Long-Term Study of Fatty Acid Composition of Wagyu Beef

Texas Wagyu Association
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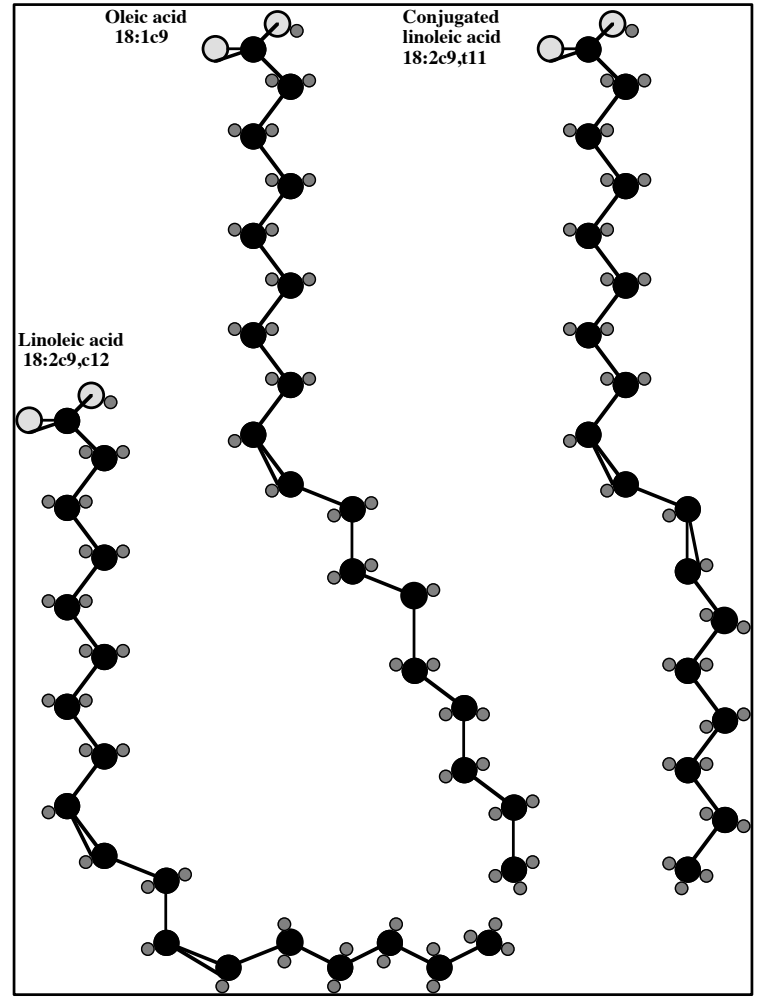
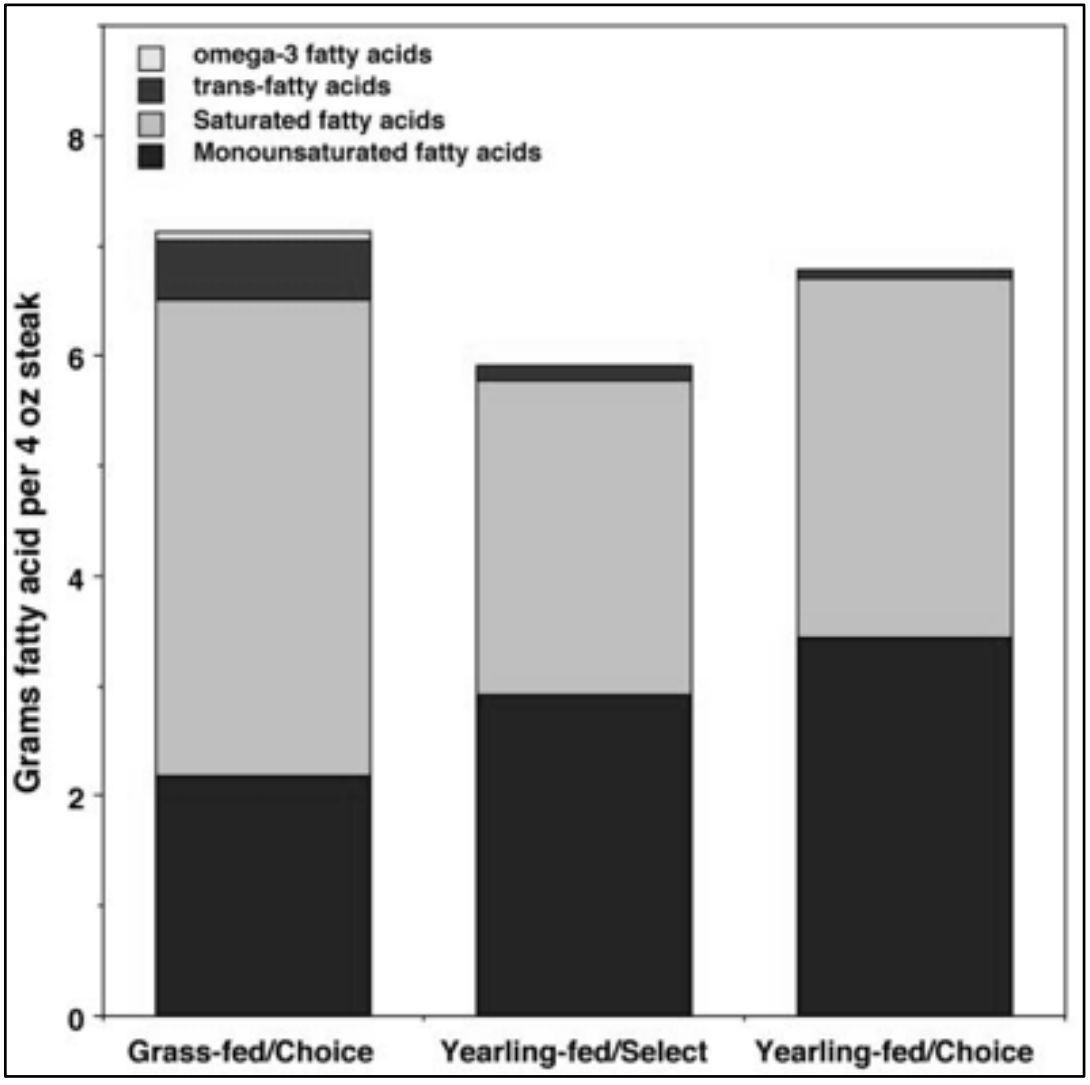
The healthful fatty acids in beef

