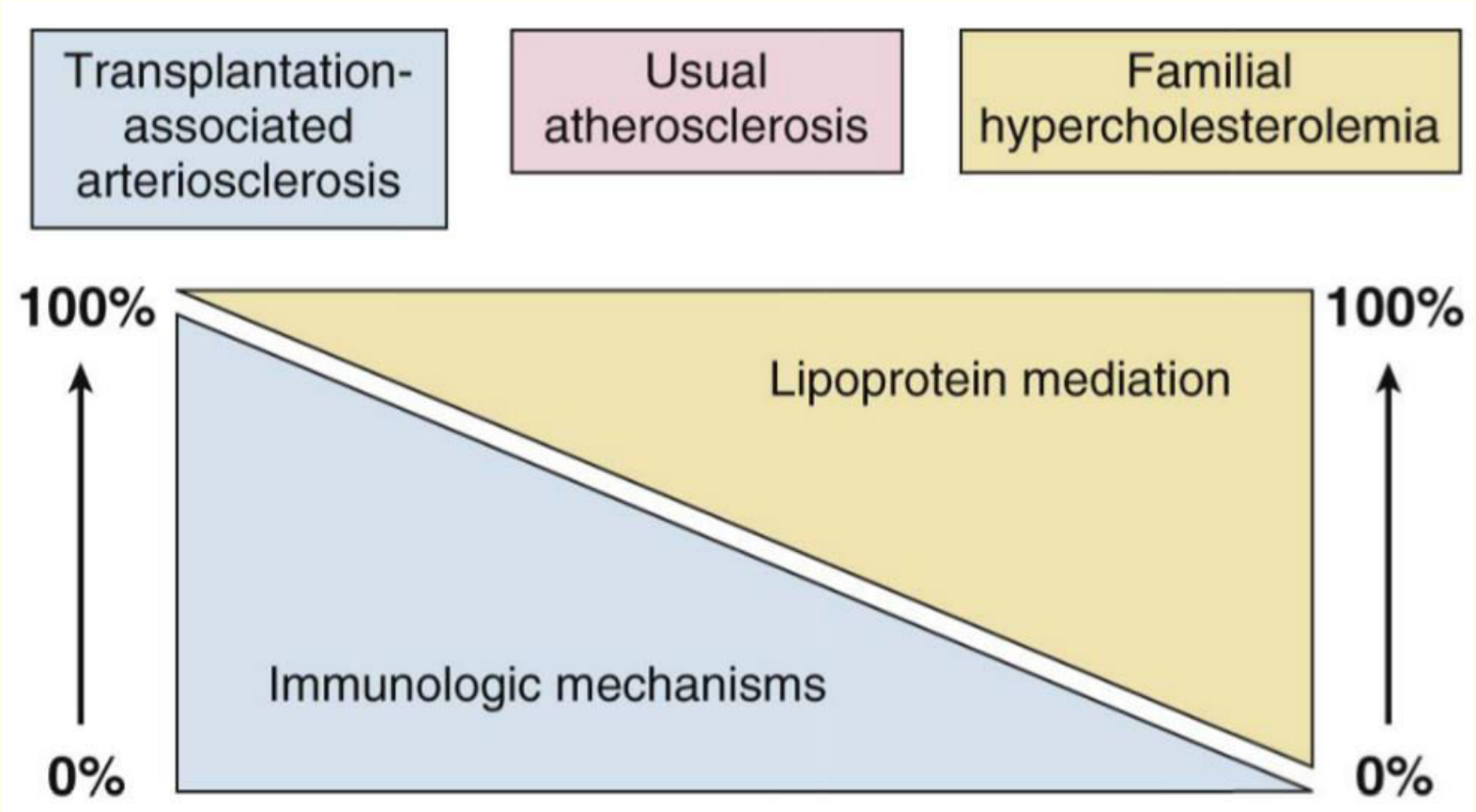
MANAGEMENT OF DYSLIPIDEMIA: ROLE OF FENOFIBRATE

Prof. Pham Nguyen Vinh
Tam Duc Heart Hospital
Ho Chi Minh City Heart Institute
Pham Ngoc Thach Medical University

Pathogenesis of atherosclerosis



TL: Libby P. Braunwald's Heart Disease, 2015, 10th ed, Elsevier Saunders, p 873-889

Risk factors of atherosclerosis

- Smoking
- Hypertension
- ↑ LDL-C, ↓ HDL-C, ↑ TG
- Metabolic syndrome; Insulin resistance; Diabetes

Impact of LDL-C level

- An increase of 1% LDL-C may raise > 2% of coronary artery disease in 6 years

- A decrease of 10 mg/dL LDL-C may cause 5.4% reduction of CV risk factors in 5 years

LDL-C = low-density lipoprotein cholesterol; CAD = coronary artery disease.

