Chapter 13

Ethics and Biotechnology

13.1 What Is Ethics?

- Ethics identifies a code of values for our actions
- **Bioethics** – area of ethics that deals with the implications of biological research and biotechnological applications, especially regarding medicine
  - Ask “Should this be done?” not “Can this be done?”

13.1 What Is Ethics?

- Approaches to Ethical Decision Making
  - Two main viewpoints
    - **Utilitarian approach** – states that something is good if it is useful, and an action is moral if it maximizes pleasure among humans; "greatest good for the greatest number"
    - **Deontological approach** (Kantian approach or duty ethics) – focuses on certain imperatives, or absolute principles, which we should follow out of a sense of duty and which should dictate our actions

13.2 Biotechnology and Nature

- Scientists met at conference in Asilomar, CA, in 1975 to discuss the safety and possible consequences of recombinant DNA techniques
  - Established guidelines for different levels of biosafety containment

13.2 Biotechnology and Nature

- Cells and Products
  - Issues of safety
  - Issue of **efficacy** (effectiveness)
  - Humane treatment of animals

13.2 Biotechnology and Nature

- GM Crops: Are You What You Eat?
  - Several areas of concern
    - The plant itself (**species integrity**)
    - Possible effect of altered plants on the ecosystem and on overall **biodiversity**
      - Effects on nontarget species
    - How will the crop be used? Is it safe to feed to animals? Is it safe for humans?
    - Consideration of other genes or products present in the GM crop

13.2 Biotechnology and Nature

- GM Crops: Are You What You Eat?
  - Social and economic questions arise
- Statistical Probability
  - The likelihood of an event; what chance exists for a “bad” event to happen
- Risk Assessment
  - Considers the likelihood that something harmful or unintended will happen in making a decision

13.2 Biotechnology and Nature

- Animal Husbandry or Animal Tinkering
  - Raises same ethical questions as genetic modification of plants
- The Human Question
  - **Informed consent** – patients have the right to be informed fully of the potential effects of the experimental treatment, both good and bad
  - **Placebos** – a safe but non-effective treatment
    - Double-blind trials

13.2 Biotechnology and Nature

- What Does It Mean to Be Human?
  - Many ethical debates revolve around the moral status of the human embryo
    - Is it ethical to destroy early-stage human embryos for research that may potentially treat thousands of patients?
  - **Personhood** – used to define an entity that qualifies for protection based not on an intrinsic value but rather on certain attributes, such as self-awareness

13.2 Biotechnology and Nature

- Spare Embryos for Research Versus Creating Embryos for Research
  - Primary source of embryos for research is excess embryos from *in vitro* fertilization
  - Another potential source is the creation of embryos for research purposes

13.2 Biotechnology and Nature

- Cloning
  - Raises many of the same questions, with the added complexity of the technique and the potential identity of the clone
  - Is creating a cloned embryo with the intent of initiating a pregnancy another type of assisted reproductive technology?

13.2 Biotechnology and Nature

- Cloning
  - Ethical considerations of a human clone include
    - How lack of relatedness to one parent might change kinship and family relationships
    - Expectations put on a clone once born to “live a better life” than the person who was cloned
    - Expectation to live up to a legacy achieved by the donor of the genetic material

13.2 Biotechnology and Nature

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- Cloning
  - Creation of human embryos could lead to matched embryonic cells for patients
    - Could this lead to human commercialization, making human life a commodity to be bought, sold, and used?

13.2 Biotechnology and Nature

- Patient Rights and Biological Materials
  - Physicians do have a duty to disclose the physician's personal interest in research and potential economic matters unrelated to patient treatment
  - Courts have ruled that donors of cells and other biological materials do not have ownership rights of their biological materials

13.2 Biotechnology and Nature

- Regulations in Flux
  - August 9, 2001, ban on using federal funds for embryo creation or destruction
  - Some states have enacted their own laws

13.2 Biotechnology and Nature

- Your Genes, Your Self
  - Concern over the privacy of DNA information
    - How genetic information could be used negatively by employers, insurance companies, governmental agencies, or through perceptions by the general public
    - 2008, the Genetic Information Nondiscrimination Act was passed into law
      - Prohibits discrimination based on genetics and the improper use of genetic information in health insurance and employment

13.2 Biotechnology and Nature

- More or Less Human?
  - Ethical considerations of gene therapy
    - Informed consent, safety, and efficacy
    - What about treatment of the possibility of genetic disease?

13.3 Economics, The Role of Science, and Communication

- Money plays a major role in research decisions
- Patenting of intellectual property may be lucrative, but may also pose ethical and scientific problems
  - Limited scientific access to gene for other researchers
- Should scientists have unlimited freedom for research?
- Accurate, honest communication is vital to the success of science