

Does Biotechnology Put The Food Supply At Risk?

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how you can evaluate the validity and reliability of this information.

As the relationships between overconsumption of calories, fat, saturated fat and cholesterol and human health become better understood, dietary guidelines are developed to help consumers make appropriate changes in dietary habits. Current data indicate that American adults get too many calories from fat, that men's diets include too much cholesterol on average, and that women's diets are lacking in calcium and iron (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 1986). Calcium is insufficient in half our children's diets, and four-fifths of children have diets low in iron. These data led to general dietary guidelines being established by several National Health Agencies including the American Heart Association, the American Cancer Society and the National Institute of Health (National Academy of Sciences, 1988).

Animal products (meat, milk, eggs and products derived from them) provide a major portion of essential nutrients (such as protein, essential fatty acids, B-vitamins and some minerals) required for a balanced diet and good health. However, these food products also contribute approximately 57% of the total fat consumed in our diet in 1984. This is

markedly reduced from the 70% of total they represented in 1957-59. They also contribute about three-fourths of the saturated fatty acids we consume. Red meat (beef, veal, pork and lamb) contributes slightly more than one-fourth of the fat from animal products and about 16% of the total fat found in our diet. Red meats also contribute about one-fourth of our dietary intake of cholesterol, while nearly 40% comes from eggs and about 14% from milk and milk products. This information led to strong consumer demand for leaner meat and meat products. Other incentives for meat animal producers to raise animals which contain less fat include the following: 1) greater efficiency (less feed required) when nutrients are deposited as muscle instead of fat, 2) recent increases in subsidies to pork producers in the European Economic community (none exist in the U.S.), 3) limitations in reducing fat content of meat animals through genetic selection, 4) difficulty in managing intact male cattle (which are leaner than females and castrate males) and 5) undesirable odor and flavor found in pork from intact male pigs raised to our conventional market weights.

Recombinant DNA technology has recently made it possible for us to use our knowledge of endocrine (hormonal) influences and

control of protein and fat metabolism through mass production of hormones or hormone releasing factors which influence muscle growth and fat accumulation in meat animals. This greater availability of these hormones allowed us to investigate the possibility of improving efficiency of meat animal production and of reducing the fat content of meat animals by administering somatotropin (growth hormone) to cattle, pigs

and sheep used for beef, pork and lamb production.

Dramatic improvements are seen in growth rate, feed efficiency and composition of meat from pigs given a range of porcine somatotropin. Production efficiency is improved by up to 35%, markedly reducing the amount of feed and associated resources required to raise the pig to market weight. This improvement in efficiency results from the coordi-

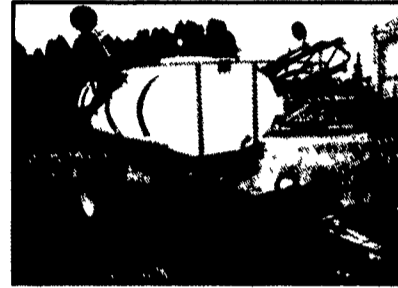
nated shift in use of nutrients consumed toward greater rates of protein (muscle) accretion and away from synthesis and deposition of fat. Total muscle weight in the animal is increased by up to 35% and total fat is reduced by up to 50%.

Porcine somatotropin also markedly reduces fat content of individual muscles by 45 to 75%, thereby markedly reducing the

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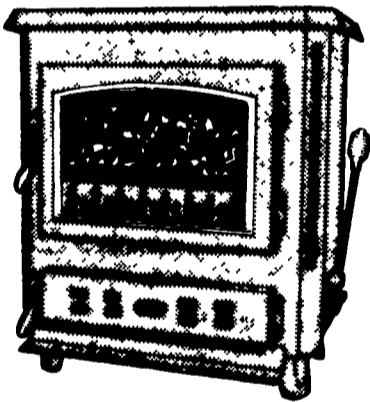
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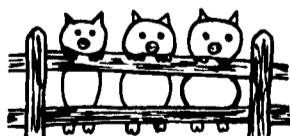
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