

Control and co-ordination in mammals

Mark Scheme 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Control and co-ordination
Sub Topic	Control and co-ordination in mammals
Booklet	Theory
Paper Type	Mark Scheme 2

Time Allowed : 58 minutes

Score : / 48

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 (a) anterior pituitary ;

[1]

(b) (i) early follicle development not dependent on FSH ;

with no FSH/no FSH receptors, follicle development stops ; **ora**

with no FSH/no FSH receptors, Graafian / ovarian, follicle does not develop ; **ora**

with no FSH/no FSH receptors, there is no ovulation ;

no corpora lutea because these form, from Graafian follicle/after ovulation ; [max 4]

(ii) sperm development better when FSH present ;

with FSH receptors
more sperm produced ; **ora**

sperm more active ; **ora**

males have increased fertility ; **ora**

without FSH receptors
some sperm produced ;

[max 3]

[Total:8]

CHEMISTRY ONLINE
— TUITION —

2 (a) (indicates that they) have undergone meiosis I;

so are, haploid/n ;
A 23 chromosomes

[2]

(b) (i) water moved out of cells;

down water potential gradient/into a more concentrated solution/into a lower water potential;

(by) osmosis;

[max 2]

(ii) (**B**) has, higher survival of oocytes after thawing/more successful fertilisations;

supporting figures;

*these should compare columns 1 or 2 with column 3 or 5 for both **A and B**
raw or manipulated data can be given*

[2]

(iii) idea of deferring, fertilisation/implantation;

idea of preserving oocytes from a woman who may lose her fertility due to medical treatment;

idea of fewer rounds of, hormone treatment/oocyte retrieval;

[max 1]

[Total: 7]

CHEMISTRY ONLINE
— TUITION —

- 3 (a) correct ref. to woman being given hormones;
ref. to one suitable hormone, e.g. FSH / gonadotrophin / LH / GnRH agonist; [2]
- (b) 1. capacitation;
2. able to undergo acrosome reaction;
3. able to swim (more vigorously); [max 2]
- (c) 1. fewer IVF cycles needed;
2. no need to transfer more than one embryo to the uterus;
3. so less chance of problems from multiple embryos;
4. less chance of miscarriage; [max 2]
- (ii) 1. need to wait (at least 7.8 hours) before transferring embryo to uterus;
2. may be difficult to keep embryos in ideal conditions during this time period;
3. embryos destroyed; [2 max]

[Total: 8]

CHEMISTRY ONLINE
— TUITION —

- 4 (a) 1. (mostly) secreted, during the second half of the cycle / from day 14 onwards ;
2. maintains, lining of the uterus / endometrium ;
3. in preparation for implantation ;
4. inhibits, GnRH / development of new follicle ; **A** FSH / LH [3 max]
- (b) (i) 32.6 - 32.8 days ; [1]
- (ii) 1. high fat diet causes decrease in age of puberty ;
2. change in either mother or her offspring has an effect ;
3. (from 40% +) greater effect by changing mother's diet;
4. use of comparative figures ;
5. cannot assume that effect on humans would be the same as on rats ;
6. no data provided on change in diet in European girls ;
7. does not take into account other possible changes ;
8. AV ; e.g. for mp 7 [4 max]

[Total: 8]

CHEMISTRY ONLINE
— TUITION —

- 5 (a) contains oestrogen and progesterone ; **A** progesterone only
prevents, fertilisation / ovulation / implantation ;
negative feedback on / inhibition of, FSH / LH ;
AVP ; e.g. change in cervical mucus / thinning of uterine lining

[2 max]

- (b) (i) 24 813 ;;

allow one mark for working

e.g. $27\,000 \times (8.1 \div 100) = 2187$ so,

or

$27\,000 \times 91.9 \%$

[2]

- (ii) ARVs have no effect on, number of pregnancies / whether or not a woman gets pregnant ;
ARVs do not get rid of HIV (so cannot reduce number of pregnancies in HIV-infected women) ;

contraception reduces the number of pregnancies (in HIV infected women) ; [2 max]

- (iii) 1. contraception reduces the number of (HIV-infected) pregnancies (but ARVs do not) ;
2. reference to advantage of this ; e.g. *fewer drugs needed if fewer HIV-infected pregnancies*
3. effect of (current and predicted use of) contraception greater than ARVs on births of HIV-infected children ;
4. comparative use of figures ;
ARV versus contraception for either pregnancies or births
5. ref. low cost of contraception compared with cost of ARVs ; **ora**

[3 max]

[Total: 9]

- 6 (a) 1. ref. hormone treatment ;
2. results in, superovulation / many oocytes / many follicles, maturing at same time ;
3. oocytes harvested ;
4. detail of harvesting ;
5. mixed with sample of sperm ;
6. in special medium ;
7. idea of, waiting for three days / wait until 6–8 cell stage ;
8. embryos placed in uterus ;
9. ref. maintenance of endometrium ;
10. sperm / sperm nucleus / sperm DNA, may be injected into oocyte ; [4 max]

- (b) one mark for a ✓ in the correct box
more than one ✓ in a row = no mark
ignore crosses

DNA – colourless ;
acrosome – colourless ;
mitochondria – green ;

[3]

- (c) 1. (hydrolytic) enzymes may damage oocyte ;
2. (acrosome contents) affect development of fertilised oocyte ;

[1 max]

[Total: 8]

CHEMISTRY ONLINE
— TUITION —