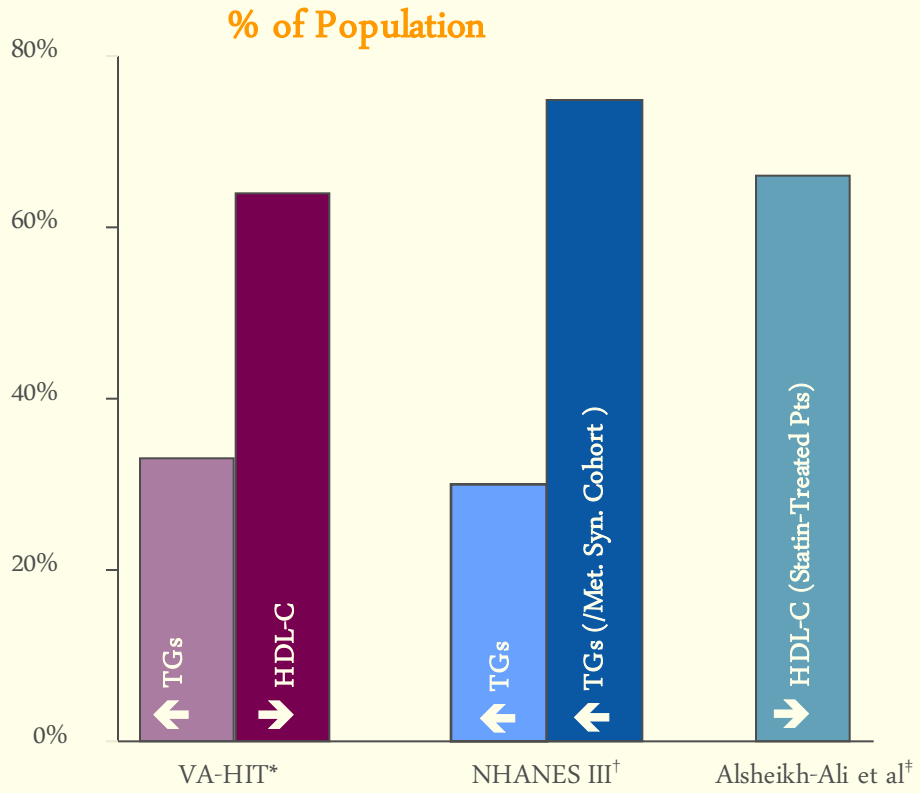
Wilson PW. *Am J Cardiol.* 1990;66:7A-10A.

Cholesterol Treatment Trialists' (CTT) Collaborators. *Lancet.* 2005;366:1267-1278.

Prevalence of mixed dyslipidemia

Mixed Dyslipidemia:

1. Low HDL-C levels
   - Men <40 mg/dL
   - Women <50 mg/dL
2. High TG levels
   - >150 mg/dL
3. Small, dense LDL particles



*Population of approximately 8500 community-dwelling men with known CHD; ↑ TGs in this study = levels >200 mg/dL.

†Survey data for US adult population, 1988-94.

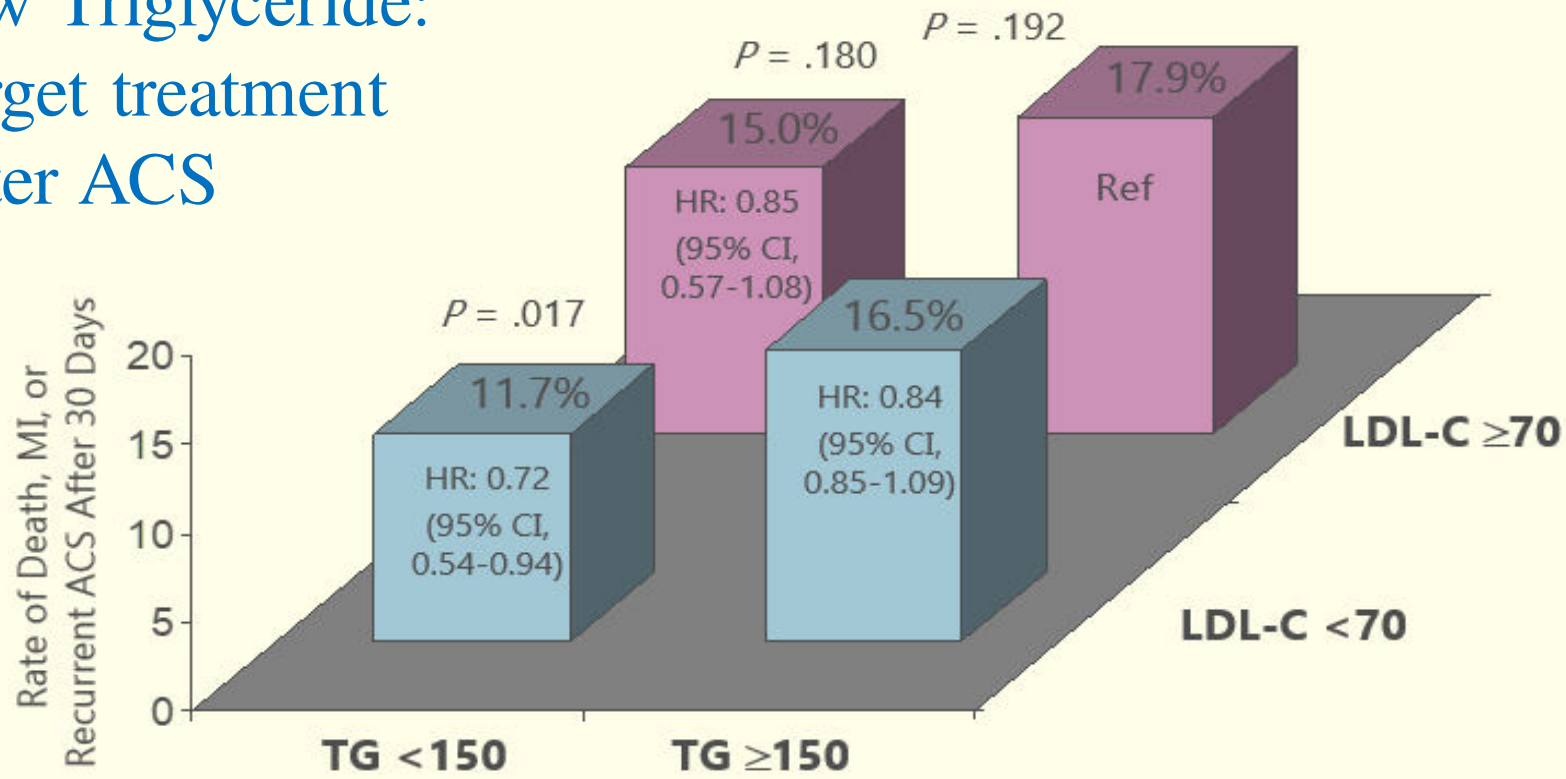
‡Population of US statin-treated patients with CHD or CHD risk equivalents and well-controlled LDL-C levels.

