

Fats and Heart Disease

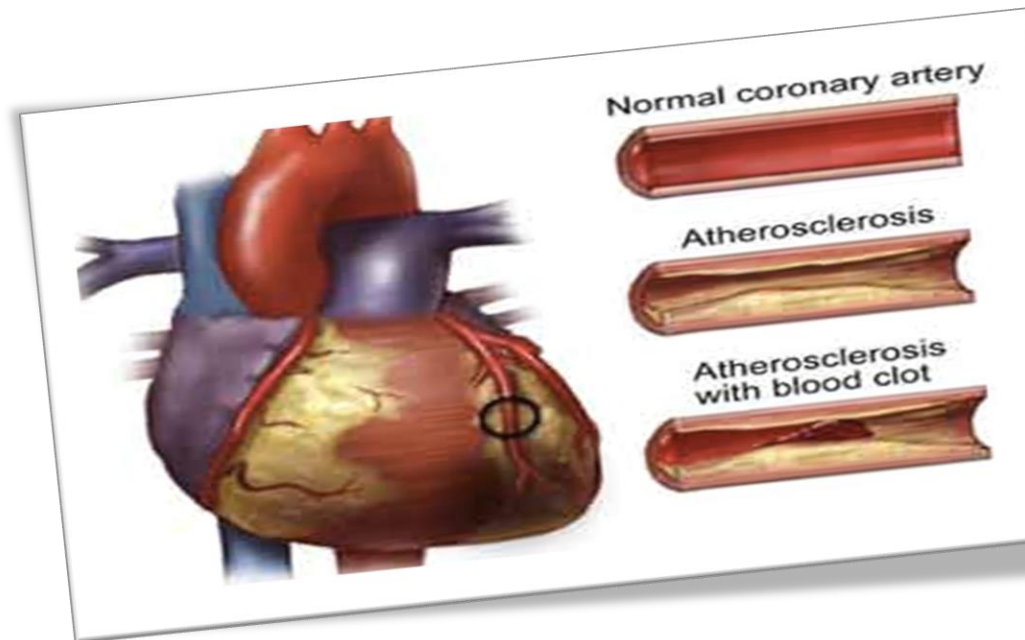
Lourdes Ella G. Santos, MD

Preventive Cardiology, Clinical Lipidology and Hypertension

UP-PGH / Cardinal Santos Medical Center

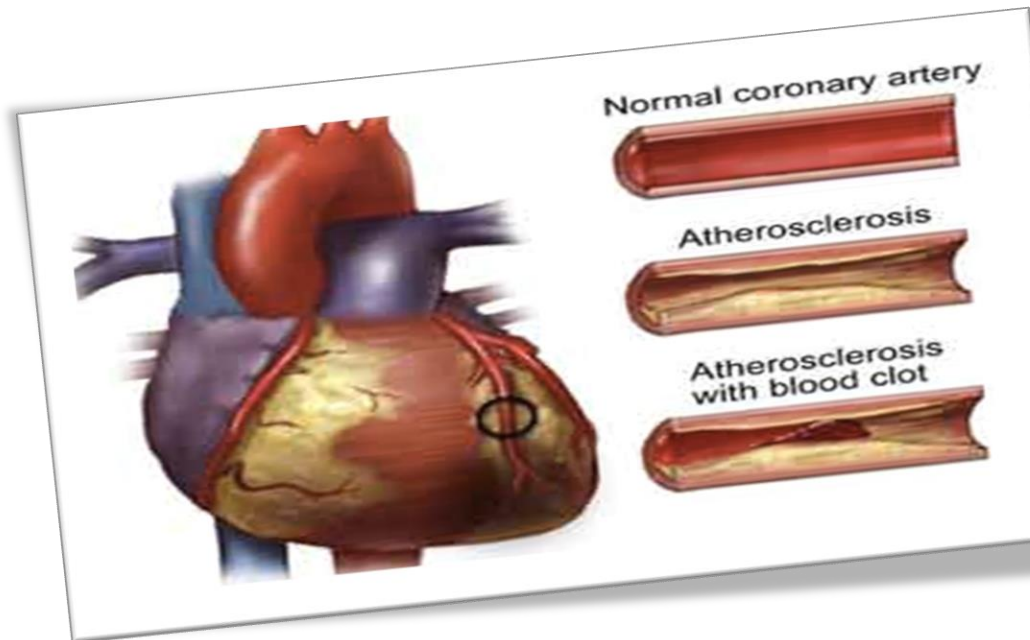
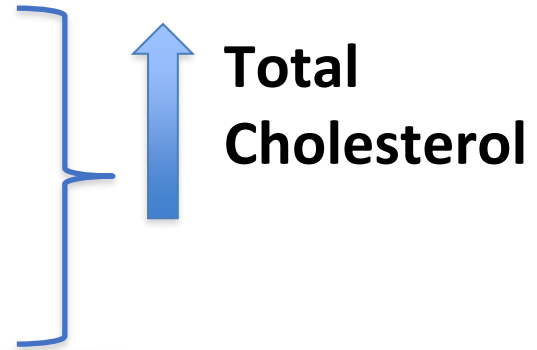
Cholesterol Components

- Triglycerides
- High density Lipoprotein (HDL)
- Low density Lipoprotein (LDL)



Cholesterol Components

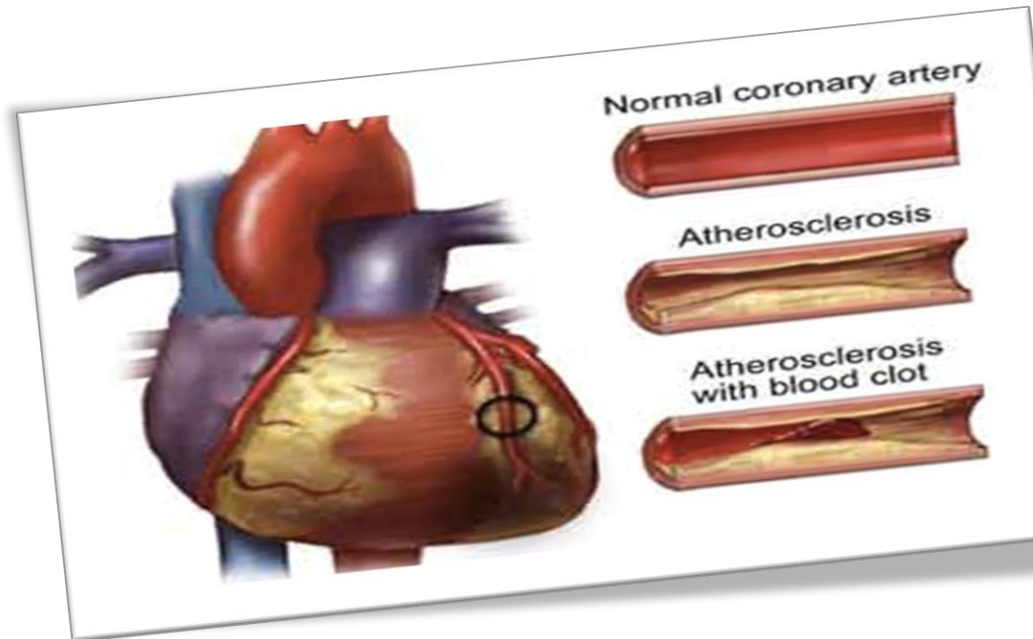
- Triglycerides
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Cholesterol Components

- Triglycerides
- High density Lipoprotein (HDL)
- Low density Lipoprotein (LDL)

↑ Total Cholesterol



Triglycerides

Classification of Serum Triglycerides

- Normal < 150 mg/dL
- Borderline High 150 – 199 mg/dL
- High 200 – 499 mg/dL
- Very High \geq 500 mg/dL

