Meat in the Diet - Science of Meat

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Meat is a great source of high quality nutrient rich protein.

- Zinc
- Selenium
- Phosphorus
- B12
- Iron
- Niacin

Meat Consumption is Associated with Less Stunting among Toddlers in Low-income settings


Meat Positively Impacts Test Scores in Kenyan Children


Meat as Complementary Food Increases Growth But Not Adiposity in Breastfed Infants

Meat is a Recommended First Food

Meat is Valued for Heme Iron

“Adolescent and premenopausal females should increase consumption of foods rich in iron. Heme iron from lean meats is highly bioavailable, hence, an excellent source.”

Meat’s High Quality Protein and Calorie Advantage

Is Meat’s Place on the Plate Shifting?

Science Impacts Paradigm Shifts for Beef

3+ Decades of Advice to Eat Less
Dietary patterns associated with positive health outcomes for the U.S. population are: higher in vegetables, fruits, whole grains, low- or non-fat dairy, seafood, legumes, and nuts; moderate in alcohol (among adults); lower in red and processed meat\(^1\); and low in sugar-sweetened foods and drinks and refined grains.

\(^{1}\)“As lean meats were not consistently defined or handled similarly between studies, they were not identified as a common characteristic across the reviews. However, as demonstrated in the food pattern modeling of the Healthy U.S.-style and Healthy Mediterranean-style patterns, lean meats can be part of a healthy dietary pattern.”

2015-2020: Many Factors Facing Meat

Saturated Fat Skepticism and Debate

Accurate Data on Today’s Meat Supply

- **Today** a sirloin steak has 34% less fat than it did in the 1960’s
- Since 1980 Dietary Guidelines for Americans were issued, external fat on beef has decreased by 81%
- 38+ cuts that meet USDA Guidelines for Lean

Western Diet Stereotypes Persist
Note to Self

Western Pattern is Real...

Building Better Diets with Beef

Dietary Pattern Research Relies on a Weaker Form of Evidence

Limitations of Observational Evidence

Diet and Cancer

- Confounding
- Correlated nature of nutrients and dietary components
- Dietary measurement error
- Weak or modest associations (RR< 1.5)
- Displacement/substitution effects
- Healthy or unhealthy consumer bias

"A substantial amount of data from cohort and case control studies showed a dose response relationship supported by evidence for plausible mechanisms operating in humans. Red meat is a **provoking cause** of colorectal cancer."
Causal Criteria have Not been Met

"The totality of the available evidence does not support an independent positive association between red meat and cancer."

Recent Research Provides Clarity

"High consumption of red and processed meat was inversely associated with fruits, whole grain and nuts, and positively with potatoes, oil and coffee in both sexes."

"The strong association between meat consumption and a lower-quality diet may complicate epidemiological studies on meat and health."

"In conclusion, the state of the epidemiologic science on red meat consumption and colorectal cancer is best described in terms of weak associations, heterogeneity, an inability to disentangle effects from other dietary and lifestyle factors, lack of a clear dose-response effect, and weakening evidence over time."

