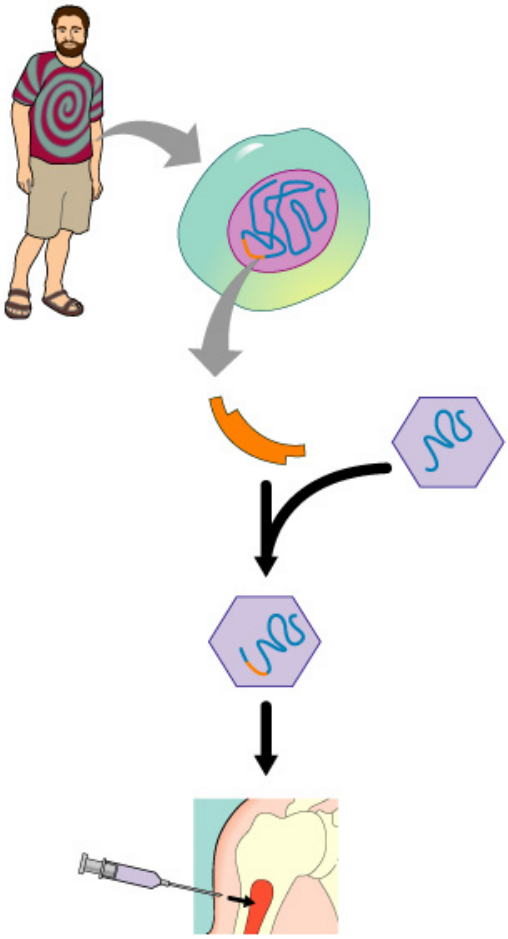
CHAPTER 12 Part 2

Human Gene Therapy and GMOs

HUMAN GENE THERAPY

•Human _____ therapy is a _____ DNA procedure that seeks to treat disease by altering the _____ of the afflicted person

- Normal human gene _____ and _____
- Nonharmful virus (_____) is used to _____ the new genes
- Virus injected into _____
- New DNA is incorporated into patient's _____
- Patient then begins to produce normal _____



Can you fill in and explain this figure on the quiz?

Treating Severe Combined Immunodeficiency

•_____ is a fatal inherited disease caused by a single defective _____ (like sickle-cell anemia)

- •The gene prevents the development of the _____ system
- •SCID patients quickly _____ unless treated with a bone _____ transplant

•Human _____ has been used to treat people suffering from _____

- In 2000, two infants suffering from _____ were provided with functional copies of their _____
- However, the SCID study was halted in 2002, after two patients developed _____ symptoms

SAFETY AND ETHICAL ISSUES

•As soon as scientists realized the power of _____ technology, they began to worry about potential _____

- The creation of hazardous new _____(disease causing organisms)

- The transfer of _____ genes into infectious bacteria and _____

•Strict laboratory _____ procedures have been designed to protect researchers from infection by engineered _____

- Procedures have also been designed to prevent _____-- from accidentally leaving the _____

The Controversy Over Genetically Modified Foods

•_____ strains account for a significant percentage of several _____ crops in the _____

- In 1999, controversy over the _____ of these foods prompted _____ throughout _____

- The sign says; "_____!"

•Advocates of a cautious approach have two primary _____

- Fear that _____ carrying genes from other species might harm the _____

- Fear that _____ foods could be hazardous to human _____

•Negotiators from 130 countries (including the _____) agreed on a _____

- The _____ requires exporters to identify _____ organisms present in _____ shipments

•Several U.S. regulatory agencies evaluate biotechnology projects for potential risks

•Department of Agriculture

•_____ (FDA)

•_____(EPA)

•_____ (NIH)

Ethical Questions Raised by DNA Technology

•Should genetically engineered human growth hormone be used to stimulate growth in HGH-deficient children? Is it a disease?_____

•Genetic engineering of _____ and _____ has been accomplished in _____ animals

•Should we try to eliminate genetic defects in our children?_____

•Should we interfere with evolution in this way?_____

•Advances in genetic _____ raise _____ issues

•What about the information obtained in the Human Genome Project?

