

Otázka: Fertilisation in mammals vs angiosperms

Jazyk: Angličtina - Comparative essay

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Compare and contrast the processes of gametogenesis and fertilisation in mammals and flowering plants

In order for species to survive they need to reproduce. Although angiosperms and mammals are from biological point of view totally unique and different organisms, both reproduce sexually. What are then the most important similarities and differences in their gametogenesis and fertilisation strategies?

Gametogenesis is the production of haploid sex cells. In mammals the process of development of female gamete (egg) is called oogenesis and development of male gamete (sperm) is called spermatogenesis. However, in angiosperms in order to produce sperm, a diploid mother cell has to undergo microsporogenesis and microgametogenesis, and to produce egg a diploid mother cell has to undergo megasporogenesis and megagametogenesis. In angiosperms and in mammals these cells play an extremely important role: the transfer of the genetic information from one generation to the next. Mammalian mother cell firstly divides by mitosis (forming identical diploid cells) after that meiosis takes place. Whereas, angiosperm's mother cell starts with meiosis first, forming haploid cells that undergo mitosis. In both angiosperms and in mammals there are processes called meiosis and mitosis although they happen in different order the result is same - forming one egg cell and countless sperms.

In mammals fertilization is the process of fusion of haploid male and female gametes to form a diploid zygote, likewise in angiosperms. Mammalian fertilisation takes place in the oviduct enclosed in ovary, giving the rise to embryo, in comparison with angiosperms where the fertilization takes place in the ovule enclosed within the ovary of the flower, giving rise to seed and fruit. Just as in mammals also in angiosperms there is unequal quantity of female and male gametes. In both cases the number of sperms is many times higher as they are produced every

day in big amount in contrast with an egg which is produced once a month.

Something that only occurs during fertilisation in angiosperms is double fertilisation. The double here means that two male gametes are involved. Function of the first one is the same as in mammals (to fertilise an egg cell). The other sperm fuses with the two polar nuclei that develop into a triploid endosperm which plays a pivotal role in nutrient provision as it is rich in starch, oils and proteins.

Contrasting angiosperms, where pollinators such as insects and birds or wind and water are responsible for transport of pollen grains (male gametes) from the stamen of one plant to carpel of another, in the case of mammals, males and females are individuals who interact physically with each other during sexual intercourse. The similarity here is between pollinators and mammals, because both are attracted on the basis of smell or appearance. When successful pollination (in case of angiosperm) or sexual intercourse (in case of mammals) happens, the male gametes are differently transported toward the egg cell. Angiosperms form a pollen tube (formed from generative cell of pollen grain), which is the pathway for sperm to reach the egg, on the other hand, in mammals sperm cell travels through fallopian tube.

In conclusion, we found out, that even though at the first sight these biological groups seemed to have nothing in common, there are obvious similarities. Both fertilisation processes result

in the development of an embryo but the method is different.