(D) The type of nuclei used

---

45 What happens during cloning? (Sample exam 2025)

(A) Replacing the nucleus of a body cell (2N) with a nucleus (N) from an egg cell

(B) Replacing the nucleus of an egg (N) with a nucleus (N) from a body cell

(C) Replacing the nucleus of a sperm (N) with a nucleus (2N) from a body cell

(D) Replacing the nucleus of an egg (N) with a nucleus (2N) from a body cell

---

46 Unfertilized eggs can turn asexually into new individuals by all of the following methods EXCEPT ..... (1st session 2025)

(A) Cloning
(B) Shaking
(C) Removing the nuclei
(D) Parthenogenesis

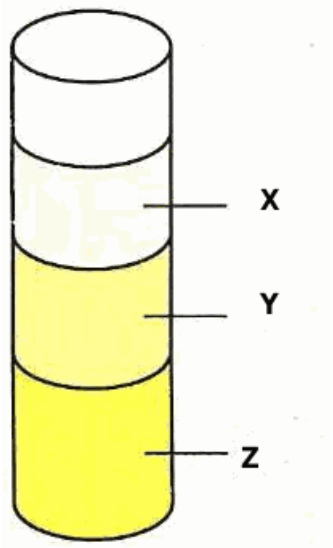
47 During cloning, the nucleus transplanted into the enucleated egg can be the nucleus of any of the following cells EXCEPT ..... (2nd session 2025)

(A) A diploid cell
(B) A cell from the morula stage
(C) A liver cell
(D) A female gamete cell

48 Mammals are among the most advanced living organisms that reproduce sexually, but we can use one of the methods of asexual reproduction to produce complete new individuals, such as ..... (Sample exam 2026)

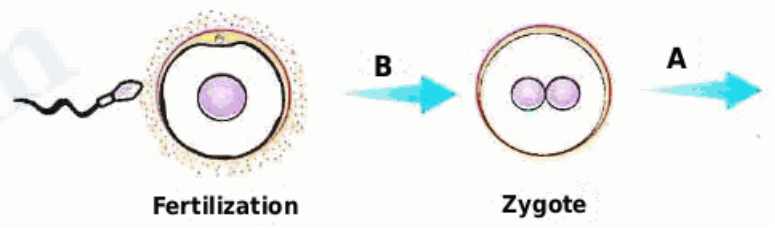
(A) Cloning
(B) Natural parthenogenesis
(C) Tissue culture
(D) Test-tube babies

49 To separate sperms carrying the longer chromosome (X) from those carrying chromosome (Y), centrifugation is used, so the sperms of higher density are in the lower layers and those of lower density are in the upper layers. From the opposite figure, which of the following layers can be used to produce mostly males? (Sample exam 2026)



(A) (X)
(B) (Y)
(C) (X) and (Z) together
(D) (Y) and (Z) together

50 From the opposite drawing, what are the two cell divisions represented by the letters (A) and (B), and what is their importance? (Sample exam 2025)



51 Calculate the number of times the second meiotic division occurred in a woman who gave birth 3 times, had 4 miscarriages and used contraceptive pills for 150 days. (Sample exam 2025)

Answer key and solutions

Multiple choice questions

1 A	2 B	3 B	4 C	5 C	6 D	7 B	8 C	9 A	10 A
11 B	12 B	13 A	14 D	15 C	16 A	17 C	18 A	19 D	20 A
21 C	22 D	23 C	24 B	25 D	26 A	27 A	28 D	29 A	30 B
31 B	32 A	33 A	34 D	35 D	36 C	37 C	38 B	39 C	40 D
41 D	42 A	43 C	44 B	45 C	46 D	47 D	48 B	49 C	50 D
51 B	52 B	53 C	54 D	55 B	56 D	57 B	58 D	59 C	60 D
61 D	62 C	63 D	64 C	65 A	66 B	67 C	68 C	69 D	70 D
71 A	72 C	73 A	74 A	75 A	76 D	77 D	78 B	79 A	80 B
81 C	82 B	83 A	84 C	85 A	86 C	87 B	88 C	89 A	90 C
91 A	92 D	93 B							

1 **Answer (A)**

The chromosome number is reduced by the first meiotic division inside the ovary.

2 **Answer (B)**

The egg lives about one day after ovulation, so it stays alive until day 15.

3 **Answer (B)**

The egg gives the nucleus and the cytoplasm, and the sperm gives the nucleus and the neck content (the two centrioles).