- Oleic acid
  - The most abundant fatty acid in most beef
- Linoleic acid
  - Most comes from plant oils
- Conjugated linoleic acid
  - Small amounts in beef
- α-Linolenic acid (omega-3 fatty acid, not shown)
  - Small amounts in beef (even grass-fed)



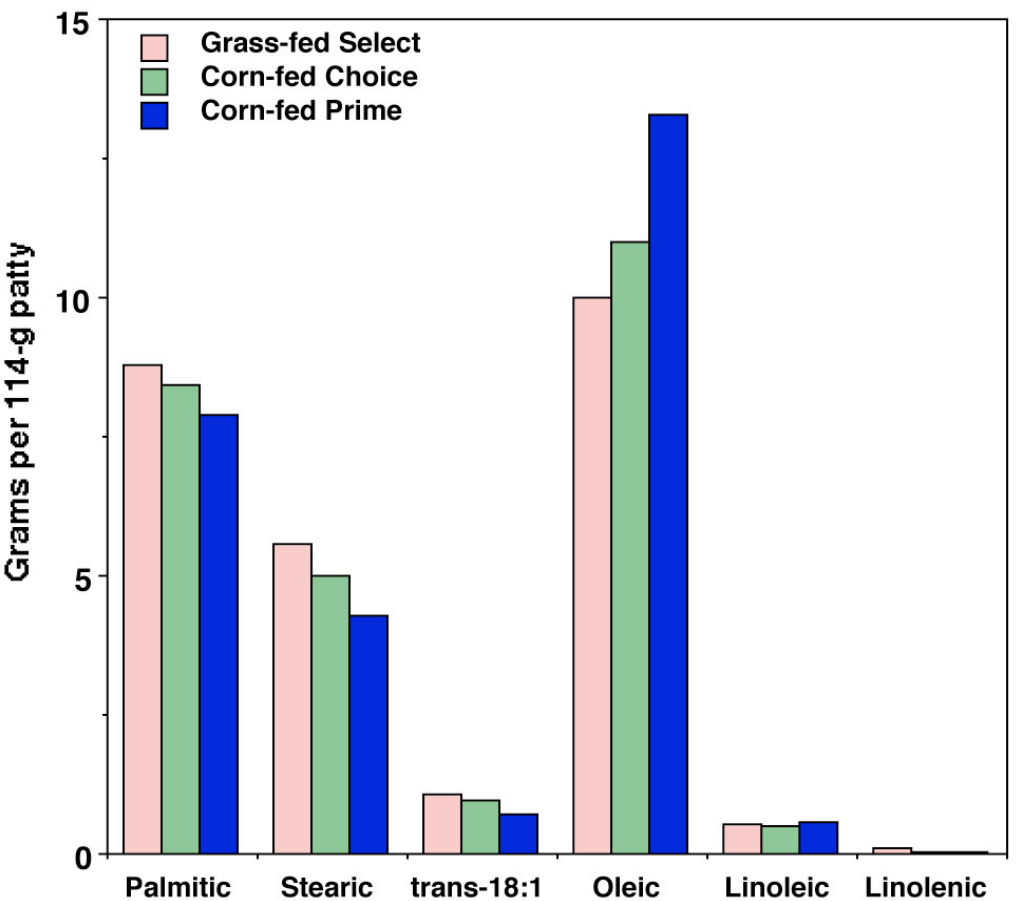
Pasture feeding increases saturated and *trans*-fats in beef steaks.

- Grain-fed beef has twice as much oleic acid as beef from grass-fed cattle.
- Grass feeding increases saturated and *trans*-fatty acids.



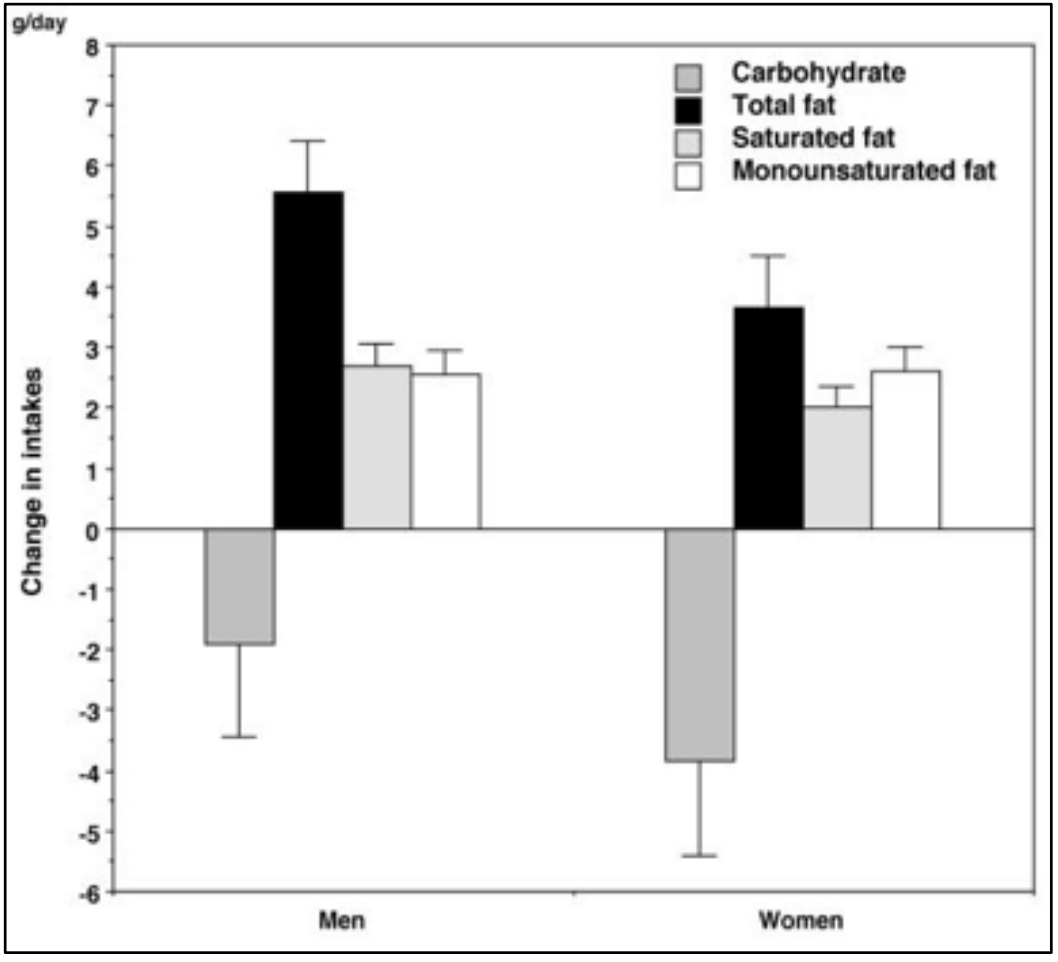
Typical composition of the ground beef used in our four human trials

- Ground beef from grass-fed is high in saturated and *trans*-fatty acids.
- Ground beef from corn-fed cattle is high in oleic acid.
- Omega-3 fatty acids were very low in all ground beef types.



