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Poster: Embryonic Stem Cell Research

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Embryonic Stem Cell Research

Emillie Partridge, Wright State University, 2015

Research Question

Do the current and potential benefits outweigh the moral and ethical issues?

Introduction:

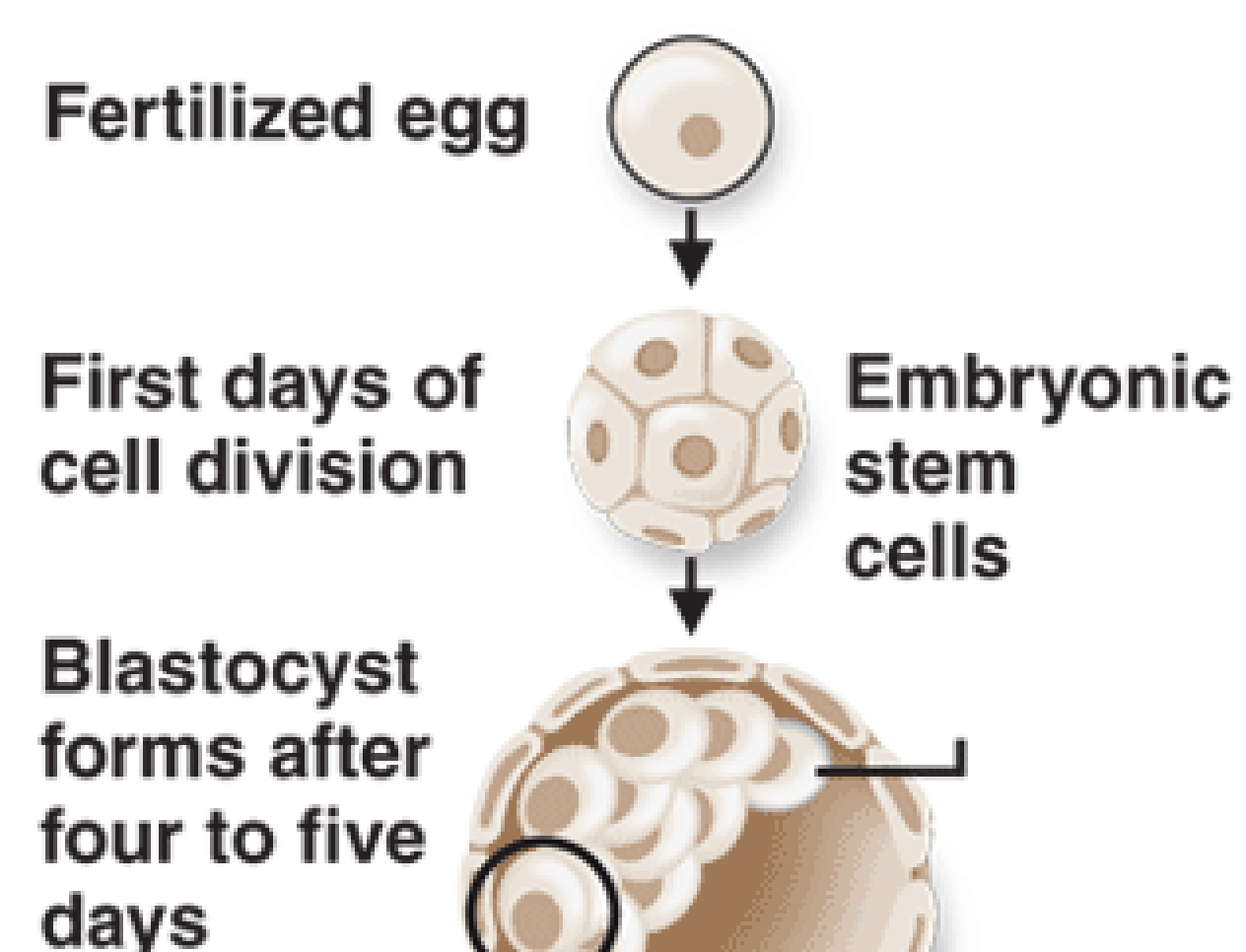
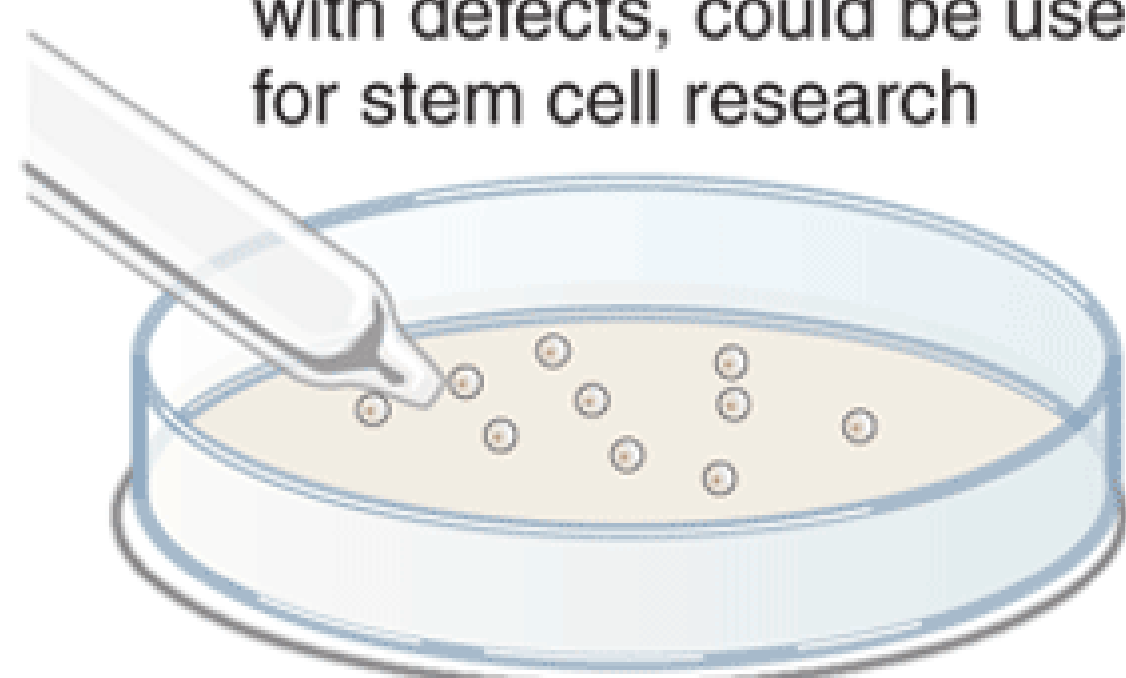
- Embryonic Stem cells are unspecialized cells that can replicate indefinitely and differentiate into all 3 germ layers. The germ layers are the layers of cells the form during the formation and development of an embryo. Embryonic stem cell lines come from unused embryos from in-vitro fertilization that were otherwise doomed. These stem cells are used in research focused on the cure for degenerative diseases and ultimately the key of human development and aging.