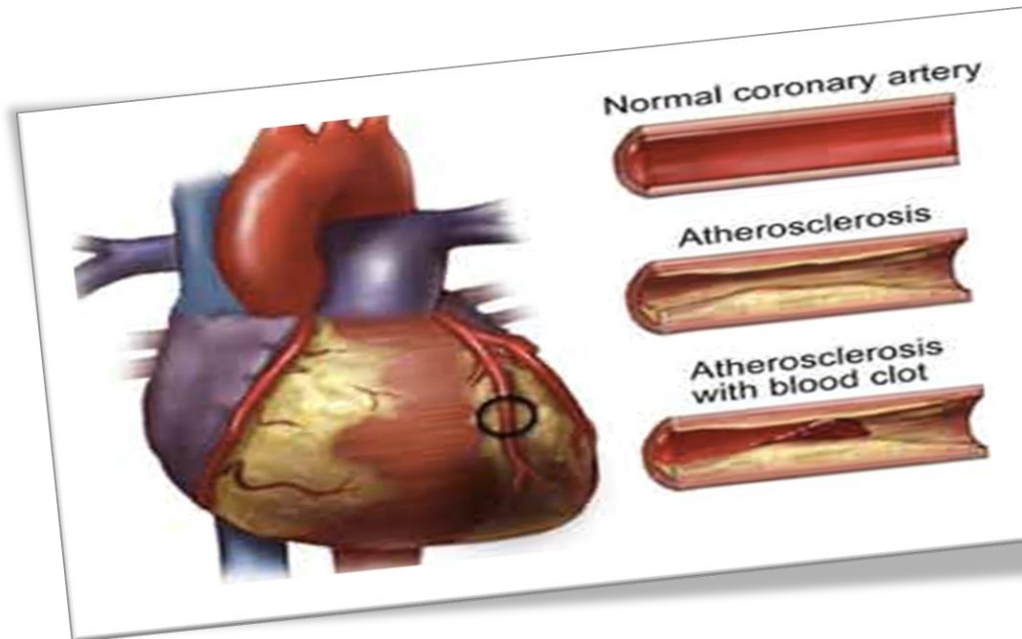
1. Jacobson, Terry & Ito, Matthew & Maki, Kevin & Orringer, Carl & Bays, Harold & Jones, Peter & McKenney, James & Grundy, Scott & Gill, Edward & Wild, Robert & Wilson, Don & Brown, William. (2014). National Lipid Association Recommendations for Patient-Centered Management of Dyslipidemia: Part 1—Full Report. *Journal of Clinical Lipidology*. 8. 10.1016/j.jacl.2014.07.007.
2. 2016 ESC/EAS Guidelines for the Management of Dyslipidaemias *European Heart Journal* (2016) 37, 2999–3058
3. Laufs U et al., *European Heart Journal* (2020) 41, 99–109



Cholesterol Components

- Triglycerides
- High density Lipoprotein (HDL)
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↑ Total Cholesterol

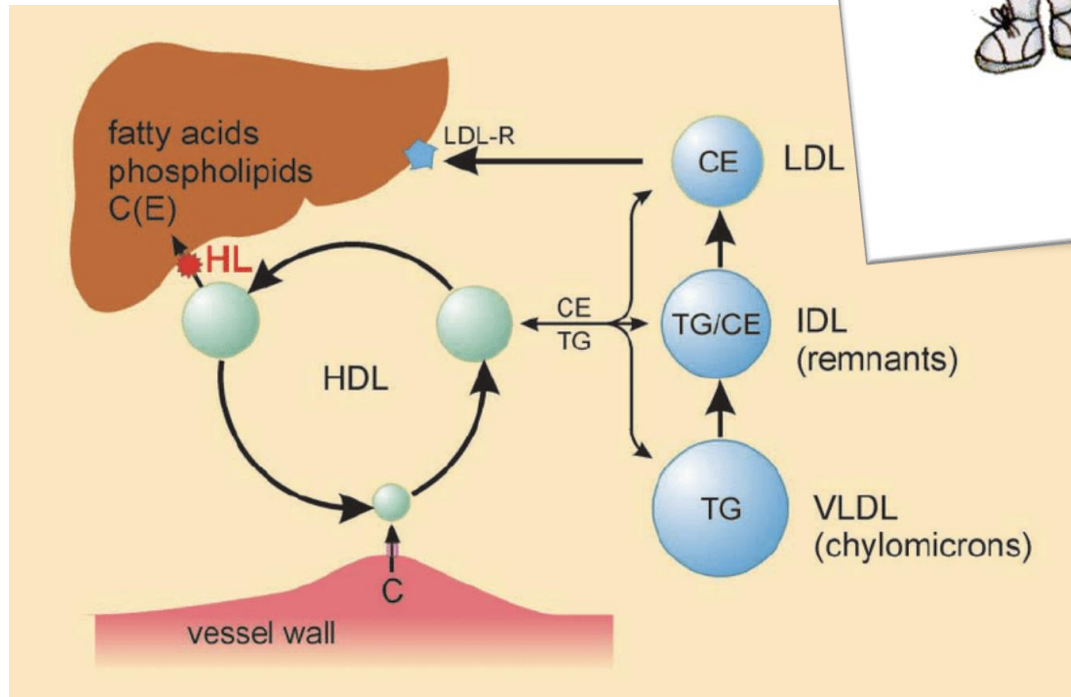
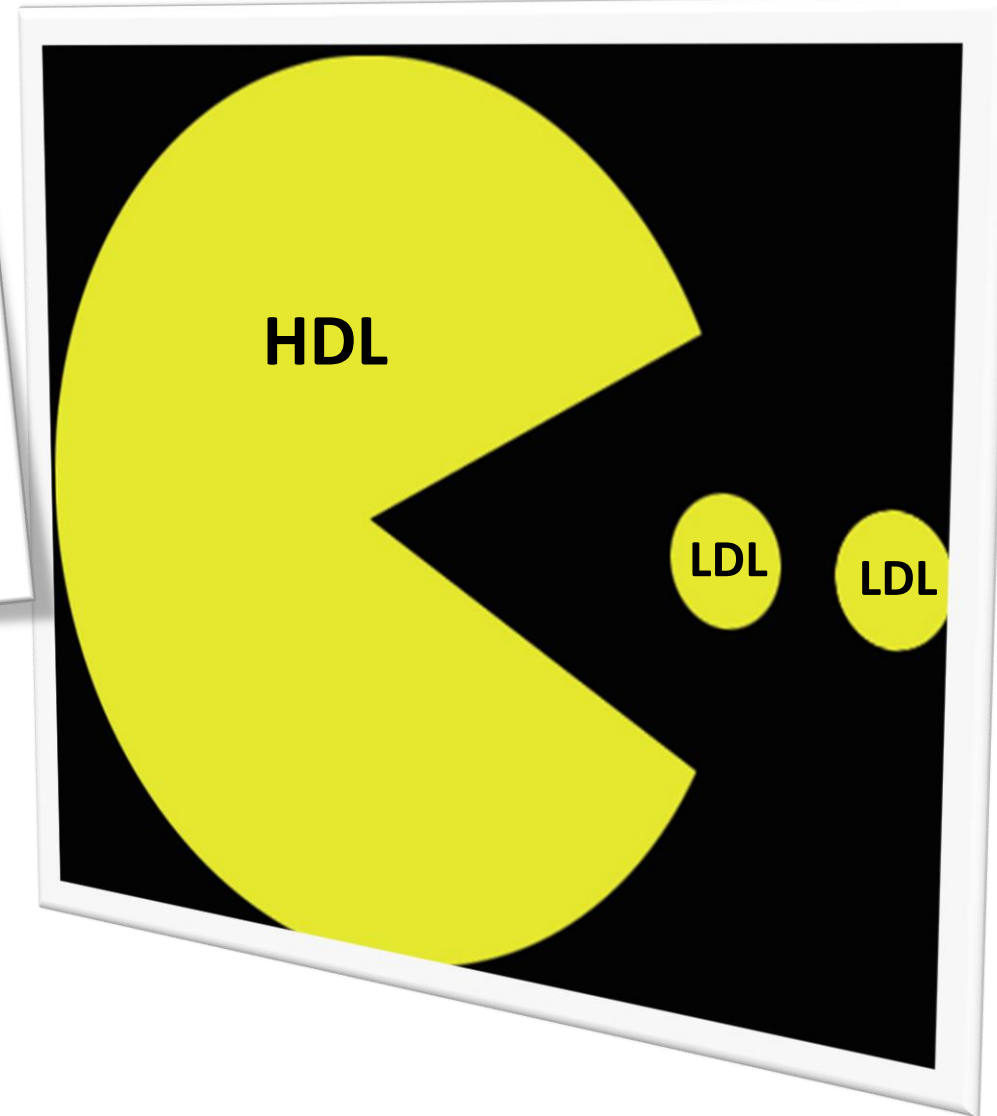
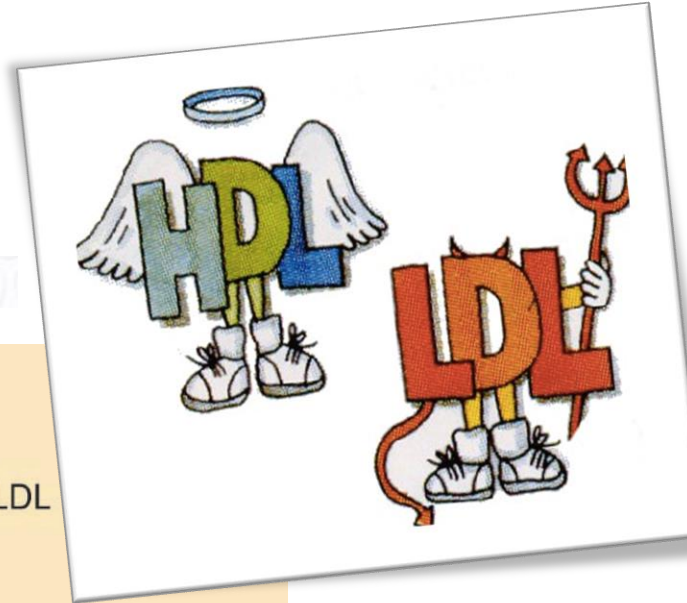


