

Genetically Modified Embryos: The Good, the Bad and the Ugly

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History

Prehistoric era-selective breeding processes

Breeding animals and food in order to make them more nutritious- improving crops durability

Corn, Horses, Cows, Domesticating animals

1859- Darwin publishes The Origin of the Species—knowledge of breeding at the time

1865- Mendel's Pea Model foundation of modern genetics

1913- Sturtevant constructs genetic map

1953- Watson and Crick propose double helix structure of DNA

1974- First genetically modified organism

1980- First genetically modified mouse

1987- GM mouse with human genes

1991- Gene therapy on humans

1994- Widespread use of genetically modified crops in USA

1996- First cloned animal

Benefits

- Increase the human lifespan up to 30 years
- A better understanding of genetics
- Eradicate some diseases
- Prevents genetic diseases
- Decrease the chance of having a inherited medical condition
- Better odds that the child will succeed throughout its life
- Gene therapy, or the medical treatment of a disease by repairing or replacing a defective gene
- The creation of superior pharmaceuticals by cloning genes
- Keeps up with modern technology
- A complete ban will increase the demand and send people to unauthorized biologists or overseas to receive the same treatment that the US is capable of.



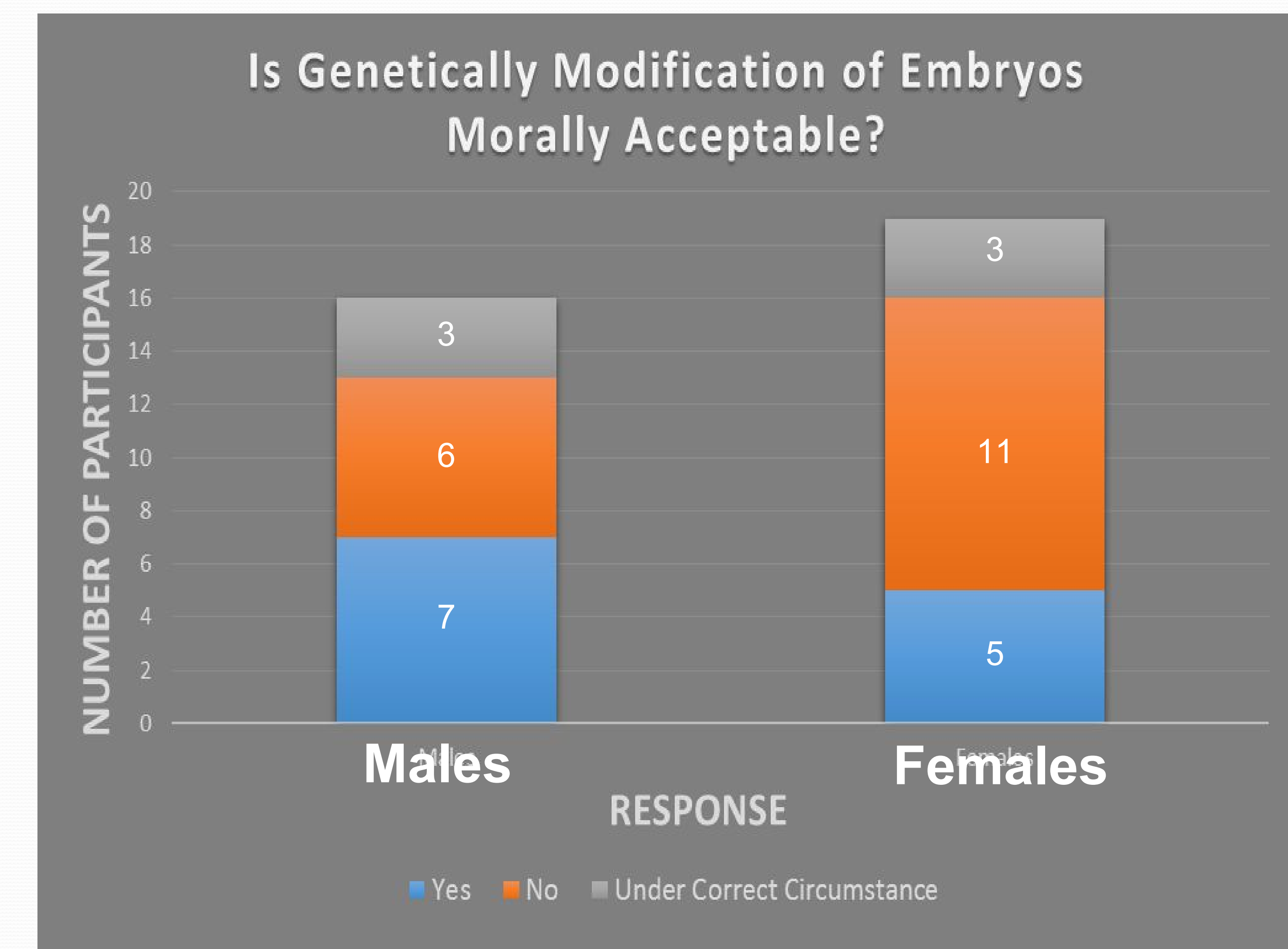
Problems

- Lack of a complete understanding of the outcomes of any modifications can lead to the unintentional addition of health conditions and disease to humans.
- Questionable morality behind the technology makes it very controversial as scientists are being seen as "playing-God".
- Diminishing the genetic diversity of the population can lessen humans susceptibility to various viruses and diseases.
- The overall process is very complex and expensive, creating a gap between the wealthy who can afford it and those who cannot.

Methods

35 randomly selected individuals on the Cleveland State campus were given surveys asking their thoughts on genetically modified embryos. Specifically we asked them "Is genetic modification of embryos morally acceptable?"

Results



	Males	Females
Yes	7	5
No	6	11
Under correct circumstance	3	3

Conclusion

Based on the information from the small survey conducted, it appears as though women are more likely than men to answer negatively as to whether genetically modifying an embryo is morally acceptable.

Process

- Typically, fibroblasts are used because they can grow rapidly in culture
- 2 main approaches to modification:
 - modification of the somatic cell (non reproductive) by infecting target cells with a modified virus
 - Division of fetal fibroblast modified with a marker gene, clonal line chosen, cell fused to enucleated mature oocyte (ovary undergoing meiosis)
 - oocyte must be in 2nd metaphase of meiosis and donor cells in G1 phase have a higher rate of development
 - modification of the germ cells (sperm or egg)

1) Cloned Transgenic Calves Produced from Nonquiescent Fetal Fibroblasts BY JOSE B. CIBELLI, STEVE L. STICE, PAUL J. GOLUEKE, JEFF J. KANE, JOSEPH JERRY, CATHY BLACKWELL, F. ABEL PONCE DE LEÓN, JAMES M. ROBL SCIENCE22 MAY 1998 : 1256-1258

2) Use of Genetically Modified Stem Cells in Experimental Gene Therapies . In Stem Cell Information [World Wide Web site], Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services, 2015 [cited Sunday, April 03, 2016] Available at <http://stemcells.nih.gov/info/scireport/pages/chapter11.aspx>