4 **Answer (C)**

Gametes are produced in (X) and (Y), fertilization is internal in the female (X), and the zygote divides in (X).

5 **Answer (C)**

The second meiotic division takes place in the first third of the Fallopian tube when the sperm enters, which is (3).

6 **Answer (D)**

The cell released from the ovary at ovulation is the secondary oocyte.

7 **Answer (B)**

Ovulation takes place on day 14 from the start of menstruation.

8 **Answer (C)**

FSH stimulates the growth of the Graafian follicle, which secretes estrogen, so the uterine lining grows.

9 **Answer (A)**

Implantation of the blastocyst keeps the corpus luteum, so it does not degenerate.

10 **Answer (A)**

The primary oocyte changes into a secondary oocyte inside the Graafian follicle, which is (4).

11 **Answer (B)**

The enzyme dissolves the layer around the egg, which is what (2) points to.

12 **Answer (B)**

The jelly layer (2) contains hyaluronic acid.

13 **Answer (A)**

The acrosome (X) contains the enzymes that dissolve the egg's coat.

14 **Answer (D)**

The type of the sex chromosome determines the sex of the fetus and does not affect the success of fertilization.

15 **Answer (C)**

Some sperms dissolve the egg's coat with their enzymes and only one sperm enters, so the large numbers help dissolve part of the coat.

16 **Answer (A)**

The sperm transfers only the nucleus (DNA) and the two centrioles.

17 **Answer (C)**

(X) is at day 3, when the Graafian follicles are small.

18 **Answer (A)**

(Z) is at day 20, which is the blastocyst stage.

19 **Answer (D)**

(L) is at day 36 and pregnancy has occurred, so there is an embryo in the first stage of growth.

20 **Answer (A)**

Day W is about day 3, and the sperms die before ovulation.

21 **Answer (C)**

On the day of ovulation the fast sperm (Y) arrives first, so the fetus is male.

22 **Answer (D)**

The (X) sperm lives longer, so it stays alive until ovulation and the fetus is female.

23 **Answer (C)**

The Fallopian tube is narrow and cannot bear the growth of the fetus.

24 **Answer (B)**

The mitochondria come from the egg because the sperm's mitochondria do not enter, and the food comes from the egg's cytoplasm.

25 **Answer (D)**

The fetus is fully grown at the end of the third stage.

26 **Answer (A)**

FSH secretion almost stops during pregnancy because of progesterone.

27 **Answer (A)**

The glandular tissues are (1) and (2).

28 **Answer (D)**

Ovary (X) does not carry the corpus luteum, so removing it has no effect and pregnancy continues normally.

29 **Answer (A)**

Progesterone builds up the uterine lining and increases its blood supply, which is (1).

30 **Answer (B)**

R is the end of menstruation, where the lining starts to grow, and S is day 14, which is ovulation.

31 **Answer (B)**

The amniotic fluid protects the fetus from shocks, while oxygen reaches it through the placenta.

32 **Answer (A)**

Cleavage is mitotic divisions in which the number of cells increases while the total size stays constant.

33 **Answer (A)**

After the sperm enters and before the two nuclei fuse (A), the nucleus is (n).

34 **Answer (D)**

A lack of ovarian hormones (from the corpus luteum) causes miscarriage in the first stage.

35 **Answer (D)**

The concentration of the hormone rises until birth, so it is oxytocin.

36 **Answer (C)**

Oxytocin is secreted by nerve cells in the hypothalamus.

37 **Answer (C)**

After birth it causes the ejection of milk.

38 **Answer (B)**

Cleavage takes about 6 days.

39 **Answer (C)**

The stages start with fertilization, then growth and tissue differentiation.

40 **Answer (D)**

The mother's blood and the fetus's blood are separate, and substances pass between them by diffusion through the placenta.

41 **Answer (D)**

The two ovaries are formed at the end of the third month.

42 **Answer (A)**

The sex of the fetus is determined at the moment of fertilization, according to the sperm.

43 **Answer (C)**

A crocodile embryo feeds on the yolk.

44 **Answer (B)**

The finger-like villi come from the fetus.

45 **Answer (C)**

(X) is part of the placenta, which contains the villi.

46 **Answer (D)**

The placenta secretes estrogen, progesterone and relaxin, while prolactin comes from the pituitary gland.