High Density Lipoprotein (Good Cholesterol)

HDL > 50 mg/dL women

HDL > 40 mg/dL men

Williams B, Mancina G et al. Eur Heart J (2018); doi:10.1093/eurheartj/ehy339

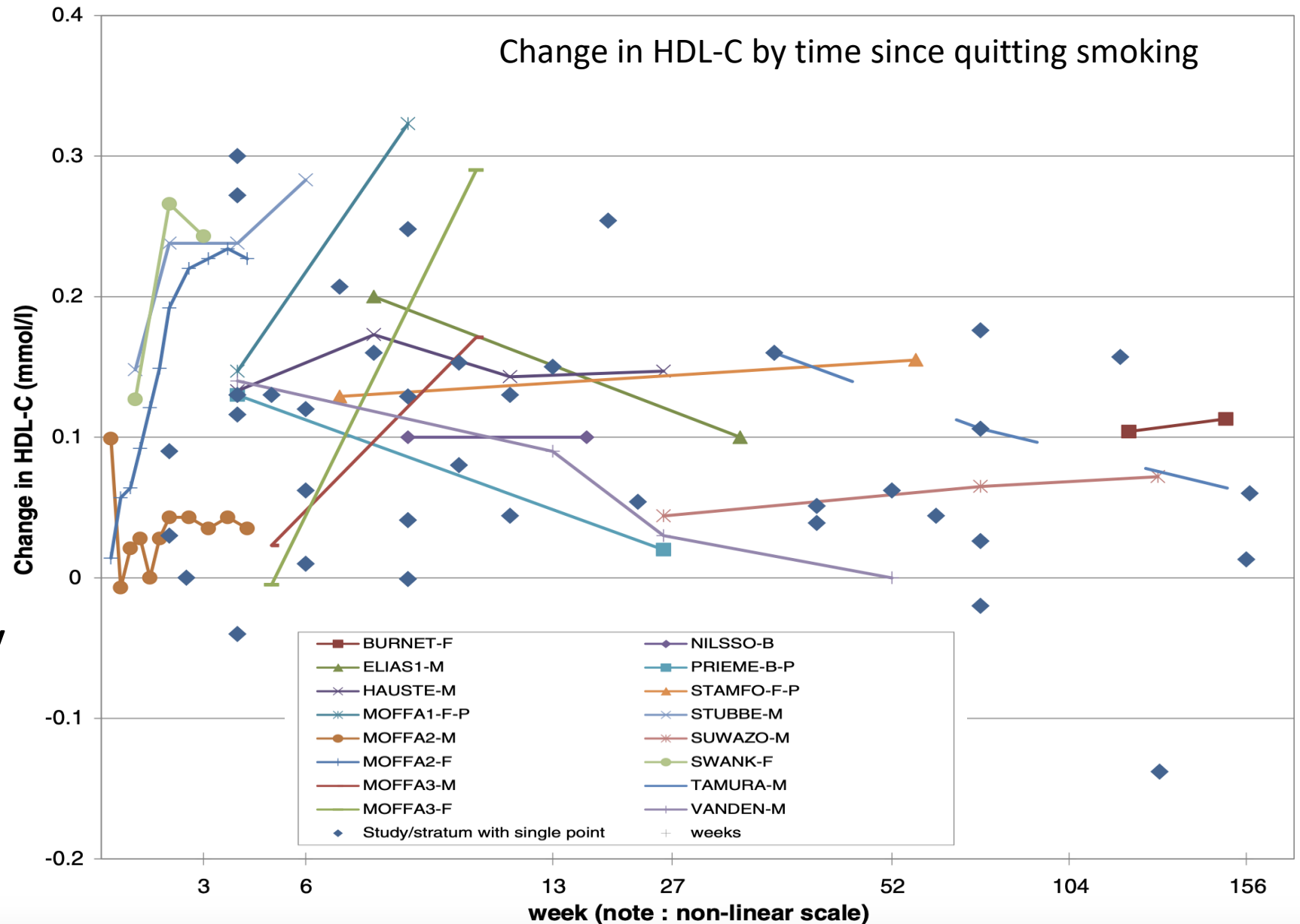


How to Raise HDL : SMOKING CESSATION

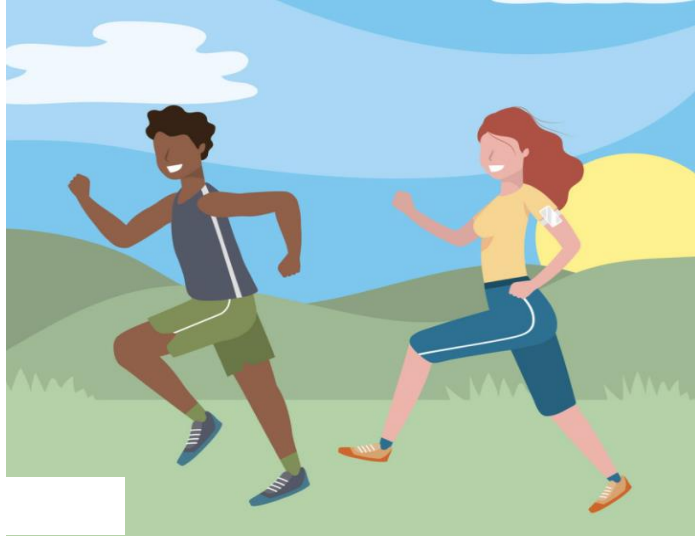


45 studies
N – 45,549

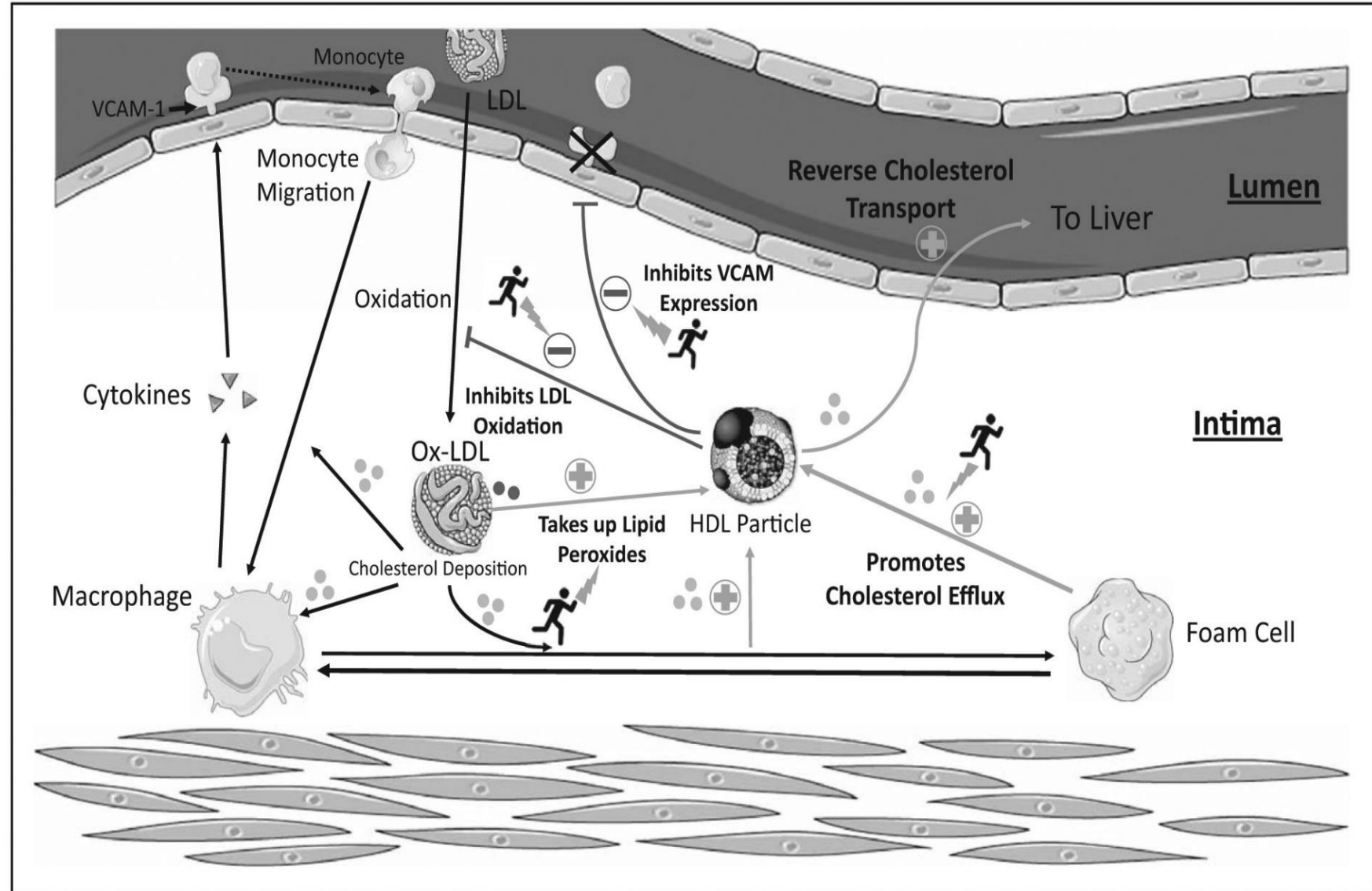
Quitting smoking
increases HDL-C
