Rachel S. & Megan Ethics Planning Template -2

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Ethics and Biotechnol…

THE SCIENCE

How does this biotechnology work?
Try to incorporate ideas that have been explored in class.
Be sure that the language you use is grade-level appropriate.

Malaria is possibly one of the biggest killers in human history

- 200,000,000 infected in 2015
- 500,000 people died
- We can use Crispr to completely change animals' genomes
- Added a antibody gene into the mosquito DNA
    - Makes the mosquito immune to malaria
- The edit would only be carried by half the offspring because of mandilion genetics
- The gene drive forces the edited gene to become dominate
- If the change isn't fast enough malaria could adapt to over come it
- The mosquitoes have nothing to gain from carrying diseases
    - If this is a success, scientists might move on to change other animals that carry diseases
        - Mosquitoes → Dengue Fever, Zika
        - Tics → Lyme Disease
        - Flies → Sleeping Sickness
        - Flees → the plague

CRISPR

- It alters the genes in human embryos (the gametes)
- Being used to prevent genetic diseases
- Cleave and cut specific DNA molecules
- The removal and addition of genes is called CRISPR interference
    - Creates new lines of pre-embryonic germ cells and new varieties of crops
- Common in prokaryotes
- Already been used to edit the genome of plants, mice, monkeys and human embryos
- Deactivate and activate pre-existing genes
- Uses the Cas9 enzyme
    - If the embryo finds a mutation it will break off the mutation from one parent and replace it with the healthy gene from the other parent
    - This would eliminate inheritable mutations and diseases
    - Mutations cause evolution
    - **Do we still need/want to evolve as a species?**
- We can currently only edit out genes from an embryo or just after fertilization (NOT A LIVING PERSON)
        - None of the embryos used in the study where implanted and grown into humans
- Could increase the success of in vitro fertilization
- The article recommends additional research into gene editing and the gene drive
    - It also recommends looking into the broad ethical concerns behind the technology

Ethics Planning Template

DILEMNA
See reverse.

Group members:

THE SOLUTION

How can society adapt to the integration/implementation or advancement of this technology?

- CRISPR is still very new
- Once we do it we can't go back
- It might not work in nature
- The embryo may still carry the mutation
    - Some cells have the correction
    - Some cells have the mutation
        - To avoid genetically mosaic embryos, they injected the sperm and oocyte with the correction
- Society will accept or reject the advancement of this technology
- Society may become healthier as genetic diseases are eliminated
    - More money for the governments as health care costs goes down
    - More money in the peoples pockets as they will dispense less money on medication and hospital trips

What are the benefits? Who is helped?

CONSEQUENCES

What are the risks? Who is hurt/at risk?

- When changing an animals capability of spreading a disease, the disease we're trying to eliminate may evolve in a negative way to counter act the changes or to become more deadly.

AUTONOMY

Should individuals have the right to choose for themselves, or does one decision count for everyone?

- For humans it would be the individual's right to chose
    - It would be for their unborn child
- For animals it would have to be humans choosing for the whole species
    - The gene drive would spread faster in some animals than others
    - It would most likely be governments and scientists voting

TED-Talk:

Dilemma: **Should humans have the power to edit / change and entire species - forever?**

- They did acknowledge that there is a some distrust between scientists and people of faith
- Some people at New David Baptist Church of Christ in Baltimore say that some members fear that some people would use this technology to justify ideas of racial inequality
    - Sounds like experimentation to determine inferiority
- There's not enough education on the subject
- We are too quick to accuse people of religious beliefs of slowing scientific progress
- Everyone needs to be a part of the conversation

What perspectives do groups with other cultural, spiritual, or religious views have? L or

OTHER VIEW POINTS

What/who's rights need to be protected?

Who is responsible for protecting these rights?

RIGHTS AND RESPONSIBILITIES

https://www.youtube.com/watch?v=TnzcwTyr6cE