Stem Cell Cultures

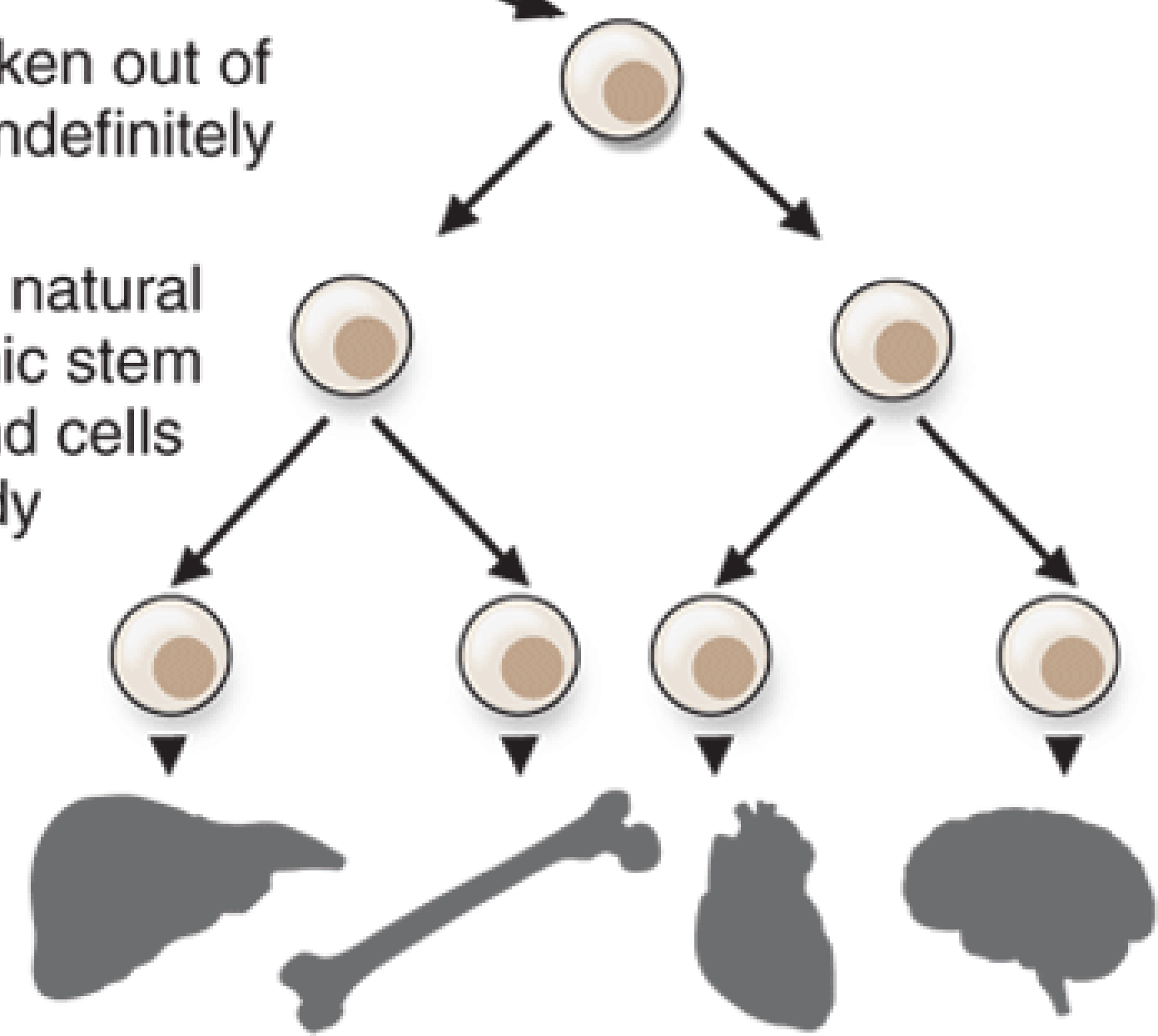
Researchers say embryonic stem cells could unlock secrets of disease and lead to cures for illnesses such as Alzheimer's and diabetes.

Making an embryonic stem cell culture

- Several eggs are fertilized at once during in vitro fertilization; after genetic testing, healthiest embryos are implanted in womb; remaining embryos, some with defects, could be used for stem cell research



- Embryonic stem cells are taken out of blastocyst; cells can divide indefinitely
- Chemical agents that mimic natural processes turn the embryonic stem cells into adult stem cells and cells found everywhere in the body
- Adult stem cells form
- Researchers study cells, with the hope of repairing damaged organs



Source: University of Michigan

Graphic: Detroit Free Press

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Accomplishments

- In rat models of Parkinson's disease, embryonic stem cells transplanted into their brains develop into functional neurons, resulting in functional improvement. However, tumors developed in about 20% of the animals. Stem cell culture has overcome the tumor problem and is one of the most promising therapies.
- Skeletal muscles, endothelial cells, liver, pancreatic cells, and others have all been generated from stem cell lines. Therapeutic applications of these cells has not yet been determined, but the potential is vast.

Regulations:

Current guidelines were established in August 2001 by President Bush:

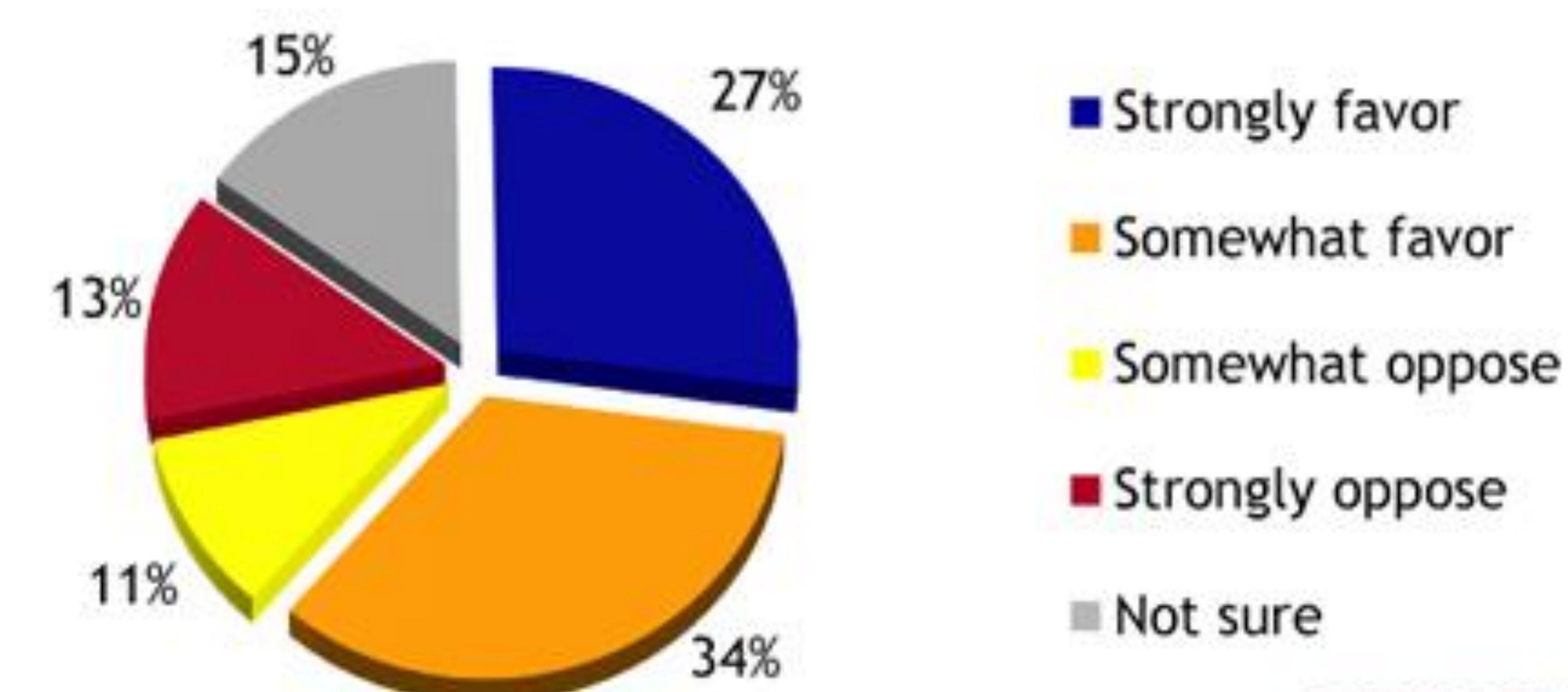
- Stem cells must be derived from an embryo that was created for reproductive purposes.
 - The embryo is no longer needed for this purpose.
 - Informed consent must be obtained for the donation of the embryo.
 - No financial inducements are provided for donation of the embryo. In addition, American researchers with federal funding are restricted to using the 64 embryonic stem cell lines that existed before August 2001.
- However, out of these 64 stem cell lines very few are available, and many are extremely expensive.

Ethical Debate

- In order to derive the stem cells for research an embryo must be destroyed. To some, this is equivalent to destroying human life because they view embryos to have the same moral status as adults and children. This is mostly a religious issue.
- The other point of view is that an embryo is just a cluster of cells, and therefore, has no moral status and lacks consciousness. From this perspective, there is no ethical issue.
- A third point of view lies somewhere in the middle, viewing embryos as having no moral status, but deserving respect as a developing form of human life. This viewpoint backs stem cell research, but for the most serious reasons.

Voters Favor Expanding Funding for ESC Research

Do you favor or oppose expanding federal funding for research using embryonic stem cells?



JZ Analytics Source: A Research!America poll of likely voters conducted in partnership with JZ Analytics in August 2012.



Position

- Currently, embryonic stem cell research has so much potential and promise, but is hindered by the restrictions in place on which stem cell lines may be used by researchers with federal funding. If these restrictions were lifted, stem cell research may unlock the secrets of human development and aging.

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