Current Perspectives in Managing Cardiometabolic Risk and Dyslipidemia

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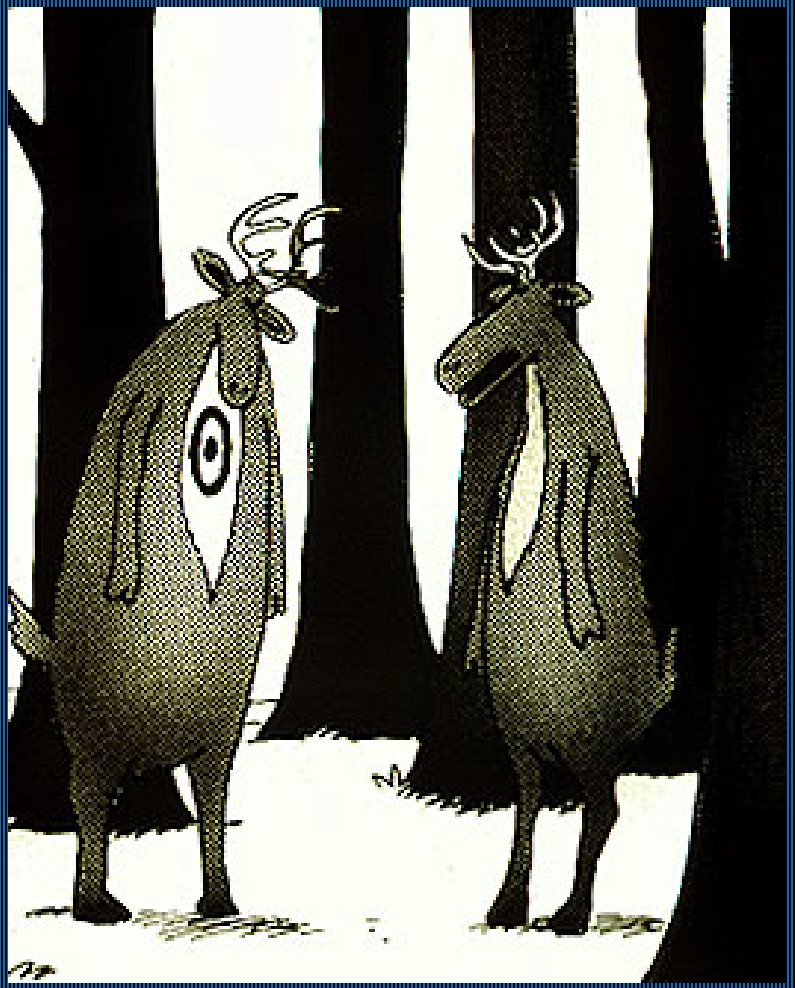
AGENDA

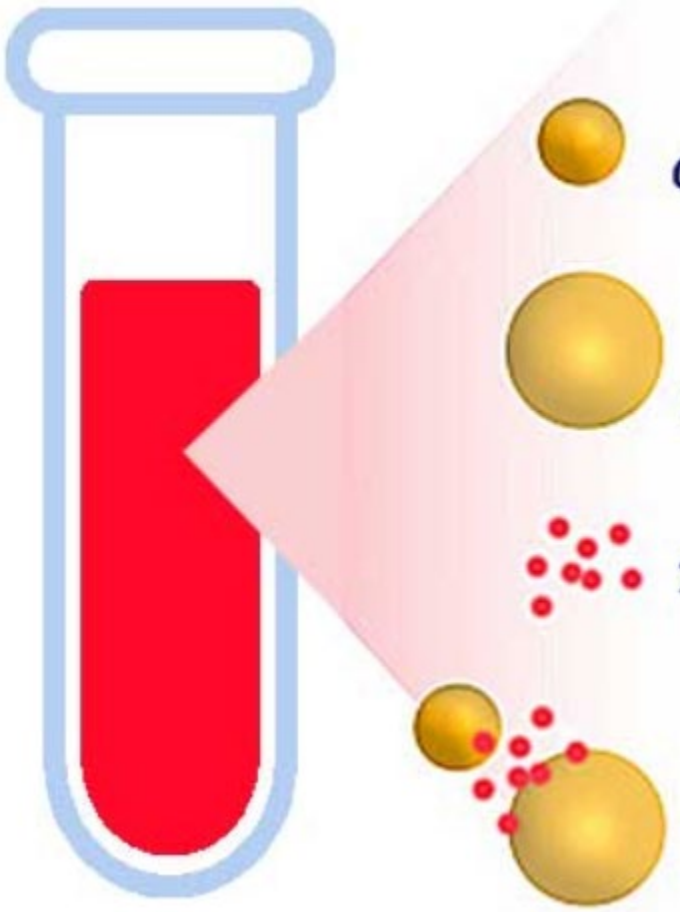
- Dyslipidemia & guideline essentials
- Familial hypercholesterolemia
- Statin Intolerance
- Exercise and postprandial lipemia
- Exercise and cardiac dysrhymias

