
Saturated Fat Hypothesis: Fact or Fiction

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In the 1950's nutrition scientists proposed that a growing epidemic of heart disease in the USA was related to a high intake of dietary fat (in particular saturated fat). By the 1970's, elevated levels of components of blood serum called "total cholesterol" and "LDL cholesterol" were found to be linked with increased risk of heart disease.

The traditional diet heart paradigm continues to influence current policy in this field (or "Paradigm" *Figure 1*). This paradigm states that both total fat and saturated fat increases total serum cholesterol and LDL ("bad") cholesterol, therefore increasing the risk of heart disease. This traditional paradigm has driven government agencies and not-for-profit organizations to urge the public to avoid eating saturated fat, using tools such as "healthful" food claims ("reduced saturated fat" etc) and limits in dietary saturated fat intake (USDA < 10%; AHA < 7%).

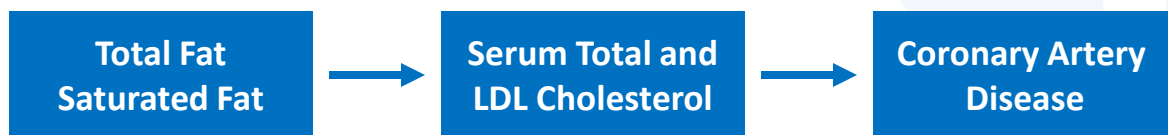


Fig. 1: The traditional Diet Heart Paradigm

However, by the 1980's, another component of blood serum called "HDL cholesterol" (good cholesterol) was found to have the opposite effect of LDL. Elevated levels of serum HDL cholesterol are associated with a *reduced* incidence of risk for heart disease.

Figure 2 below shows the effect of different fatty acids on serum LDL and HDL cholesterol. This data is taken from a 2005 meta-analysis, where many smaller studies are combined together to make a larger study. Larger studies provide much more reliable data than any individual study alone. In this study, 60 smaller studies were combined together.

In the case of saturated fat and trans fat, the LDL increases as expected. Monounsaturated and polyunsaturated fats show a small decrease in LDL. Which again was the basis for the diet heart paradigm established in the 1950's.

But figure 2 below shows the effect of different fatty acids on serum HDL cholesterol. Perhaps surprising to many, saturated fat *improves good cholesterol more than any other fatty acid*, suggesting a positive effect for reducing risk of heart disease. Trans fat does not raise serum HDL at all, and mono and polyunsaturated fats have an intermediate effect.

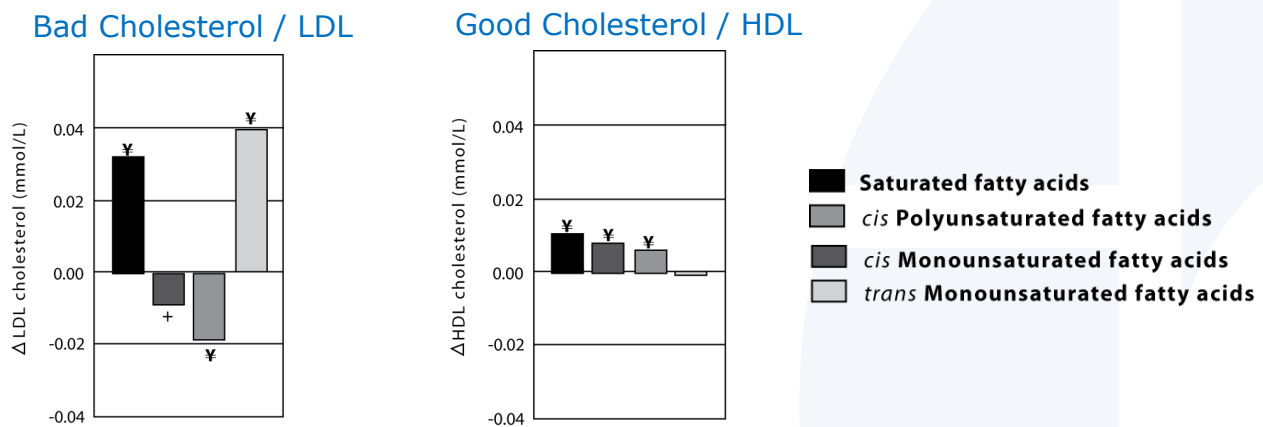


Fig 2: Effects of fatty acids on LDL and HDL cholesterol

Today it is known and accepted that when assessing risk of heart disease, it is essential to take into account the opposing effects of LDL and HDL cholesterol. By far the best indicator for risk of heart disease is the Total: HDL ratio, a value that essentially subtracts the good and bad cholesterol from each other. A lower ratio indicates a reduction in risk of heart disease, and a higher ratio, an increased risk. In recent years, cardiologists and general practitioners have been using the ratio as an accurate assessment of risk of heart disease.

