
# UNDERSTANDING HORMONE USE IN BEEF

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## Q Why do cattle farmers use "hormones" or "growth promotants" in modern beef farming?

Most of the beef in the United States today is "grain-fed" or "grain-finished." Consumers of beef in the United States have traditionally preferred the tender beef from young steers and heifers. These cattle spend most of their lives grazing on grass in pastures but are "finished" for the last 120-200 days in a feeding operation where they are fed a balanced diet of grains, harvested forages, and nutrient supplements (vitamins and minerals).

Most male cattle (bulls) are neutered early in life and become steers. Bulls produce natural male hormones that can cause aggressive behavior and injury to themselves and others. But these hormones cause bulls to grow faster, produce more muscle and protein and deposit less fat than steers.

Heifers also produce hormones, but young heifers produce much less than older or pregnant heifers. Providing small amounts of these or similar hormones to young steers and heifers allows them to regain some of the growth rate of bulls and older heifers. This occurs even though the amounts of hormones given are a fraction of the natural production of mature bulls or heifers.

## Q What are growth promotants and how are they given?

Growth promotants are primarily given to cattle in the form of small pellets placed under the skin in the animal's ear. These ear implants dissolve slowly over a 100-120 day period. The ear is used because ears do not enter the food supply.

The active ingredients – most of which are naturally occurring hormones – are either estrogens or androgens. The estrogens can be either natural, synthetic or plant-based. The androgens may be either natural or synthetic. The synthetic androgen used in implants (trenbolone acetate) has fewer negative aggressive male behavior effects and more of the muscle enhancing effects compared to natural androgens.

Depending on the implant, and the age and sex of the animal, implants will improve growth rate from 10 to 20 percent and decrease the cost of beef production by 5 to 10 percent. Studies show that the benefits of lower costs are passed on to the consumer. More efficient beef production requires less feed and land resources.

## Q How do they work?

Implants work by changing what happens to the nutrients that cattle eat. Muscle growth is enhanced at the expense of fat deposition. Because muscle is more efficient for the animal to produce compared to fat, the animal grows faster with less feed consumed. One benefit for the consumer is that, at the same weights, implanted cattle will be leaner and the beef will have fewer calories than non-implanted beef. Since the USDA quality grades are based on marbling, which is internal fat in the ribeye muscle, implanted cattle need to be fed to heavier weights or they will be given a lower quality grade.

## Q Are they safe?

Hormone implants are regulated by the Food and Drug Administration and extensive toxicological testing is conducted prior to the approval of any new growth promontant. This toxicological testing by the FDA also includes assessments of the breakdown of these products before they enter the environment. Residues of the synthetic hormones are routinely monitored by the Food Safety Inspection Service of the United States Department of Agriculture to ensure safety of the beef. The natural hormones are not tested since they are not different than those naturally produced by the animal and the quantities are a small percentage of what is normally produced.

The natural human production of both androgens and estrogens are several thousand times the content of a generous serving of beef produced with hormone implants. Likewise, other common foods are naturally much higher in estrogen than implanted beef including eggs and milk. Soybean oil can contain as much as 9,000 times the estrogen activity as the same quantity of implanted beef. Shown in Tables 1 and 2 are the estrogen activity of common foods and the natural estrogen production of people. Common consumer questions about hormones in beef often relate to cancer and early puberty in children. Exposure to high levels of hormones through implanted beef has never been implicated in early puberty in young girls although factors such as height, weight, diet, exercise and family history have (see suggested references for more information). In the 1970s diethylstilbesterol (DES), a human hormone supplement, was found to be carcinogenic. Low doses of DES were used as a growth promotant for cattle at that time. DES was banned for use in cattle in 1979.

### Table 1. Estrogenic activity of common foods

| *Food* | *Estrogenic Activity* |
|---|---|
| Soybean Oil | 1,000,000 |
| Cabbage | 12,000 |
| Wheat germ | 2,000 |
| Peas | 2,000 |
| Eggs | 17,500 |
| Ice cream | 3,000 |
| Milk | 65 |
| Beef from pregnant female | 700 |
| Beef from implanted steer | 11 |
| Beef from non-implanted steer | 8 |

Preston (1997); units are nanograms per 500 grams of food

### Table 2. Estrogen production in humans, and potential estrogen intake from implanted beef

| *Item* | *Estrogen Amount* |
|---|---|
| Pregnant woman | 90,000,000 ng/day |
| Non-pregnant woman | 5,000,000 ng/day |
| Adult man | 100,000 ng/day |
| Pre-puberal children | 40,000 ng/day |
| 500 g of beef from implanted cattle | 11 ng |

Preston (1997)

## Q What about natural beef?

Beef marketed under the label of "naturally raised" must be grown without growth promotants and verified by enrollment in a process verification program administered by the USDA. These cattle must also have been fed without antibiotics and animal byproducts. Beef marketed as organic beef also is not implanted and must adhere to strict organic guidelines including the feeding of organically grown feeds. Consumers who are concerned about the use of implants can find beef, through labeling, that verifies that implants have not been used. However, since implants reduce the cost and resources used in the production of beef, consumers should be prepared to pay a premium for these products.

### *Suggested Resources*


Gandhi, Renu and Suzanne Snedeker. 2000. Consumer Concerns about Hormones in Food. Cornell University Program on Breast Cancer and Environmental Risk Factors in New York State. Fact Sheet # 37. http://envirocancer.cornell.edu/Factsheet/Diet/fs37.hormones.cfm

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