Defining Targets



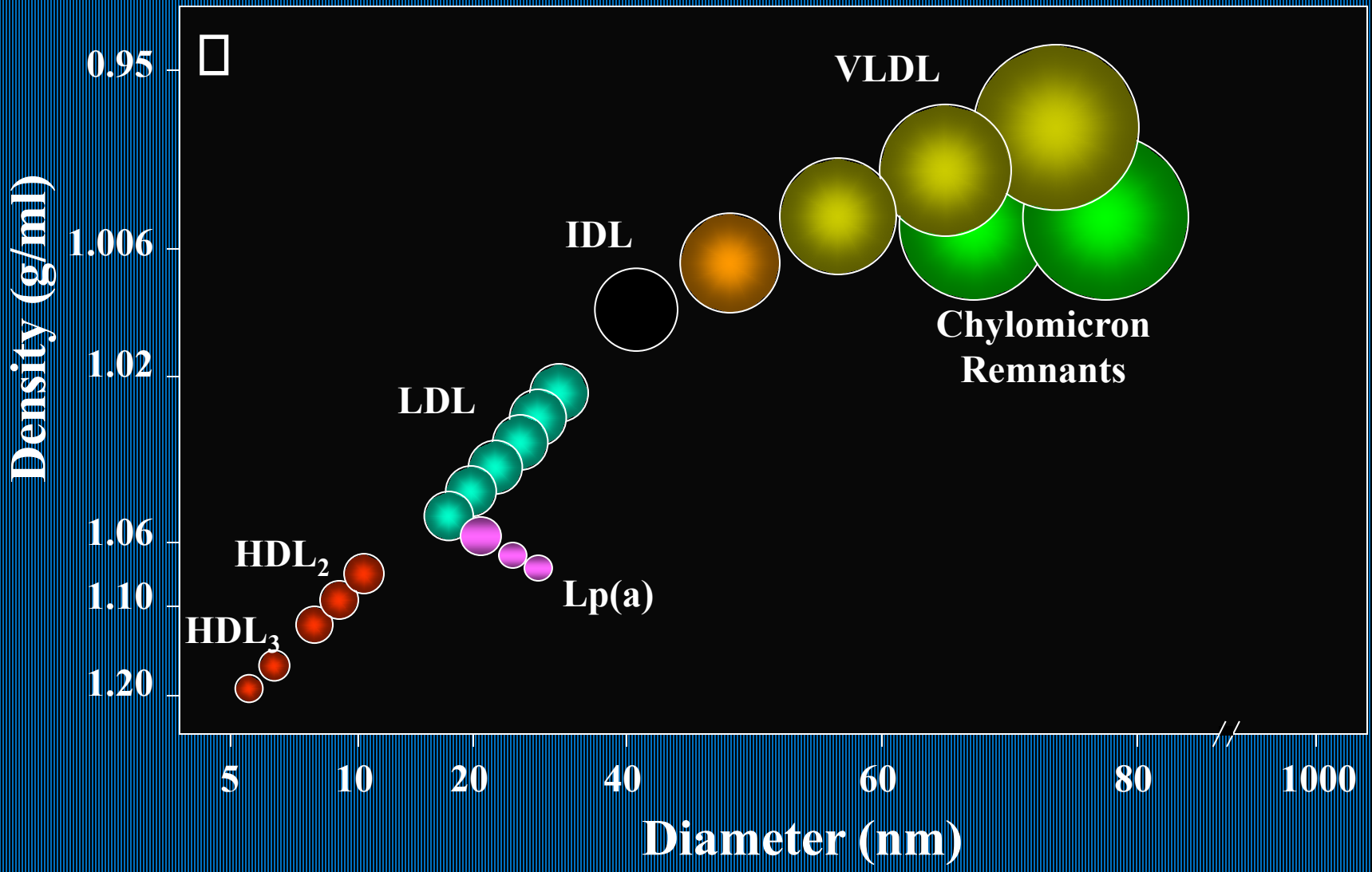
"Bummer of a birthmark, Hal."

