FROM ABSTRACT:

Context
Coronary heart disease (CHD) remains the leading cause of mortality in industrialized countries and is rapidly becoming a primary cause of death worldwide.

Thus, identification of the dietary changes that most effectively prevent CHD is critical.

Objective
To review metabolic, epidemiologic, and clinical trial evidence regarding diet and CHD prevention.

Data Sources and Study Selection
We searched MEDLINE through May 2002 for epidemiologic and clinical investigations of major dietary factors (fat, cholesterol, omega-3 fatty acids, trans-fatty acids, carbohydrates, glycemic index, fiber, folate, specific foods, and dietary patterns) and CHD.

We selected 147 original investigations and reviews of metabolic studies, epidemiologic studies, and dietary intervention trials of diet and CHD.

Data Synthesis
Compelling evidence from metabolic studies, prospective cohort studies, and clinical trials in the past several decades indicates that at least 3 dietary strategies are effective in preventing CHD:

1. substitute nonhydrogenated unsaturated fats for saturated and trans-fats;
2. increase consumption of omega-3 fatty acids from fish, fish oil supplements, or plant sources;
3. consume a diet high in fruits, vegetables, nuts, and whole grains and low in refined grain products.

However, simply lowering the percentage of energy from total fat in the diet is unlikely to improve lipid profile or reduce CHD incidence. **[IMPORTANT]**

Many issues remain unsettled, including the optimal amounts of monounsaturated and polyunsaturated fats, the optimal balance between omega-3 and omega-6 polyunsaturated fats, the amount and sources of protein, and the effects of individual phytochemicals, antioxidant vitamins, and minerals.
Conclusions
Substantial evidence indicates that diets using non-hydrogenated unsaturated fats as the predominant form of dietary fat, whole grains as the main form of carbohydrates, an abundance of fruits and vegetables, and adequate omega-3 fatty acids can offer significant protection against CHD. Such diets, together with regular physical activity, avoidance of smoking, and maintenance of a healthy body weight, may prevent the majority of cardiovascular disease in Western populations.

THESE AUTHORS ALSO NOTE:

Studies going back to 1908 show that diets high in cholesterol and saturated fat increase the risk of CHD in humans.

However, this cholesterol and saturated fat hypothesis of CHD is “overly simplistic.”

DIETARY FAT

Saturated fatty acids increase total LDL(bad) cholesterol.

Polyunsaturated fatty acids decrease total LDL(bad) cholesterol.

“All 3 classes of fatty acids (saturated, monounsaturated, and polyunsaturated) elevate high-density lipoprotein cholesterol (HDL-C) when they replace carbohydrates in the diet.” [Therefore, carbohydrates in the diet are necessary]

Triglycerides increase when dietary fatty acids are replaced by carbohydrates. [Therefore, too many carbohydrates in the diet are harmful]

“Replacement of saturated fat with carbohydrates proportionally reduces both LDL-C (bad) and HDL-C (good), and, thus, has little effect on the LDL-HDL ratio and increases triglycerides, this change in diet would be expected to have minimal benefit on CHD risk.” [IMPORTANT, going vegetarian alone may not change risk factors]

“When monounsaturated [like olive oil] or polyunsaturated fats [like plant and fish oils] replace saturated fat, LDL-C (bad) decreases and HDL-C (good) changes only slightly.” [This is good, so these fats are good]

“Substituting polyunsaturated fat for saturated fat may have beneficial effects on insulin sensitivity and type 2 diabetes.” [VERY IMPORTANT: the fat we eat affects the ability of hormones (like insulin), neurotransmitters (like serotonin and dopamine), polypeptides, and amino acids (like glutamate) to dock on membrane receptor sites and initiate their respective physiological functions]

“In numerous controlled metabolic studies, trans-fatty acids (found in stick margarine, vegetable shortenings, and commercial bakery and deep-fried foods) have been shown to raise LDL-C levels and lower HDL-C relative to cis-unsaturated fatty acids, and the
increase in the ratio of total to HDL cholesterol for trans-fat is approximately twice that for saturated fat.”

**[This means that margarine is twice as bad for your heart than butter, and that trans-fatty acids are the bad guy]**

Trans-fat increases plasma levels of lipoprotein-a and triglycerides.

“Trans-fatty acids adversely affect essential fatty acid metabolism and prostaglandin balance by inhibiting the enzyme delta-6 desaturase.” **[VERY IMPORTANT]**

Trans-fats promote insulin resistance and increase risk of type 2 diabetes.

“Dietary cholesterol and modest egg consumption (1 egg per day) were not significantly associated with either CHD or stroke” in a 1999 study (JAMA).

There is an elevated risk of CHD with higher trans-fat intake.

The journal Circulation in 2002 showed that higher levels of trans-fatty acids from partially hydrogenated vegetable oils was associated with “significantly increased risk of primary cardiac arrest.”

**[Look at labels and notice how often “hydrogenated” oils are found]**

In all the high-polyunsaturated-fat trials reviewed, serum cholesterol was significantly reduced.

**OMEGA-3 FATTY ACIDS**

“Omega-3 fatty acids may reduce risk of CHD by preventing cardiac arrhythmia, lowering serum triglyceride levels, decreasing thrombotic tendency, and improving endothelial dysfunction.” **[Hey Vice President Dick Cheney]**

Numerous studies cited document the protective effects of “marine omega-3 fatty acids against CHD in diverse populations.”

“Blood levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are strongly associated with decreased risk of sudden cardiac death.”