47 **Answer (D)**

Relaxin increases at the end of pregnancy to relax the pubic symphysis, and figure (D) is a fully formed fetus.

48 **Answer (B)**

Progesterone decreases at the end of the ninth month, before birth.

49 **Answer (C)**

Cell (1) is a polar body and cell (2) is a mature egg.

50 **Answer (D)**

Process (Z) is a second meiotic division, which takes place in the first third of the Fallopian tube.

51 **Answer (B)**

The second meiotic division of the secondary oocyte (Y) and of the polar body (Z).

52 **Answer (B)**

Pregnancy lasts about 266 days from fertilization, so birth is around 24 November.

53 **Answer (C)**

Oxytocin makes birth easier.

54 **Answer (D)**

Fertility drugs stimulate the growth of several Graafian follicles, so more than one egg is released.

55 **Answer (B)**

The identical twins (2) and (3) come from the same zygote and may be conjoined.

56 **Answer (D)**

The two zygotes (two eggs) give two placentas and two amniotic sacs.

57 **Answer (B)**

Identical twins come from one zygote, so they always have the same sex.

58 **Answer (D)**

Identical twins are not always conjoined.

59 **Answer (C)**

The percentage of normal fetuses decreases as the mother gets older, so the quality of the eggs decreases.

60 **Answer (D)**

More than one sperm gives an extra number of chromosomes, so the fertilized egg dies.

61 **Answer (D)**

Tying the two vasa deferentia prevents sperms from passing out, and does not affect the hormones or sperm production.

62 **Answer (C)**

63 **Answer (D)**

Surgical sterilization prevents pregnancy permanently.

64 **Answer (C)**

In test-tube babies, fertilization takes place outside the body, then the fetus grows inside the uterus, and the egg stores little food.

65 **Answer (A)**

With age, the efficiency of the uterine lining in receiving the embryo decreases.

66 **Answer (B)**

The IUD does not prevent the renewal of the lining, so it gets thicker with time.

67 **Answer (C)**

68 **Answer (C)**

The blastocyst is implanted at about day 20, when the uterine lining is thickest.

69 **Answer (D)**

The pills inhibit the secretion of FSH and LH, so ovulation does not occur.

70 **Answer (D)**

Pills: no ovulation and no fertilization; IUD: ovulation and fertilization occur; male condom: ovulation without fertilization.

71 **Answer (A)**

The pills prevent ovulation, while surgical sterilization only prevents the passage of gametes.

72 **Answer (C)**

The Graafian follicle (A) secretes estrogen and the corpus luteum secretes progesterone to build up the inner layer of (C).

73 **Answer (A)**

The pills disrupt the pituitary gland, so the secretion of FSH and LH decreases.

74 **Answer (A)**

(A) is the vas deferens, and tying it prevents gametes from being transferred to the urethra (B).

75 **Answer (A)**

The safe period is the least effective method, so it is the highest bar in the number of pregnancies (1).

76 **Answer (D)**

The safe period is after ovulation and the chance of pregnancy, so it is from day 18 to 25.

77 **Answer (D)**

Tying the two Fallopian tubes only prevents the egg from passing, so it does not stop the activity of the two ovaries.

78 **Answer (B)**

The IUD does not prevent ovulation, fertilization or menstruation.

79 **Answer (A)**

Cutting the two Fallopian tubes permanently prevents natural pregnancy while the cycle continues.

80 **Answer (B)**

(1) and (4) can have children because at least one of the two tubes is intact.

81 **Answer (C)**

A blockage of the two vasa deferentia prevents the gametes from passing, so they are drawn from the epididymis.

82 **Answer (B)**

MUC1 prevents the blastocyst from sticking to the uterine lining, which is what the IUD does.

83 **Answer (A)**

The IUD does not affect the hormones, so the FSH and LH pattern stays normal.

84 **Answer (C)**

Ovulation is linked to the first meiotic division, while the second takes place at fertilization.

85 **Answer (A)**

The nucleus comes from mouse (A), so the embryo belongs genetically to it only.

86 **Answer (C)**

Keeping gametes in banks ensures the survival of the species.

87 **Answer (B)**

The mouse's characteristics come from the nucleus of female (1) and the nucleus of the sperm that fertilized it from the male.

88 **Answer (C)**

Producing individuals by nucleus transplantation (cloning) is asexual reproduction preceded by sexual reproduction to form the embryo.

89 **Answer (A)**

The cells of the same embryo have 100% identical genetic material.