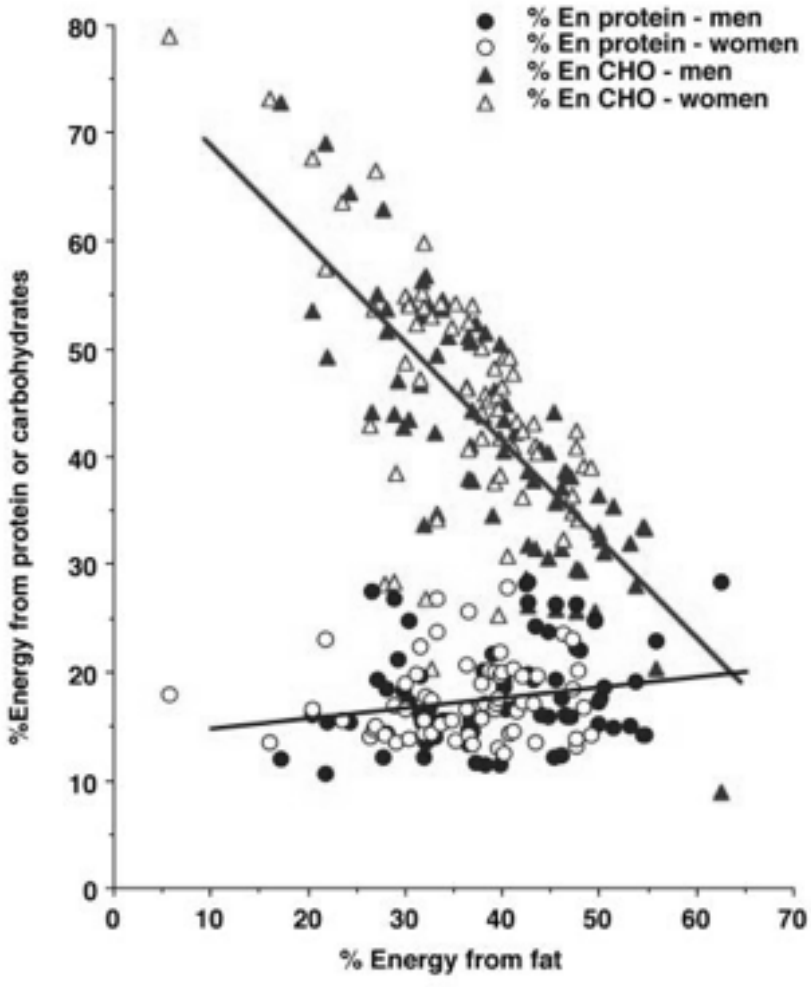
Eating ground beef decreases carbohydrate intake and increases fat intake.

- Men and women changed their eating patterns.
- They reduced carbohydrate intake when they ate more ground beef.