Figure 3 shows the Total:HDL ratio of different fatty acids. Again, likely to surprise many, it shows that saturated fat neither increases nor decreases the Total:HDL ratio.

No change in Total:HDL ratio indicates that saturated fat is not expected to increase or decrease risk of heart disease – it is neutral. Trans fat is the only fat that increases the ratio and therefore, the only fat that can increase risk of heart disease. Monounsaturated and polyunsaturated fats reduce the Total: HDL ratio suggesting a reduction of heart disease risk.

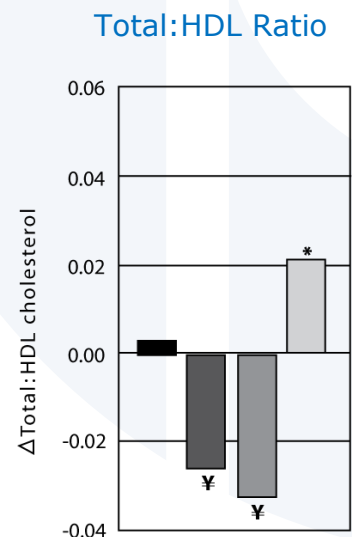


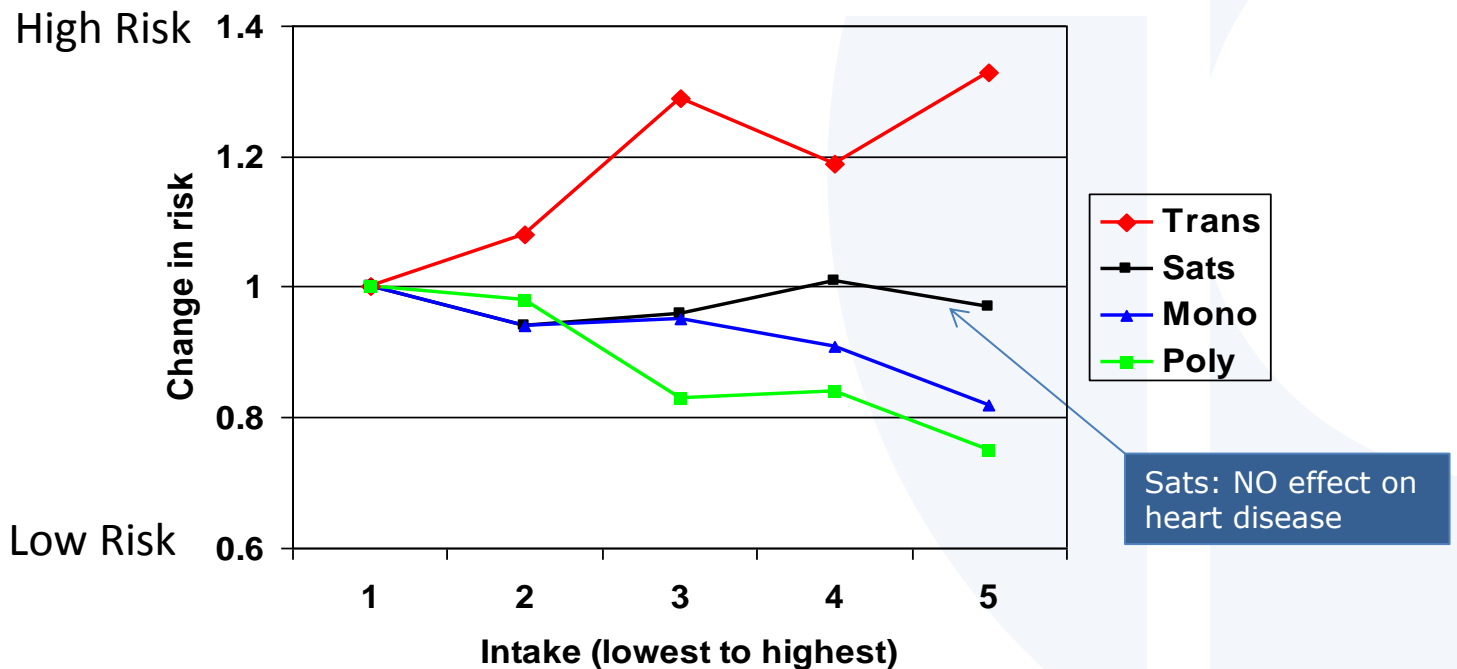
Fig. 3: Total:HDL Ratio

For decades, policy makers used only LDL and total cholesterol for assessing effects of fatty acids on heart disease. The neglect of HDL cholesterol made saturated fat look worse than it really was, and unfortunately, made trans fat look better. Clearly measuring LDL, HDL and Total:HDL cholesterol ratios is a far more useful and accurate predictive tool for risk of heart disease.