increase occurs rapidly
after quitting



How to Raise HDL : EXERCISE



- Regular aerobic exercise improves cholesterol efflux capacity
- Exercise dose threshold needs to be exceeded to produce beneficial effects
- Exercise improves the antioxidative and anti-inflammatory properties of HDL.

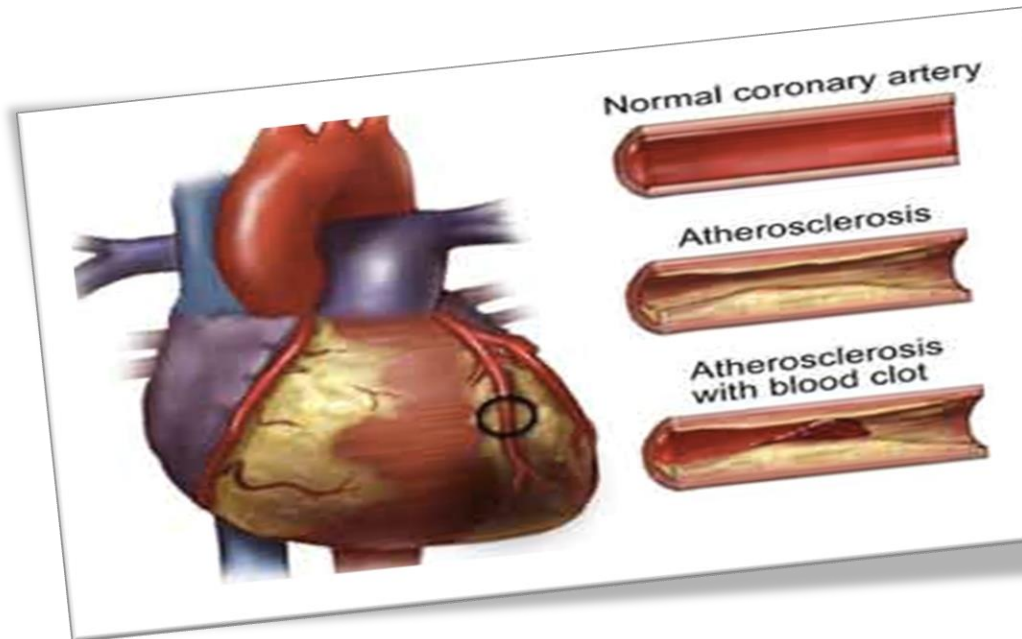
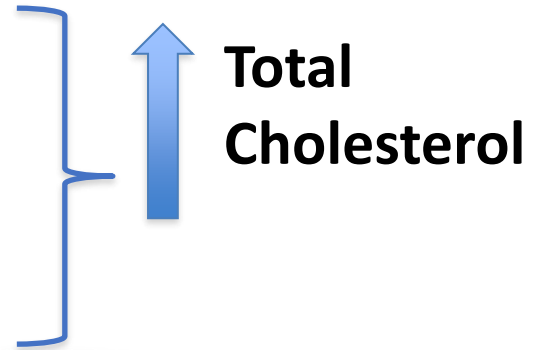


