

Shelby County Schools  
Extended Learning Packet



English/ Language Arts  
Grade 10

## Grade 10 Educational Websites and Web Resources

Title of Resource	Web Address	Description	Student Access
<b>TedEd</b>	<a href="http://www.ed.ted.com">www.ed.ted.com</a>	Provides a digital media library of educational videos and discussions.	Students are able to view content for free and without an account.
<b>Khan Academy</b>	<a href="https://www.khanacademy.org">https://www.khanacademy.org</a>	Students will be able to get additional practice with skills in various subjects and test prep.	Students will need to sign up for a free account if they do not already have an account.
<b>CommonLit</b>	<a href="http://www.commonlit.org">www.commonlit.org</a>	Provides a digital library and gives students rigorous practice with complex text and questions.	Students may need to sign up for a free account if they do not already have one.
<b>NewsELA</b>	<a href="http://www.newsela.com">www.newsela.com</a>	Provides a digital library and gives students rigorous practice with complex text and questions.	Some content is free and students are able to engage with the current events with a free account.
<b>Tween Tribune</b>	<a href="https://www.tweentribune.com/">https://www.tweentribune.com/</a>	Provides a digital library and gives students rigorous practice with complex text and questions.	Students are able to read various articles without an account, however students will need a free account to access quizzes and questions.

Name: \_\_\_\_\_ Class: \_\_\_\_\_

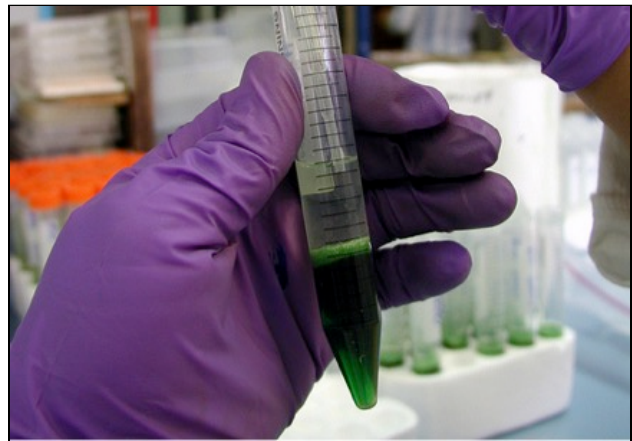
# **Proposed Treatment to Fix Genetic Diseases** **Raises Ethical Issues**

By Rob Stein, NPR's Morning Edition  
2013

*Genetic scientists have developed a technique that makes it possible for families to remove unwanted DNA<sup>1</sup> from an embryo<sup>2</sup>. The process, however, has raised ethical<sup>3</sup> issues, and some scientists fear that the potential problems outweigh the potential benefits. As you read, take notes on both the ethical and scientific concerns regarding this new genetic discovery.*

- [1] The federal government is considering whether to allow scientists to take a controversial step: make changes in some of the genetic material in a woman's egg that would be passed down through generations.

Mark Sauer of the Columbia University Medical Center, a member of one of two teams of U.S. scientists pursuing the research, calls the effort to prevent infants from getting devastating genetic diseases "noble." Sauer says the groups are hoping "to cure disease and to help women deliver healthy, normal children."



*"DNA Extraction" by CIMMYT is licensed under CC BY-NC-SA 2.0.*

But the research also raises a variety of concerns, including worries it could open the door to creating "designer babies." The Food and Drug Administration has scheduled an Oct. 22 hearing to consider the issues.

Specifically, the research would create an egg with healthy mitochondrial DNA (mtDNA). Unlike the DNA that most people are familiar with — the 23 pairs of human chromosomes that program most of our body processes — mtDNA is the bit of genetic material inside mitochondria, living structures inside a cell that provide its energy.

- [5] Scientists estimate that 1 in every 200 women carries defects in her mtDNA. Between 1 in 2,000 and 1 in 4,000 babies may be born each year with syndromes caused by these genetic glitches; the syndromes range from mild to severe. In many cases, there is no treatment, and the affected child dies early in life.