_____

•How do we prevent genetic information from being used in a discriminatory manner?_____

Review Questions:

1. What is a recombinant DNA procedure that seeks to treat disease by altering human genes?
2. What are the steps involved in human gene therapy?
3. What is a fatal inherited disease of the immune system caused by a single defective gene?
4. How are SCID patients treated?
5. Human gene therapy has had no problems in initial testing T/F
6. What are the potential dangers of DNA technology?
7. Why are strict lab procedures designed when dealing with recombinant organisms?
8. The US does not use GM organisms for its production of food T/F
9. Other countries have not had a problem with the US growing and selling its GM foods abroad T/F
10. What are the two main concerns of the advocates of a cautious approach to GM foods?
11. What is the Biosafety Protocol?
12. What four U.S. regulatory agencies evaluate biotechnology projects for potential risks?
13. Genetic engineering of gametes and zygotes has been accomplished with what animals?
14. Advances in what part of this research have raised privacy issues?
15. What are some of the ethical questions surrounding DNA technology?

Choices for your research project

•You have 2 choices for your research project;
- A family pedigree or
- A 3-5 page research paper on GMOs

•If you choose to do the family pedigree, you will need to see me after class, during office hours, or just after lab to get directions (worksheets) and see examples from last semester.

•If you choose to do the research paper (GMOs), stick around for the rest of this presentation

•If you choose to do the pedigree project, you may leave now if you wish. (I would stay, just in case)

If you choose to do the research paper;

•Your research subject is the controversy over Genetically Modified Organsims (GMOs)

•Use the internet and magazines (there are very few books on the subject). Discover magazine has several excellent articles you should find and use.

•Photocopy or print all articles used for your report and attach them to your final submission. Sections directly referenced need to be highlighted on your copy

•**DO NOT PLAGARIZE**! If your writing sounds to "science-y" and there is no reference, you will receive a zero on the project.

•This is a difficult thing to avoid, so see me with questions about it.

Strategies for writing the report;

•Read the article and then **PUT IT AWAY**.

•Write down as many ideas as you remember about the article; **IN YOUR OWN WORDS**.

•If you forgot something, go back and re-read a section, but don't put the article next to your notes. **It is too tempting to copy that way**.

•Have someone (other than yourself) proofread your draft well in advance of the due date. If you wait until the last minute to start this, you will not receive a good grade on it.

•I will review typed drafts for content. You need to spell and grammar check it before giving it to me.

Format of the paper

•The report should be 3-5 pages in length.

•Put name in upper right and large title; centered at top

•Make your title interesting. "Gentically Modified Organisms" is BORING. Be creative.

•Each section must be titled. For example; just before the introduction section write "Introduction" on the left side or centered above the 1st section.

•The paper must be **typed**, **double spaced**, and written in a **12 point font**. If you don't know what this means see me.

Introduction

•The first section (the introduction) should be a quick statement (2-5 paragraphs) of the topic in a way that would introduce a person to GMOs; what they are and the main issues associated with them.

•Don't think of me (a science instructor) reading this; write this paper for someone who knows very little about science. (not a young child, an adult)

•How would you write it so that they would understand what you are saying?

Body

•The body of the paper presents your summary of what GMOs are and the main issues that surround them.

•What are the benefits and dangers of GMOs?

•Present both sides of the issue. You may take a stand on the issue, but back it up with ***FACTS*** learned in class or from your research; not feelings.

•This section should represent 40-60% of the paper.

•Please remember my warning about plagiarism.

Conclusion and References

•The conclusion should wrap up the paper. It should be similar to your introduction, but briefly restates the main points of the body. (1-3 paragraphs)

•The references (at the end) should be written as below;
"The Problem with GMOs", Discover Magazine, December, 2003, pages 213-217.
or
"Latest Research in Genetically Modified Crops", www.somefancybiowebsite.edu/GMOs
(be sure to print all parts of the articles you use and include them with your paper, in the order listed in references)

Good Luck.
See me with questions.