90 **Answer (C)**

The mitochondria are in the egg's cytoplasm, which is from female number (2).

91 **Answer (A)**

Sperms (Y) give males, which have more meat.

92 **Answer (D)**

The more advanced the donor embryo's development (4), the less able its nucleus is to form a new individual.

93 **Answer (B)**

Cloning gives males or females according to the donor, while parthenogenesis gives females only.

Essay questions

1 **Model answer**

(1) (1) Ovulation, (2) Fertilization.

(2) The sperms will not reach the secondary oocyte released from the ovary, so fertilization does not occur and pregnancy does not happen naturally.

The technique: test-tube babies.

2 **Model answer**

The thickness of the uterine lining will not increase to the level needed for the implantation of the blastocyst (if pregnancy occurs), which makes the uterine lining unprepared to receive the embryo.

3 **Model answer**

(1) A miscarriage in the first stage of pregnancy, because the level of progesterone fell in the eleventh week (before the fourth month), that is, before the placenta was fully grown.

(2) The nervous system and the heart start to form, and the eyes and hands become distinct.

4 **Model answer**

Fraternal (non-identical) twins / because the two twin children differ in sex, as a result of two eggs being released (from one ovary or from both) and each being fertilized separately by a sperm with a different sex chromosome.

5 **Model answer**

Two eggs / one egg was fertilized by a sperm carrying the sex chromosome (X) and the other egg by a sperm carrying the sex chromosome (Y), then each zygote divided during cleavage into two parts forming two embryos, that is, each egg gave identical twins, so the number of fetuses is 4 (2 females, 2 males).

6 **Model answer**

(1) The fifth month.

(2) In the second and third months: using a method that prevents ovulation (contraceptive pills).
In the sixth month (the second month of pregnancy): the secretion of progesterone and estrogen increases, which prevents the secretion of FSH throughout pregnancy, so ovulation is prevented and neither the first nor the second meiotic division occurs.

7 **Model answer**

Ordinary body cells from the mother's udder / they were kept in liquid nitrogen.

Past exam questions

1 B	2 A	3 C	4 D	5 A	6 A	7 D	8 B	9 B	10 A
11 C	12 A	13 B	14 B	15 A	16 A	17 B	18 A	19 A	20 D
21 A	22 D	23 A	24 C	25 D	26 B	27 C	28 A	29 B	30 D
31 B	32 D	33 C	34 D	35 A	36 B	37 D	38 A	39 D	40 D
41 C	42 A	43 C	44 D	45 D	46 C	47 D	48 A	49 A	50 —
51 —									

1 **Answer (B)**

As the number of sperms increases, the amount of the enzyme hyaluronidase increases, which dissolves the coat around the egg, so the probability of fertilization increases.

2 **Answer (A)**

The sperm's head enters, so fertilization occurs, but the centriole in the middle piece is needed for the zygote to divide.

3 **Answer (C)**

Process (2) is cleavage: 2 cells, then 4, then 8 cells, that is, 3 mitotic divisions up to the morula.

4 **Answer (D)**

In the Fallopian tube the embryo passes through the two-cell, 4-cell and morula stages, and the blastocyst forms in the uterus.

5 **Answer (A)**

The figure shows a fetus in the last stage of pregnancy, when the growth of the fetus slows down.

6 **Answer (A)**

The morula forms before the end of the first week, and it is at the end of the Fallopian tube.

7 **Answer (D)**

The fibrous joints of the fetus's skull start to form in the fifth month.

8 **Answer (B)**

The cilia of the Fallopian tube move toward the uterus, and the sperms move against them toward the ovary.

9 **Answer (B)**

The ovary (B) contains the corpus luteum, which secretes progesterone, and the embryo implants in the uterine lining (D).

10 **Answer (A)**

The uterine muscles of a pregnant woman contract only at birth, so they contract the least during a year.

11 **Answer (C)**

The muscles start to develop and the sense organs become complete at the end of the second stage of pregnancy.

12 **Answer (A)**

After day 28, progesterone and estrogen stay high, so there is a pregnancy and an embryo inside the uterus (A).

13 **Answer (B)**

The placenta is made of the fetus's finger-like villi (6) and the blood vessels of the uterine lining (7).

14 **Answer (B)**

The reproductive system forms early in the fetus and is not used until after puberty.