How to Raise HDL : Good Fats



Cholesterol Components

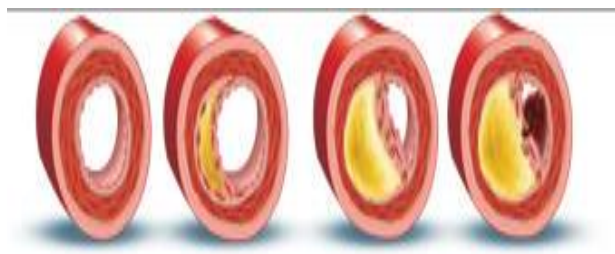
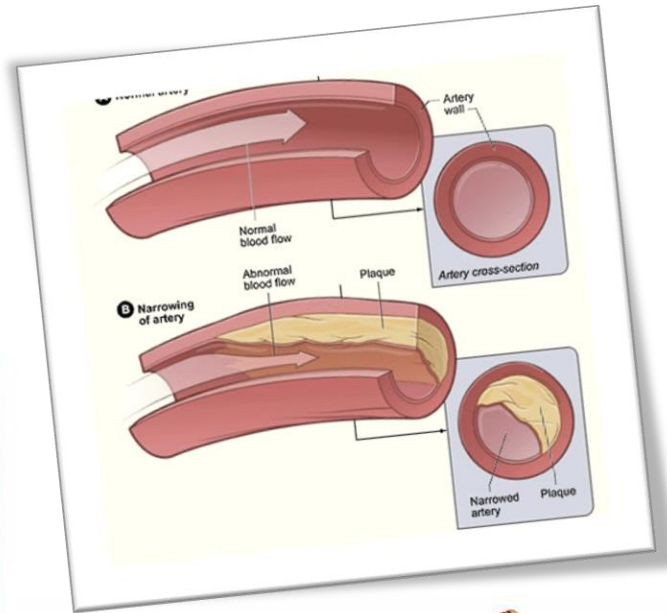
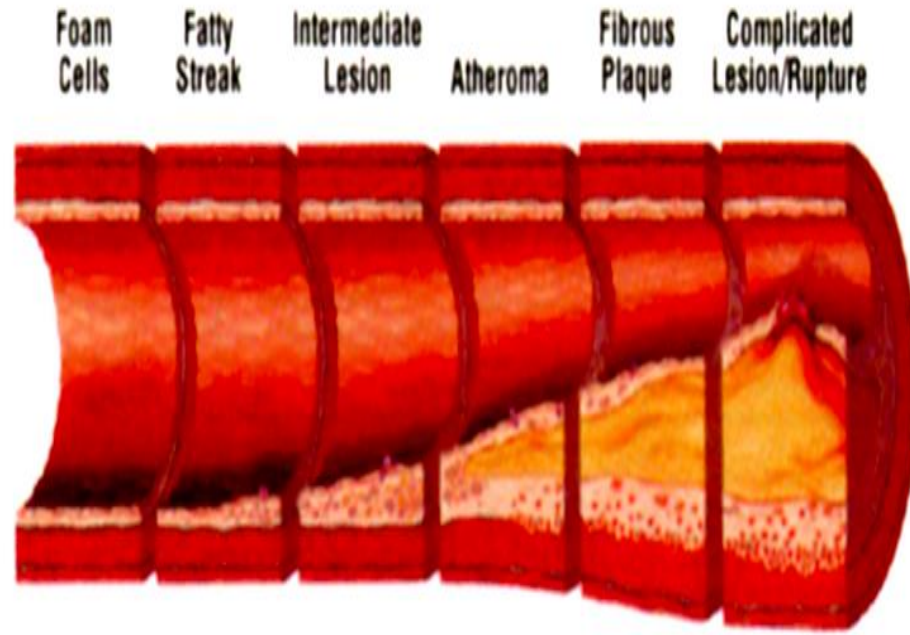
- Triglycerides
- High density Lipoprotein (HDL)
- Low density Lipoprotein (LDL)



Low Density Lipoprotein (Bad Cholesterol)

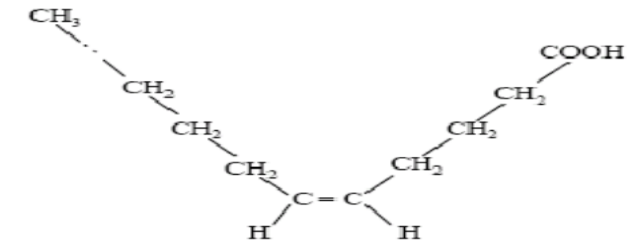
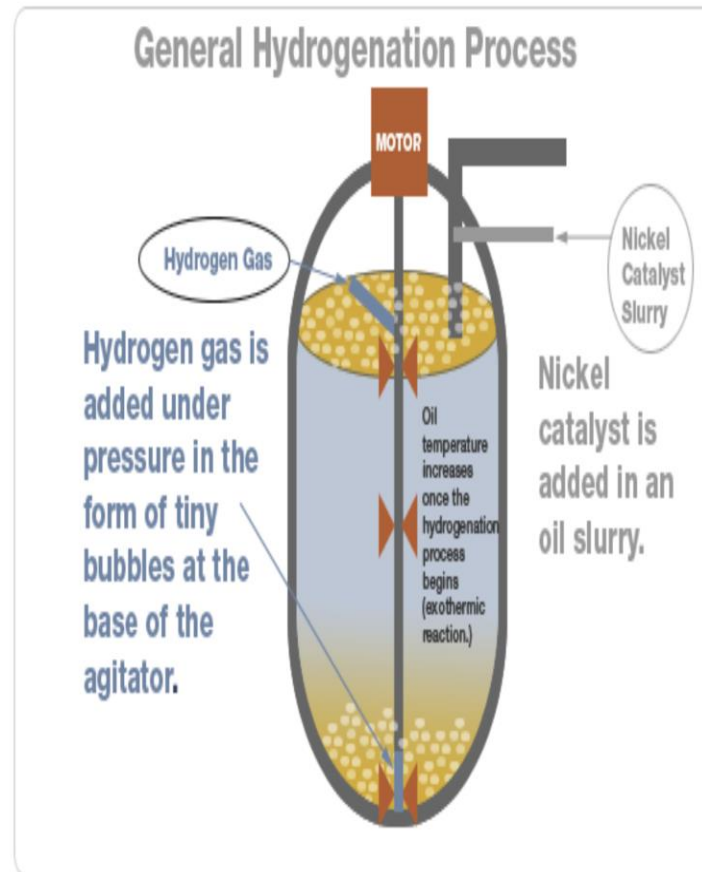
PATIENT GROUPS	LDL-C TARGET
Individuals with no clinical ASCVD	< 130 mg/dL
DM individuals	< 100 mg/dL
With ≥ 1 risk factors/target organ damage	< 70 mg/dL
With ASCVD	< 55 mg/dL
Individuals with clinical ASCVD	< 55 mg/dL
FH Individuals without ASCVD or without major risk factor/target organ damage	< 70 mg/dL
FH With ASCVD or with ≥ 1 risk factors/target organ damage	< 55 mg/dL

Endothelial Dysfunction →

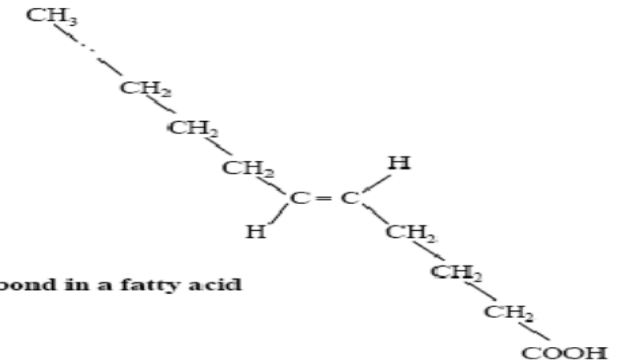


LDL-C Elevation Greatly Impacted by Dietary Trans Fat

Trans fat is created when hydrogen is bubbled into unsaturated fat, making it more solid, and less likely to go rancid.