Lipids and Reference Ranges

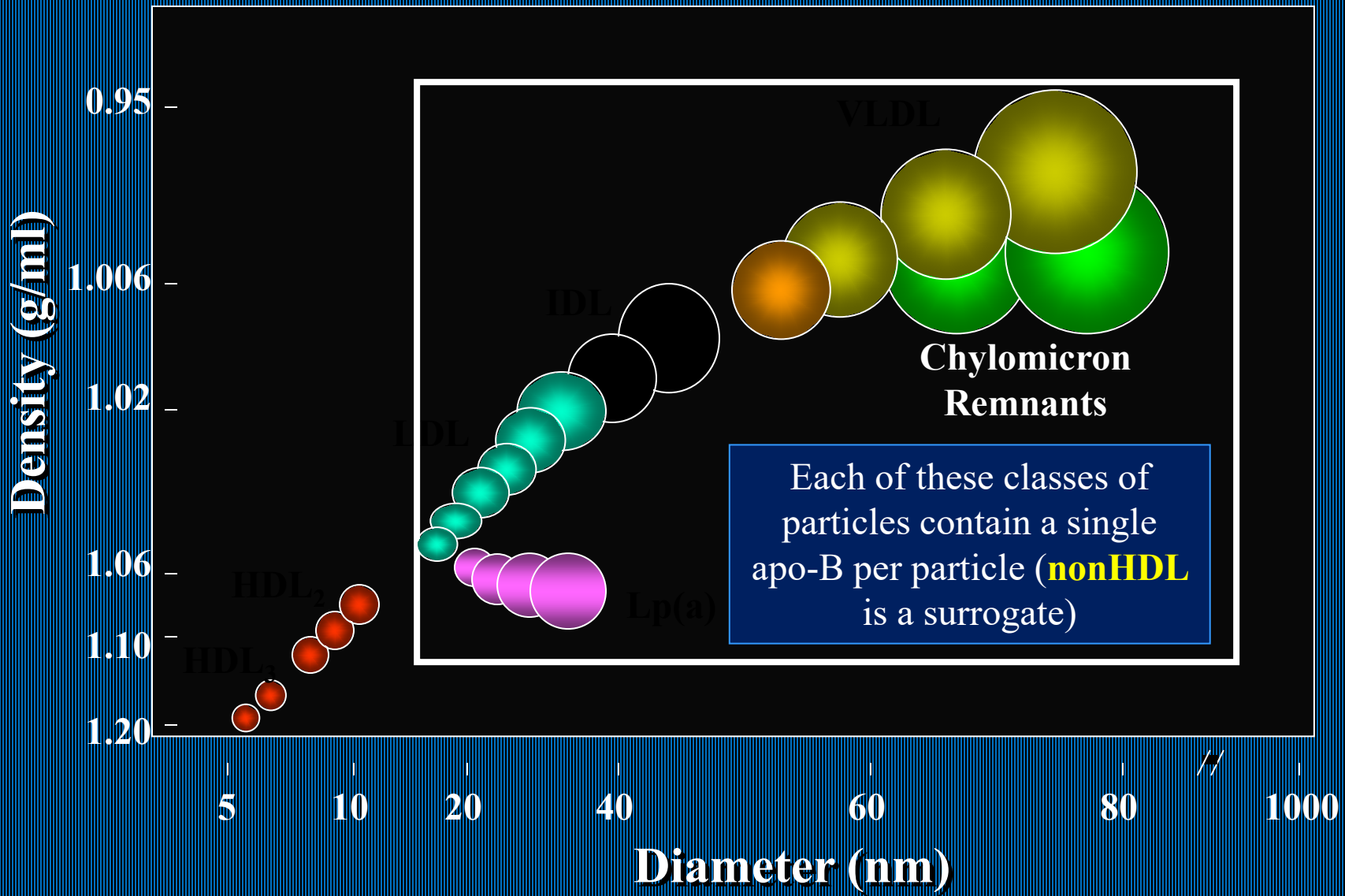


	Desirable	Borderline	High Risk
HDL Cholesterol	60 mg/dl	35-45 mg/dl	<35 mg/dl
LDL Cholesterol	60-130 mg/dl	130-159 mg/dl	160-189 mg/dl
Triglycerides	<150 mg/dl	150-199 mg/dl	200-499 mg/dl
Total Cholesterol	<200 mg/dl	200-239 mg/dl	240 mg/dl

Lipoprotein (Sub)Classes



Apo-B Lipoproteins

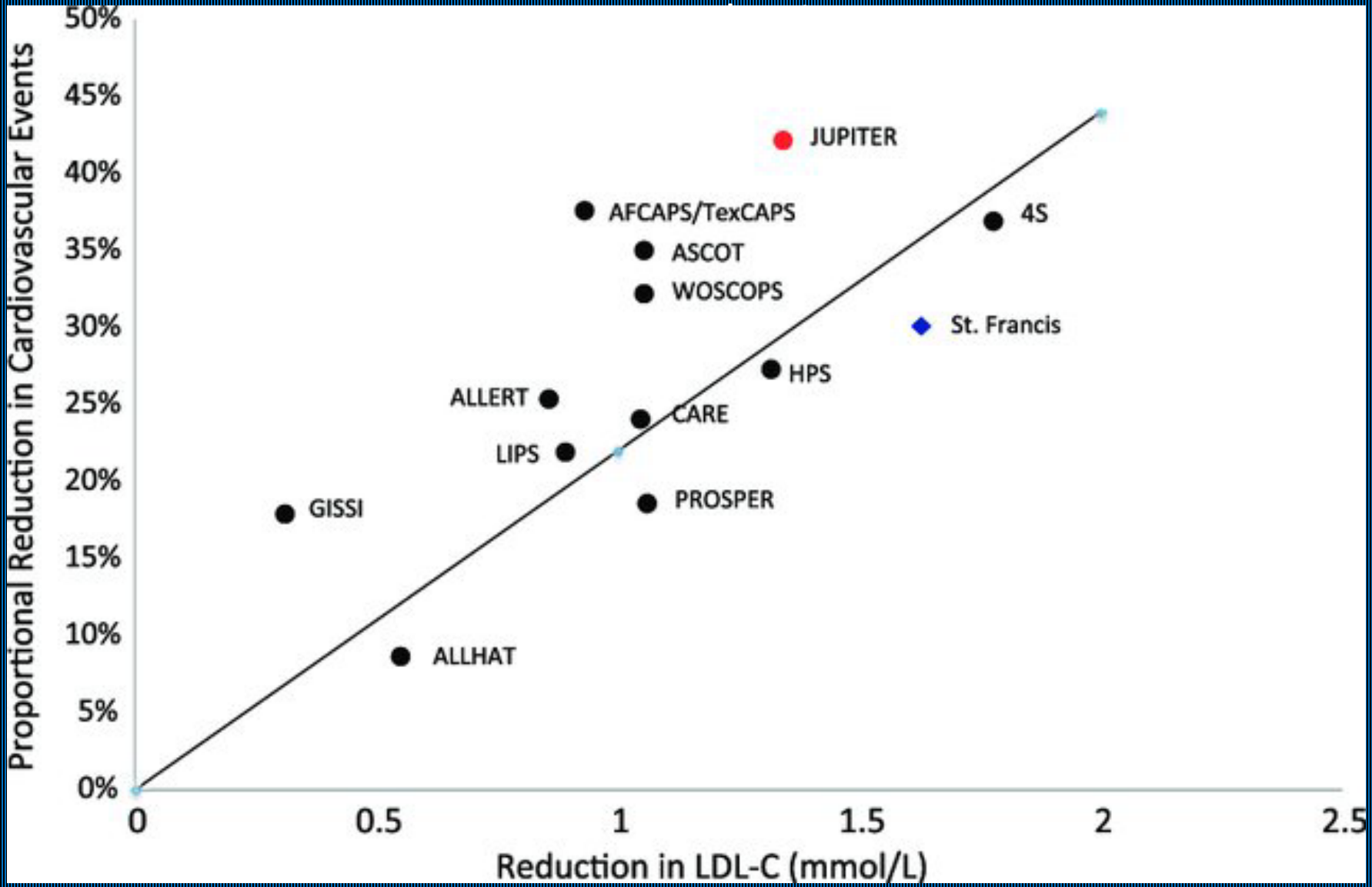


NonHDL-C = Total Chol – HDL

Hazard ratios for CVD are 2-fold higher for non-HDL in American Indians with diabetes mellitus than for LDL. (Strong HS)

Liu w, Resnick H et.al. Diabetes Care 26:16–23, 2003

Linear relationship between low-density lipoprotein-cholesterol (LDL-C) reduction and cardiovascular



Changing the Paradigm for Post-MI Cholesterol Lowering

Cardiovascular risk reduction is agnostic to how LDL-C is lowered.