15 **Answer (A)**

The digestive and respiratory systems work only after birth, because the fetus gets its food and oxygen from the placenta.

16 **Answer (A)**

Each of the twins in the figure has a placenta, so they are non-identical twins that may have the same sex or different sexes.

17 **Answer (B)**

If the two fetuses differ in sex, they are non-identical twins, so the sex of the fetus determines the type of twins.

18 **Answer (A)**

Male twins in one amniotic sac result from the division of one egg fertilized by one sperm (identical twins).

19 **Answer (A)**

Identical twins come from one egg, so there is one corpus luteum in one of the two ovaries.

20 **Answer (D)**

Progesterone secretion decreases near the end of pregnancy in preparation for birth (D).

21 **Answer (A)**

Non-identical twins come from two eggs, so there are two corpora lutea (A).

22 **Answer (D)**

(X) is a blastocyst with two cell masses, so it gives identical twins that share one placenta.

23 **Answer (A)**

(X) is the placenta, and it separates from the uterine wall in the third stage of birth.

24 **Answer (C)**

The figure shows two fetuses, each with a placenta, so they are non-identical twins from two eggs and two sperms.

25 **Answer (D)**

Cutting the two Fallopian tubes prevents natural pregnancy, so childbearing is only possible by the test-tube baby technique.

26 **Answer (B)**

Surgical sterilization does not affect ovulation or the hormones, so the changes of the uterine lining continue as usual.

27 **Answer (C)**

Contraceptive pills prevent ovulation, so the corpus luteum does not form.

28 **Answer (A)**

After removing the two ovaries, estrogen and progesterone are not secreted, so the uterine lining stays thin however high FSH rises.

29 **Answer (B)**

The second meiotic division is completed at fertilization, which takes place in tube (2).

30 **Answer (D)**

Surgical sterilization is a permanent method, so it does not suit preventing pregnancy for a limited time.

31 **Answer (B)**

Progesterone rises from the fifth day, which happens when contraceptive pills are taken.

32 **Answer (D)**

When the Fallopian tube is tied at its middle, the tube catches the egg, but the sperms do not reach it.

33 **Answer (C)**

The IUD prevents the implantation of the fertilized egg, so it does not prevent fertilization or the second meiotic division.

34 **Answer (D)**

Part (X) is past the tie, on the ovary's side, so the sperms do not reach it and the secondary oocyte reaches it.

35 **Answer (A)**

When the cilia are absent, the egg is not moved, so fertilization is done outside the body and then the embryo is implanted in the uterus.

36 **Answer (B)**

Contraceptive pills start on the fifth day, after menstruation ends.

37 **Answer (D)**

Tying one of the two tubes does not affect ovulation or menstruation, so they occur every 28 days.

38 **Answer (A)**

(X) is the corpus luteum, which secretes progesterone and estrogen, and the placenta also secretes them during pregnancy, so they are not only from the ovary.

39 **Answer (D)**

In test-tube babies, fertilization and the first cleavage take place in a test tube containing a nutrient medium.

40 **Answer (D)**

The nuclei of embryonic cells such as morula cells can be used, because they are diploid.

41 **Answer (C)**

Cloning and tissue culture depend on the fact that the nucleus of a body cell contains all the genetic information.

42 **Answer (A)**

Frog embryos form outside the mother's body, so there is no need to fix the embryos in the uterus.

43 **Answer (C)**

(X) comes from fertilizing an egg with a sperm, so it may be male or female.

(Y) is a clone of a body cell of the mother, so it is female.

44 **Answer (D)**

Parthenogenesis uses the egg's own nucleus, while cloning uses the nucleus of a body cell.

45 **Answer (D)**

Cloning is replacing the nucleus of an egg (N) with the nucleus of a body cell (2N).

46 **Answer (C)**

Removing the nuclei alone does not produce a new individual.

47 **Answer (D)**

The female gamete cell is haploid, so its nucleus is not used in cloning.

48 **Answer (A)**

Cloning is an asexual method that produced complete mammals such as Dolly the sheep.

49 **Answer (A)**

Sperms carrying chromosome (Y) are less dense, so they are in the upper layer (X).

50 **Model answer**

(A) Mitotic division / cleavage takes place to form the embryo.

(B) Second meiotic division / forms the egg containing 23 DNA molecules.

51 **Model answer**

7 times: the second meiotic division occurs only at fertilization, and fertilization occurred 3 times (births) + 4 times (miscarriages) = 7