Lori Martin, 33, of Houston, found out her son, Will, was born with a genetic malady known as Leigh's syndrome, when he was about 2 years old. The progressive illness was linked to genetic problems in his mitochondria.

1. DNA, short for deoxyribonucleic acid, is the molecule that contains the genetic code of organisms. The DNA in a person is a combination of the DNA from each of their parents. This is why children share traits with their parents, such as skin, hair and eye color.
2. An embryo is an unborn animal or human being in the very early stages of development.
3. Ethical (adjective): relating to beliefs about right and wrong

"The experience of being told that your son is basically going to die and you don't know when or how, but — it's obviously life-changing, and it completely wrecks your world," Martin says.

Martin and her husband are trying to help Will live as long and as happy a life as they can. And they want more kids. But her doctor advised against it.

"Since I am a carrier, I've been told it's recommended I do not have any more biological children using my eggs," Martin says. "It's a really devastating blow to be told not to have more children."

[10] The proposed research might help Martin and women like her.

"We have developed a technique that would allow a woman to have a child that is not affected by this disease, and yet the child would be related to her genetically," says Dieter Egli of the New York Stem Cell Foundation.

Here's how the procedure would work: Doctors take eggs from women like Martin, and pluck out all the genes except for the mtDNA. They then do the same thing to eggs that have been donated by women with healthy mtDNA.

"The DNA of the woman who wants to have the child is transferred into that healthy egg," Egli says. "And now you have an egg with DNA of the woman who wants to have the child, and [it also contains] healthy mitochondrial DNA."

The new egg could then be fertilized in the laboratory with the would-be father's sperm. And the resulting embryo could be transferred into the would-be mother's womb.

[15] A team of scientists in Oregon has already made human embryos this way and even succeeded in breeding healthy baby monkeys using the techniques. Now they and the New York research group want to take the next step: They want to try to make healthy human babies.

"We're ready to move on to the next stage and to transplant the embryos we have created this way into a patient," says Shoukhrat Mitalipov of the Oregon Health & Science University in Portland.

And it looks likely that the British government will allow medical researchers in that country to try a related technique to replace the faulty mtDNA in eggs from women like Martin.

But this is all still very controversial. First of all, the baby would be born with genes from three different people: from the father, from the woman trying to have a healthy baby, and from the woman who donated the healthy egg.

"There are issues of identity that the child may experience later in life," says Ronald Green, a bioethicist at Dartmouth College. "'Who am I? Am I a human being like all other human beings with two parents? Am I some kind of new type of creature?'"

[20] There are even bigger concerns, which start with whether the technique is safe for the resulting infant, and whether by trying to fix one problem, scientists may inadvertently introduce mistakes into the human genetic code.

"If mistakes are made, they won't just be mistakes in the child that is born. But if that child [is a girl and] has children down the line, those children will inherit the mitochondria from that child, and we'll have introduced new genetic diseases into the human population," Green says.

That's why this sort of thing has always been off-limits — even banned in many countries, according to Marcy Darnovsky of the Center for Genetics and Society.

Pursuing such techniques, Darnovsky says, "really would cross this bright line that's been established and has been observed by scientists around the world. And that bright line says: 'We're not going to make genetic changes that are inheritable — that are passed down from one generation to the next.' "

And there's another big reason for that bright line, beyond fears of introducing errors into the gene pool. The big concern is that altering mtDNA eventually could lead to someone trying to make designer babies.

[25] "The problem is that once we start saying we're going to allow inheritable genetic changes to make healthier children, then the next step is, we're going to allow these kinds of genetic engineering experiments to make children who are more intelligent or more athletic or have perfect pitch," Darnovsky says.

Now, the scientists who want to do this say they're nowhere near being able to do anything like that. And all their research so far indicates the procedure they propose is safe.

"Abuses in medicine can occur, and they do," says Sauer. "But that's not what this is about."

For her part, Martin hopes the research keeps going. It may be too late for her, but it may help other women like her, such as her younger sister.