HDL-C = high-density lipoprotein cholesterol; TG = triglyceride; VA-HIT = Department of Veterans Affairs HDL Intervention Trial.

Fazio S. *Clin Ther.* 2008;30:294-306. Rubins HB. *Am J Cardiol.* 1995;75:1196-1201. Alsheikh-Ali AA. *J Am Coll Cardiol.* 2007;49(suppl A):A389. Ford ES. *JAMA.* 2002;287:356-359. Jacobson TA. *Diabetes Obes Metab.* 2004;6:353-362.

Increased risk of CVD due to hypertriglyceridemia

Low LDL-C and low Triglyceride: target treatment after ACS



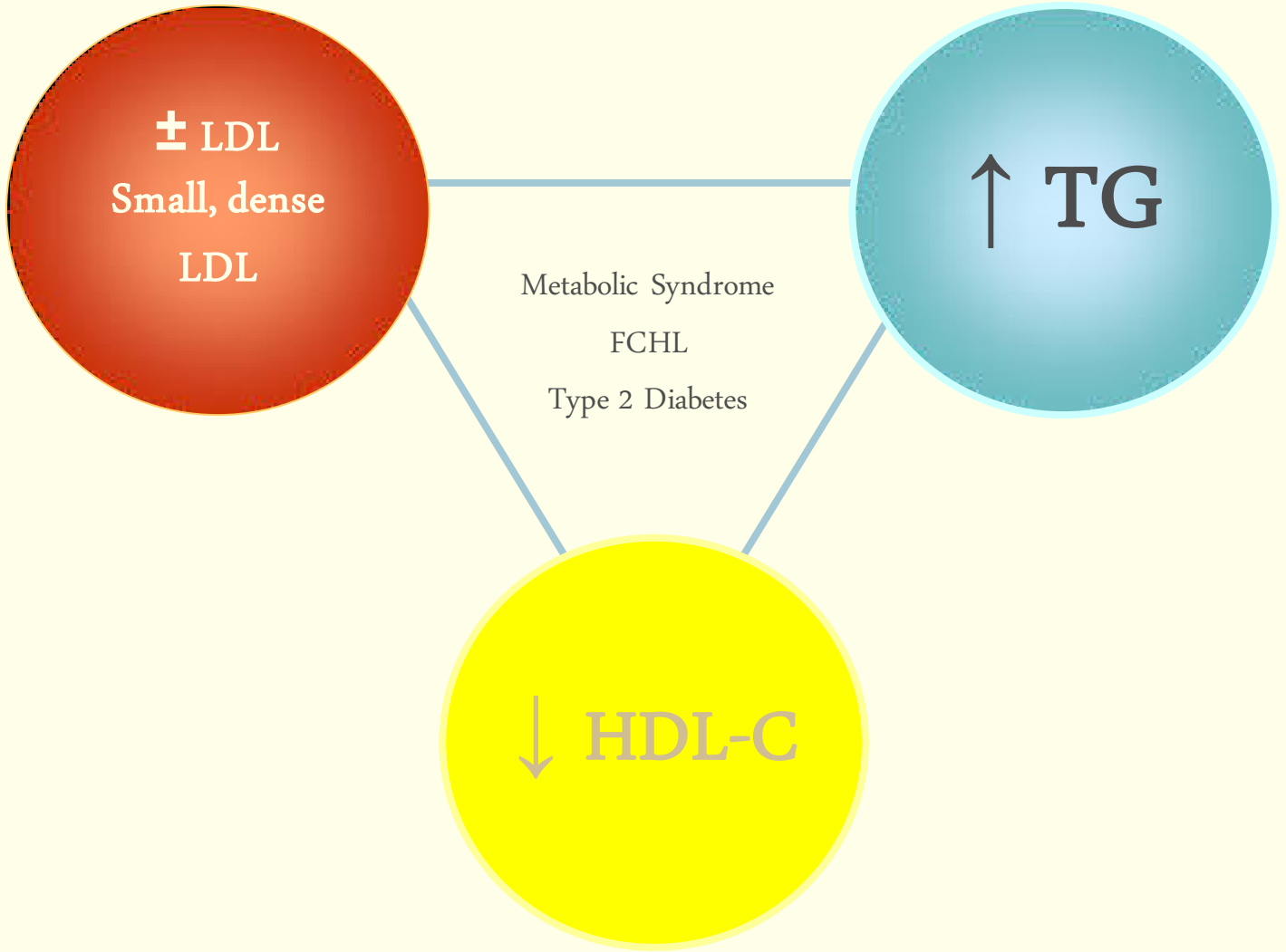
Miller M, et al. *J Am Coll Cardiol.* 2008;51:724-730.

