
Altering Lipid Profile

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FATS

- Simple Fats:
- Compound Fats
- Derived Fats

Simple Fats

- Triglycerides: most plentiful fat in the body.
- Constitutes the major storage form of fat (more than 95% of the body fat in the form of Trigl.)
- Glycerol(3-carbon molecule/not fat) and fatty acids.

Compound Fats

- Composed of simple fats in combination of other chemicals:
- Phospholipids(formed in all cells but most synthesized in liver)- blood clotting and insulating sheath around nerve fibers.
- Lipoproteins (formed in liver from comb. of Trig., cholest., and/or phosp. with protein)

Lipoproteins

- Constitute the main form of transport for fat in the blood (if blood lipids were not bound to protein or some other substance they would float to the top).
- HDL: contain the largest amount of cholesterol.
- LDL/VLDL: contain the greatest fat and least protein component.

Low Density Lipoprotein

- have the greatest affinity for the arterial wall as they help carry cholesterol in to the cell.
- Involved in the process arterial narrowing in coronary heart disease.

High Density Lipoprotein

- Protect against heart disease in 2 ways:
- 1. to carry cholesterol away from the arterial wall for degradation to bile in the liver and subsequently excreted by the intestines.
- 2. to compete with LDL fragment for entrance into the cells fo the arterial wall.

Derived Fats

- This group of fats includes substances derived from the simple and compound fats.
- Most known: Cholesterol (a sterol containing no fatty acids by exhibiting some of the physical and chemical characteristics of fat).
- From dietary view is considered Fat

Cholesterol

- It is present in all cells and is either consumed in foods or is synthesized within the cell.
- Even in a cholesterol free diet, one may still produce from 0.5 to 2.0 grams per day.
- Liver: major organ for cholesterol synthesis. Also, walls of arteries.

Cholesterol

- Normal daily rate of synthesis is sufficient for body needs.
- synthesis of vitamin D, adrenal gland hormones, estrogen, progesterone, hormones responsible for male and female sex charact.
- Formation of bile secretion that emulsify fat during digestion.

Cholesterol

- Egg yolk
- Red meats
- Organ Meats
- Shellfish (shrimp)
- Dairy products (ice cream; cream cheese, butter, whole milk)
- It is not present in any foods of plant origin.

Cholesterol and Heart Disease

- Studies have shown that diets high in cholesterol and fat concentration may cause plaque.
- Plaque: formation of cholesterol-rich deposits.
- Atherosclerosis: Plaque attached to the inner lining of arteries. Leads to narrowing then closure of these vessels.

Cholesterol and Heart Disease

- Lowering total cholesterol and LDL levels reduce the risk for CAD.
- ACSM guidelines: p.36

Therapy

- ACSM guidelines: p.34
- Physical Activity
- Diet modification(AHA: less than 300 mg of cholesterol each day). Saturated fats may raise cholesterol/Polyunsat. tend to lower cholesterol).
- Drug therapy

Exercise Therapy

- Aerobic Exercise
- ACSM guidelines for cardiov. exercise
- Research shows that aerobic exercise enhances the good cholesterol and decreases the bad cholesterol. It also improves overall cholest. concentration.

Diet

- Low Fat diet
- less than 300 gr/ cholesterol per day
- Saturated fats may increase cholesterol
- Polyunsaturated fats may decrease cholesterol (fats from plants: cottonseed oil, corn and soy-bean oil).

Drug Therapy

- Drug therapy should be used only after a careful trial of diet modification and exercise.
- There are many drugs and combination of drugs and vitamins, which may be used to control cholesterol.

Drug Therapy

- Cholestyramine:(Questran). lowers total Cholest. and LDL levels. No effect on HDL cholesterol.
- Side effects: constipation, nausea, bloating, lose ability to absorb vitamins A, D and K (fat-soluble).

Drug Therapy

- Colestipol (Colestid). Lower total Choles. and LDL. No effect on HDL. May raise tryglycerides.
- Side Effects: nausea, bloating, unable to absorb vitamins (A, D K).

Drug Therapy

- Probucol (Lorelco)
- Lower LDL and HDL. Not good if want to maintain a healthy ratio.
- diarrhea, nausea, abdominal pain, headache, rashes, ekg chnges (QT interval Prolongation)

Drug Therapy

- Clofibrate (Atromid-s)
- Lower triglycerides and VLDL. May increase or decrease LDL and may increase or maintain HDL.
- Side Effects: upset stomach, gallbladder, nausea, diarrhea, increase in arrhythmias, claudication in pts with previous MI , angina.

Drug Therapy

- Niacin/ Nicotinic Acid (one of the B-complex vitamins, B-3). Nicolar and Nicobid.
- Lower triglycerides, LDL, VLDL, and may raise HDL.
- Side effects: dry skin, intestinal disorders, problems in liver, decrease in BP.

Drug Therapy

- Lovastatin: lowering LDL and maintaining HDL levels.
- Side effects: change in liver enzymes, occasional eye problem.