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Phenomenon of Cloning and specificity of its usage

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Abstract

Cloning is studied by different branches of science. Medicine is interested in cloning because of its ability to transplant special tissues and organs, genetics – with the purpose of studying heredity and succession, sociology deals with moral and ethic aspects of the phenomenon. The paper is devoted to the study of cloning, its special features and usage in different spheres of social life. The article represents main types of cloning, specificity of vegetative and animal cloning and problems of its expansion. The paper also demonstrates the actual topic of nowadays studies connected with human cloning and its aftereffects for science and society. The article may be useful for a wide audience and for people, who are interested in studies of cloning and problems of its realization.

Keywords: Cloning, clone, cloning of plants, cloning of animals, human cloning, Dolly the sheep.

1. Introduction

The term of *cloning* is popular nowadays among scientific and media societies. Cloning is an exact produce of some living object in some quantity of copies [3]. Obviously, that such a copy should have an identical hereditary information, i.e. to bear an identical gene pattern. Genetics get clones from the objects, which reproduce by parthenogenesis – an asexual way of reproduction, without previous fecundation. Then descendants of original germ cell are the same in genetic sense and form a *clone* [3].

Human cloning needs some stages: any donor cell is taken for the beginning; then the cell is implanted into the egg cell of another donor (with deleted genes) and this cell starts to develop in the embryo under laboratorial conditions; then the cell is implanted in the uterus of a surrogate mother [6].

Cloning started its development in the 20th century when scientists tried to find different methods of plant and animal's asexual reproduction. The most known experiment of animal cloning – is the cloning of the Dolly sheep by British embryologist I. Wilmut in 1996. During the experiment, one of somatic cells of dead sheep was implanted into the sex cell (oocyte) of another sheep. Cell's own genetic material was removed and the formed egg cell was carried by sheep-surrogate mother. The result of the experiment was a lamb, known as Dolly [7].

Later scientists did different experiments in animal cloning – on horses, bulls, cats, dogs, etc. It was supposed that such experiments could be useful for scientists to save endangered species of plants and animals and to create new artificial sorts.

2. Types of cloning and its abilities

Cloning may be used for different needs of science and society because its abilities are multifaceted. Thus, cloning can be used *in medicine* to transplant main tissues and organs, in *genetics* to indicate hereditary diseases and their removal, in *agriculture* to regulate the animal gender.

Cloning may change, depending on the spheres of its usage – genetic, therapeutic or reproduction.

Genetic cloning is the most extended type of cloning, which deals with genetic copies: the gene of one-organism implants into the genetic material of donor. (For example, viruses and bacterium) [4].

Therapeutic cloning is used for producing cloned embryos with the purpose of the embryonic stem cells' creation with the same DNA as donors have. Such stem cells may be used in studies of diseases and for development of new methods of treatment [5].

Reproductive cloning produces copies of animals and allows us to create a human, who is genetically identical to another person from the Past or Present.

Such experiments contradict religious and social values, connected with human dignity. Many people suppose that cloning breaks principles of personal freedom and individuality. However, scientists are sure, that cloning may be used for good – for example, for pairs who cannot be parents because of infertility.

3. Problems of cloning

In spite of its actuality, cloning has faced to some problems and its results cannot be realized in science. Such problems may be scientific, ethical and lawful [5].

Scientific problems of cloning. Nowadays it is necessary to increase an output of viable reconstructed embryos and adult cloned animals and to clear the influence of methods on their lifetime, functional characteristics and fertility. It is also very important to decrease the risk of the egg cell's defective development and to solve the problem of the foreign cells' rejection, because such incidents may not only help to tissues of organism, but degenerate into some tumor [4].

Ethical and lawful problems of cloning. Such problems are reduced to the fear about the possible influence of human cloning on social, moral and personal values. That is why these problems disturb not only science, but church too, which supposes that tries of human cloning are immoral and unacceptable.

Such fears are based on the fact, that human cloning may disturb moral and lawful aspects and, for instance, create the “highest” classes of people or commercialize DNA. It is also noted that human dignity, uniqueness and personal inviolability may be endangered. Besides, the biological level of human reproduction (with collaboration of females and males) may be substituted by cloning and such social concepts as *marriage, blood relations, parenthood, and family* can lose their actuality [2].

Human becoming as a person based not only on the biological heredity, but also on the family, social and cultural aspects. With human cloning it is impossible to allow all necessary conditions of upbringing and education, formed by the original person (prototype). Furthermore, during asexual reproducing, the rigid programming of genome predetermines the smaller variety of organism's interaction with surrounding conditions. Lawful aspects of research also raise some important questions: [2]

- Will the cloned individual have citizen's rights and responsibilities?
- What kinds of rights and responsibilities will there be?

- What lawful categories will the clone's status determine?

All of these questions allow us to speak about cloning only theoretically, because the discussion speaks not about cloning itself, but about getting a copy of the *existent* person.

Conclusion

In spite of its usefulness for science and society for supposed positive results in medicine (treatment of genetic diseases, elimination of infertility, animal gender's regulation, etc.), the problem of cloning has faced to many problems – scientific, ethical and lawful.

Problems attest that humanity is still not ready for such studies and the negative consequences of this event considerably exceed its benefits, so in conditions of the Present, human cloning is inappropriate.

Otherwise, there is hope that during the time all of these problems will be resolved and the answers will be found. Such results may be reached by the education of highly-skilled specialists in genetics, by the social genetic literacy's increase and by the expert juridical rules and standards' development.

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