Characteristic of mixed dyslipidemia

- Increased total cholesterol and triglyceride
- ↑ LDL-C, ↑ LDL apo B, ↑ small dense Lpa
  ↑ VLDL-C, ↑ VLDL triglycerids,↓- HDL-C
- Clinical:
  - Obesity
  - Metabolic syndrome
  - Diabetes

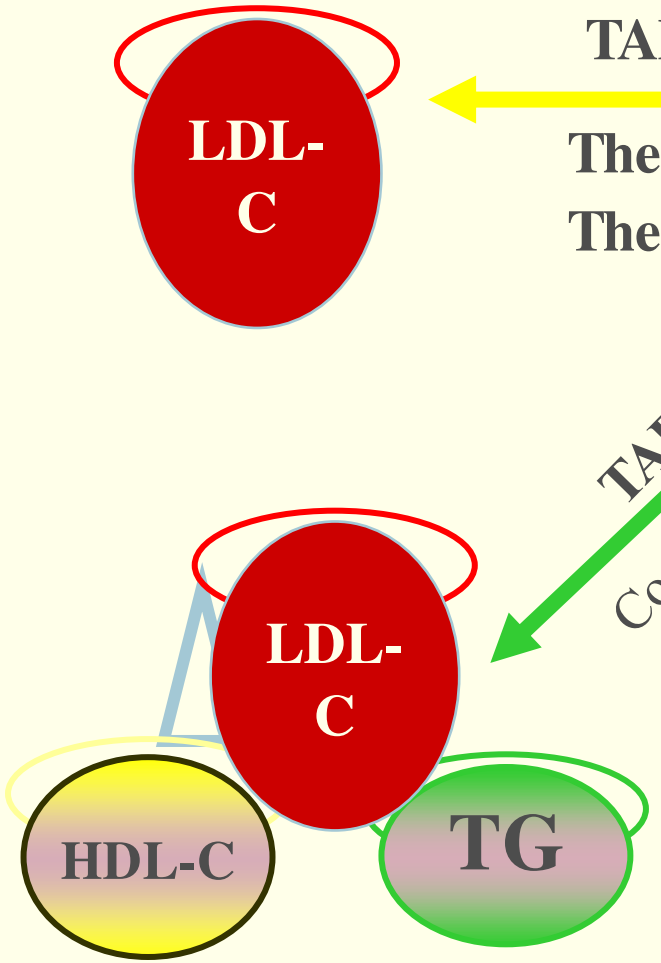
TL: Genest J et al. Braunwald's Heart Disease, ed by Libby, Bonow, Mann, Zipes; Saunders Elsevier 2008, 8th ed.p. 1071- 1091

Diabetic dyslipidemia



Keech AC et al, Lancet 371:117-25, 2008

CVD prevention: reduced-risk treatment



TARGET

The Lower The Better

- Statin, Statin+Ezetimibe

-Combination therapy

Statin and Fibrate, Statin and Nicotinic Acid, Statin and Fish Oil …..

TARGET

Comprehensive is Best

From TNT and PROVE-IT on optimal LDL-C (70 mg/dL) the contribution of persistently low HDL-C (<40 mg/dL) and high TG (>200mg/dL) to the CV residual risk is around

25-40%

The 2016 ESC/EAS Guidelines for the Management of Dyslipidemias

Recommendations for lipid analyses in CVD risk estimation

Recommendations	Class [a]	Level [b]
TC is to be used for the estimation of total CV risk by means of the SCORE system.	I	C
LDL-C is recommended to be used as the primary lipid analysis for screening, risk estimation, diagnosis and management. HDL-C is a strong independent risk factor and is recommended to be used in the HeartScore algorithm.	I	C
TG adds information on risk and is indicated for risk estimation.	I	C
Non-HDL-C is a strong independent risk factor and should be considered as a risk marker, especially in subjects with high TG.	I	C
ApoB should be considered as an alternative risk marker whenever available, especially in subjects with high TG.	IIa	C
Lp(a) should be considered in selected cases at high-risk, in patients with a family history of premature CVD, and for reclassification in subjects with borderline risk.	IIa	C
The ratio apoB/apoA1 may be considered as an alternative analysis for risk estimation.	IIb	C
The ratio non-HDL-C/HDL-C may be considered as an alternative but HDL-C used in HeartScore gives a better risk estimation.	IIb	C

Apo = apolipoprotein; CKD = chronic kidney disease; CVD = cardiovascular disease; HDL-C = high-density lipoprotein-cholesterol; LDL-C = low-density lipoprotein-cholesterol; Lp = lipoprotein; SCORE = Systemic Coronary Risk Estimation; TC = total cholesterol; TG = triglycerides.
[a]Class of recommendation.
[b]Level of evidence.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Treatment targets and goals for CVD prevention

Smoking	No exposure to tobacco in any form.
Diet	Healthy diet low in saturated fat with a focus on whole grain products, vegetables, fruit and fish.
Physical activity	2.5–5 h moderately vigorous physical activity per week or 30–60 min most days.
Body weight	BMI 20–25 kg/m^2, waist circumference <94 cm (men) and <80 cm (women).
Blood pressure	<140/90 mmHg[a]
Diabetes	HbA1c: <7% (<53 mmol/mol).

BMI = body mass index; HbA1C = glycated haemoglobin; HDL-C = high-density lipoprotein-cholesterol; LDL-C = low-density lipoprotein-cholesterol; TG = triglycerides.