“cis” double bond in a fatty acid

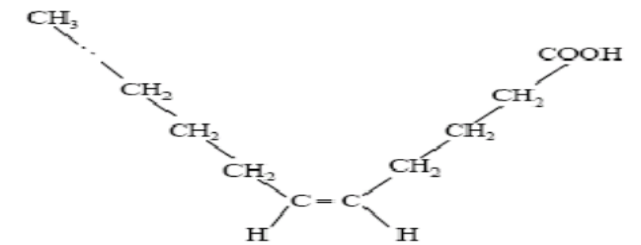
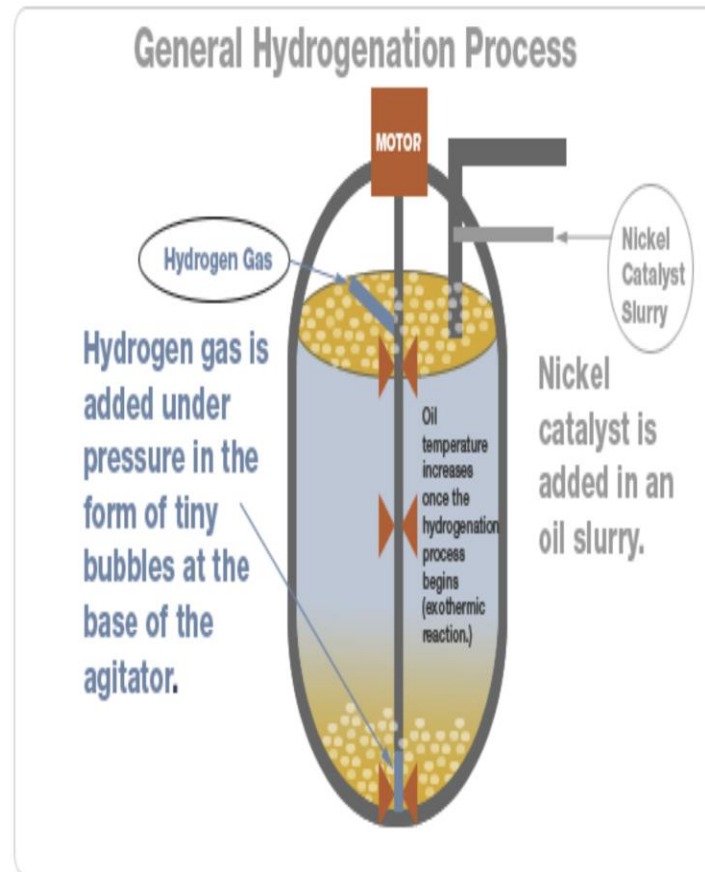


“trans” double bond in a fatty acid

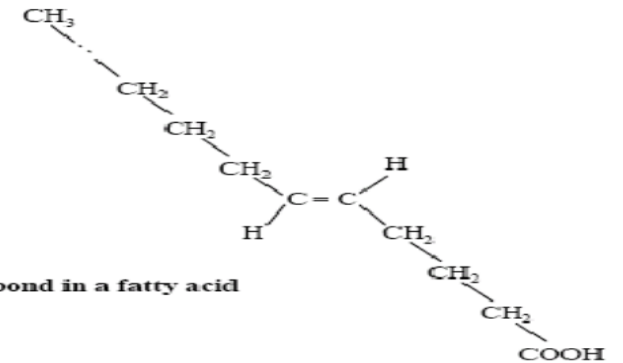
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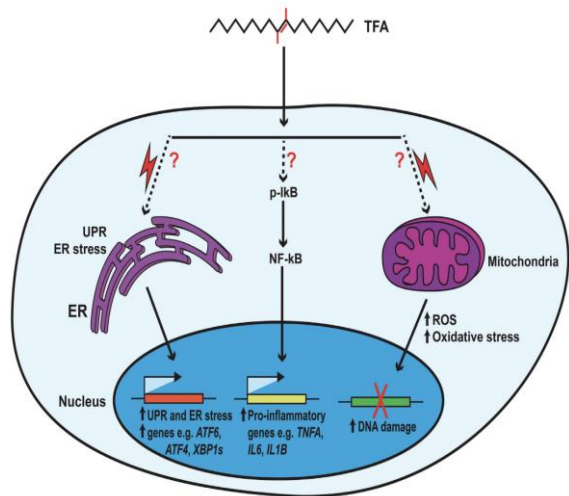
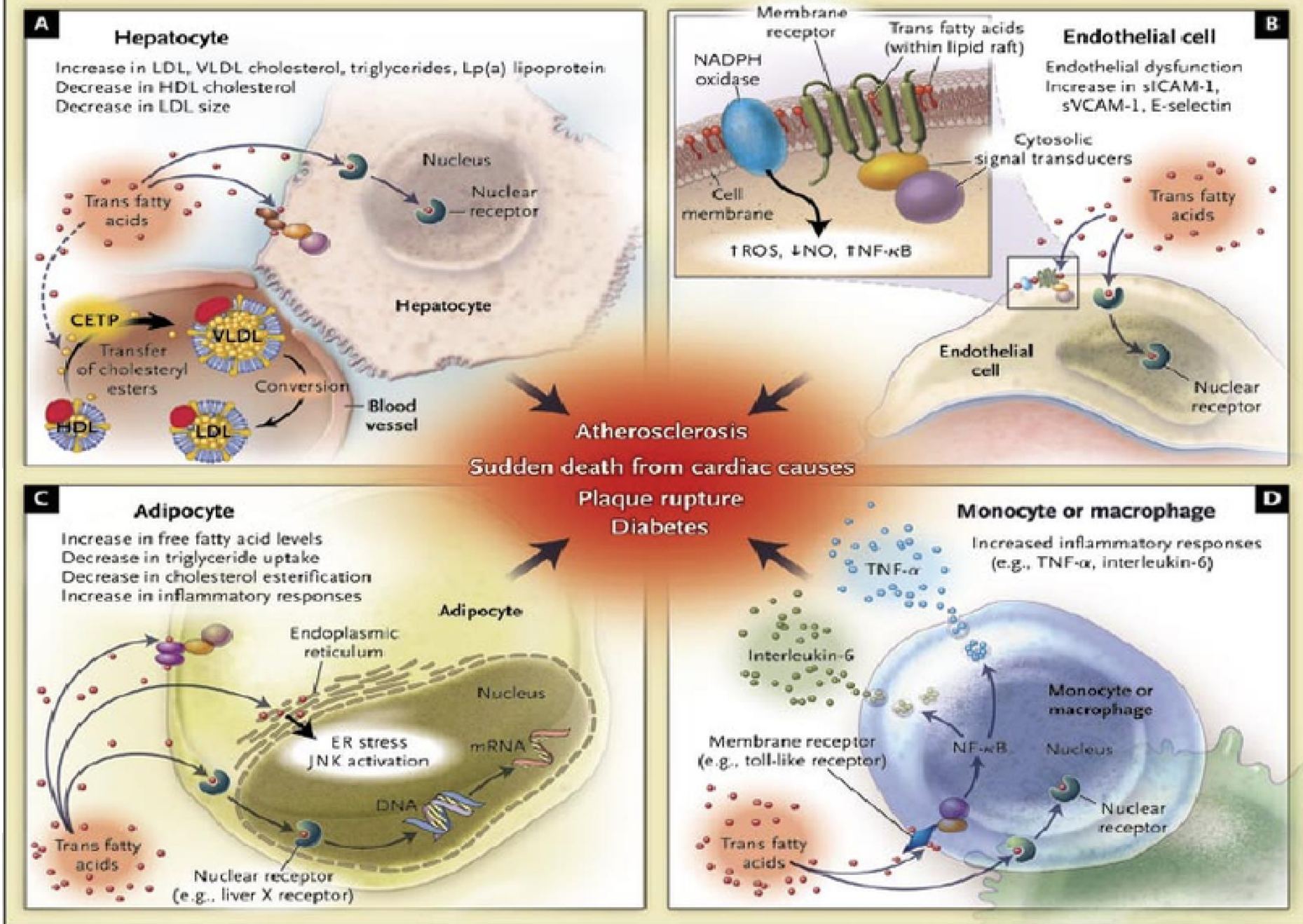