"Any woman would love to be able to create a baby of [her] own," Martin says. "Having that kind of gift would be — it's a priceless gift to us. So I hope that that would be an option for our family."

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## Text-Dependent Questions

**Directions:** For the following questions, choose the best answer or respond in complete sentences.

1. Which statement best expresses the central idea in the article?
  - A. Scientists have discovered a way to prevent genetic defects in babies, but some believe genetic development should be left to nature
  - B. Scientists have discovered a way to prevent genetic defects in babies, but some worry that the process could be used for great economic gain
  - C. Scientists have discovered a way to prevent genetic defects in babies, but the method is against many families' religions
  - D. Scientists have discovered a way to prevent genetic defects in babies, but the process is still very risky
  
2. PART A: In paragraph 3 and paragraph 24, what is meant by the phrase "designer babies"?
  - A. Babies that are bred to be particularly attractive
  - B. Babies whose DNA has been altered to enhance a specific trait
  - C. Babies whose DNA has been altered to avoid disease
  - D. The biological children of genetic researchers
  
3. PART B: What detail from the text best supports the answer for Part A?
  - A. "...the research would create an egg with healthy mitochondrial DNA (mtDNA)." (Paragraph 4)
  - B. "First of all, the baby would be born with genes from three different people..." (Paragraph 18)
  - C. "...we're going to allow inheritable genetic changes to make healthier children..." (Paragraph 25)
  - D. "...we're going to allow these kinds of genetic engineering experiments to make children who are more intelligent or more athletic or have perfect pitch..." (Paragraph 25)
  
4. How do DNA and mtDNA differ?
  - A. DNA contains 23 pairs of chromosomes, while mtDNA contains 46
  - B. DNA comes from the mother and the father, while mtDNA is manufactured in a lab
  - C. DNA is often damaged or can cause illness in unborn babies, while mtDNA is always free of defects
  - D. DNA comes from the mother and the father, while mtDNA is only found in the egg of the mother

5. What are some of the ethical issues of editing human DNA? Cite examples from the text to defend your answer.

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## Discussion Questions

**Directions:** Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. How might this new procedure confuse a person's identity? Explain.
2. Imagine you are a genetic scientist who has been asked to advise the president on whether or not this new procedure should be made legal. What do you say?
3. What are the costs and benefits of technology? Use this article, your own experience, and other examples in your answer.



Name: \_\_\_\_\_ Class: \_\_\_\_\_

# Scientists Clone Human Embryos To Make Stem Cells

By Rob Stein and Michaela Doucleff  
2013

*Scientists have long been interested in harnessing the power of stem cells, which are undifferentiated, self-replicating cells that are capable of becoming differentiated cells within an organism. Pluripotent stem cells, which include embryonic stem cells, are capable of giving rise to any cell in an organism. Scientists believe that learning more about stem cells will allow them to develop treatments and potential cures for a variety of diseases. However, many object to the use of embryos for scientific purposes. In 2001, U.S. President George W. Bush signed an executive order restricting federal funding for research on stem cells obtained from human embryos; in 2009, U.S. President Barack Obama overturned the ban. As you read, take notes on the different viewpoints expressed on the subject of stem cell research.*

- [1] Scientists say they have, for the first time, cloned<sup>1</sup> human embryos capable of producing embryonic stem cells.

The accomplishment is a long-sought step toward harnessing<sup>2</sup> the potential power of embryonic stem cells to treat many human diseases.<sup>3</sup> But the work also raises a host of ethical<sup>4</sup> concerns.

"This is a huge scientific advance," said Dr. George Daley, a Harvard stem cell scientist who wasn't involved in the work. "But it's going to, I think, raise the specter<sup>5</sup> of controversy again."

The controversy arises from several factors. The experiments involve creating and then destroying human embryos for research purposes, which some find morally repugnant.<sup>6</sup> The scientists also used cloning techniques, which raise concerns that the research could lead to the cloning of people.

- [5] Ever since human embryonic stem cells were discovered, scientists have had high hopes for them because the cells can morph into any kind of cell in the body. That ability means, in theory, that they could be used eventually to treat all sorts of illnesses, including diabetes, Alzheimer's, Parkinson's and spinal cord injuries.