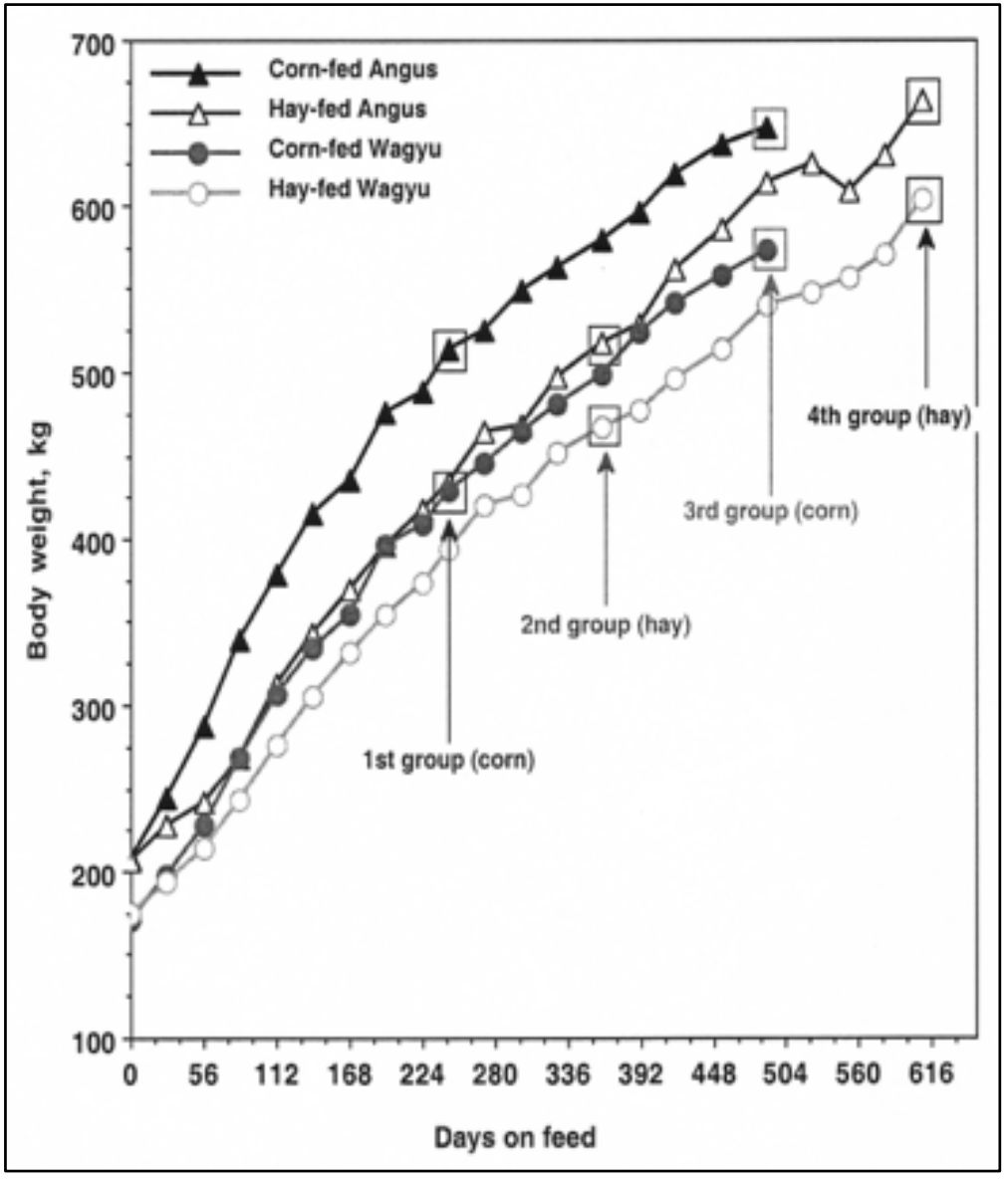
Carbohydrate intake versus fat intake

- As we consume more fat we consume *much* less carbohydrates.
- I consider this to be a healthy approach.



How do we change the fatty acid composition of beef?

- We compared Angus and Wagyu steers fed corn-based or hay-based diets.
- Cattle were fed to 1,100 lb or 1,400 lb.



Corn-based and Hay-based diets

コーンベスえさ

Corn-based diet

- 89.1% dry matter
- 11.2% crude protein
- NE_m = 1.81 Mcal/kg
- NE_g = 1.19 Mcal/kg
- Target = 3 lb/d ADG.

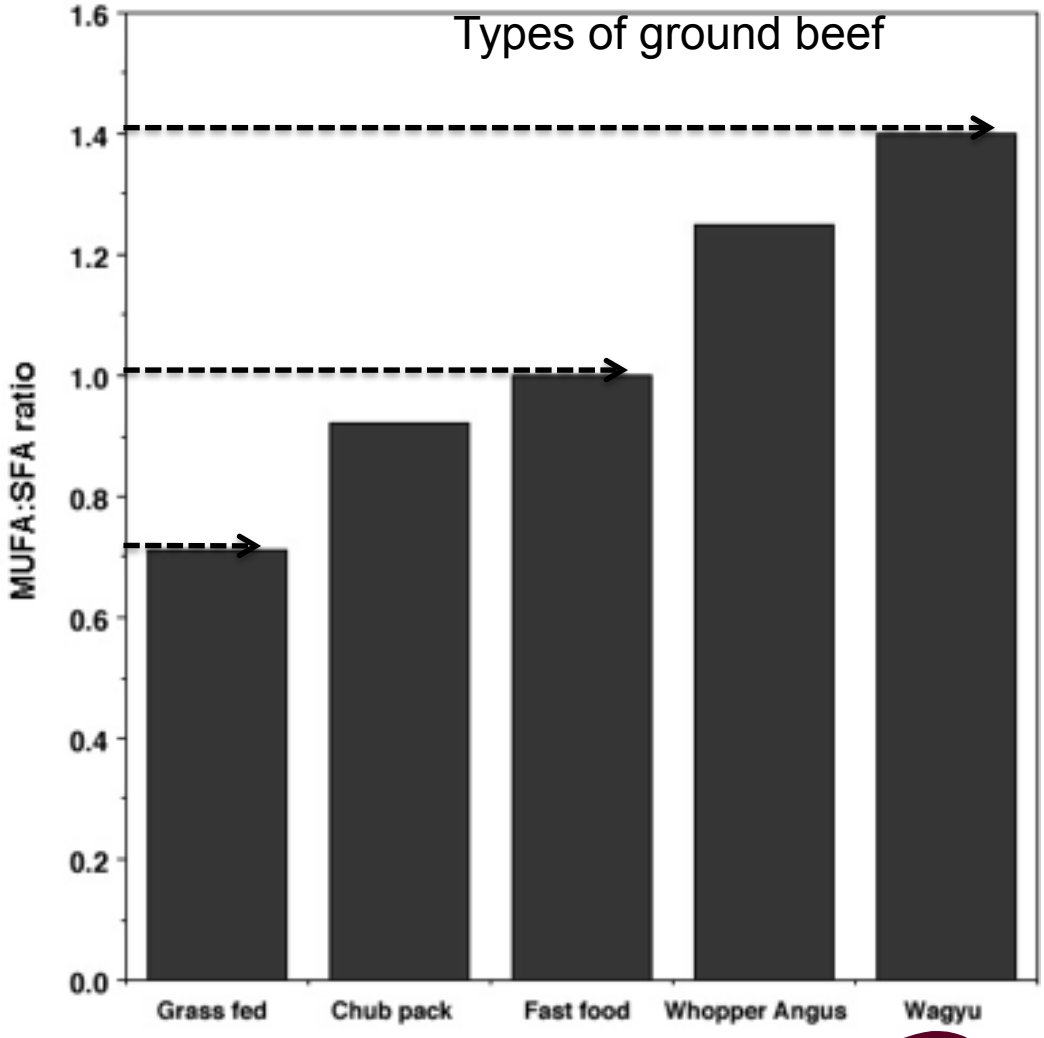
ヘイベスえさ

Hay-based diet

- Steers had free access to hay and pasture.
- Corn diet was added to provide 2 lb/d ADG.

Variations in the MUFA:SFA ratio for ground beef

- The MUFA:SFA ratio is the ratio of monounsaturated fatty acids (mostly oleic acid) to saturated fatty acids.
- High-quality beef has a high MUFA:SFA ratio (greater than 1.2).



