

# **WHY PEOPLE EAT BEEF<sup>1</sup>**

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## **Summary**

An integral element of the beef industry's focus on the consumer is an understanding of why people eat beef. Evolutionists tell us that humanity has changed its dietary patterns—now eating more food from plant sources than from animal sources—but should now consider returning to a diet more like that of our Paleolithic ancestors—high-protein and low-fat. Vegetarians eat no meat. People who live by religious tenets do not eat meat from some farm-animal species (e.g., Jews, Moslems, Hindus) but do eat meat from other farm-animal species while Christians, for example, believe they can consume meat from all farm-animal species. Biologically, humans benefit nutritionally from meat consumption and benefit from consumption of beef (an exquisite combination of vital nutritional entities) especially if it is lean and if it is part of a nutritionally balanced diet. Beef is a wonderful package of essential nutrients (e.g., zinc, iron, protein) and, if lean, compares favorably to chicken as a part of healthful and remedial (for sick people) diets. Great efforts have been made by supermarketing firms to present lean beef to their customers (closely trimmed steaks/roasts and high-lean ground beef). People who prefer beef over pork, lamb and/or poultry do so because of beef's unique flavor; if, however, the industry could deliver consistently juicy and tender beef with the exemplary flavor that results from 100 days or more of grain-feeding, many more consumers would routinely select beef as the meat of choice. Those who produce and market beef should realize that the endproduct they sell is not meat...it is taste; people will pay more for greater satisfaction...and, taste is their measure of satisfaction in food. Flavor desirability of beef can be increased by grain-feeding for about 100 days and by increasing the amount of marbling in beef muscles. Juiciness of beef can be improved by increasing the amount of marbling in beef muscles. Tenderness of beef can be increased by harvesting more youthful cattle of types/kinds that produce genetically tender muscle containing increased amounts of marbling and by managing them to minimize stress, intramuscular injections and hormonal balances likely to toughen the endproducts. Purveyors, retailers and restaurateurs expect those in the cattle industry to improve the palatability of beef. USDA Quality Graders and certain brands of beef do a remarkable job of sorting carcasses and cuts according to expected palatability of the cooked product. There are ways to make beef tender without increasing marbling, but that will not suffice (in causing more people to prefer to eat beef rather than other red or white meats from other farm-animal species) without also assuring sufficient marbling in the muscles—and its impact in enhancing flavor and juiciness—beef cannot continue to win back consumer demand.

## **How has what we eat changed over time?**

Evolutionists tell us that humanity has changed over time—largely as the result of natural selection acting to maximize dietary quality; changes in food availability over time, it seems, strongly influenced our hominid ancestors. William Leonard said (Scientific American, 2002), “The characteristics that most distinguish humans from other primates are largely the results of

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natural selection acting to improve the quality of the human diet and the efficiency with which our ancestors obtained food; thus, in an evolutionary sense, we are very much what we ate.”

Arthur de Vany reported (Texas Cattle Feeders Association Annual Convention, 2001), “Humans spent two million years as hunters and scavengers, eating meat-oriented diets that were about 65%:35% livestock:plant calories (the US diet today is 38%:62% livestock:plant calories); after humans began growing crops, just 10,000 years ago, they could feed larger populations but plant-only diets produced poorer health. This argues strongly for greater meat consumption.

Loren Cordrain concluded (The Paleo Diet, 2001), “The early people, who ate mainly plants, lacked key vitamins, minerals and amino acids, which led to higher infant mortality, shorter life-spans, more infectious diseases, widespread iron-deficiency anemia and bone-mineral disorders. While many dieticians recommend low-fat, high carbohydrate diets as healthy, my research shows that the most effective diet many be traced to our Paleolithic ancestors living 40,000 years ago. ‘The Paleo Diet’ has basic tenets that call for eating all of the lean meats, fish, seafood, fruits and non-starchy vegetables you can eat but no cereal grains, legumes, dairy products or processed foods. ‘The Paleo Diet’ rejects the modern dependence on grains and processed food and returns to a high-protein, low-fat diet.” Lean beef can well be one of the lean meats in this and similar diets.

### **Who Can Eat Meat?**

Judeo-Christians believe meat from farm animals is an acceptable component of their diets. Rules regarding which animals were acceptable as food, how those animals were to be harvested and how meat was to be prepared for the Children of Israel are detailed in the Old Testament of the Holy Bible. Christians believe instruction provided in the New Testament of the Holy Bible release them from instructions regarding meat consumption. Christians and Hindus believe it is permissible to consume pork but Orthodox Jews and Moslems do not, while Hindus do not eat beef.