[a]The BP target can be lower in some patients with type 2 diabetes127 and in some high-risk patients without diabetes who can tolerate multiple antihypertensive drugs.[70]

[b]The term "baseline LDL-C" refers to the level in a subject not taking any lipid lowering medication.

Lipids LDL-C is the primary target	**Very high-risk: LDL-C <1.8 mmol/L (70 mg/dL)** or a reduction of at least 50% if the baseline[b] is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL).
	High-risk: LDL-C <2.6 mmol/L (100 mg/dL) or a reduction of at least 50% if the baseline[b] is between 2.6 and 5.2 mmol/L (100 and 200 mg/dL).
	Low to moderate risk: LDL-C <3.0 mmol/L (115 mg/dL).
	Non-HDL-C secondary targets are <2.6, 3.4 and 3.8 mmol/L (100, 130 and 145 mg/dL) for very high-, high- and moderate-risk subjects, respectively.
	HDL-C: no target, but >1.0 mmol/L (40 mg/dL) in men and >1.2 mmol/L (48 mg/dL) in women indicates lower risk.
	TG: no target but <1.7 mmol/L (150 mg/dL) indicates lower risk and higher levels indicate a need to look for other risk factors.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Impact of specific lifestyle changes on lipid level

	Magnitude of the effect	Level of evidence	References
Lifestyle interventions to reduce TC and LDL-C levels			
Reduce dietary trans fat	+++	A	136, 139
Reduce dietary saturated fat	+++	A	136, 137
Increase dietary fibre	++	A	140, 141
Use functional foods enriched with phytosterols	++	A	142, 143
Use red yeast rice supplements	++	A	144–146
Reduce excessive body weight	++	A	147, 148
Reduce dietary cholesterol	+	B	149
Increase habitual physical activity	+	B	150
Use soy protein products	+/-	B	151
Lifestyle interventions to reduce TG-rich lipoprotein levels			
Reduce excessive body weight	+++	A	147, 148
Reduce alcohol intake	+++	A	152, 153
Increase habitual physical activity	++	A	150, 154
Reduce total amount of dietary carbohydrate	++	A	148, 155
Use supplements of n-3 polyunsaturated fat	++	A	156, 157
Reduce intake of mono- and disaccharides	++	B	158, 159
Replace saturated fat with mono- or polyunsaturated fat	+	B	136, 137
Lifestyle interventions to increase HDL-C levels			
Reduce dietary trans fat	+++	A	136, 160
Increase habitual physical activity	+++	A	150, 161
Reduce excessive body weight	++	A	147, 148
Reduce dietary carbohydrates and replace them with unsaturated fat	++	A	148, 162
Modest consumption in those who take alcohol may be continued	++	B	152
Quit smoking	+	B	163
Among carbohydrate-rich foods prefer those with low glycaemic index and high fibre content	+/-	C	164
Reduce intake of mono- and disaccharides	+/-	C	158, 159

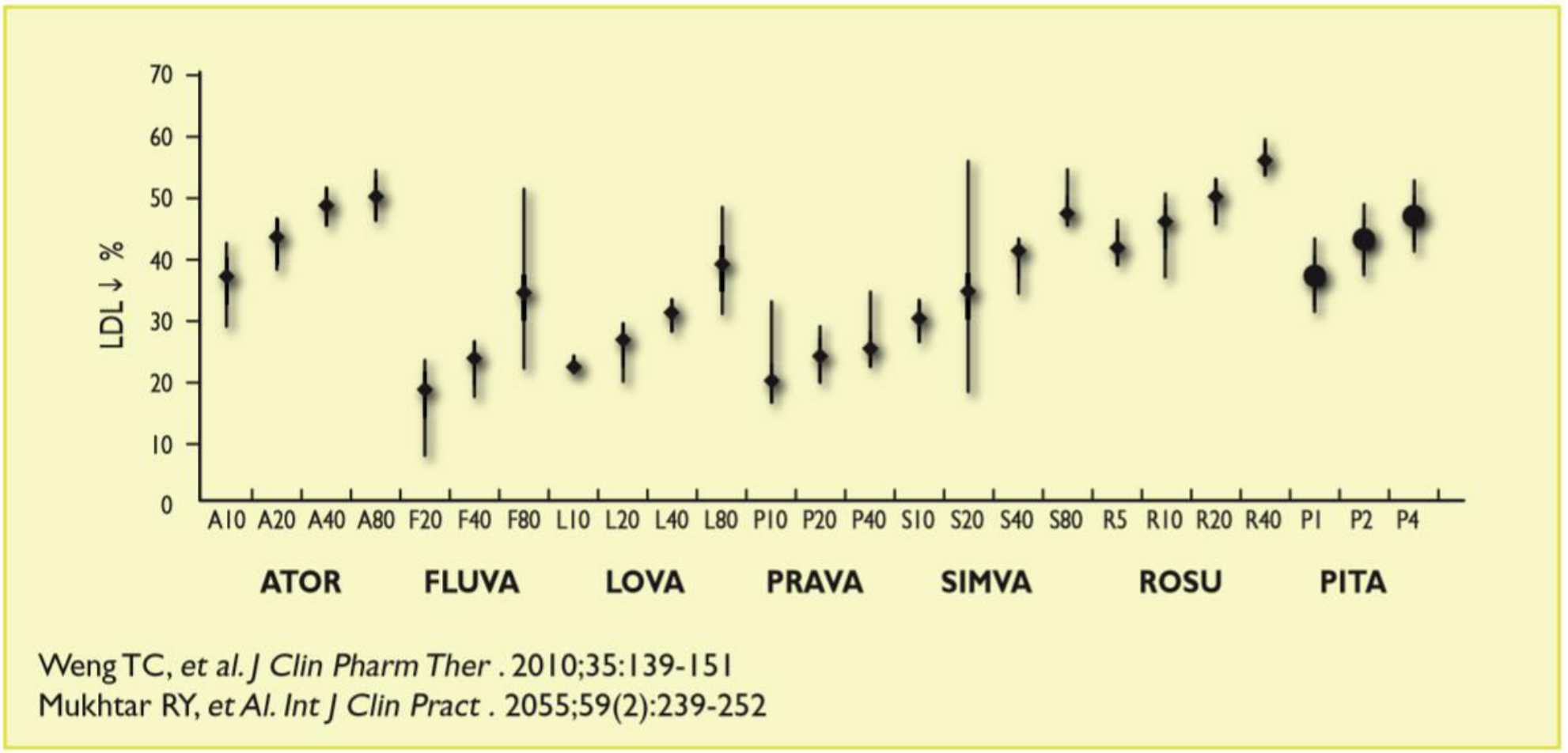
Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Dietary recommendations to lower LDL-c and improve the overall lipoprotein profile