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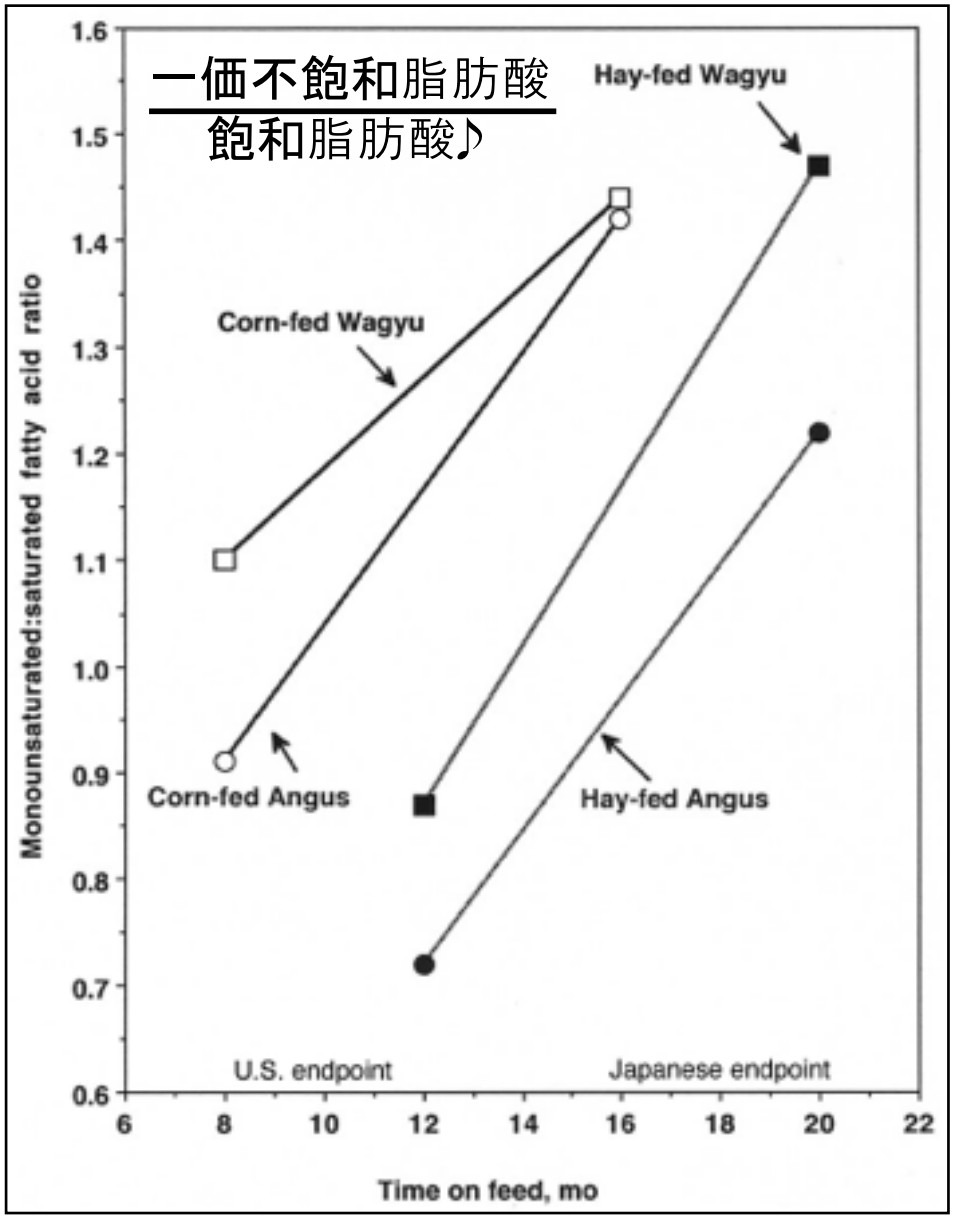
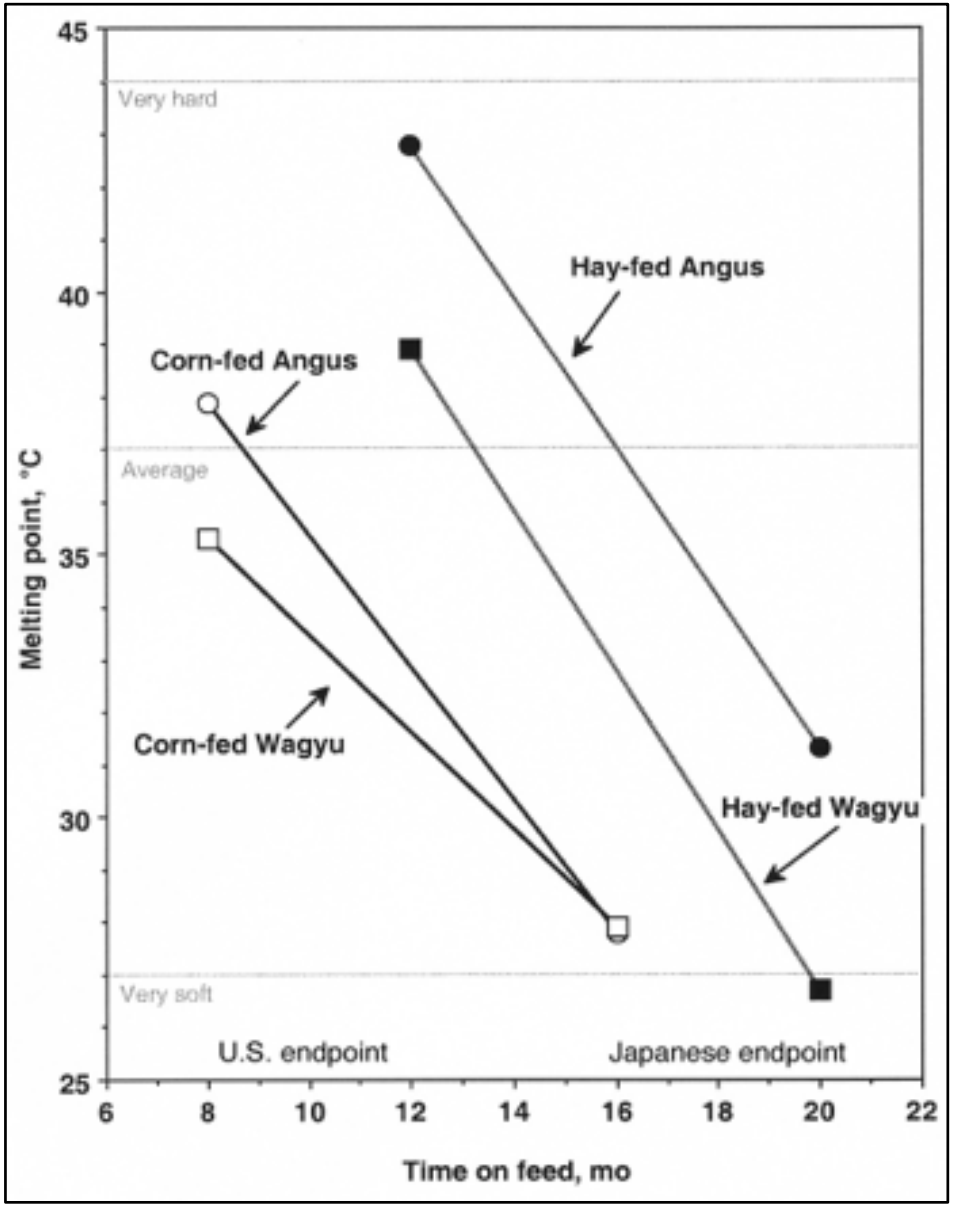
The MUFA:SFA ratio increased in adipose tissue with age.