There are people of all religions, plus people who follow no organized religion, who do not eat meat; in general those people are categorized as “vegetarians.” Some vegetarians have such sincere compassion for other living beings that they just can’t eat products from them, others believe animal products are unhealthful, and some feel decidedly uncomfortable “eating a body part that is recognizable as a section of an arm, the back, or a leg of an animal.” In my 45 years of teaching/extension interaction with young people, I have encountered many who became vegetarians because it was “currently fashionable” but reverted to being omnivores as they matured. The worst thing we can do is to argue with vegetarians; in my experience, that will not work.

### **Who Should Eat Meat?**

Gary Smith said (Boehringer/Ingelheim Canada Seminars, 2002), “To replenish the human body, we need to consume things that are, chemically, most like ourselves; meat, poultry, fish and game have proteins (actually, the appropriate combination and balance of amino acids) most like our own, and taste good to us, so they become our food of choice...and need.” Every nutrient in meat can be obtained by taking supplements that contain amino acids, fatty acids, vitamins and/or minerals; there’s nothing good—nutritionally—in meat that is unique to meat. So, unless

one's religious beliefs or devotion to vegetarianism preclude consumption of meat—in which case, the optimal combination of nutrients must be achieved by eating plant-source foods supplemented with chemicals (pure nutrient sources) and balanced to meet the needs of the human body—everyone should eat meat. Meat consumption is especially important to people who are young, and growing rapidly, as well as to pregnant and non-pregnant pre-menopausal females of all ages. “Studies of traditionally living populations show that modern humans are able to meet their nutritional needs using a wide variety of dietary strategies; we have evolved to be flexible eaters,” said William Leonard (Scientific American, 2002).

### **Who Should Eat Beef?**

Alex Avery said (Harris Ranch Partnership For Quality Meeting, 2001), “Who should eat beef? Sick people and genetically disease-susceptible people shouldn't eat beef, but everybody else should.” “For people that are susceptible to lipid-related illnesses, beef can be recommended for consumption only if it is lean; for the remainder of people in the population, beef is an exquisite combination of vital nutritional entities in a single product and can be eaten in quantities that do not, when combined with all other foods in a person's diet, create intolerable caloric levels,” said Gary Smith (Rocky Mountain Beef Options Seminar, 2003). William Leonard (Scientific American, 2002) concluded, “The health concerns of the industrial world, where calorie-packed foods are readily available, stem not from deviations from a specific diet but from an imbalance between the energy we consume and the energy we expend.” American Council on Science and Health (2003) asked a group of physicians and scientists to conduct a literature review which concluded that “Many Americans are misinformed and think beef in their diet will have negative consequences; many of the supposed risks associated with consuming beef either lack scientific support or have been exaggerated.”

### **What Does Beef Consumption Contribute To Human Nutritional Status?**

One 3-ounce serving of beef contributes (as percentages of Daily Values in a 2,000-calorie reference diet), 9% of calories, 50% of protein, 14% of iron, 39% of zinc, 37% of Vitamin B-12 and 16% of Vitamin B-6 (USDA-ARS, 2001; NCBA, 2004). Runners World (2003) concluded, “What's the best way to boost your iron status? Reach for meat. Steak is loaded with iron, plus zinc; fish and chicken also supply these minerals but beef packs more per serving than the white meats. Monounsaturated fat in beef is protective against heart disease, and conjugated linoleic acid (found in red meat and dairy products) inhibits tumor development, lowers total and “bad” (LDL) cholesterol, reduces body fat and may delay the onset of diabetes (Render, 1998).

The “Parity Study” (Archives Of Internal Medicine, 1999) concluded that: (a) lean red meat is just as effective in lowering cholesterol as chicken and gives people on a low-fat diet a greater variety of food from which to choose, and (b) eliminating lean red meat is unnecessarily restrictive—and, advising against consumption may actually impact long-term dietary compliance.” To help assure that lean beef is available for those who prefer it, or need it (medically): (a) supermarkets now offer very closely trimmed beef steaks and roasts plus high-lean ground beef (Dale Denton, King Soopers, 2004, said “Our most popular ground beef 10 years ago was 78% lean, 5 years ago was 85% lean, and presently is 93% lean.) and (b) the beef industry (NCBA, 2004) has identified the “Skinniest Seven” very closely trimmed retail cuts from the round and loin that fall between the skinless chicken breast and thigh in terms of total fat.