	To be preferred	To be used with moderation	To be chosen occasionally in limited amounts
Cereals	Whole grains	Refined bread, rice and pasta, biscuits, corn flakes	Pastries, muffins, pies, croissants
Vegetables	Raw and cooked vegetables	Potatoes	Vegetables prepared in butter or cream
Legumes	Lentils, beans, fava beans, peas, chickpeas, soybean		
Fruit	Fresh or frozen fruit	Dried fruit, jelly, jam, canned fruit, sorbets, popsicles, fruit juice	
Sweets and sweeteners	Non-caloric sweeteners	Sucrose, honey, chocolate, candies	Cakes, ice creams, fructose, soft drinks
Meat and fish	Lean and oily fish, poultry without skin	Lean cuts of beef, lamb, pork or veal, seafood, shellfish	Sausages, salami, bacon, spare ribs, hot dogs, organ meats
Dairy food and eggs	Skim milk and yogurt	Low-fat milk, low-fat cheese and other milk products, eggs	Regular cheese, cream, whole milk and yogurt
Cooking fat and dressings	Vinegar, mustard, fat-free dressings	Olive oil, non-tropical vegetable oils, soft margarines, salad dressing, mayonnaise, ketchup	Trans fats and hard margarines (better to avoid them), palm and coconut oils, butter, lard, bacon fat
Nuts/seeds		All, unsalted (except coconut)	Coconut
Cooking procedures	Grilling, boiling, steaming	Stir-frying, roasting	Frying

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Drugs for treatment of hypercholesterolemia



A systematic review and meta-analysis of the therapeutic equivalence of statins. ATOR: atorvastatin; FLUVA: fluvastatin; LOVA: lovastatin; PRAVA: pravastatin; SIMVA: simvastatin; ROSU: rosuvastatin; PITA: pitavastatin.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Recommendations for the pharmacological treatment of hypercholesterolaemia

Recommendations	Class [a]	Level [b]	Ref [c]
Prescribe statin up to the highest recommended dose or highest tolerable dose to reach the goal.	I	A	62, 64, 68
In the case of statin intolerance, ezetimibe or bile acid sequestrants, or these combined, should be considered.	IIa	C	239, 256, 257
If the goal is not reached, statin combination with a cholesterol absorption inhibitor should be considered.	IIa	B	63
If the goal is not reached, statin combination with a bile acid sequestrant may be considered.	IIb	C	
In patients at very high-risk, with persistent high LDL-C despite treatment with maximal tolerated statin dose, in combination with ezetimibe or in patients with statin intolerance, a PCSK9 inhibitor may be considered.	IIb	C	115, 116

LDL-C = low-density lipoprotein-cholesterol; PCSK9 = proprotein convertase subtilisin/kexin type 9.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Possible causes of hypertriglyceridaemia

Genetic predisposition
Obesity
Type 2 diabetes
Alcohol consumption
Diet high in simple carbohydrates
Renal disease
Hypothyroidism
Pregnancy (physiological triglyceride concentrations double during the third trimester)
Paraproteinaemia and autoimmune disorders such as systemic lupus erythematosus
Multiple medications including: • Corticosteroids • Oestrogens, especially those taken orally • Tamoxifen • Antihypertensives: adrenergic beta-blocking agents (to a different degree), thiazides • Isotretinoin • Bile acid-binding resins • Ciclosporin • Antiretroviral regimens (protease inhibitors) • Psychotropic medications: phenothiazines, second generation antipsychotics

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Recommendations for drug treatments of hypertriglyceridaemia

Recommendations	Class[a]	Level[b]	Ref[c]
Drug treatment should be considered in high-risk patients with TG >2.3 mmol/L (200 mg/dL).	IIa	B	261, 262
Statin treatment may be considered as the first drug of choice for reducing CVD risk in high-risk individuals with hypertriglyceridaemia.	IIb	B	263, 264
In high-risk patients with TG >2.3 mmol/L (200 mg/dL) despite statin treatment, fenofibrate may be considered in combination with statins.	IIb	C	261–264

CVD = cardiovascular disease; TG = triglycerides.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Summary of the efficacy of drug combinations for the management of mixed dyslipidaemias

A combination of statins with fibrates can also be considered while monitoring for myopathy, but the combination with gemfibrozil should be avoided.
If TG are not controlled by statins or fibrates, prescription of n-3 fatty acids may be considered to decrease TG further, and these combinations are safe and well tolerated.