Source: Fogelholm et al 2015 EJCN; Alexander et al 2015 JACN

2015 DGAC Top Sources of Calories

<table>
<thead>
<tr>
<th>Subcategory</th>
<th>% of total energy consumption</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDDERS, SANDWICHES, and JACOBS</td>
<td>2.1%</td>
<td>13.8%</td>
</tr>
<tr>
<td>DESSERTS and SWEET BEVERAGES</td>
<td>6.5%</td>
<td>22.3%</td>
</tr>
<tr>
<td>SUGAR-SWEETENED and SODA BEVERAGES</td>
<td>6.5%</td>
<td>28.8%</td>
</tr>
<tr>
<td>RICE, PASTA, GRAIN-BASED MIXED DISHES</td>
<td>5.5%</td>
<td>34.3%</td>
</tr>
<tr>
<td>CHIPS, CRACKERS, and SAVORY SNACKS</td>
<td>4.6%</td>
<td>39.9%</td>
</tr>
<tr>
<td>PIZZA</td>
<td>4.3</td>
<td>43.2%</td>
</tr>
<tr>
<td>MEAT, POULTRY, SEAFOOD MIXED DISHES</td>
<td>3.9%</td>
<td>47.1%</td>
</tr>
<tr>
<td>VEGETABLES (incl. Beans and Peas, not starchy)</td>
<td>3.8%</td>
<td>50.9%</td>
</tr>
<tr>
<td>ALCOHOLIC BEVERAGES</td>
<td>3.8%</td>
<td>54.8%</td>
</tr>
<tr>
<td>STARCHY VEGETABLES</td>
<td>3.8%</td>
<td>56.6%</td>
</tr>
<tr>
<td>YEAST BREADS AND TORTILLAS</td>
<td>3.8%</td>
<td>62.4%</td>
</tr>
<tr>
<td>HIGHER FATTY MILK YOGURT</td>
<td>3.5%</td>
<td>65.8%</td>
</tr>
<tr>
<td>BREAKFAST CEREALS AND BARS</td>
<td>3.5%</td>
<td>69.3%</td>
</tr>
<tr>
<td>POULTRY (Not excl. Deli and Minced Dishes)</td>
<td>3.3%</td>
<td>72.6%</td>
</tr>
</tbody>
</table>

Red Meat and Heart Health

Cholesterol Concerns Top Limiter

Accurate Data on Today’s Meat Supply

- Today a sirloin steak has 34% less fat than it did in the 1960's
- Since 1980 Dietary Guidelines for Americans were issued, external fat on beef has decreased by 81%
- 38+ cuts that meet USDA Guidelines for Lean
Strong Evidence Lean Red Meat as part of a Heart Healthy Diet Lowers Cholesterol

### Reference Study Design Results for Beef

| Flynn et al. AJCN, 1981 | 5 oz. beef, poultry, fish | Similar serum lipids, lower TG in women*
| Flynn et al. AJCN, 1982 | 5 oz. beef, poultry, fish, pork | No difference in serum lipids*
| Scott et al. Nutr Metab Cardiovasc Dis, 1995 | 8 oz. lean meat, chicken, fish, Step I | Similar lipid-lowering effects**
| Davuluri et al. Arch Intern Med, 1999 | 6 oz. lean red vs. lean white meat, Step I | Similar lipid-lowering effects**
| Hunninghake et al. AJCN, 2000 | 16 oz. lean red vs. lean white, Step I | Similar lipid-lowering effects**
| Boushey-Rondinone et al. AJCN, 2003 | 16 oz. lean beef, chicken, white fish, Step I | Similar lipid-lowering effects**
| Mclenahan et al. Nutrition, 2003 | Beef vs. chicken, indiv. hypocaloric diets | Similar lipid-lowering effects**
| Hodgson et al. Arch Intern Med, 1994 | 8 oz. lean red meat, partial card substitution | Lower systolic blood pressure with prep
| Mahon et al. AJCN, 2007 | 36g, 120g, 153g lean beef, in DASH, WAD control diets | Similar lipid-lowering effects**
| Russell et al. J Hum Hypertens, 2004 | 28g, 113g, 153g lean beef, in DASH, WAD control diets | 15g/day significantly decreased systolic blood pressure

#### Author Conclusions:

“The results of the BOLD study provide convincing evidence that lean beef can be included in a heart healthy diet that meets current dietary recommendations and reduces Cardiovascular Disease risk.”

### Red Meat Adds Flexibility to Restrictive DASH diet

Although no consensus existed regarding the best approach to assess DASH compliance, its suboptimal compliance warrants attention. This study implied a need to investigate effective approaches to sustain the DASH dietary pattern beyond counseling alone.

### Red Meat’s Misunderstood Fat Profile

- 1/3 of beef’s saturated fatty acid is stearic acid
- More than half of beef’s fatty acids are monounsaturated (good) fat – the same kind found in olive oil

### Mediterranean Diet: Gold Standard and Definition Evolving

Mediterranean diet cuts heart disease risk by nearly half

#### Mediterranean diet cuts heart disease risk by nearly half

- Older research showed that mediterranean diet is inversely associated with cardiovascular diseases, but this study adds significant weight loss, reduction of blood pressure and lower blood cholesterol levels, in addition to reduced risk of heart disease.