And, experts agree that including beef may provide the additional variety to help people stick with a low-fat diet (Today's Health & Wellness, 2003). An article in American Journal of Medicine (2002) reported that 80% of Atkin's Diet participants in a Duke University study adhered to the diet for the entire six months and lost an average of 10% of original body weight. If beef demand is, in fact, increasing, to what do we attribute such reversal of fortune? My (GCS) guess is that we owe a great debt of gratitude to Dr. Atkins and Suzanne Somers, both of whom espoused diets that advocated high levels of beef consumption. I decided this after hearing two of my daughters and one of my daughters-in-law discussing the fact that, although they no longer fully subscribe to "Dr. Atkins's Diet," they have continued to eat—and serve their families—lots of beef.

### **Are There Palatability Differences That Cause People To Prefer Beef Over Pork, Lamb And Poultry?**

"Taste" is defined (The American Heritage Dictionary, 2002) as "The sense of flavor, in combination with the senses of smell and touch, which together receive a sensation of a substance in the mouth." For cooked meat, the components of taste that determine "overall palatability" of beef (i.e., the satisfaction gained from eating beef) are flavor, juiciness and tenderness. Of the palatability attributes—flavor, juiciness and tenderness—which of these accounts for the preference of those who choose beef over other red and white meats from farm animals? It isn't tenderness or consistency of tenderness because both lamb and poultry meat are—on average—more tender than beef; both beef and pork—across the total supplies available—exhibit substantial variability in tenderness/toughness. It is likewise doubtful that it is juiciness inasmuch as both lamb and pork (especially now that almost all fresh pork is "enhanced" (by injecting it with a solution of water, salt and phosphate); beef is, though, on average, more juicy than poultry meat. The palatability difference—for those who prefer beef rather than pork, lamb or poultry—is beef's unique flavor. If, however, the industry could deliver consistently juicy and tender beef with the exemplary flavor that results from 100 days or more of grain-feeding, many more consumers would routinely select beef as the meat of choice.

### **How Important Is Taste In Determining Desirability Of Food, Meat And Beef?**

Fergal Quinn (SuperQuinn Supermarkets in Ireland) said (World Meat Congress, 1999), "If you can get away from the straitjacket of regarding meat as a commodity, you will concentrate on how you can best satisfy the needs of the consumer. The endproduct you sell is not meat...it is taste. Consumers won't pay more for food that satisfies their nutritional requirements or fits their food safety requirements. People will pay more for greater satisfaction...and, taste is their measure of satisfaction in food."

For the 20 years (from 1983 through 2002) that Food Marketing Institute asked supermarket shoppers about their purchase habits, they identified taste as the most important factor in food selection. A Maritz Meat Attitude Tracker Survey for the National Pork Board (Pork, 2002) determined that consumers rate taste as the top factor when they're considering a meat purchase, ranking it much higher in terms of influencing buying decisions than value for price, can be prepared in a variety of ways, family favorite or easy to prepare (ranked 2, 3, 4 and 5, respectively).

### **What Factors Determine The Palatability Attributes Of Beef?**

Gary Smith said (Certified Angus Beef Seminar, 2004) “The desirability of the flavor and aroma of cooked beef is determined by species-specific carbonyl compounds (aldehydes, ketones, fatty acids) that are in the intramuscular fat (marbling) of beef muscle. The primary determinants of flavor desirability of beef and its marbling fat are: (a) grain-fed vs. grass-fed, (b) fed on grain for about 100 days, and (c) flavor increases as marbling increases.” US consumers—based on research conducted by Bowling *et al.* (1977, 1978), Smith *et al.* (1979), Gawlik *et al.* (1982), Lockhart *et al.* (2001) and Brewer & Calkins (2003)—prefer the taste and aroma of the fat from grain-fed, rather than grass-fed, cattle.

“The juiciness of cooked beef is determined by the amounts of intramuscular water (moisture) and intramuscular fat (marbling) remaining in muscle after the beef has been cooked. The primary determinants of juiciness in cooked beef are: (a) endpoint degree of doneness, (b) water-holding capacity of muscles, and (c) juiciness increases as marbling increases” (Gary Smith, Canadian Beef Palatability Enhancement Workshop, 2002). The juiciness of cooked beef increases almost linearly as amount of marbling in the muscle increases (Smith *et al.*, 1984, 1985, 1987; Platter *et al.*, 2002) in much the same manner as the succulence of a baked potato improves with additional “pats” of butter.

