

BIOLOGY ASSIGNMENT

CRITICAL THINKING

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Q1. Do you think cloning should be legalized?

Justify your statement.

Ans. I do not agree with the statement. The following are certain factors in the regarding:

- Interference with nature: The process of cloning or animals may lead to a domino effect. It is meant that genes can be modified such that they would create a smarter and brighter being. This in return would alter the identity of the naturally grown person and may interfere with the whole system of nature.
- Fast Ageing: The cloning process uses older cells to generate DNA structure that further helps develop a clone. This process often leads to some premature ageing. As cloning is a replacement process, some new cells copy the same ageing characteristics and print to the newly cloned one that could lead to fast ageing.
- Higher Rate of Failure: At the moment, the process of human and animal cloning has a 89% chance of failure. This means that the whole process is risking the DNA that is being exposed. The implication of what will happen when the process goes wrong is unknown leading to a problem modern science is yet to figure out.
- Division of People: When clones start getting mass-produced, all beings might not get equal treatment as that of natural humans and will create a gap between the two groups. This, as a result, will lead to division and social unrest. The division of gap from social status, race, age, and color will hamper people's natural balance in the environment and lives.
- Sense of Individuality: The clone would result in the same physical appearance as the individual. The clone will have a limited set of thinking ability and it will not allow them to mingle or interact with normal people. This will create a gap and lead to isolation of the clone. The individual who got cloned will lose his identity as he may have two or more clones. The sense of individuality is endangered and will promote creating of more problems for people around them.

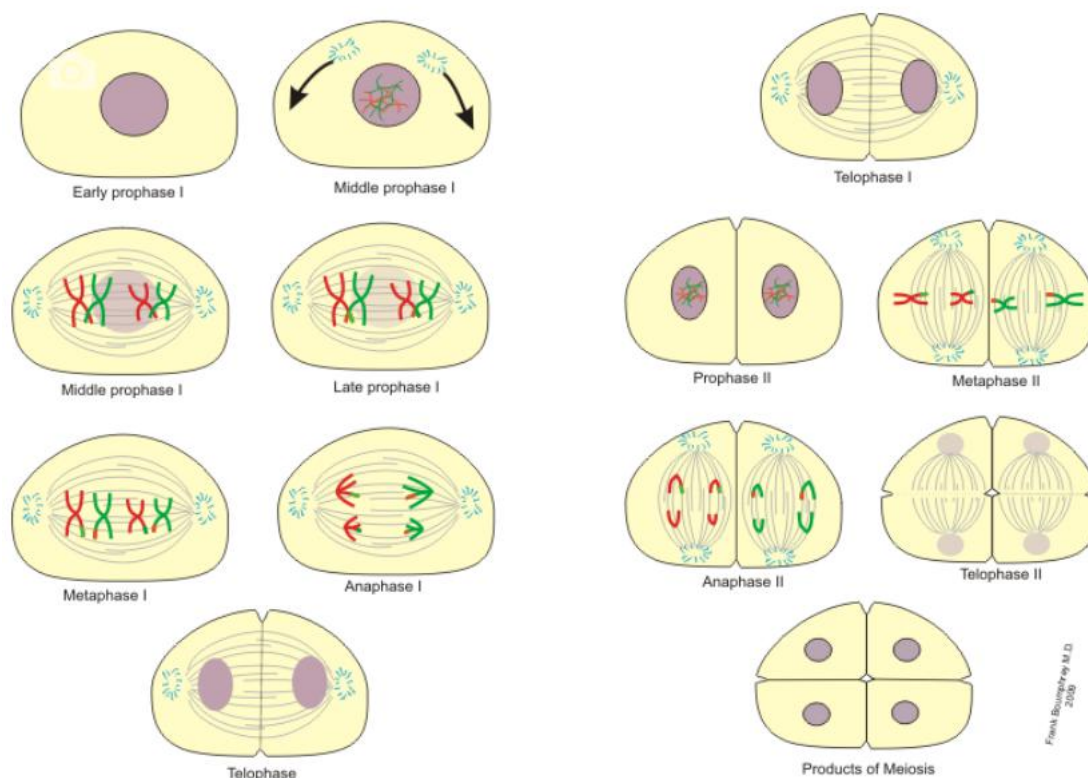
Q2. How can meiosis be responsible for introducing variation in nature?

Ans: During fertilization, 1 gamete from each parent combines to form a zygote. Because of recombination and independent assortment in meiosis, each gamete contains a different set of DNA. This produces a unique combination of genes in the resulting zygote.

Recombination or crossing over occurs during prophase-I. Homologous chromosomes-1 inherited from each parent-pair along their lengths, gene by gene. Breaks occur along the chromosomes, and they rejoin, trading some of their genes. The chromosomes now have genes in a unique combination.

