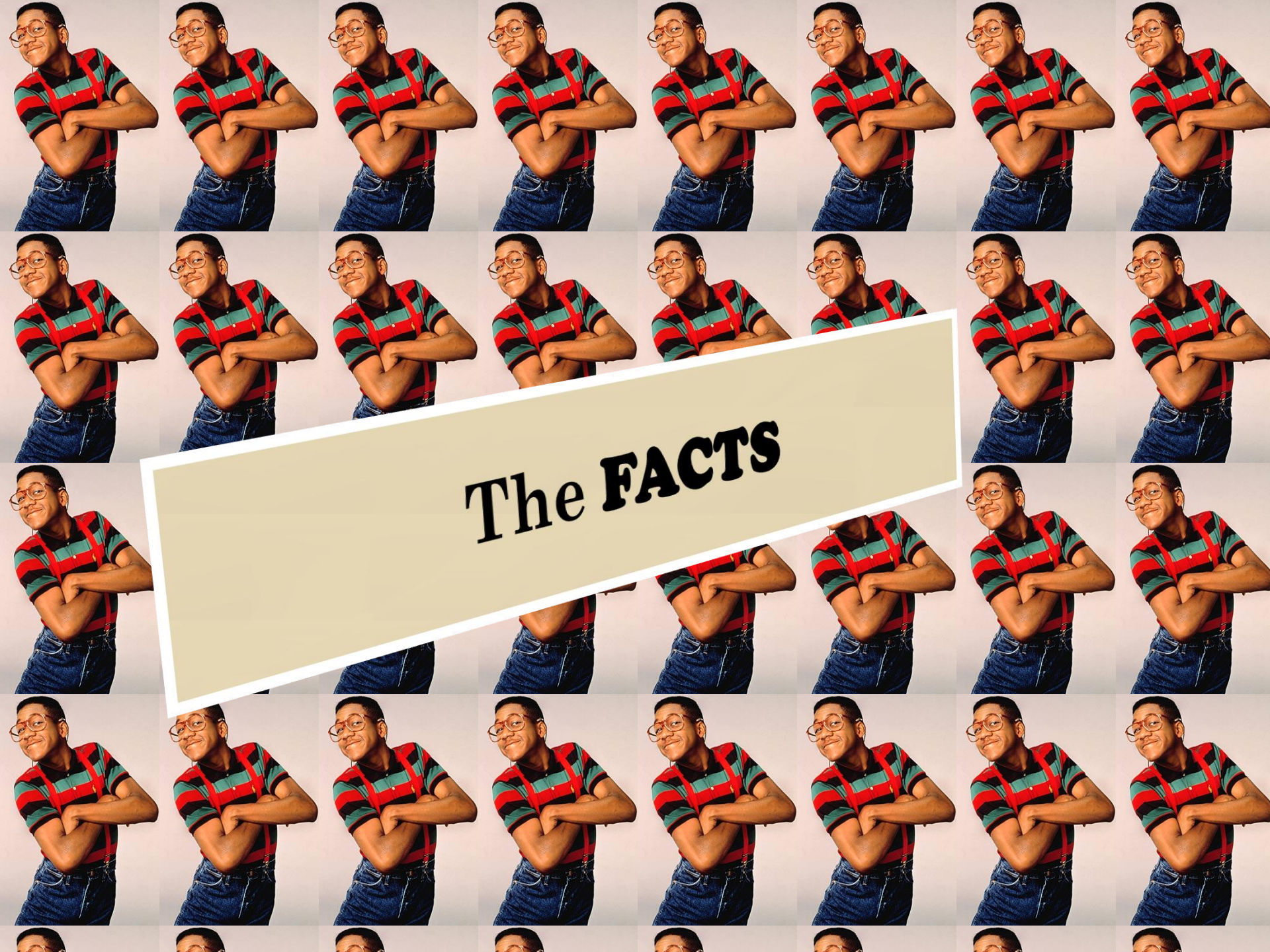




Designer Babies

By: Sierra Silberman



The **FACTS**

What Is a “Designer Baby”?

- Note: The term “designer baby” is a journalistic term, not scientific.
- The Definition of a designer baby is as follows: “A baby whose genetic makeup has been artificially selected by genetic engineering combined with In Vitro fertilization to ensure the presence or absence of particular genes or characteristics” (Oxford English Dictionary)

How are Designer Babies Possible?