*"Stem Cell Research" by The U.S. Food and Drug Administration is in the public domain.*

1. Cloning is the process of asexually producing a genetically identical copy of an organism or cell from a single ancestor.
2. **Harness (verb):** to gain control for a particular use

So for years, scientists have been trying to use cloning techniques to make embryonic stem cells that are essentially a genetic match for patients. The idea is that such a close match would prevent their bodies from rejecting the cells.

"It's been a holy grail<sup>7</sup> that we've been after for years," says Dr. John Gearhart, a stem cell pioneer at the University of Pennsylvania.

But every previous attempt ended in failure or fraud, leading many scientists to wonder if the goal might be impossible to reach.

However, Shoukhrat Mitalipov of the Oregon Health & Science University and his colleagues never gave up. They succeeded in mice and monkeys. And in this week's issue of the journal *Cell*, Mitalipov's team reports they finally did it in humans.

[10] "I'm very excited," Mitalipov says. "It's a very significant advance."

The researchers first recruited women who were willing to provide eggs for the research. Next, they removed most of the DNA<sup>8</sup> from each egg and replaced the genetic material with DNA from other peoples' skin cells.

Then, after a long search, they finally found the best way to stimulate<sup>9</sup> each egg so that it would develop into an embryo without the need to be fertilized with sperm. The key turned out to be a combination of chemicals and an electric pulse.

"We had to find the perfect combination," Mitalipov says. As it turned out, that perfect combination included something surprising: caffeine.

"The Starbucks experiment, I guess," quipped<sup>10</sup> Daley. "This little change in the cocktail was what really allowed the experiment to really ultimately succeed."

[15] That ingredient, plus other tweaks in the process, including using fresh eggs and determining the optimal<sup>11</sup> stage of each egg's development, Mitalipov says.

The researchers showed that the resulting embryos could develop to a stage where they could produce healthy stem cells containing the genes from the skin cells. They even showed that the stem cells could be turned into other types of cells, including heart cells that in a laboratory dish could pulse like a beating heart.

The work drew immediate criticism because of ethical concerns.

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3. Stem cells are extensively studied for their regenerative potential, which many scientists believe holds the key to personalized medicine.
  4. **Ethical (adjective):** morally right, pertaining to right and wrong in conduct
  5. **Specter (noun):** something widely feared as a possible unpleasant or dangerous occurrence
  6. **Repugnant (adjective):** extremely distasteful; unacceptable
  7. A Holy Grail is a thing that is earnestly and intensely pursued or sought after.
  8. DNA is a self-replicating material present in nearly all living organisms as genetic information and instructions.
  9. **Stimulate (verb):** to initiate action
  10. **Quip (verb):** to make a witty or clever statement
  11. **Optimal (adjective):** best or most favorite

First of all, the Oregon researchers compensated<sup>12</sup> women financially to donate eggs for the experiments — something many in the field have considered ethically questionable.

But beyond that, the creation and destruction of a human embryo is morally repugnant to people who believe an embryo has the same moral standing as a human being.

- [20] “This is a case in which one is deliberately setting out to create a human being for the sole purpose of destroying that human being,” says Dr. Daniel Sulmasy, a professor of medicine and a bioethicist at the University of Chicago. “I’m of the school that thinks that that’s morally wrong no matter how much good could come of it.”

Moreover, Mitalipov used the same method that researchers used previously to clone Dolly the sheep.<sup>13</sup> That approach raises the possibility that scientists could try to clone a human being.

“This raises serious problems because it is the first actual human cloning,” Sulmasy says. “We already know there are people out there who are itching to be able to be the first to bring a cloned human being to birth. And I think it’s going to happen.”

But Mitalipov dismisses those concerns. He says the embryos he created aren’t the equivalent<sup>14</sup> of a human being because they weren’t fertilized naturally. And his experiments with monkeys indicate that it’s unlikely that they could ever develop into a healthy baby.