Independent assortment is the process where the chromosomes move randomly to separate poles during meiosis. A gamete will end up with 23 chromosomes after meiosis, but the independent assortment means that each gamete will have 1 of many combinations of chromosomes.

This reshuffling of genes into unique combinations increases the genetic variation in a population.



Q3. What is the importance of stem cells in our body?

Ans: Stem cells have remarkable potential to renew themselves, they can turn into any specific cells as the body needs them. They are present inside different types of tissue's including: the brain, bone marrow, blood and blood vessels, skeletal muscles and skin.

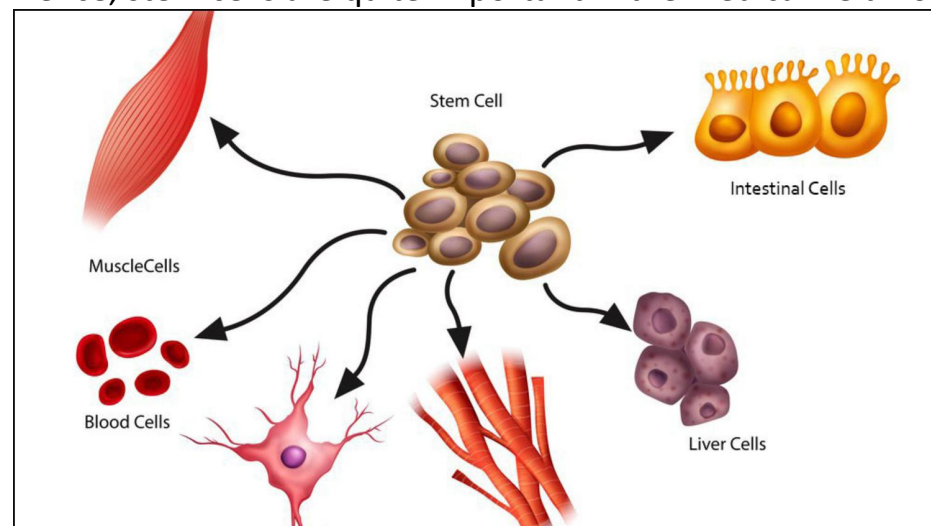
There are 2 main categories of stem cells:

- Adult Stem Cells: Found in a tissue, or a organ(eg. Liver) and can differentiate to yield the specialized cell of types of that tissue or organ. They are found in skin, liver, bone marrow.
- Embryonic stem cells: Obtained from the undifferentiated inner mass cells(or from early-stage embryos) of a human embryo.

Some great uses of stem cells are:

- In tissue and organs, regeneration of damaged parts and stem cell therapies.
- Brain disease treatment. Eg- Parkinson's disease
- Cardiovascular treatment
- Cell-deficiency therapy. Eg- Heart ailments
- Cure of blood disorders like leukemia, anemia, etc
- In researches on how diseases occur or why certain cells develop into cancer cells.
- Testing of new drugs for safety and effectiveness
- Stem cells also show promise for treating some diseases that currently have no cure.

Hence, stem cells are quite important in the medical field nowadays.



Q4. Why is homeostasis important for living organisms?

Ans: Homeostasis refers to the balance within a system that keeps it operating within a range of conditions. Homeostasis helps animals maintain stable internal and external environments with the best conditions for it to operate. It is a dynamic process that requires constant monitoring of all systems in the body to detect changes, and mechanisms that create those changes and restore stability.

The following are some of the functions done by homeostasis:

1. Maintenance of body temperature
2. Maintenance of glucose level
3. Protection from infection
4. Maintenance of blood pressure
5. Maintenance of fluid volume
6. Maintenance of Breathing patterns
7. Removal of wastes/toxins
8. Regulation of light entry in eyes
9. Stable population in an ecosystem

Based on the above examples, it is quite evident that living organisms need to maintain homeostasis constantly in order to properly grow, work and survive. In general, homeostasis is essential for normal cell function, and overall balance.

Importance of Homeostasis:

- In the human body, chemicals like oxygen, carbon dioxide and digested food enter and exit the cells using the concept called diffusion and osmosis. For this process to function properly, homeostasis helps our body to keep both water and salt balance level.
- Enzymes in the cell help in the speedy chemical reactions in order to keep the cells alive but these enzymes need to be in optimal temperature to function properly. Again, homeostasis plays a crucial role in maintaining a constant body temperature for enzymes to do their jobs.
- Mechanisms to attain homeostasis are stable as they need to resist any change that happens within and outside the organism's environment. These mechanisms vary depending on the individual and may either be positive or negative feedback.