**《发育生物学》**

**“生殖细胞发生”课后习题**

**姓名： 学号： 班级：**

**选择题**

1. Which feature of meiosis, as compared with mitosis, is most imporant for the production of gametes?--------b

a) Homologous chromosomes separate in meiosis I, whereas sister chromatids separate in mitosis.

b) Meiosis leads to the production of haploid products, whereas mitosis leads to diploid daughter cells.

c) Meiosis provides an opportunity for recombination, whereas mitosis does not.

d) Typically. three of the four products do not become oocytes during meiosis in female organisms, whereas mitosis will produce four functional products after two rounds of cell division.

2. In what stage of which type of cell division, is the mammalian oocyte at the birth of the animal?--------c

a) The oocyte is in G1 of the mitotic cell cycle.

b) The oocyte is in metaphase of meiosis II.

c) The oocyte is in prophase of meiosis I.

d) The oocyte is in prophase of mitosis.

3. What is the zona pellucida of the mammalian egg?-------c

a) a hardened membrane that forms a physical block to polyspermy, formed from the vitelline membrane and the contents of the cortical granules

b) a layer of follicle-derived cells called cumulus cells

c) an extracellular layer of glycoproteins

d) the plasma membrane of the egg

**简答题**

1. **精子发生与卵子发生主要包括哪些阶段及其主要事件？**

答：

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 增殖期 | 生长期 | 成熟期 | 变态期 |
| 精子发生 | 精原细胞有丝分裂增加细胞数量 | 精母细胞进行成熟分裂前的物质准备 | 通过减数分裂形成精子细胞 | 精子细胞变态形成精子 |
| 卵子发生 | 卵原细胞有丝分裂增加细胞数量 | 卵母细胞合成和积累大量早期胚胎发育所需要的营养物质和形态发生因子等细胞质成分。 | 初级卵母细胞完成生长以后，停滞在第一次减数分裂前期的双线期。在一些外部刺激因子如孕酮的作用下，解除这种抑制，恢复减数分裂，排出第一极体，形成次级卵母细胞。之后停滞在第二次减数分裂的中期，在受精等作用下解除这种抑制，排出第二极体，形成卵细胞。 | —— |

**2.以哺乳动物为例，精子发生与卵子发生有哪些异同点？**

答：

|  |  |  |  |
| --- | --- | --- | --- |
| 项目 | | 精子的发生 | 卵子的发生 |
| 区别 | 场所 | 睾丸曲细精管(场所唯一） | 卵巢(MI)、输卵管(MII) (场所不唯一 ) |
| 时间 | 初情期后 | 性别分化后开始，卵泡(含次级卵母细胞和第一极体)的形成和在卵巢内的储备，是在出生前(胎儿时期)完成的，减数第二次分裂是在精子和卵子的结合过程中(即受精过程中)完成的 |
| 过程  特点 | MI和MII是连续的；需要变形；  细胞质均等分配；细胞质桥保证了精子发生的同步性 | MI 和MII是不连续的；不需要变形；细胞质不均等分配；  卵子发生的同步仅限于卵原细胞阶段 |
| 结果 | 形成4个精子 | 形成1个卵细胞和3个极体 |
| 相同点 | | 性原细胞的增殖为有丝分裂:生殖细胞的成熟为减数分裂;成熟过程均经过一次复制和两次分裂，子细胞中染色体数目减半。 | |