- In Vitro Fertilization- In Vitro fertilization is a technique where the egg is fertilized outside of the body and then the egg is injected back into the uterus.
- Method #1: Pre-Implantation Genetic Diagnosis (PGD)
 - The ability to screen the embryo's. (Used commonly to avoid passing diseases)
- Method #2: Choosing the sperm that fertilizes the egg
- Method #3: Cloning



The ETHICS/ PROS & CONS



Ethics

- The Ethical divide between THERAPY & ENHANCEMENT
- The two big questions:
 - Are the technologies of genetic modification and selection safe enough to be used on humans?
 - Even if the technologies are safe, can they be morally defended?

Other Questions Concerning Ethics

- Is the way parents rear a child also a way of designing a child?
- Will we lose our humanity if we modify human genes?
- Are designer babies “Post-humans”?
 - Are geniuses accidental post-humans because they’re above the norm?
- Will genetic enhancement lead to a discriminatory society?



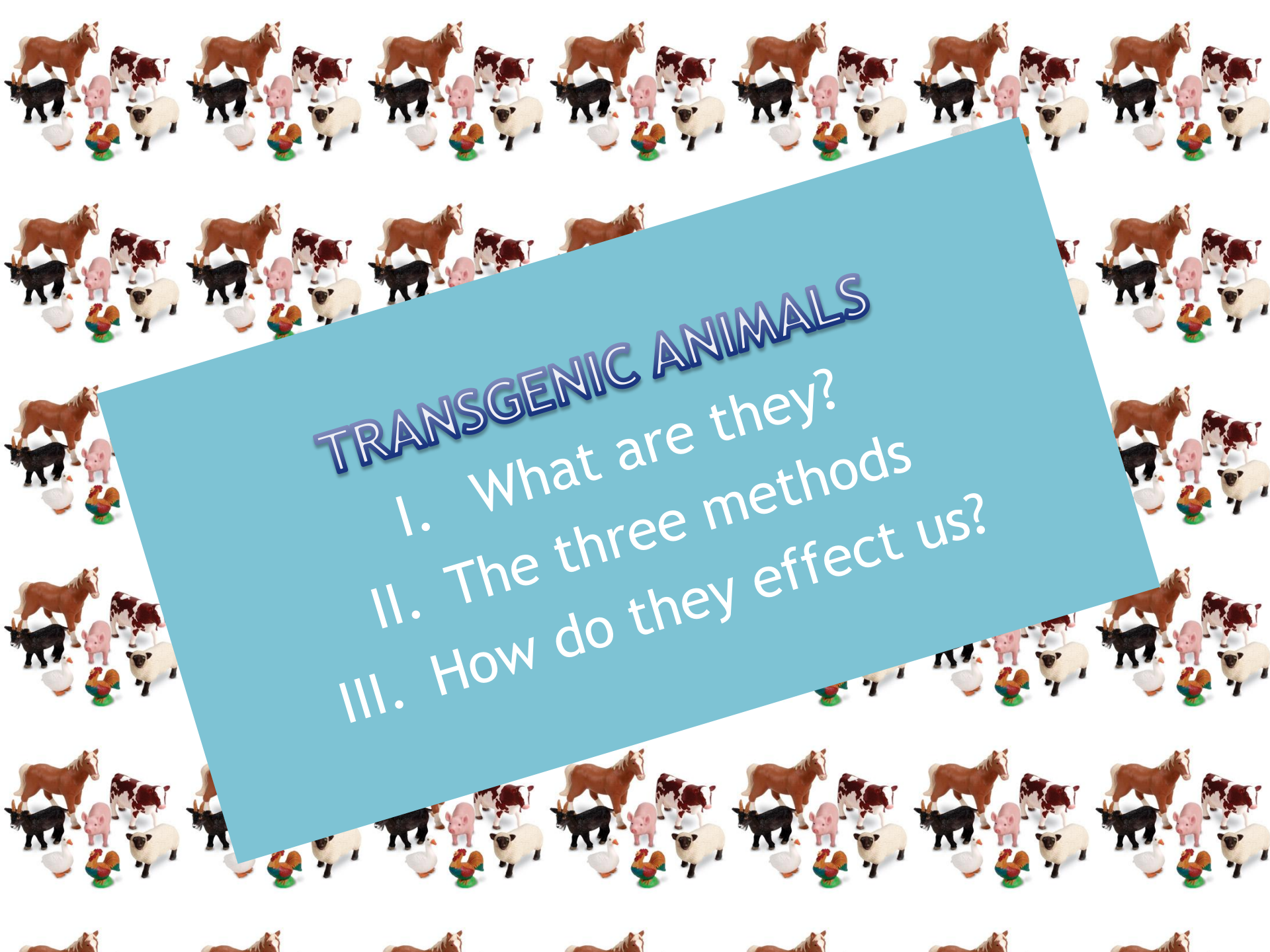
PROS

1. Prevents genetic disease
2. Helps infertile parents have children
3. Parents won't have to spend as much \$ on health care in the future
4. Less stress for parents
5. There are possible enhancements on life span, and positive alterations to personality such as intelligence.

CONS

1. Embryos are thrown away
2. Could possibly start a population of "super humans"
3. There are chances of having a baby with defects.
4. There born to make others happy
5. What's going to happen if they don't get what they want? EX: They wanted a blue-eyed blonde haired girl and they get a girl with brown hair and brown eyes?

Designer Babies & Introduction into
Transgenic Animals- Princeton professor
Lee Silver



TRANSGENIC ANIMALS

- I. What are they?
- II. The three methods
- III. How do they effect us?

What is a Transgenic Animal?

- The Federation of European Laboratory Animal Associations defines the term transgenic animal as “An animal in which there has been a deliberate modification of its genome (A genome is the genetic makeup of an organism responsible for inherited characteristics)”
- A little more simple: An animal whose genome has been changed to carry genes from other species.

Created Transgenic animals

- Mice
- Rats
- Rabbits
 - Pigs
 - Sheep
 - Cows

Definitions for the Next Slides

- Pronucleus- The nucleus of the sperm or egg during the fertilization process.