- **Date:** March 4, 2015
- **Source:** American College of Cardiology

### Red and Processed Meat Myths

Red and processed meat intake (g/1000 calories) in dietary patterns identified as having health benefits, in comparison to usual red and processed meat intake by adults, NHANES 2007-2010, and to amounts in the USDA Food Patterns for adults.

<table>
<thead>
<tr>
<th>Protein Source</th>
<th>Calories</th>
<th>Lacto-ovo veg</th>
<th>Lacto veg</th>
<th>Meat and Seafood</th>
<th>Processed Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chickpea</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Lentil</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Tofu</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Fish</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Beef</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Processed Meat</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

#### Author Conclusions:

How did LDL cholesterol levels change from baseline (start of study)?

- **HAD**
- **DASH**
- **BOLD**
- **BOLD-PLUS**

<table>
<thead>
<tr>
<th>Δ LDL Cholesterol from baseline(%)</th>
<th>-3%</th>
<th>-10%</th>
<th>-10%</th>
<th>-10%</th>
</tr>
</thead>
</table>

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“The results of the BOLD study provide convincing evidence that lean beef can be included in a heart healthy diet that meets current dietary recommendations and reduces Cardiovascular Disease risk.”

68TH RECIPROCAL MEAT CONFERENCE
Consumer Interest in Protein has Skyrocketed

- 91% of Americans think it is important to get enough protein in their diets (IFIC, 2014)
- 57% of Americans consider how much protein is in a food or beverage before purchase (IFIC, 2014)

Flexibility to Increase Protein Intake
Reduced Evening Snacking When Beef is Consumed at Breakfast

Overweight late adolescent breakfast skipping girls significantly reduced unhealthy evening snacking following a protein-rich breakfast.

Source: Leidy, et al., AJCN, 2013

Protein’s Role in Reward Driven Eating

A  
Activation BS greater than Breakfast

B  
Activation MP greater than MP

Drain regions displaying differential activation prior to dinner in response to food vs nonfood stimuli.

Source: Leidy, et al., AJCN, 2013

Lean Red Meat Supports Strength in Elderly Women

(aged 60-90) Living in Retirement Villages

Lean Red Meat + Resistance Exercise

(5 ½ ounces LRM + 2 d/wk resistance exercise)

✓ Muscle Strength increased
✓ Insulin-like Growth factor increased
✓ Reduction in Pro-Inflammatory Markers
✓ No differences in blood lipids or blood pressure.

Source: Daly et al., AJCN, 98 (4)2014

DASH-type Diet with Lean Red Meat Improves Mood

CONCLUSION: A moderate sodium DASH-type diet, rich in fruits and vegetables, which included lean red meat on most days, appeared to improve mood to a greater extent than the HD, particularly in relation to anger. In addition, an increase in lean red meat and fruit was related to an improvement in depression and confusion, respectively.


Feeling Better with Beef

“Beef gives me the strength and energy to do more.”

“I have a really full schedule and I keep moving so I need the right food to give me the energy to make it through the day everyday.”

“Beef is a food that I feel gives me physical energy when I need a boost throughout the day and also gives me mental boost and when I’m consistently tired and happy! Protein is always looking to do more.”

Source: L. 25

“Beef fuels my journey for good health.”

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Source: L. 25

“Beef fuels my journey for good health.”

“My definition of health is a really good balance of moving my body so that I don’t feel stuck, and eating things that let me move my body in the ways that I want to. And also emotional balance: just feeling really emotionally stable and able to do good.”

Source: L. 28

Millennials Crave Balance

While health is important to Millennials and something they think about, they do not want to obsess about being healthy. Millennials would prefer to seamlessly integrate healthy decisions into their lives.

Balance and moderation are important components to staying healthy – both in terms of balancing their food choices, as well as finding the happy balance of nutrition and taste in their food.
Tides Turn

Questions?
For further information, please contact Shalene McNeill, PhD, RD; Executive Director, Human Nutrition Research at the National Cattlemen’s Beef Association, a contractor to the Beef Checkoff Program. Every beef farmer and rancher and every beef importer contributes to a fund called the beef checkoff, which is used to support the Human Nutrition Research program.

Thanks to our Sponsor

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