TG = triglycerides.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Recommendations if drug treatment of low HDL-C is considered

Recommendations	Class [a]	Level [b]	Ref [c]
Statins and fibrates raise HDL-C with a similar magnitude and these drugs may be considered.	IIb	B	262, 292
The efficacy of fibrates to increase HDL-C may be attenuated in people with type 2 diabetes.	IIb	B	261, 262

HDL-C = high-density lipoprotein cholesterol.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Management of dyslipidaemia in different clinical settings

Dutch Lipid Clinic Network diagnostic criteria for familial hypercholesterolaemia

Criteria	Points
1) Family history	
First-degree relative with known premature (men: <55 years; women: <60 years) coronary or vascular disease, or	
First-degree relative with known LDL-C above the 95th percentile	1
First-degree relative with tendinous xanthomata and/or arcus cornealis, or	
children <18 years of age with LDL-C above the 95th percentile (see 9.1.2.3)	2
2) Clinical history	
Patient with premature (men: <55 years; women: <60 years) coronary artery disease	2
Patient with premature (men: <55 years; women: <60 years) cerebral or peripheral vascular disease	1
3) Physical examination	
Tendinous xanthomata	6
Arcus cornealis before age 45 years	4
4) LDL-C levels	
LDL-C ≥ 8.5 mmol/L (325 mg/dL)	8
LDL-C 6.5–8.4 mmol/L (251–325 mg/dL)	5
LDL-C 5.0–6.4 mmol/L (191–250 mg/dL)	3
LDL-C 4.0–4.9 mmol/L (155–190 mg/dL)	1
5) DNA analysis	
Functional mutation in the LDLR, apoB or PCSK9 gene	8
Choose only one score per group, the highest applicable Diagnosis (diagnosis is based on the total number of points obtained)	
A 'definite' FH diagnosis requires >8 points	
A 'probable' FH diagnosis requires 6–8 points	
A 'possible' FH diagnosis requires 3–5 points	

FH = familial hypercholesterolaemia; LDL-C = low-density lipoproteincholesterol.
[a]Exclusive of each other (i.e. maximum 6 points if both are present)

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Summary of dyslipidaemia in metabolic syndrome and in type 2 diabetes

Dyslipidaemia in MetS represents a cluster of lipid and lipoprotein abnormalities including elevation of both fasting and postprandial TG, apoB, and small dense LDL and low HDL-C and apoA1.
Non-HDL-C or apoB are good surrogate markers of TRLs and remnants and are a secondary objective of therapy. Non-HDL-C <3.4 mmol/L (<130 mg/dL) or apoB <100 mg/dL is desirable in those at high-risk, and <2.6 mmol/L (<100 mg/dL) and <80 mg/dL, respectively, in those at very high-risk.
Increased waist circumference and elevation of TG seems to be a simple tool to capture the high-risk subjects with MetS.
Atherogenic dyslipidaemia is one of the major risk factors for CVD in people with type 2 diabetes.

apoB: apolipoprotein B; MetS: metabolic syndrome; TG: triglycerides; TRLs: triglyceride-rich lipoproteins.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Recommendations for the treatment of dyslipidaemia in diabetes

Recommendations	Class [a]	Level [b]	Ref [c]
In all patients with type 1 diabetes and in the presence of microalbuminuria and/or renal disease, LDL-C lowering (at least 50%) with statins as the first choice is recommended irrespective of the baseline LDL-C concentration.	I	C	64, 357
In patients with type 2 diabetes and CVD or CKD, and in those without CVD who are >40 years of age with one or more other CVD risk factors or markers of target organ damage, the recommended goal for LDL-C is <1.8 mmol/L (<70 mg/dL) and the secondary goal for non-HDL-C is <2.6 mmol/L (<100 mg/dL) and for apoB is <80 mg/dL.	I	B	62, 64
In all patients with type 2 diabetes and no additional risk factors and/or evidence of target organ damage, LDL-C <2.6 mmol/L (<100 mg/dL) is the primary goal. Non-HDL-C <3.4 mmol/L (<130 mg/dL) and apoB <100 mg/dL are the secondary goals.	I	B	62, 64

apoB: apolipoprotein B; CKD: chronic kidney disease; CVD: cardiovascular disease; HDL-C: high-density lipoprotein-cholesterol; LDL-C: low-density lipoproteincholesterol; MetS: metabolic syndrome; TG: triglycerides.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Recommendations for lipid-lowering therapy in patients with ACS and patients undergoing PCI

Recommendations	Class [a]	Level [b]	Ref [c]
It is recommended to initiate or continue high dose statins early after admission in all ACS patients without contra-indication or history of intolerance, regardless of initial LDL-C values.	I	A	64, 358–360
If the LDL-C target is not reached with the highest tolerable statin dose, ezetimibe should be considered in combination with statins in post-ACS patients.	IIa	B	63
If the LDL-C target is not reached with the highest tolerable statin dose and/or ezetimibe, PCSK9 inhibitors may be considered on top of lipid-lowering therapy; or alone or in combination with ezetimibe in statin intolerant patients or in whom a statin is contra-indicated.	IIb	C	115, 116
Lipids should be re-evaluated 4–6 weeks after ACS to determine whether target levels of LDL-C <1.8 mmol/L (<70 mg/dL) or a reduction of at least 50% if the baseline is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL) have been reached and whether there are any safety issues. The therapy dose should then be adapted accordingly.	IIa	C	
Routine short pretreatment or loading (on the background of chronic therapy) with high-dose statins before PCI should be considered in elective PCI or in NSTE-ACS.	IIa	A	363–365

ACS: acute coronary syndrome; NSTE-ACS: non-ST elevation acute coronary syndrome; PCI: percutaneous coronary intervention; PCSK9: proprotein convertase subtilisin/kexin type 9.