脂肪組織中MUFA/SFAは月齢により上昇しました
日本の方法の hay 給与の和牛は一番MUFA/SFAがありました

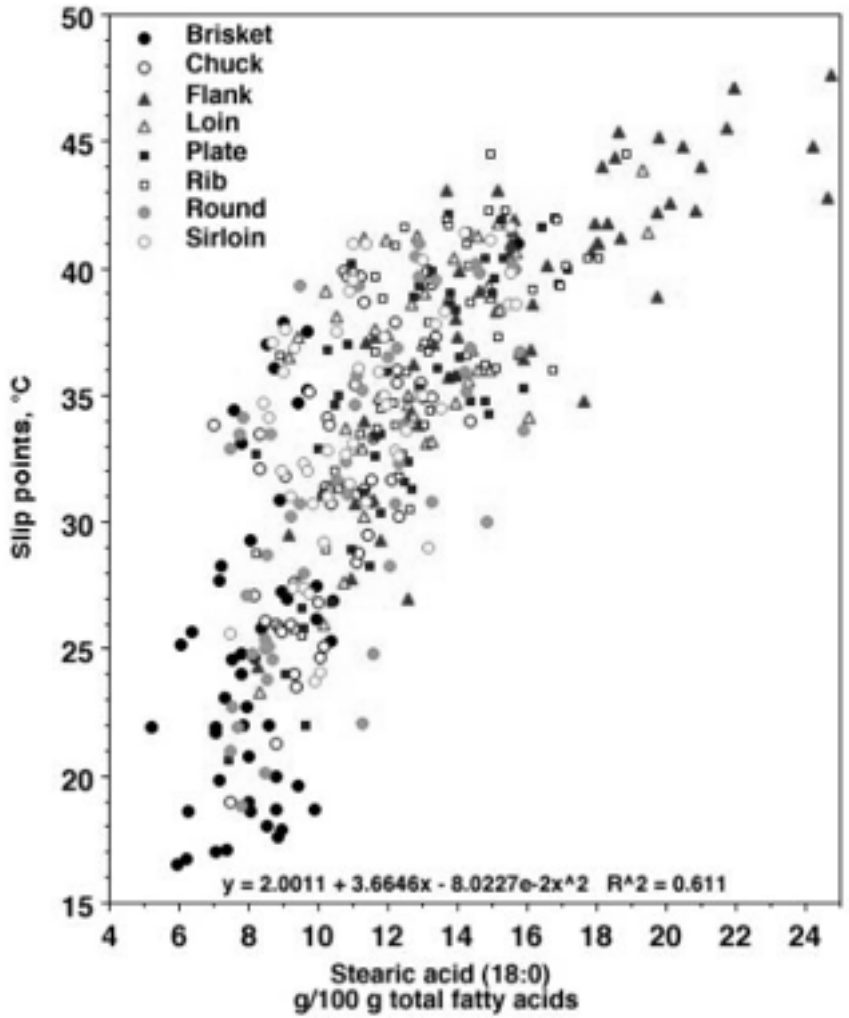


- The longer cattle are on feed, the lower the lipid melting points.
- Corn-fed cattle produce fat with lower lipid melting points than hay-fed cattle.
- Hay-fed Wagyu steers had the lowest lipid melting points.