- Cultured-Artificially nurtured or grown.
- Host Cell- A name given to a cell that is infected with a virus or bacteria.
- Chimera- An animal that has two or more different populations of genetically distinct cells.
- Homozygous-Having identical alleles for a single trait.
- Alleles- One member of a pair or series of genes that occupy a specific position on a specific chromosome
- Totipotent cell- A cell that has the ability to divide and produce all the differentiated cells in an organism.



Method One

- 1) DNA Microinjection:
 - The most predominant method.
 - The mouse was the first animal to undergo a successful gene transfer using DNA microinjection.
 - Taking cloned male gene(s) from another member of the same species or even a different species, and putting them into the pronuclei of the reproductive cell. The cell is cultured In Vitro, to develop to a specific embryonic phase and then is transferred to the female.



Method Two

- 2) Retrovirus- Mediated Gene Transfer
 - Retrovirus carries its genetic material in the form of RNA (Ribonucleic Acid) rather than DNA (Deoxyribonucleic acid)
 - This method was successfully used in 1974 when a simian virus was inserted into mice embryos which resulted in mice carrying this DNA.
 - The retroviruses are used as carriers to transfer genetic material into the host cell which results in a chimera. The chimera's are then inbred for as many as 20 generations until homozygous transgenic offspring are born



Method Three

- 3) Embryonic Stem Cell-Mediated Gene Transfer
 - Unlike the other two methods, which require live transgenic offspring to test for the presence of the desired transgene, this method allows testing for the transgenes at the cellular stage.
 - This method requires isolation of the *totipotent* stem cells from embryos. The desired gene is inserted into these cells. The cells containing the desired DNA, are then incorporated into the host embryo resulting in a chimeric animal

Why are these animals being produced? How do they contribute to human welfare?

These animals are being produced for disease models and producers of substances for human welfare.

Benefits to Human Welfare

Agriculture

- ❖ Allow herds to have specific traits
- ❖ Can improve the size of livestock
- ❖ Possible disease resistant livestock

Medical

- ❖ Transplant organs
- ❖ Milk producing transgenic animals useful for medicines

Industry

- ❖ Material fabrication