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The necessity to reexamine the definition of the human embryo adopted by the CJEU

Letters to the Editor

Abstract

In 2022, several publications have appeared which require legal and ethical reflection. These are the works of Sheng Ding, Magdalena Żernicka Goetz, Jacob Hann, and Vincent Pasque. They concern two methods of obtaining mammalian embryos without the use of an ovum. One is reprogramming, „going back" to the state of totipotency (zygote). The second one is self-organization into the organism of cells from which it seemed, until 2022, that any cells of the organism could arise, but not the organism or the teratoma. In the second case, the embryos have reached the stage that previously required implantation into the uterus. We propose to reconsider the CJEU embryo definition in an attempt to avoid the instrumental use of human embryos because the current definition is likely to be used for that purpose , especially by means of the article presented by the Sheng Ding team.

The authors of this letter (biotechnologist and bioethicist) have doubts concerning the legal status of human embryos, which can probably be obtained after using the data from these publications (1–4). These doubts result from the fact that the reports that are currently reaching the world of science in connection with the above-mentioned research, demonstrate that it is theoretically possible to create human embryos that will not be properly protected by law. The most controversial studies have been conducted on animals. Nonetheless, the project to commence the production of human embryos, for the purpose of using them as 3D-printing organs (albo 3D-printed organs) has already been

established (5). The CJEU in the Oliver Brüstle v. Greenpeace eV. case defined the human embryo as follows: "A human embryo is any egg cell, from its fertilization stage onwards, any unfertilized egg cell into which a nucleus derived from a mature human cell has been implanted, and any unfertilized human egg cell that has been stimulated to divide and further develop through parthenogenesis" (6).

Ding's work, more than Żernicka's Goetz work or Hanna's work, facilitates the genetic modification of these organisms. The process of turning mature cells into zygotes / embryos can be gradual and requires the cells to multiply over many months. An intermediate stage in this approach will consist in obtaining induced pluripotent cells (iPSc) as a result of reprogramming. Mature cells, multipotent and pluripotent stem cells can be genetically modified (e.g., by CRSIPS method) and treated as GMM (genetically modified microorganism). However, after receiving human embryos from these GMMs, someone can try to circumvent the ban on obtaining human GMOs (genetically modified organism) because, according to the definition of the CJEU, these will not be human embryos. In these circumstances, a certain paradox may arise. The CJEU definition, that was supposed to protect a certain human value of the human embryo, can theoretically be used to deprive it of this protection.

In the case of Żernicka-Goetz work, the authors themselves call an embryo synthetic, which may be-regarded as an opening of a certain gateway to the usage of the CJEU definition as a point to which researchers will refer negatively: i.e. they will create organisms in such a way that, while not meeting the definition of the Tribunal, they will constitute valuable material for further work. The emergence of similar discoveries points to yet another dangerous element. In bioethical-biotechnological discussions, there was consensus on the protection of the dignity of the embryo, no matter how it arose. The embryos have never been differentiated as to their different quality or dignity. The emergence of the concept of a „synthetic embryo" may be perceived by someone as a green light for a priori recognition of the inferior quality of certain human organisms, which may potentially open the way to unethical activities on them, and in the future may constitute a justification for classifying people in terms of their dignity, which can be differentiated as a result of similar actions. From the other side, Zernicka -Goetz' term can be recognized as admitting that this is a human embryo regardless of the CJEU definition. Genetic modification of cells from which totipotent cells will be created does not have to rely on the intended improvement. It may consist in the deliberate introduction of genetic defects in cells that will produce cellular elements of synthetic embryo. The same may be

true for introducing defects at the stage of embryo self-organization. It is also possible to reach an advanced stage of development, after which the transfer of a human fetus/embryos to the woman's uterus is no longer possible, because the moment in its development at which implantation occurs has been irreversibly exceeded. In other words, the ability to implant is lost. This situation would therefore resemble an ectopic (extrauterine) pregnancy. Thus the so far method developed by Hanna et al does not allow for further stages of development, and the pregnancy/organism transferred to the uterus would not survive in it, because it would not implant there. A typical ectopic pregnancy is, of course, unplanned. In the case of Hanna bioreactor, something resembling an ectopic one would be created in a planned manner (5).

Another question can be proposed then. If at the stage of the iPSc or even at the stage of an earlier mature cell, some mutation is made, causing the reprogramed to pseudo-totipotent cell unable to develop an important part of the nervous system but to develop the heart, is it acceptable? In turn, may such a creature be considered a more legitimate source of cells or even organs for transplantation? We became unsure of not only what is a human embryo but also what is an organism. Due to the fact that these organisms develop without the necessity of implantation (without the uterus), it will be additionally easier to legitimate the use of advanced in development human embryos. Thinking positive, it is probably possible to obtain structures similar to teratomas, containing well-shaped selected organs and their functional structures, e.g., nephrons, but definitely distant from organisms. At the same time, these elements cannot endanger the development of teratoma in the recipient. After all, the SHEEFS (synthetic human entities with embryo-like features) research has been conducted for a long time. However, no one should search for the boundary between an improved teratoma and an organism using „synthetic human embryos".

The definition of an embryo in the present situation can be as follows: „any human totipotent cell, whether obtained from an ovum or an adult cell, any multicellular structure that has the potential to develop into a mature human organism". There are probably more suitable suggestions for this definition, but altogether they should be proposed.

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