

Research Proposal for Scientific Controversy Position Paper

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ENG 21003-E Writing for Sciences

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## Proposals:

### I. 14 Day-Rule on Human Embryonic Stem Cell Research

There is a scientific consensus in Embryonic Stem Cell Research, which prohibits the growth of embryonic stem cells for more than 14 days in the lab. This limits the research capability on the pluripotent cells due to the time limitation as current technology has progressed far enough that has enabled the researchers to study the stem cells more thoroughly. (Pera, 2017; Chan, 2018; Hyun et al. 2016; Tahakashi, 2014)

### II. The negative sides of Renewable Energy

There is no doubt that to tackle the upcoming energy crisis and the climate change, renewable energy sources are one of the most important solutions. However, the cost of building and maintaining renewable energy, especially for developing country can be a bargain between economic growth or disaster. Furthermore, the direct environmental impact of renewable energy production plants needs to be accounted for. For example, large areas contributing to wind turbines, hampering the wildlife and biodiversity of the area. Finally, there is a lack of a proper way of storing excess energy upon production from renewable sources. For example, energy from solar plants can only be produced in the morning and needs to be stored properly to use during night. The conventional storage method not only has high carbon footprint but also use toxic chemicals which degrade over time increasing the cost of maintenance. (Huenteler, 2016; Trainer, 2017; Winfield & Dolter, 2014)

### III. Artificial Sweeteners can increase the chance of premature death

It is a well-established fact that excess sugar contribute to many health risks and premature deaths, however, a study done by a University professor at Dublin, Amy Mullee and her colleagues shows that sugar supplements, in other words, artificial sweeteners also contribute to premature deaths. In contrast, some researchers believe that direct study on the effects of artificial sweeteners on the human body is required to ensure that variables such as the lifestyle choices of those who use artificial sweeteners or artificially sweetened products, do not affect the results of the study. (Jacobs, 2019; Mullee, 2019; Mossavar-Rahmani, 2019)

Chosen Proposition:

#### 14-day rule on Human Embryonic Stem Cell Research

Stem cell researcher at The Jackson Laboratory, Martin Pera, PhD, published a paper on June 1, 2017, discussing the jurisdictions that prohibit the research of Human Embryonic Stem Cells to a 14-day limit (Pera, 2017). The 14-day rule over the embryonic stem cell research had been in place for over 4 decades, however, due to lack of technological advancement, growing an embryo in vitro for over 14 days was not feasible. It all changed after the results from the experiment conducted by Takahashi et al. (2014) was published, where the researchers were able to successfully grow an in vitro embryo for 14 days, moreover, they grew it from somatic cell or regular body cells. This raised the question among the scientists in the field, which was portrayed by Pera (2017), whether or not to remove the 14-day rule. In his article, Pera (2017) also discussed the origin of the 14-day consensus and evaluated its applicability in the current generation of studies where

technology has improved greatly considering embryonic cell cultures and the ability to produce structures resembling the embryonic cell stages. Pera (2017) showed the research result of Takahashi et al. (2014), where the researchers were able to successfully produce primitive streak which is the structure that forms in the early stages of human embryonic development, including in avian, reptilian and other mammalian species. Since, the research of Takahashi et al. (2014), did not start with human embryonic cells, rather somatic or body cells, which was turned into stem cells through the induction of transcription factors, it showed an advancement in the current capabilities of the researchers in this field. His team had to discard the samples as soon as they identified the formation of the primitive streak before crossing the 14-day cap. The rule has become an obstacle, when, according to Pera (2017), culturing embryonic stem cells over 14-days was now not only achievable through current technology, but also it can be started with a regular body cell. This will enable the researchers to analyze the early stages of development, emergence of classified cells or tissues, potential organ development and study effects of different drugs on embryo. Pera (2017) talked about the origin of the 14-day rule which was first established in the 1970s during bioethical discussions in the early stages of In Vitro Fertilization. During those years, first IVF pregnancy and first successful birth by IVF was documented and the question rose about the moral status of a human embryo. When the 14-day rule was recommended by the then Department of Health Education and Welfare in the US, most researchers believed that future research may conclude in ectogenesis, growing a human embryo in laboratory, in other words, a person being born artificially. Pera (2017) also reported in the article that, the Warnock Committee, found the ectogenesis ethically very controversial, and suggested that it is a criminal act if the human embryo is developed in vitro conditions for more than 14 days. Moreover, when this rule was established, through the technology at that time the researchers were not capable of developing embryonic stem cells till the 14<sup>th</sup> day as well as the general understanding on the embryonic stages was also lacking. However, since now it is

possible to produce human embryonic cells from induced pluripotent somatic cells, Pera (2017) believed that, this will provide a wide range of possibilities for researchers. In addition, the development in embryonic research will improve our understanding of the human body, diseases and mutations that occur during embryonic development, organ production and transplantation, and, the effects of drugs can be studied on human cells or tissues without harming any living individuals. In conclusion, Pera (2017) believed that, the current legislation of the 14-day rule is needed to be removed for embryonic development research to take place as a model of human development.

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