"cis" double bond in a fatty acid



"trans" double bond in a fatty acid

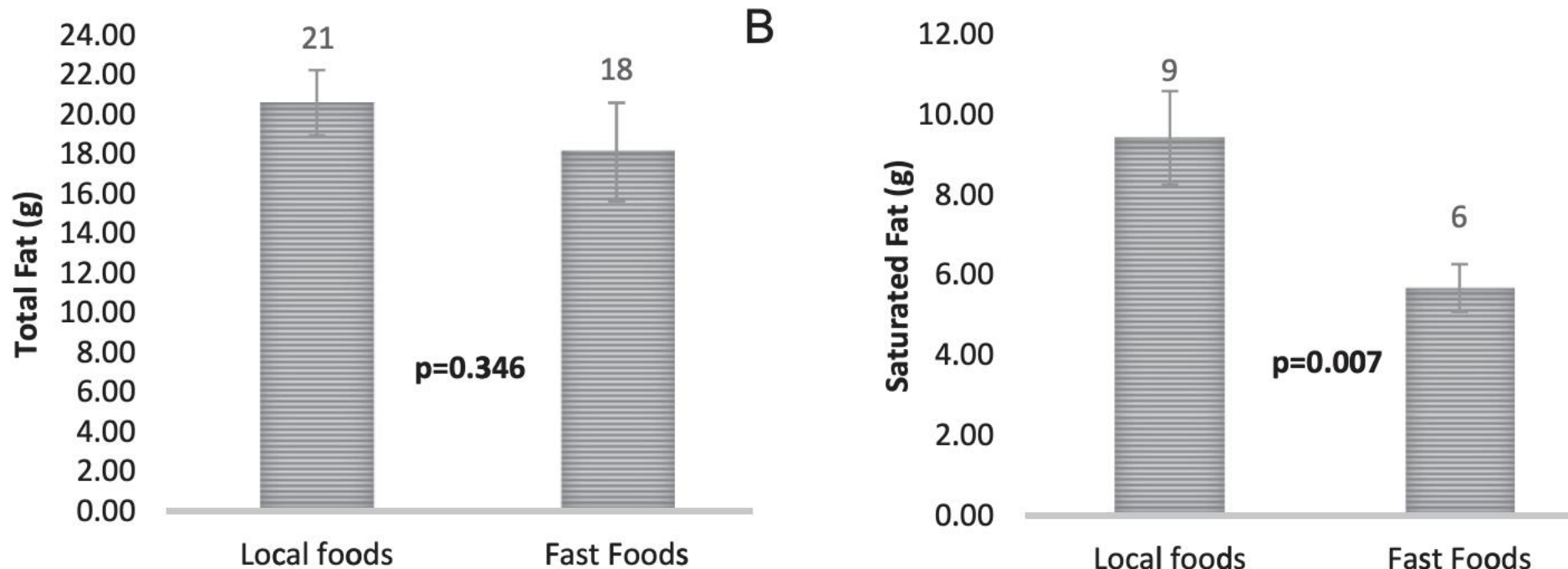
Trans Fat Influence on Atherosclerosis Progression



1. Antwi-Boasiako Oteng and Sander Kersten Nutrition, Metabolism and Genomics Group, Division of Human Nutrition and Health, Wageningen University, Wageningen, The Netherlands. Adv Nutr 2020;11:697–708.

2. Sedighe and Bahareh., Facts About Trans Fatty Acids. ARYA Atherosclerosis Journal 2008 (Spring); Volume 4, Issue 1

Asian Foods Have Unhealthy Levels of Fat Compared to Western Counterparts



- Asian foods are as high in energy content, saturated fat, sodium and cholesterol as western-styled fast foods.
- Highlight the need to reexamine the notion that the consumption of western-styled fast foods alone is the bane of our ill health in Asia.



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Eliminating industrially produced trans fats from diets in WHO South-East Asia Region





Objectives of DOH AO 2021-0039

NATIONAL POLICY ON TRANS FAT ELIMINATION



1. Regulating pre-packaged food products containing TFA



2. Enabling the replacement of TFA with alternative oils, fats, and oilseeds



3. Increasing awareness of the negative impacts of TFA to the public

This policy seeks to provide a policy framework to initiate efforts to gradually eliminate TFA from the nation's food supply and is complementary to similar legislative efforts.



Slide Source: Mr. Rodley Carza, Head of the Policy and Technology Section, Department of Health - Health Promotion Bureau during the Media Forum on DOH AO 2021-0039 (July 8, 2021)

WHAT IS DOH AO 2021-0039?

The Department of Health issued AO 2021-0039 on the elimination of industrially-produced trans fat for the prevention and control of non-communicable diseases.

The AO provides a policy framework for the elimination of toxic trans fat from our food supply and is complementary to other legislative efforts like the #TransFatFreePhilippines Bill. With preliminary regulation in place, we're well on our way to becoming a #TransFatFreePhilippines!

Reduce Filipinos' trans fatty acids intake to less than 1 percent of their recommended total energy intake.

2020 Clinical Practice Guidelines for the Management of Dyslipidemia in the Philippines



Q1: Among individuals with **dyslipidemia**, regardless of their present morbid condition or risk profile, should **lifestyle modification** (i.e., reduced fat diet, smoking cessation, exercise & regular physical activity) be advised to reduce overall CV risk?

Outcome	Evidence Quality	Relative Importance	Overall Control Rate	Overall Treatment Rate	Relative Risk	NNT
Total Mortality	High	9	2404/40957	1888/30833	0.98 (0.93,1.04)	NS
Cardiovascular Deaths	High	9	774/37840	633/28138	0.94 (0.85,1.04)	NS
Fatal and non-fatal MI	High	9	1174/37280	894/27611	0.9 (0.72,1.11)	NS
Strokes (Fatal and nonfatal)	High	9	683/34790	457/25063	0.99 (0.89, 1.11)	NS
Cardiovascular events	Moderate	7	2867/37402	2020/28106	0.86 (0.77, 0.96)	209
Revascularization	Moderate	6	NS	NS	NS	NS

2020 Clinical Practice Guidelines for the Management of Dyslipidemia in the Philippines



Statement 1.1 Diet For individuals at any level of cardiovascular risk, especially those with established atherosclerotic cardiovascular disease (ASCVD), a low-fat, low cholesterol diet, rich in fruits and vegetables, is **RECOMMENDED.**

Evidence from RCT's of MODERATE QUALITY, N= 18,000 +, Significant for CV events

Low fat diet aimed to reduce fat intake to less than 30% energy from fat.

Low cholesterol is approximately 150 mg/1000 kcal.

Specific Recommendations: Using the Pinggang Pinoy!

PINGGANG PINOY™
Healthy food plate for Filipino adults



- A nine-inch plate is advised
- Distributing foods among the food groups provides approx 1,200 to 1,500 calories/day.
- Half of the plate is composed of green leafy vegetables and one serving of fruit per meal.
- 4 to 6 servings of fruit/day.

Low fat diet aimed to reduce fat intake to less than 30% energy from fat .
Low cholesterol is approximately 150 mg/1000 kcal.

