

## Useful Background Information

One dimension of this lesson deals with the importance of understanding some of the biological effects of sex hormones. Children going through puberty are well aware that their bodies are changing because of sex hormones. This is an appropriate time to teach the relevant biology.

The other dimension is the issue of drug side effects, of estrogen in this particular case. However, the basic issue is generalisable to all drugs. Under current law, pharmaceutical companies can only market drugs that have been tested and found both safe and effective, under guidelines and supervision of the Food and Drug Administration. Thus, if the government certifies a drug as safe, is it appropriate for a patient to sue a drug company if an adverse effect occurs? The more important issue for students to understand is that all drugs, even something as simple and widely accepted as aspirin, can have deadly effects in a few isolated cases. It is not feasible to test every new drug in more than a few hundred or a thousand people for safety. In a market of millions of subjects, there is high probability that somebody will have a bad reaction. Ask the students to think about what would happen to the drug industry if manufacturers were held liable for any bad effect in a population of millions of people. Ask them to think about which they prefer: medicines that work most of the time for most of the people or no medicines at all.

### The Veterinary Black Bag Program

#### Project Goals:

- Develop Veterinarian's Black Bags (VBBs) of instructional items and pamphlets for middle school teachers to support classroom visits by local veterinarians.
- Provide professional development for veterinarians and teachers on how to use items in the VBBs
- Promote inquiry-based thinking about health-related subjects while emphasizing the value of biomedical research and promoting careers in science.



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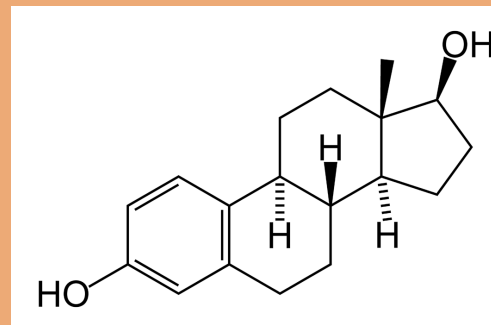
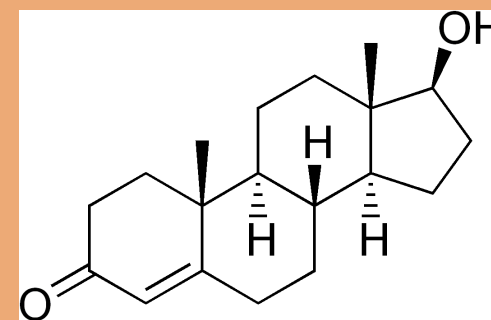
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<http://peer.tamu.edu/VBB/Summary.asp>

## Sex Hormones

Follow Up Lesson



The instruction in this module includes:  
**Presentation on *Neutering***  
Follow-up lessons on:

***Sex Hormones***  
***Reproductive Cancers***  
***Castration of Farm Animals***

## Summary of Lesson Content

### Objectives

- Explain the function of estrogens and testosterone
- State the side effects of estrogen therapy and of using anabolic steroids
- Debate or prepare an essay or poster on the issues of corporate liability for estrogen replacement products.
- Prepare a persuasive essay why anabolic steroids should not be used by athletes.

This lesson focuses on estrogen and testosterone. Some historical background on sex hormone research is provided in the slide show, along with summary of functions and medical uses of hormone replacement therapy.

A key issue with replacement therapy is the medical liability of drug companies that provide estrogen. One company has lost multi-million dollar lawsuits for supplying estrogen that caused unwanted side effects. This is a good opportunity for students to think about the pros and cons of this issue.



### Lesson Content, Continued

Doctors and patients often want estrogen replacement therapy. Yet estrogen does have side effects, like apparently increasing the incidence of breast cancer. What are we to do? All drugs have side effects, a point that the public sometimes is unwilling to accept.

The lesson also includes information on anabolic steroids, which are testosterone analogs. These are commonly used, illegally, by athletes and “body builders.” Information is presented on adverse side