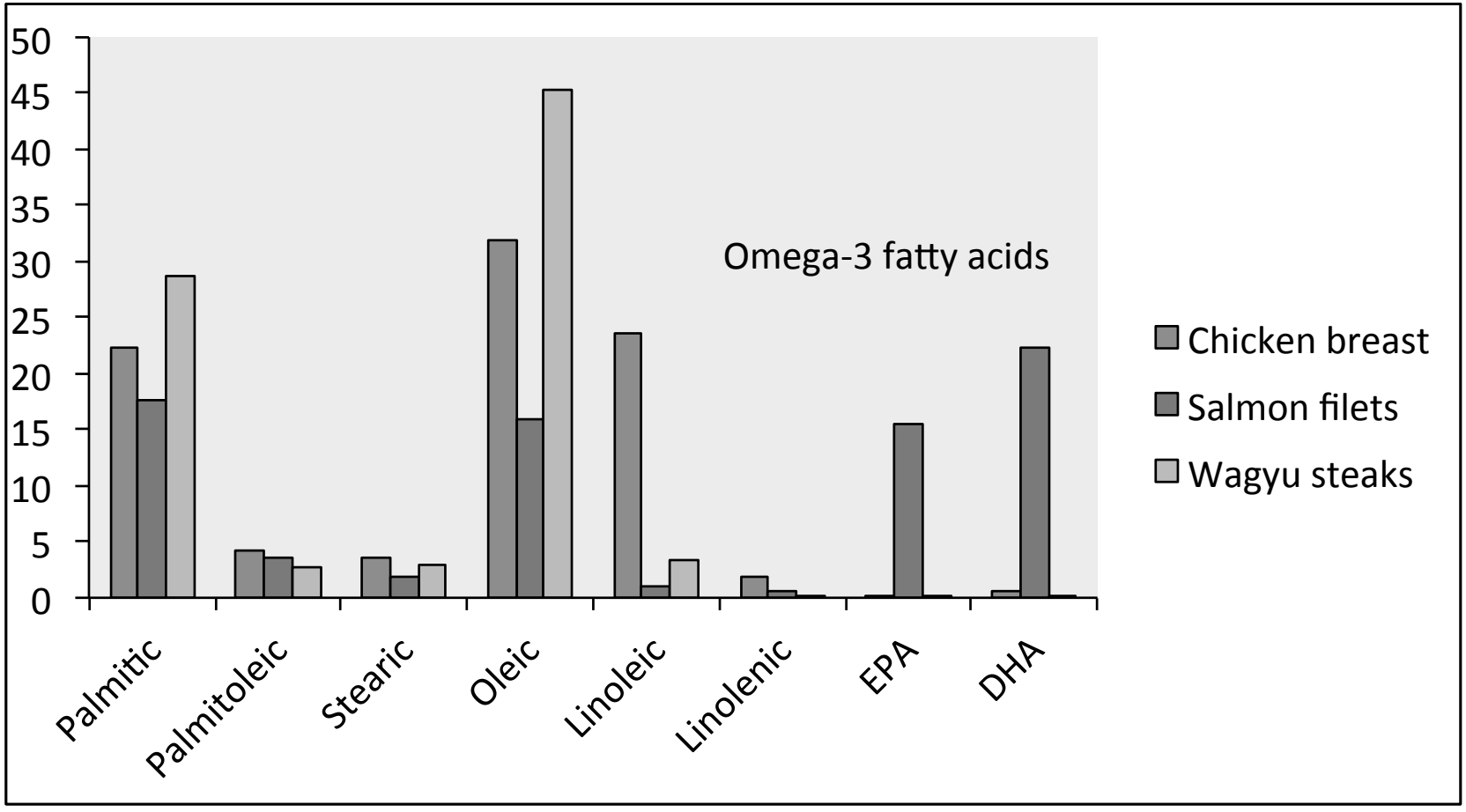


In beef, lipid melting points are determined by the amount of stearic acid.

- Fat depots differ widely in their amounts of stearic acid and melting points.
- Wagyu beef and domestic brisket have very low amounts of stearic acid and low melting points.