Meat, Fish, and Poultry

Higher Fat Foods

- ↑ Whole eggs
- ↑ Hot dogs (regular)
- ↑ Bacon or sausage
- ↑ Regular ground beef
- ↑ Chicken or turkey with skin, duck, or goose
- ↑ Oil-packed tuna
- ↑ Beef (chuck, rib, brisket)
- ↑ Pork (spareribs, untrimmed loin)

Lower Fat Alternative

- ↓ Egg whites or egg substitutes
- ↓ Lower fat hot dogs
- ↓ Canadian bacon or lean ham
- ↓ Extra-lean ground beef such as ground round or ground turkey (read labels)
- ↓ Chicken or turkey without skin (white meat)
- ↓ Water-packed tuna (rinse to reduce sodium content)
- ↓ Beef (round, loin) (trimmed of external fat) (choose select grades)
- ↓ Pork tenderloin or trimmed, lean smoked ham

Dairy Products

Higher Fat Foods

- ↑ Evaporated whole milk
- ↑ Whole milk
- ↑ Ice cream
- ↑ Whipping cream

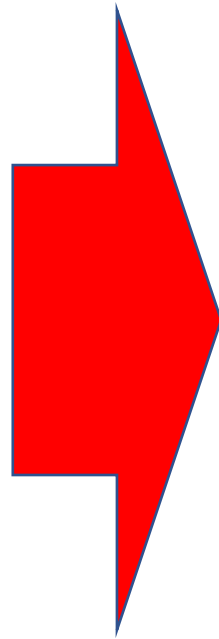
Lower Fat Alternative

- ↓ Evaporated fat-free (skim) or reduced-fat (2%) milk
- ↓ Low-fat (1%), reduced-fat (2%), or fat-free (skim) milk
- ↓ Sorbet, sherbet, low-fat or fat-free frozen yogurt, or ice cream
- ↓ Imitation whipped cream (made with fat-free [skim] milk)

Healthier Oil Choices



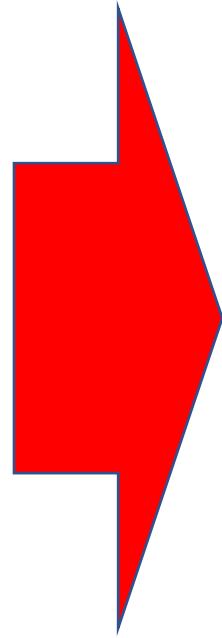
2.1 g trans fat/ 1 tablespoon



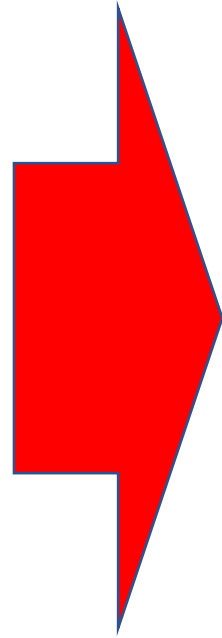
No To Reusing Oil



Choose Leaner Meat



Choose Leaner Meat



Worsening of Lifestyles and An Increase in Health Risk Behaviors During the Covid 19 Pandemic

45,161 individuals, 53.6% female, completed high school education 72.4%, ConVid Behavior online survey

Table 1 – Prevalence of smoking habit and change in number of cigarettes consumed per day, during the COVID-19 pandemic, by sex and age group, ConVid Behavior Survey, Brazil, 2020

Variables	Current smoker	Change in number of cigarettes consumed per day				
		Reduced	Remained the same	Increase of 5 cigarettes or less	Increase of around 10 cigarettes	Increase of 20 cigarettes or more
	% (95%CI) ^a	% (95%CI) ^a	% (95%CI) ^a	% (95%CI) ^a	% (95%CI) ^a	% (95%CI) ^a
Total	12.0 (11.1;12.9)	12.1 (9.7;14.9)	53.9 (50.0;57.8)	6.4 (4.3;9.4)	22.5 (19.6;25.7)	5.1 (3.4;7.7)
Sex						
Male	13.8 (12.3;15.5)	11.9 (8.6;16.3)	57.9 (51.8;63.8)	8.4 (4.9;14.1)	16.8 (13.3;21.0)	5.0 (2.7;8.8)
Female	10.4 (9.5;11.4)	12.3 (9.2;16.0)	49.4 (44.6;54.1)	4.1 (2.9;5.7)	28.9 (24.7;33.6)	5.3 (2.9;9.54)
Age group (years)						
18-29	8.7 (7.3;10.4)	13.7 (9.6;19.2)	50.2 (40.7;59.6)	15.7 (8.2;28.0)	17.0 (12.0;23.5)	3.4 (1.8;6.2)
30-39	13.1 (11.1;15.5)	12.7 (7.3;21.1)	49.3 (40.7;57.9)	6.6 (3.4;12.5)	21.6 (16.0;28.6)	9.8 (4.3;20.6)
40-49	12.5 (10.5;14.8)	9.3 (4.9;17.0)	57.7 (48.6;66.3)	7.1 (3.4;14.4)	20.9 (15.0;28.4)	5.0 (2.4;10.0)
50-59	14.1 (12.3;16.3)	13.9 (9.0;20.9)	56.6 (49.1;63.7)	1.1 (0.6;1.93)	23.5 (18.3;29.5)	4.9 (2.5;9.3)
≥60	12.7 (10.7;15.0)	10.7 (6.8;16.4)	56.3 (47.6;57.8)	2.6 (0.6;1.93)	28.6 (21.1;37.3)	1.8 (0.8;4.4)

a) 95%CI: 95% confidence interval.

Table 2 – Increase in alcoholic beverage intake during the COVID-19 pandemic, by sex and age group, ConVid Behavior Survey, Brazil, 2020

Variables	Higher alcoholic beverage intake during the pandemic
	% (95%CI) ^a
Total	17.6 (16.4;18.9)
Sex	
Male	18.1 (16.0;20.4)
Female	17.1 (15.9;18.5)
Age group (years)	
18-29	18.6 (16.4;21.0)
30-39	24.6 (21.2;28.3)
40-49	16.9 (14.3;19.9)
50-59	15.2 (12.9;17.7)
≥60	11.2 (8.8;14.2)

a) 95%CI: 95% confidence interval.

- **Increase in number of cigarettes smoked and alcoholic beverage consumption**

Worsening of Lifestyles and An Increase in Health Risk Behaviors During the Covid 19 Pandemic

45,161 individuals, 53.6% female, completed high school education 72.4%, ConVid Behavior online survey

Table 3 – Consumption of healthy and unhealthy food before and during the COVID-19 pandemic, by sex and age group, ConVid Behavior Survey, Brazil, 2020

Variables	Before the pandemic	During the pandemic
	% (95%CI) ^a	% (95%CI) ^a
Total		
Regular consumption of greens and vegetables	37.3 (35.9;38.6)	33.0 (31.7;34.3)
Regular consumption of fruit	32.8 (31.5;34.2)	31.9 (30.6;33.3)
Regular consumption of beans	43.3 (41.8;44.7)	40.9 (39.4;42.3)
Frozen food more than 2 days	10.0 (8.9;11.2)	14.6 (13.5;15.9)
Savory snacks more than 2 days	9.5 (8.6;10.5)	13.2 (12.2;14.3)
Chocolate/sweet biscuits/pieces of tart more than two days	41.3 (39.8;42.7)	47.1 (45.6;48.6)

Table 4 – Sufficient physical activity before and during the COVID-19 pandemic, by sex and age group, ConVid Behavior Survey, Brazil, 2020

Variables	Sufficient physical activity before the pandemic	Sufficient physical activity during the pandemic
	% (95%CI) ^a	% (95%CI) ^a
Total	30.1 (28.9;31.5)	12.0 (11.1;12.9)
Sex		
Male	33.0 (30.7;35.5)	14.0 (12.4;15.8)
Female	27.6 (26.2;29.0)	10.3 (9.4; 11.2)
Age group (years)		
18-29	32.6 (30.2;35.1)	10.9 (9.6;12.5)
30-39	31.0 (27.7;34.5)	10.6 (8.8;12.7)
40-49	27.1 (24.3;30.1)	11.6 (9.6;14.1)
50-59	28.2 (25.6;31.0)	13.2 (11.3;15.4)
≥60	30.4 (27.2;33.8)	14.2 (11.9;16.9)

a) 95%CI: 95% confidence interval.

- **Increase in intake of ultra-processed foods and a decrease in practicing physical activity**

Summary

- Dietary and lifestyle modifications remain cornerstone in the management of dyslipidemia
- HDL-C is influenced by smoking cessation, increased exercise and intake of foods rich in omega-fatty acids
- LDL-C is increased with trans-fatty acid intake
- A low fat, low cholesterol diet is encouraged among adult Filipinos with dyslipidemia for CV risk reduction
- Consider healthy choices for managing lipid disorders during pandemic