What matters is the **absolute reduction** and the **duration of that reduction**, hence the concept of cumulative exposure to the time-averaged LDL-C, which are functions of adherence (patients) and the treatment intensity prescribed (doctors).

Ray K. Eur Heart J. 2021;42(3):253-256.

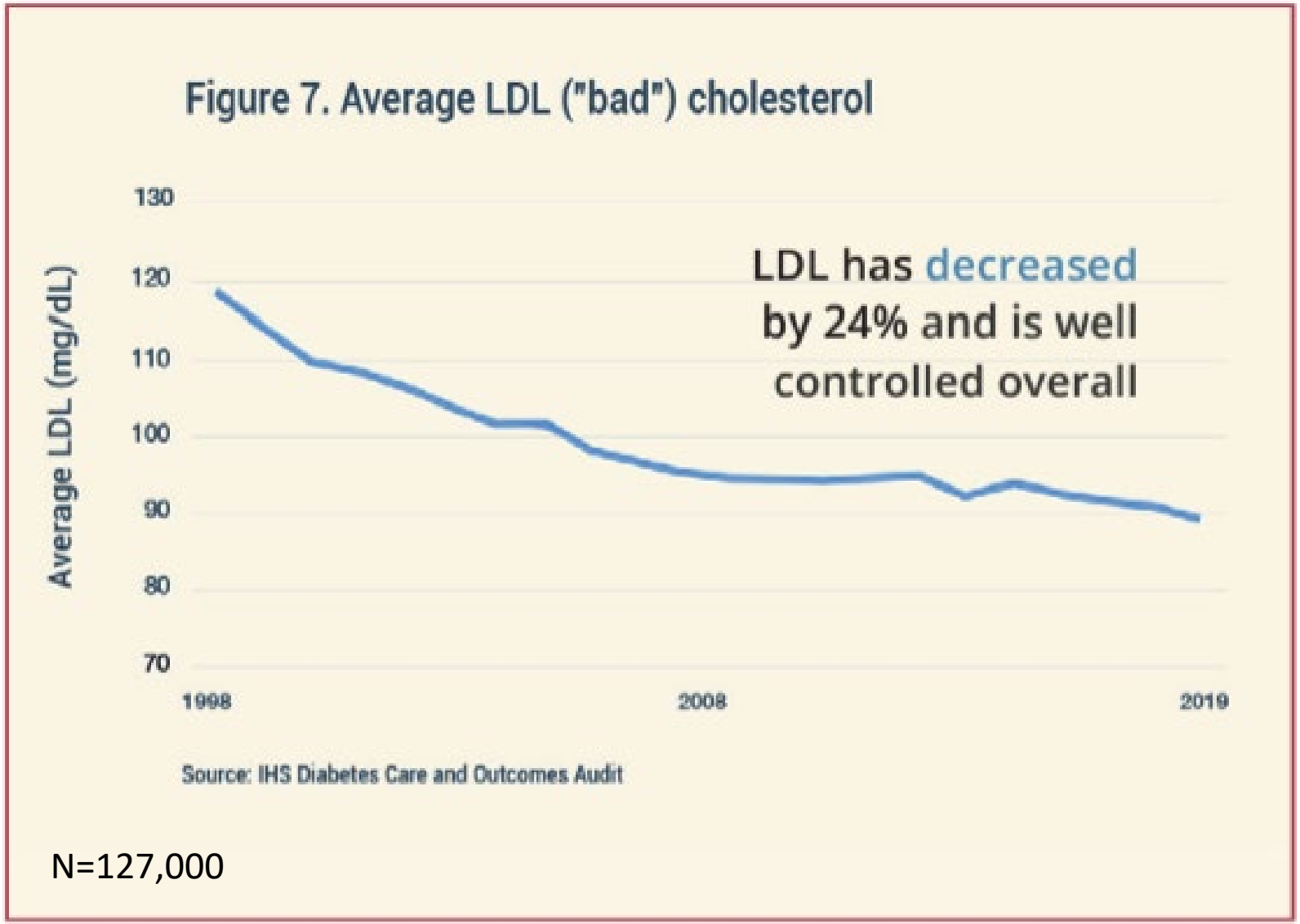


Figure 7. Average LDL ("bad") cholesterol
Average LDL (mg/dL)
130
120
110
100
90
80
70
1998
2008
2019
LDL has decreased by 24% and is well controlled overall
Source: IHS Diabetes Care and Outcomes Audit

N=127,000

Lipid & Aspirin Therapy in Type 2 Diabetes

Lipid Therapy in Type 2 Diabetes

Please Note: This algorithm is **not** intended for treatment and target selection in children <18 years of age or in women who are or could become pregnant.