This new and more powerful data began to emerge in the 1990's. Long-term research called observational studies were designed to track how much of the different fatty acids individual people ate during a period of many years, and then tracked which of these individuals suffered heart attacks or died of heart disease.

A landmark study called the "Nurses Health Study" (2) administered by the Harvard School of Public Health spanning 20 years with 80,000 participants was published in 2005. It clearly showed that saturated fat consumption was **not** associated with actual heart attacks or death from heart disease (*figure 4*). This did not support the old heart health paradigm, but did confirm the Total:HDL prediction that saturated fat does not affect risk of heart disease.

Figure 4. Nurses Health Study



More and more long term observational studies have since been released, so that by 2010 the first major meta analysis of observational studies was published (3). This analysis was a combination of 21 studies spanning up to 23 years with a combined 347,000 participants

The primary author, Dr. Ron Krauss, stated **"..there is no significant evidence for concluding that saturated fat is associated with an increased risk of CHV or CVD"**

However, natural fats and oils are not made of a single fatty acid. *Figure 5* below compares the saturated and unsaturated fatty acid composition of coconut oil, palm oil and human milk fat. In the USA palm oil is gaining acceptance as a healthy alternative to trans fat and partially hydrogenated vegetable oil. Although often referred to as a “saturated fat”, it is actually a natural balance of 50% saturated fat and 50% unsaturated fat (Fig. 5). This makes palm oil a healthy choice, especially for trans fat replacement.

Interestingly, the composition of human milk fat has a similar saturated fat content to palm oil. Surely as human milk fat has been designed by nature to give optimum nutrition to babies, it could never be envisioned as “artery clogging”.

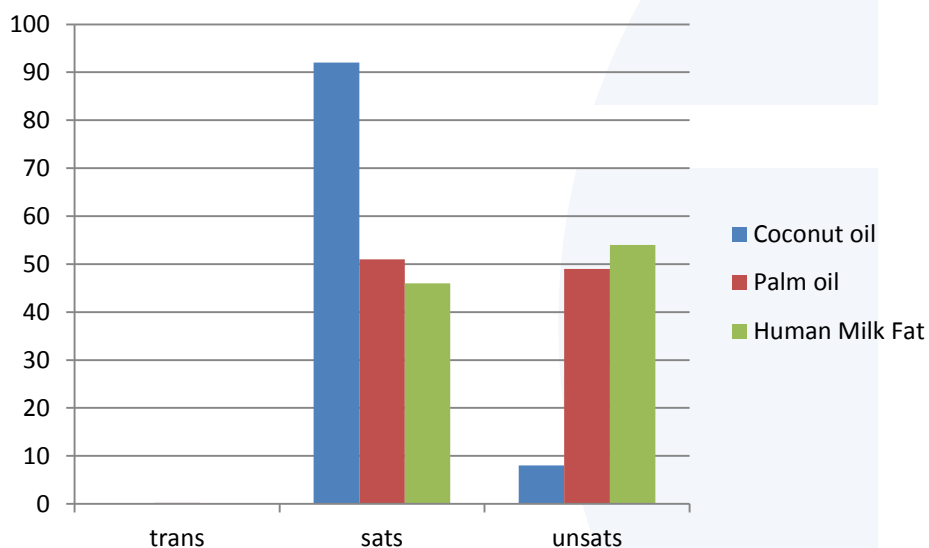


Figure 5: Comparison of saturated and unsaturated fatty acid content of coconut oil, palm oil and human milk fat.

In conclusion, decades of research on saturated fat has dispelled and eliminated an unfavorable connection between saturated fat and heart disease. Measurement of LDL (bad) and HDL (good) cholesterol revealed that saturated fat produces more HDL than any other fat, cancelling out any increase in LDL and reinforcing its position as a healthy alternative to trans fat.

Observational studies that measured consumption of dietary saturated fat over many years found no effect of saturated fat on actual heart disease, confirming the LDL:HDL ratio predictions.

In recent years many observational studies have been combined into meta-analyses to get better data. All of these very large studies were unanimous. Eating saturated fat does not cause heart disease. Policy makers need to acknowledge that this area of nutrition science is closed, and begin to address real health issues that will have a true positive impact on the health of the nation and the world.

References:

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2. Oh K., Hu F., Manson J., Stampfer M and Willett W. Dietary Fat Intake and Risk of Coronary Heart Disease in Women: 20 Years of Follow-up of the Nurses' Health Study. *Am J Epidemiology* 2005;161:672–679
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