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

Recommendation for the treatment of dyslipidaemia in autoimmune diseases

Recommendation	Class [a]	Level [b]
The universal use of lipid-lowering drugs is not recommended	III	C

Source: Catapano AL, et al. 2016 ESC/EAS Guidelines for the Management of Dyslipidemias. Eur H J, Aug 27, 2016

2017 AACE and EAS Lipid Guidelines

Atherosclerotic CVD Risk Categories and LDL-C Treatment Goals

	Risk Category	Risk factors[a]/10-Year risk[b]	Treatment goals: LDL-C (mg/dL)	Non-HDL-C (mg/dL)	apoB (mg/dL)
Extreme Risk	AACE	• Progressive ASCVD after achieving an LDL-C <70 mg/dL • Established clinical cardiovascular disease in patients with DM, CKD ¾ , or HeFH • History of premature ASCVD (<55 male, <65 female)	<55	<80	<70
	EAS	No recommendation made	-	-	-
Very High Risk	AACE	• Established or recent hospitalization for ACS, Coronary, carotid or peripheral vascular disease, 10-year risk >20% • Diabetes or CKD ¾ with 1 or more risk factor(s) • HeFH	<70	<100	<80
	EAS	• Established ASCVD • Severe CKD (GFR <30) • DM with target organ damage or major risk factor	<70	<100	<80
High Risk	AACE	• >2 risk factors and 10-year risk 10-20% • Diabetes or CKD ¾ with no other risk factors	<100	<130	<90
	EAS	• Diabetes, moderate CKD (GFR 30-50), 10-year Risk 5-10%, Familial hypercholesterolemia	<100	<130	<100
Moderate Risk	AACE	<2 risk factors and 10-year risk <10%	<100	<130	<90
	EAS	10-year risk 1-5%	< 115	-	-
Low Risk	AACE	No risk factors	<130	<160	NR
	EAS	10-year risk <1%	< 115	-	-

Abbreviations: ACS = acute coronary syndrome; ASCVD = atherosclerotic cardiovascular disease; CKD = chronic kidney disease; DM = diabetes mellitus; HDL-C = high-density lipoprotein cholesterol; HeFH = heterozygous familial hypercholes-terolemia; LDL-C = low-density lipoprotein cholesterol; NR = not recommended;

[a] Major independent risk factors are high LDL-C, polycystic ovary syndrome, cigarette smoking, hypertension (blood pressure ≥140/90 mm Hg or on hypertensive medication), low HDL-C (<40 mg/dL), family history of coronary artery disease (in male, first-degree relative younger than 55 years; in female, first-degree relative younger than 65 years), chronic renal disease (CKD) stage 3/4, evidence of coronary artery calcification and age (men ≥45; women ≥55 years). Subtract 1 risk factor if the person has high HDL-C.

[b] Framingham risk scoring is applied to determine 10-year risk.

Source: Baer J. AACE and EAS Lipid Guidelines. J Am Coll Cardiol, Aug 11, 2017.

Primary Lipid Lowering Drug Classes

Drug class	Metabolic effect	Main considerations
Fibric acid derivatives • gemfibrozil, • fenofibrate, fenofibric • acid	Primarily ↓ TG 20%-35%, ↑ HDL-C 6%-18% by stimulating lipoprotein lipase activity Fenofibrate may ↓ TC and LDL-C 20%-25% Fenofibrate ↓ fibrinogen level	Gemfibrozil may ↑ LDL-C 10%-15%, GI symptoms, possible cholelithiasis Myopathy/rhabdomyolysis when used with statin Fibrates are associated with increased serum creatinine levels, which may not reflect renal dysfunction. Can improve diabetic retinopathy

Source: Mogni S. AACE Guideline 2017: Management of Dyslipidemia and Prevention of Atherosclerosis. Mar 6, 2017.

Fibrates

R61. Fibrates should be used to treat severe hypertriglyceridemia (TG >500 mg/dL)

R62. Fibrates may improve ASCVD outcomes in primary and secondary prevention when TG concentrations are ≥200 mg/dL and HDL-C concentrations <40 mg/dL

Source: Mogni S. AACE Guideline 2017: Management of Dyslipidemia and Prevention of Atherosclerosis. Mar 6, 2017.

Combination Therapy

R71. Combination therapy of lipid-lowering agents should be considered when the LDL-C /nonHDL-C level is markedly increased and monotherapy (usually with a statin) does not achieve the therapeutic goal

Source: Mogni S. AACE Guideline 2017: Management of Dyslipidemia and Prevention of Atherosclerosis. Mar 6, 2017.

Conclusion

- Mixed-dyslipidemia: important in obesity, metabolic syndrome, diabetes mellitus
- First target in dyslipidemia: cholesterolemia, unless TG > 500 mg/dL
- Statins and fenofibrate combination: class IIb indication
- Atherogenic dyslipidemias: ↑CE, ↑TG, ↓HDL-C, ↑ small dense Lpa