Gary Smith said (Certified Angus Beef Seminar, 2004) “The tenderness of cooked beef is determined by five structural and histological differences (related to chemical and physical composition of muscles, and to the histological architecture of the sarcomeres, myofibrils, muscle fibers, muscle bundles and muscles) and by, at least, seven animal and carcass characteristics related to the genetics of the animal and to the environment to which the animal was exposed. The structural and histological differences that are related to beef tenderness are: (a) amount of connective tissue, (b) cross-linking of collagen (and reticulin) in connective tissue, (c) length of sarcomeres, (d) size and dispersion of marbling deposits, and (e) activity of endogenous proteolytic enzymes. The seven animal and carcass characteristics that are related to the genetics of the animal and the environment to which the animal is exposed, and that help determine the relative tenderness of cooked beef are as follows: (a) physiological age/maturity of cattle/carcasses, (b) external fat thickness of cattle/carcasses, (c) amount of marbling in muscles of carcasses, (d) biological types of cattle, (e) temperament and handling/stress of cattle, (f) management of cattle relative to castration, use of growth implants and intramuscular injections, and (g) feeding of Vitamin D<sub>3</sub>.” Colorado State University studied a Palatability Assurance Critical Control Points (PACCP) model (Tatum *et al.*, 1997, 1998, 1999) for improving beef tenderness and reported that the two interventions that were most effective were: (a) selecting the top 25% of sires based on progeny-group means for 14-day loin steak shear force values, and (b) high-voltage electrical stimulation of carcasses followed by a postmortem aging period (for cuts) of 14 to 21 days.

### **How Useful Are Quality Grades And Brands Of Beef In Assuring Satisfactory To Exemplary Palatability?**

For more than five decades, US consumers relied almost solely upon USDA Quality Grades to guide their selection to beef that best satisfied their taste requirements. Then, in the 1970s, the American Angus Association developed the first “brand” of beef. Certified Angus Beef (CAB) was based on breed-origin of cattle and a unique combination of USDA Quality Grade factors—

the most notable of which was a minimum marbling score of Modest, thus there was a re-partitioning of the three marbling scores in the US Choice grade such that CAB consisted of the Upper Two-Thirds of US Choice. Since then, scores of additional brands of beef have been successfully merchandised using variations on the CAB idea of bracketing within and across USDA grades and/or combining genetics, grade factors and/or production practices, in attempts to generate populations of beef that are more consistent in palatability. Many other brands of beef are premised much more upon production-practice differences (Natural, Organic, Grassfed) than on palatability prediction.

Gary Smith said (Canadian Beef Palatability Enhancement Workshop, 2002) that research results during the past 25 years reveal that the odds of having an unpleasant eating experience are 1 in 33 (3%) if a middle-meat steak comes from a Prime carcass, as compared to 1 in 10 (10%), 1 in 6 (16%), 1 in 4 (27%), or 1 in 2 (50%), if a loin/rib steak comes from a carcass of Upper Two-Thirds Choice, Lower One-Third Choice, Select or Standard grades, respectively. Platter *et al.* (2002) compared palatability of steaks from 543 carcasses using a consumer panel in Denver, CO and reported that 24%, 32%, 35% and 39% of consumers were not satisfied with the overall eating quality of steaks from carcasses of Prime, Upper Two-Thirds Choice, Lower One-Third Choice and Select grades, respectively.

### **Is There Need To Improve The Palatability Of Beef?**

Roeber *et al.* (2002) reported that domestic merchandisers of US beef (purveyors, retailers, restaurateurs) identified the following as among the “Top Ten Quality Challenges” (based on results of the National Beef Quality Audit—2000) for the beef industry: (a) inadequate flavor (purveyors, retailers, restaurateurs), (b) inadequate juiciness (retailers), (c) inadequate tenderness (purveyors, retailers, restaurateurs) and (d) inadequate overall palatability (retailers).

The palatability performance of beef from carcasses of Prime and Upper Two-Thirds Choice is very satisfactory; so, one way the palatability of US beef—in general—could be improved is by simply selecting seedstock with high propensities for producing youthful beef with high levels of marbling. Gary Smith said (Certified Angus Beef Seminar, 2004) “For beef from carcasses that would be assigned grades of Lower One-Third Choice or Select, there are seven ways its tenderness can be improved: (a) high-voltage electrical stimulation of carcasses, (b) controlled aging (refrigerated storage for prolonged times), (c) enhancement via marination or injection of salt/phosphate solutions, (d) sorting of carcasses using physical traits (e.g., conformation, hump height), (e) sorting of carcasses using instruments (e.g., Computer Vision System, CSU BeefCam), (f) controlling genetics of the cattle, by and within breeds and crosses, before harvest, and (g) use of Palatability Assurance Critical Control Point (PACCP) programs.” It is clear though (Killinger *et al.*, 2001) that “Tender is not enough; producers cannot ignore marbling and count on tenderness leading the way back to consumers. Without marbling, and its impact on flavor and juiciness, beef cannot continue to win back consumer demand.”