- ► Obtain a fasting lipid panel in patients with diabetes
  - at diagnosis of diabetes or initial diabetes visit;
  - at least every 5 years if age <40 years, annually after 40; and
  - at initiation of statin therapy and after dosing changes.
- ► Provide lifestyle therapy to all patients with diabetes (individualized nutrition therapy, physical activity, and weight loss guidance).
- ► Evaluate for statin therapy
  - Secondary Prevention:
    Prescribe high intensity statin therapy for patients with diabetes and ASCVD[1].
  - Primary Prevention:
    Use the following table to guide statin therapy and dosing for people with diabetes and no ASCVD diagnosis.
    - Evaluate ASCVD risk factors **independent of diabetes**[2].
    - Calculate 10-year ASCVD risk for patients aged 40-75 years using the ASCVD Risk Estimator Plus at https://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/.

Age	ASCVD[1] Risk	Statin Therapy
<40 years	None	None
	One or more ASCVD risk factors[2]	Moderate or High Intensity[3]
40-75 years	None or 10-year ASCVD risk <5%	Moderate Intensity
	One or more ASCVD risk factors[2] or 10-year ASCVD risk 5-20%	Moderate or High Intensity[3]
	10-year ASCVD risk >20%	High Intensity[4]
>75 years	Individualize ASCVD risk assessment[5]	Moderate or High Intensity

1 ASCVD (atherosclerotic cardiovascular disease) is atherosclerosis affecting the vasculature that results in diseases of any of the following: heart (e.g. myocardial infarction, angina), the brain (e.g., stroke, transient ischemic attack), and the lower extremities (e.g peripheral artery disease, limb ischemia).

2 ASCVD Risk Factors **independent of diabetes** include: LDL cholesterol ≥100 mg/dL, smoking, hypertension, chronic kidney disease, albuminuria, or family history of premature ASCVD.

3 Consider high intensity statin therapy if multiple ASCVD risk factors.

4 Consider adding ezetimibe to maximally tolerated statin if ASCVD risk >20% to reduce LDL cholesterol by 50% or more from baseline.

5 Use of statin therapy for primary prevention of ASCVD in patients aged >75 years should include careful consideration of the potential risks of adverse drug events versus benefit of therapy.

Reference: American Diabetes Association Clinical Practice Recommendations

Statin Medications	Moderate Intensity Dose	High Intensity Dose
Atorvastatin	10-20 mg	40-80 mg
Rosuvastatin	5-10 mg	20-40 mg
Simvastatin	20-40 mg	Not applicable
Pravastatin	40-80 mg	Not applicable

Note: All statins are dosed daily.
Other statins include fluvastatin, lovastatin, pitavastatin (*Livalo*).

Contraindications: acute liver disease, pregnancy, nursing mothers

Safety and monitoring: Check liver function tests before initiating therapy; routine monitoring not necessary.

Statin intolerance: Usually due to side effect, such as myalgias. Consider trying a different statin. If unable to tolerate daily statin, there may still be benefit from a lower dose or less frequent dosing.

Combination therapy: In patients with ASCVD and very high risk with an LDL cholesterol ≥70 mg/dL on a maximally tolerated statin, consider the addition of ezetimibe 10 mg daily and/or a PCSK9 inhibitor to further reduce the risk of cardiovascular events.
- Evolocumab (*Repatha*) 140 mg SC every two weeks or 420 mg SC monthly
- Alirocumab (*Praluent*) 75-150 mg SC every two weeks or 300 mg SC monthly

Managing Elevated Triglycerides (>150 mg/dL)

- Ensure optimal blood glucose control; identify and address any secondary causes (e.g., high fat and/or high carbohydrate diet, hypothyroidism, excessive alcohol use, and medications).
- Consider initiating or increasing statin therapy when triglyceride levels >150 mg/dL to ≤500 mg/dL.
- Consider additional lipid lowering medications to reduce risk of pancreatitis if triglycerides ≥500 mg/dL (especially if ≥1,000 mg/dL).
  - Fenofibrate 120-160 mg daily
  - Omega 3 fatty acid 2 g bid
  - Icosapent ethyl (*Vascepa*) 2 g bid

Aspirin Therapy in Type 2 Diabetes

Secondary Prevention: Patients with a history of ASCVD should receive aspirin 75-162 mg daily if it is not contraindicated. If allergic to aspirin, consider clopidogrel 75 mg daily.

Primary Prevention: Consider aspirin 75-162 mg daily in patients with increased risk of ASCVD (e.g., age 50-70 years and one or more ASCVD risk factors) if they are not at increased risk of bleeding.

Aspirin is not recommended in patients at lower risk of ASCVD (e.g., age <50 years with no other ASCVD risk factors). Aspirin is not generally recommended in those aged >70 years due to increased bleeding risk.

Medications on the **IHS National Core Formulary** are in BOLD above.
Please consult a complete prescribing reference for more detailed information.
No endorsement of specific products is implied.

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- Provide lifestyle therapy to all patients with diabetes (individualized nutrition therapy, physical activity, and weight loss guidance).

► Evaluate for statin therapy

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Risk estimator: *LDL, BP, smoking, CKD, fam hx CVD*

Statin Dosage Intensity

Categories of High-, Moderate-, Low- Intensity

High-Intensity Statin	Moderate-Intensity Statin	Low-Intensity Statin
Daily dose lowers LDL-C by >49%	**Daily dose lowers LDL-C by 30 to 49%**	**Daily dose lowers LDL-C by <30%**
Atorvastatin 40-**80** mg Rosuvastatin **20**-40 mg	Atorvastatin **10**-20 mg Rosuvastatin 5-**10** mg Simvastatin **20-40** mg Pravastatin **40**-80 mg Lovastatin **40** mg Fluvastatin XL 80 mg Fluvastatin **40** mg 2x daily Pitavastatin 1-4 mg	Simvastatin 10 mg Pravastatin 10-20 mg Lovastatin 20 mg Fluvastatin 20-40 mg

Bold = doses used in CV event RCT's

nla NATIONAL LIPID ASSOCIATION

Grundy SM, et al. Circulation 2019;139(25):e1082-e1143.