“The procedures we developed actually are very efficient to make stem cells, but it’s unlikely that this will be very useful for kind[s] of reproductive cloning,” Mitalipov says.

- [25] Other researchers agree with him and argue that the possible benefits of the research outweigh the concerns. “Where you can improve [a patient’s] quality of life tremendously through this kind of technology, I personally believe that it is ethical to use material like this,” Gearhart says.

The scientists acknowledge that it will be years before anyone knows whether this step will actually result in treatments that might help patients. In the meantime, it’s clear that the intense debate over embryonic stem cells is far from over.

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12. **Compensate (verb):** to pay (someone) for a good or service, especially as payment for something lost or damaged  
13. Dolly (1996-2003) was a female sheep and the first mammal ever created through cloning of an adult somatic (non-embryonic or stem) cell. She was created via cloning in 1996 in Scotland.  
14. **Equivalent (adjective):** having the same value, use, or meaning

## Text-Dependent Questions

**Directions:** For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following best summarizes this article?
  - A. A group of scientists recently generated embryonic stem cells through cloning, which may help cure many diseases, though the process raises serious ethical concerns.
  - B. Stem cell research has long been hindered by controversy and repeated attempts to publish falsified data and experiments.
  - C. The most powerful criticism of stem cell research revolves around the fact that it necessarily and universally involves destroying human embryos.
  - D. Several scientists have already begun attempting to generate living human clones, and the generation of embryonic stem cells provides a vital stepping-stone to their efforts.
  
2. PART B: Which TWO phrases from the text best support the answer to Part A?
  - A. "But every previous attempt ended in failure or fraud, leading many scientists to wonder if the goal might be impossible to reach." (Paragraph 8)
  - B. "The researchers showed that the resulting embryos could develop to a stage where they could produce healthy stem cells containing the genes from the skin cells" (Paragraph 16)
  - C. "The work drew immediate criticism because of ethical concerns." (Paragraph 17)
  - D. "But beyond that, the creation and destruction of a human embryo is morally repugnant to people who believe an embryo has the same moral standing as a human being." (Paragraph 19)
  - E. "'This raises serious problems because it is the first actual human cloning,' Sulmasy says." (Paragraph 22)
  - F. "We already know there are people out there who are itching to be able to be the first to bring a cloned human being to birth. And I think it's going to happen." (Paragraph 22)
  
3. How does Paragraph 25 contribute to the development of the ideas presented in the article?
  - A. It demonstrates that the use of human embryos represents a very small sub-section of stem cell research.
  - B. It proves that stem cell therapies are not worth objecting to since we are still so far from being able to use them in human patients.
  - C. It shows that many researchers are unfairly dismissive of legitimate ethical concerns.
  - D. It advances the idea that the potential pros of stem cell research outweigh the cons.

4. Which statement from the text best illustrates the relationship between scientific advancement and corresponding public controversies?
- A. "The accomplishment is a long-sought step toward harnessing the potential power of embryonic stem cells" (Paragraph 2)
  - B. "This is a huge scientific advance," said Dr. George Daley, a Harvard stem cell scientist who wasn't involved in the work. "But it's going to, I think, raise the specter of controversy again." (Paragraph 3)
  - C. "But every previous attempt ended in failure or fraud, leading many scientists to wonder if the goal might be impossible to reach." (Paragraph 8)
  - D. "First of all, the Oregon researchers compensated women financially to donate eggs for the experiments — something many in the field have considered ethically questionable." (Paragraph 18)
5. What is the author's main purpose in writing this article? Cite evidence from the text in your response.

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## Discussion Questions

**Directions:** Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. Does the idea of human beings genetically modifying other organisms concern you? What might be some pros and cons of developing cloning technology?
2. The article depicts a struggle between physicians and scientists hoping to cure ailing patients whose bodies naturally reject foreign infusions and transplants. In the context of this article, who is in control: man or nature? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.
3. While scientific progress excites many, plenty of people are fearful about possible negative effects of such advancements. In the context of this article, what should the future look like? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.