“Alpha-Linolenic acid (ALA), an omega-3 fatty acid high in flaxseed, canola, and soybean oils, can be converted to EPA and DHA in humans and, thus, may have a role in prevention of CHD.” **[All studies that I am aware of note that this conversion is very inefficient in humans]**

Studies “strongly support the protective effects of omega-3 fatty acids, including both ALA and fish oil, in secondary prevention of CHD.”
CARBOHYDRATES

“Prevailing dietary recommendations have emphasized high intake of complex carbohydrates, mainly starch, and avoidance of simple sugars.”

“Many starchy foods, such as baked potatoes and white bread, are rapidly digested to glucose and produce even higher glycemic and insulinemic responses than sucrose (half glucose and half fructose).”

[IMPORTANT, you are better off eating sugar than potatoes and bread]

The glycemic index (GI) ranks foods based on rise in blood glucose.

Refined grain products contain more starch but substantially lower amounts of dietary fiber, essential fatty acids, and phytochemicals. [Therefore they are bad]

Higher consumption of whole grains is associated with lower risk of CHD.

FOLATE

“Much evidence suggests that adequate folate consumption is important for the prevention of CHD.”

Folate benefits are likely to be mediated through “homocysteine-lowering effects.”

Supplementation with folic acid and vitamin B6 for 2 years significantly decreased subclinical atherosclerosis.

SPECIFIC FOODS AND DIETARY PATTERNS

“Replacement of red meat with chicken and fish has been associated with reduced risk of CHD.”

“An inverse association between nut consumption and risk of CHD has been seen consistently in prospective studies.”

Although nuts are high in fat and, the predominant types of fat in nuts are monounsaturated and polyunsaturated, which lower LDL-C level.

There is a “significant inverse association between consumption of fruits and vegetables, particularly green leafy vegetables, and vitamin C–rich fruits and vegetables, and risk of CHD.”

“Increased consumption of potatoes, however, was not associated with benefits.”

[IMPORTANT]

“Higher consumption of whole grains as opposed to refined grains was associated with a lower risk of cardiovascular disease.”
“Higher intakes of fruits, vegetables, legumes, whole grains, poultry, and fish was associated with lower risk of CHD, whereas a ‘Western’ pattern characterized by higher intakes of red and processed meats, sweets and desserts, potatoes, french fries, and refined grains was associated with a higher risk.” [The Key]

COMBINED EFFECTS OF DIET AND LIFESTYLE

“A diet high in cereal fiber, marine omega-3 fatty acids, and folate and low in trans-fat and glycemic load, with a high ratio of polyunsaturated fat to saturated fat, strongly predicted decreased risk of CHD.” [The Key]

Other important factors to prevent CHD:
1. Don’t smoke
2. Maintain a healthy body weight
3. Exercising regularly for half an hour every day

AREAS OF UNCERTAINTY

“The optimal amounts of monounsaturated and polyunsaturated fats in the diet are still unclear.”

Intake of linoleic acid [omega-6 plant oils that are found in everything] is usually recommended not to exceed 10% of energy.”

“A good strategy is to substantially increase intake of omega-3 fatty acids from fish and plant sources (because intake for many people is clearly suboptimal) without decreasing intake of linoleic acid [omega-6s].”

“Substitution of soy for animal protein reduces LDL-C [bad].” [Good]

“Substituting animal protein for carbohydrates raises HDL-C [good] and lowers triglyceride levels.” [Therefore, again, excess carbohydrates appears to be bad]

“To avoid an increase in saturated fat intake, the major source of protein in the diet should come from nuts, soybeans, legumes, poultry, and fish.”

“The role of phytochemicals and antioxidants in the prevention of CHD is promising.”

Antioxidant vitamins reduce oxidative stress.

CONCLUSIONS

Compelling evidence from metabolic studies, epidemiologic investigations, and clinical trials in the past several decades converges to indicate that at least 3 dietary strategies are effective in preventing CHD:
1. Substitute unsaturated fats (especially polyunsaturated fat) for saturated and trans-fats
(2) Increase consumption of omega-3 fatty acids from fish oil or plant sources
(3) Consume a diet high in fruits, vegetables, nuts, and whole grains and low in refined grains

“However, simply lowering the percentage of energy from total fat in the diet is unlikely to improve lipid profile or reduce CHD incidence.”
[Important, this means the standard advice to eat a low fat diet doesn’t work]

“There is a growing consensus that excess calories, whether from carbohydrates or fat, will induce weight gain.”

“Evidence is now clear that diets including non-hydrogenated unsaturated fats as the predominant form of dietary fat, whole grains as the main form of carbohydrate, an abundance of fruits and vegetables, and adequate omega-3 fatty acids can offer significant protection against CHD.”

“Such diets, together with regular physical activity, avoidance of smoking, and maintaining a healthy weight, may prevent the majority of cardiovascular disease in Western populations.”

KEY POINTS FROM DAN MURPHY

(1) Going vegetarian alone is not the answer to prevent CHD because a vegetarian diet can contain excessive amounts of trans-fatty acids and refined carbohydrates, both of which negatively impact blood fats, membrane sensitivity, inflammatory profile, and insulin resistance, all of which increase the risk for CHD.

(2) We all need to increase our intake of omega-3 fatty acids, especially long chain fatty acids EPA (20 carbons long), and DHA (22 carbons long).

(3) Excess saturated fat is bad.

(4) We should all supplement with folic acid to lower homocysteine.

(5) We should eat lots of fruits, vegetables, nuts, and whole grains.

(6) We should avoid refined carbohydrates and high glycemic load foods (potatoes).

(7) Low total fat diets are unlikely to reduce CHD.

(8) Also, exercise regularly, don’t smoke, and maintain a healthy body weight.

(9) The fat we eat affects the ability of hormones (like insulin), neurotransmitters (like serotonin and dopamine), polypeptides, and amino acids (like glutamate) to dock on membrane receptor sites and initiate their respective physiological functions.

(10) Margarine is worse for your heart than butter.