LDL “targets”

<100 – ideal primary prevention

< 70 – high risk CVD populations

<55 – very high risk CVD pop (e.g. T2D with ASCVD)

Primary Lipid Disorder Therapeutic Protocol Categories

Elevated LDL normal TG

Elevated LDL and TG

Elevated TG normal LDL

Normal LDL and TG, low HDL

Dietary
Exercise
Statins
Niacin
Fibrates
n3 fatty acids
Ezetimibe
PCSK9inh.
New agents
ASO, siRNA, etc.

Hypertriglyceridemia

< 150 mg/dL normal

150-500 moderate

>500 severe

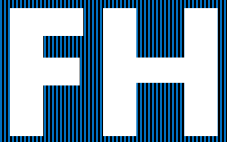
Weight loss
dec. alcohol
Inc. physical activity
dec total CHO

Other Select Lipoprotein Targets of Therapy

Lipoprotein (a) or Lp(a) (<50 mg/dL)*

Apolipoprotein B and nonHDL-C (<130 mg/dL, <<100 mg/dL high CVD risk)

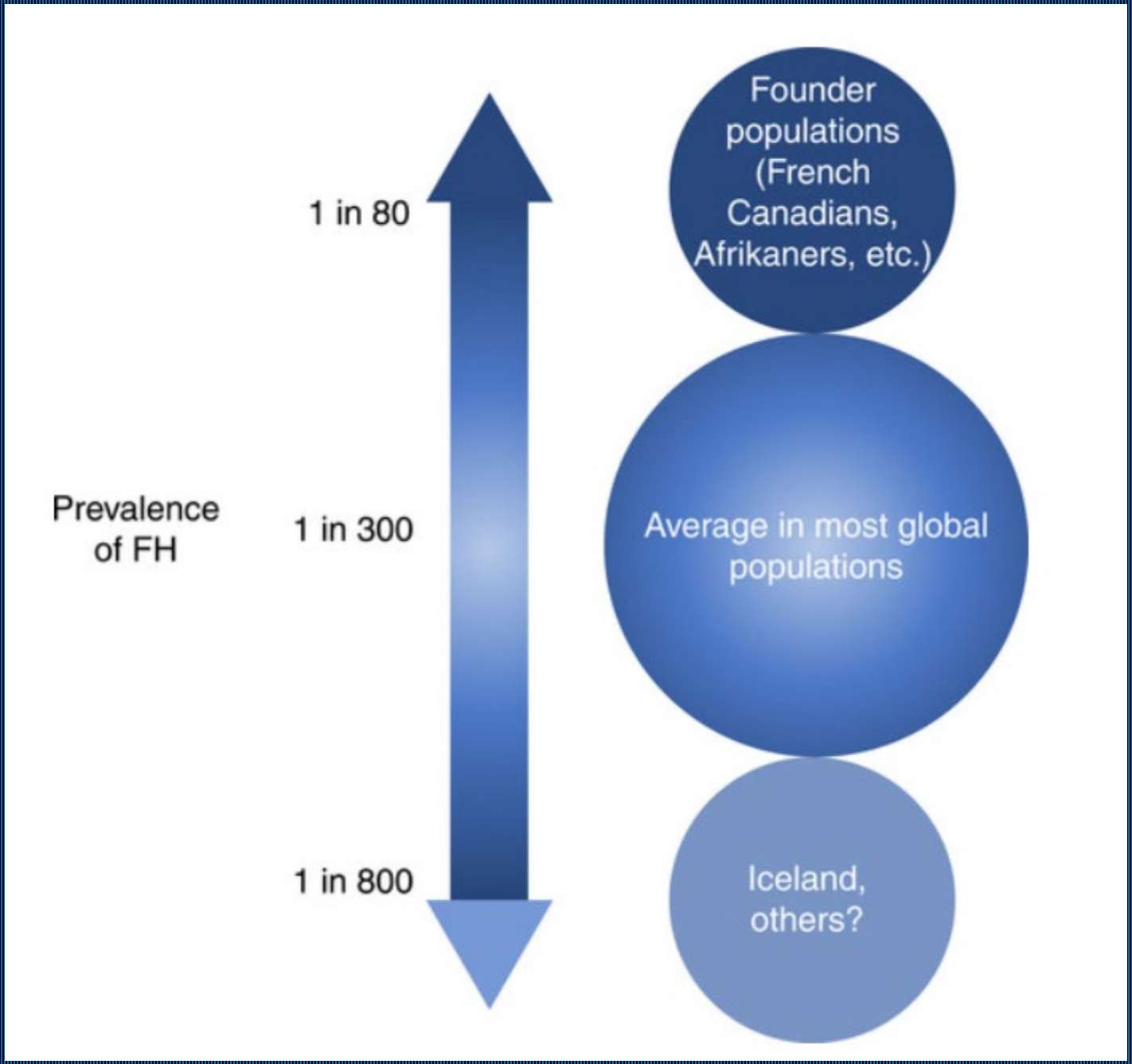
* Genetically determined



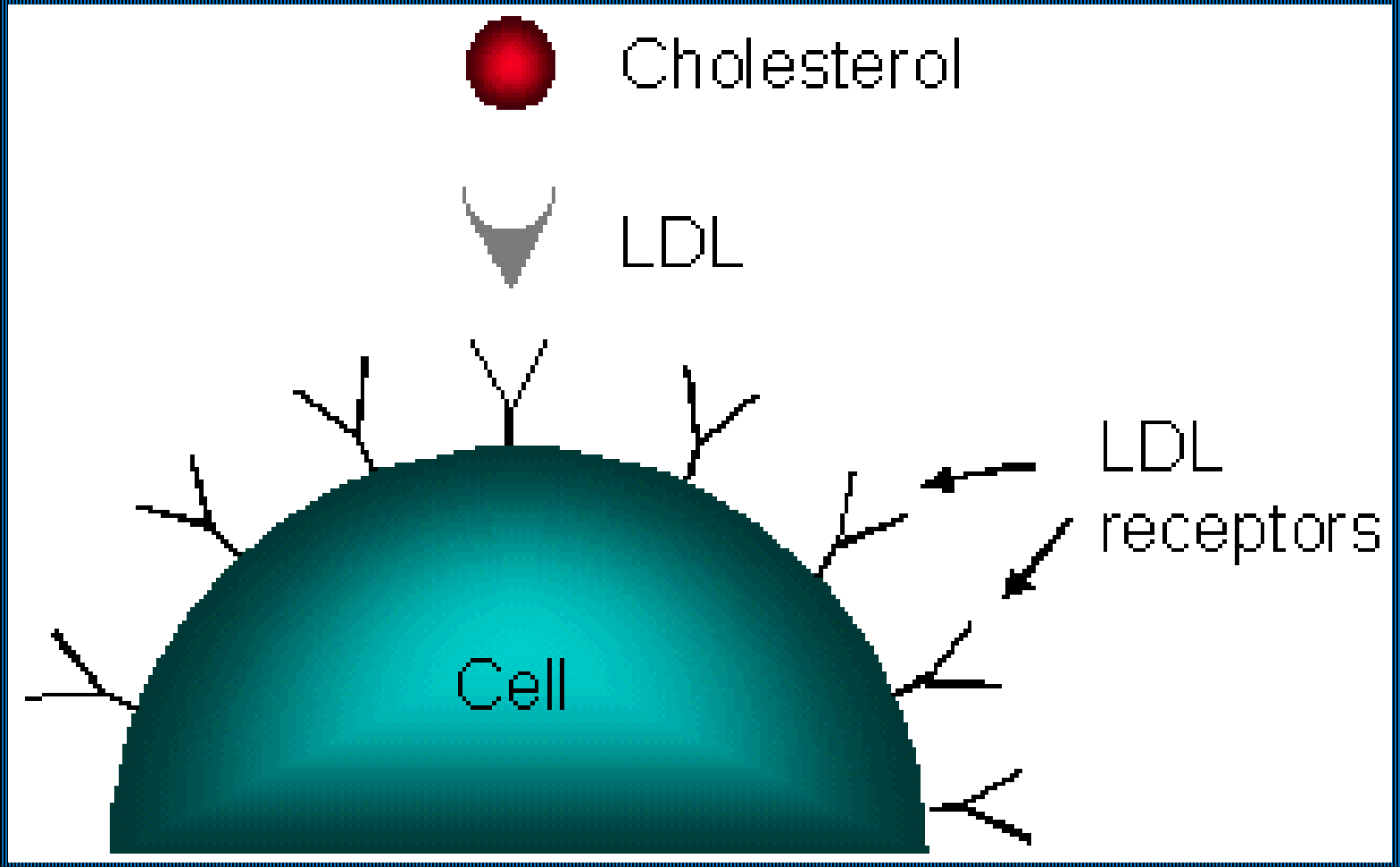
Familial Hypercholesterolemia (FH)

A group of inherited genetic defects (mutations) resulting in severe elevations of blood cholesterol levels which produce severe hypercholesterolemia and increased risk of premature coronary heart disease (CHD).

- LDL receptor defects
- Apolipoprotein (Apo)B
- Proprotein convertase subtilisin/kexin type 9 (PCSK9)
- Lp(a)
- Others


Prevalence of FH
1 in 80
1 in 300
1 in 800
Founder populations (French Canadians, Afrikaners, etc.)
Average in most global populations
Iceland, others?

Familial Hypercholesterolemia



Heterozygous or
Homozygous

Genetics of Familial Hypercholesterolemia

Familial hypercholesterolemia (FH) can be caused by inherited changes (mutations) in the *LDLR*, *APOB*, and *PCSK9* genes, which affect how your body regulates and removes cholesterol from your blood.

About 60-80% of people with FH have a mutation found in one of these three genes. Genetic testing is available to check for mutations in these genes. However, there are likely more genes involved in FH that remain unknown.

Dutch Lipid Clinical Network Criteria

The DLCN determines the likelihood (FH score) of an individual having FH based on *family history, own clinical history, a physical examination, LDL-cholesterol concentration, and a genetic examination*

National Lipid Association Guidelines on Screening and Managing FH

The expert panel recommends universal screening for elevated cholesterol by 20 years of age and that FH should be suspected:

- In adults ≥20 years if they have LDL cholesterol >190 mg/dL or non-HDL cholesterol >220 mg/dL.
- All children aged 9 – 11 years should also be screened, with FH suspected in those with LDL cholesterol or non-HDL cholesterol >160 mg/dL and >190 mg/dL, respectively.