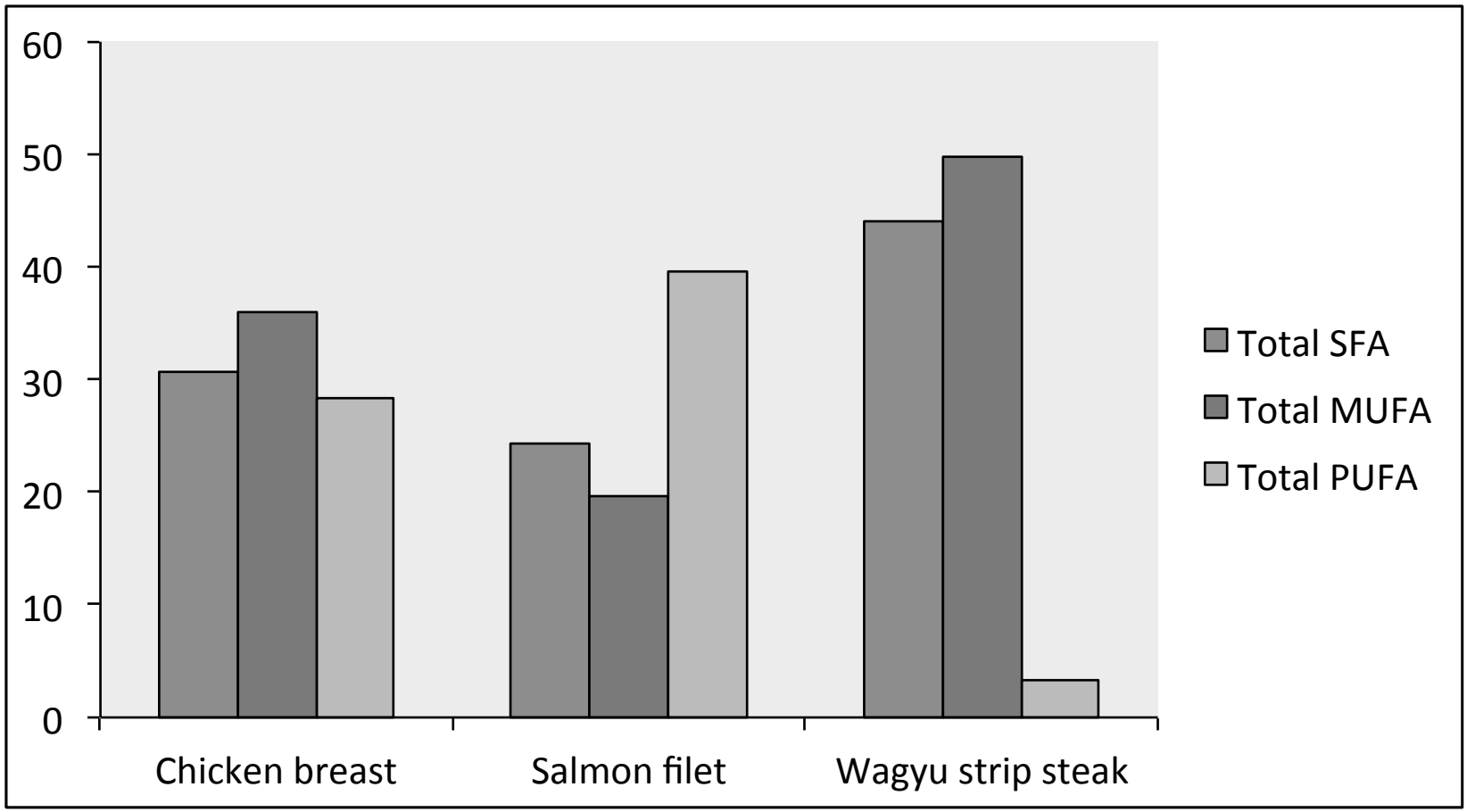


Overall Fatty Acid Composition

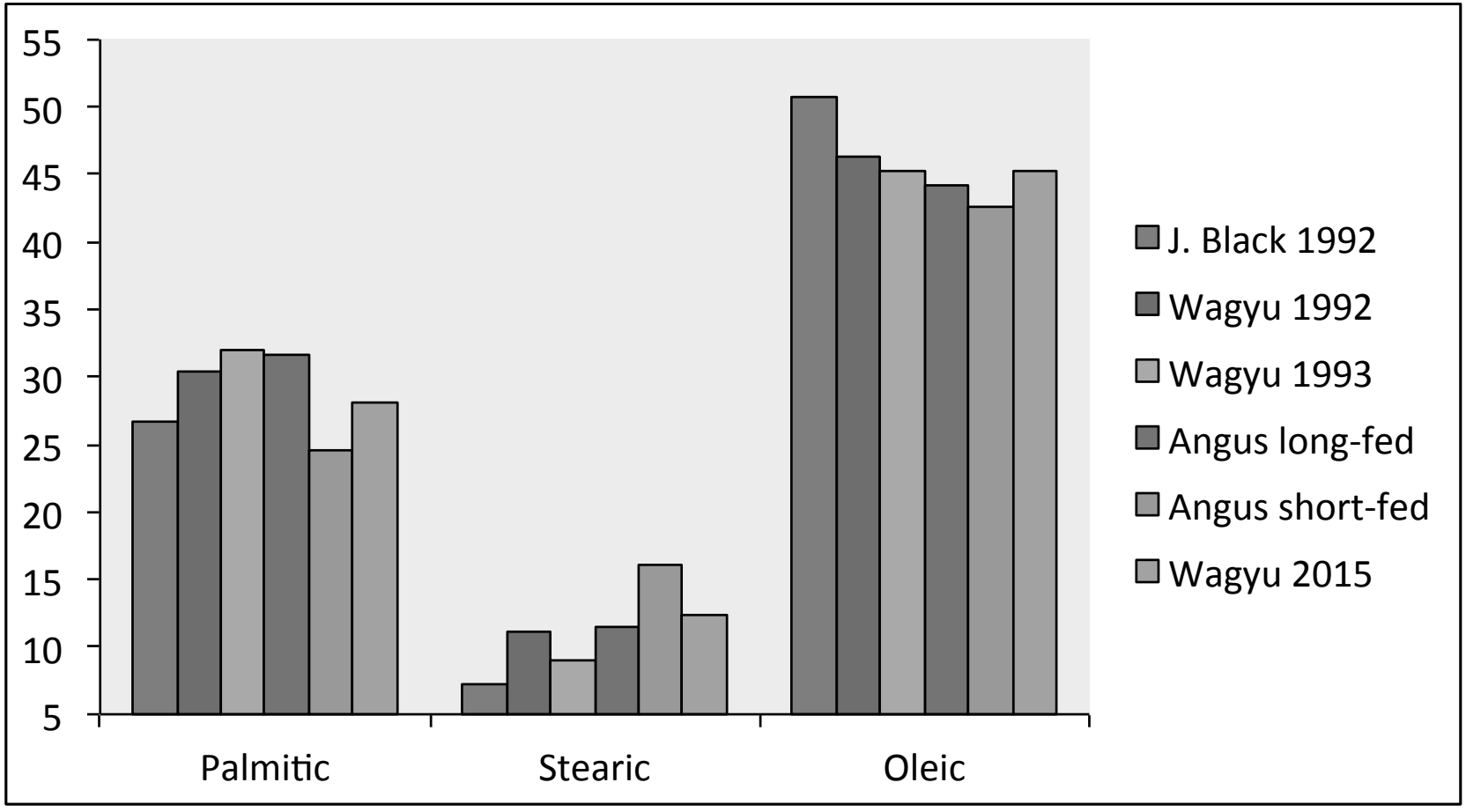


All samples containing saturated and monounsaturated fatty acids. Wagyu beef contains the highest percentage of oleic acid. Fish are high in EPA and DHA.

Total saturated, monounsaturated, and polyunsaturated fatty acids (percent of total lipid)



How do the current samples stack up?



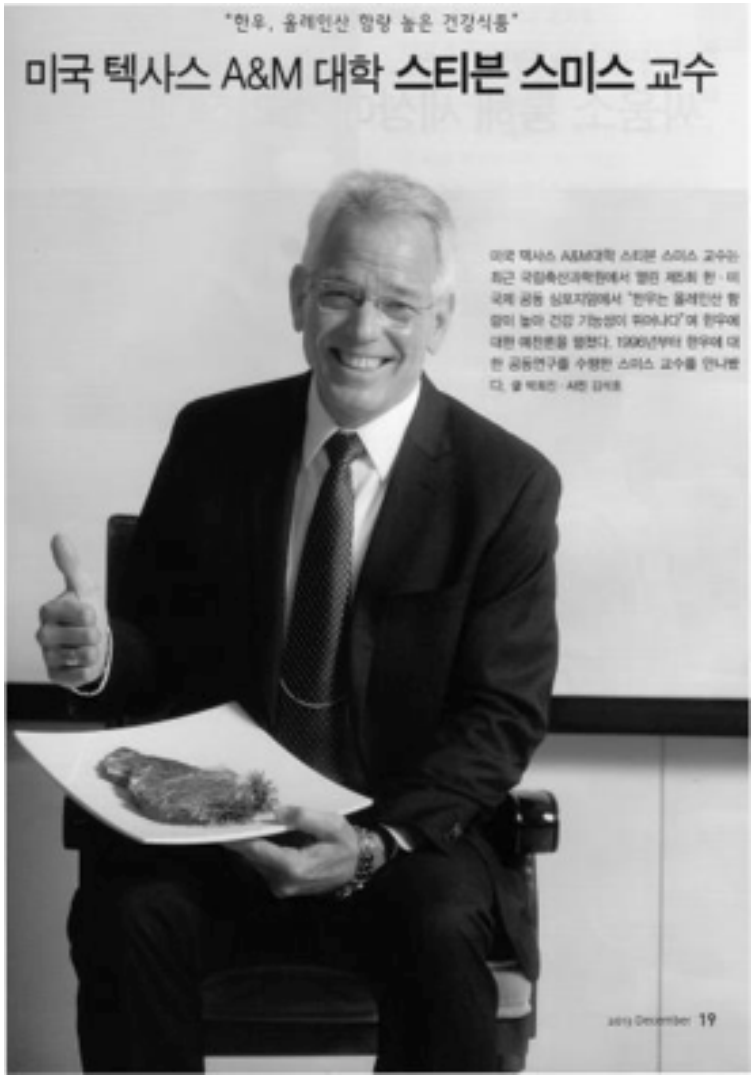
Samples from Japanese Black A5 had the highest oleic acid (> 50%), but beef from Wagyu cattle raised in the U.S. consistently contains approximately 45% oleic acid.

Where do we go from here?

- Wagyu beef represents a potential gold mine.
  - Marbling provides the flavor and juiciness beef eaters crave.
  - Oleic acid provides proven health benefits.
- Wagyu beef *may* be the true answer to grass-fed beef.
  - Grass feeding will increase omega-3 fatty acids (great for perception).
  - Grass-fed Wagyu beef *may* contain more oleic acid than grass-fed beef from conventional cattle.

What's next for me?

- Next week I am presenting "Marbling and Its nutritional impact on risk factors for cardiovascular disease" to the Korean Society for Food Science and Animal Resources.
  - The are discussing changing Korean Hanwoo beef to lower total fat.
  - This will decrease oleic acid in Hanwoo beef.



Thank you!

- Please contact me at sbsmith@tamu.edu