*Even children as young as two years should be screened for FH, say the experts, but only if there is a family history of premature cardiovascular disease or very high cholesterol levels suggesting FH in a parent. **LDL in young children should be <130mg/dL**

NLA 2023

Worth repeating

Adults (>20 years):

LDL cholesterol >190 mg/dL or non-HDL cholesterol >220 mg/dL;

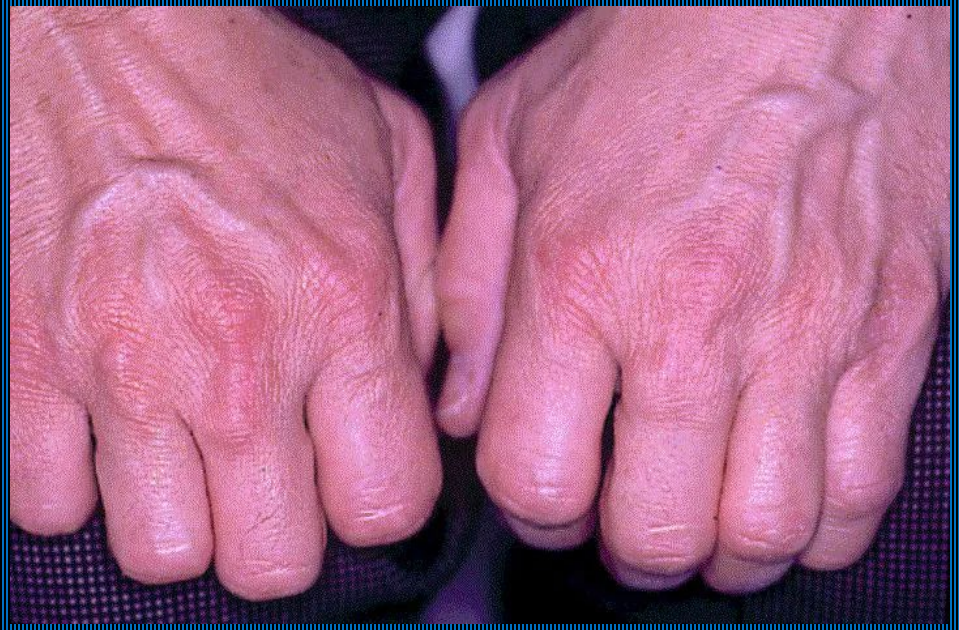
Children, adolescents and young adults (<20 years):

LDL cholesterol ≥160 mg/dL or non-HDL cholesterol ≥190 mg/dL

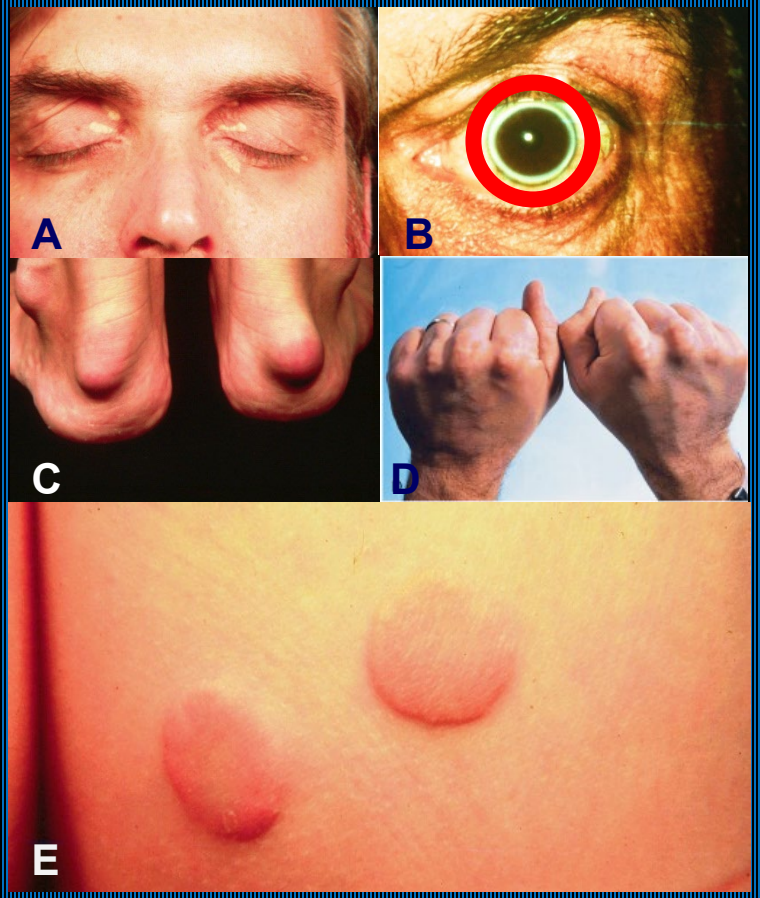
Familial Hypercholesterolemia

Practice Essentials

Xanthomas are noted commonly on the Achilles tendons and metacarpal phalangeal extensor tendons of the hands of patients with untreated FH. See the image below.



Clinical Presentation of FH May Reveal Genetic Severity of the Disease



- **Tendon xanthomas (TX) in FH independently associated with cardiovascular risk.[1]**

- **Examples**
  - **A. Xanthelasma[5]**
  - **B. Corneal arcus[5†]**
  - **C. Achilles tendon xanthomas[5]**
  - **D. Tendon xanthomas[5]**
  - **E. Planar xanthomas (HoFH, not HeFH)[5]**

Not all patients with FH present with xanthomas. Xanthomas may also be present without visible signs.

†Arcus is common in older individuals; however, it is definitive of FH in younger individuals.

1. Civeira F, et al. *Arterioscler Thromb Vasc Biol*. 2005;25:1960-1965. 2. Ferrieres J, et al. *Circulation*. 1995;92:290-295.
3. Bertolini S, *Arterioscler Thromb Vasc Biol*. 2000;20:E41-E52. 4. Descamps OS. *Atherosclerosis*. 2001;157:514-518.
5. Mahley RW, et al. In *Kronenberg: Williams Textbook of Endocrinology*. 2008.

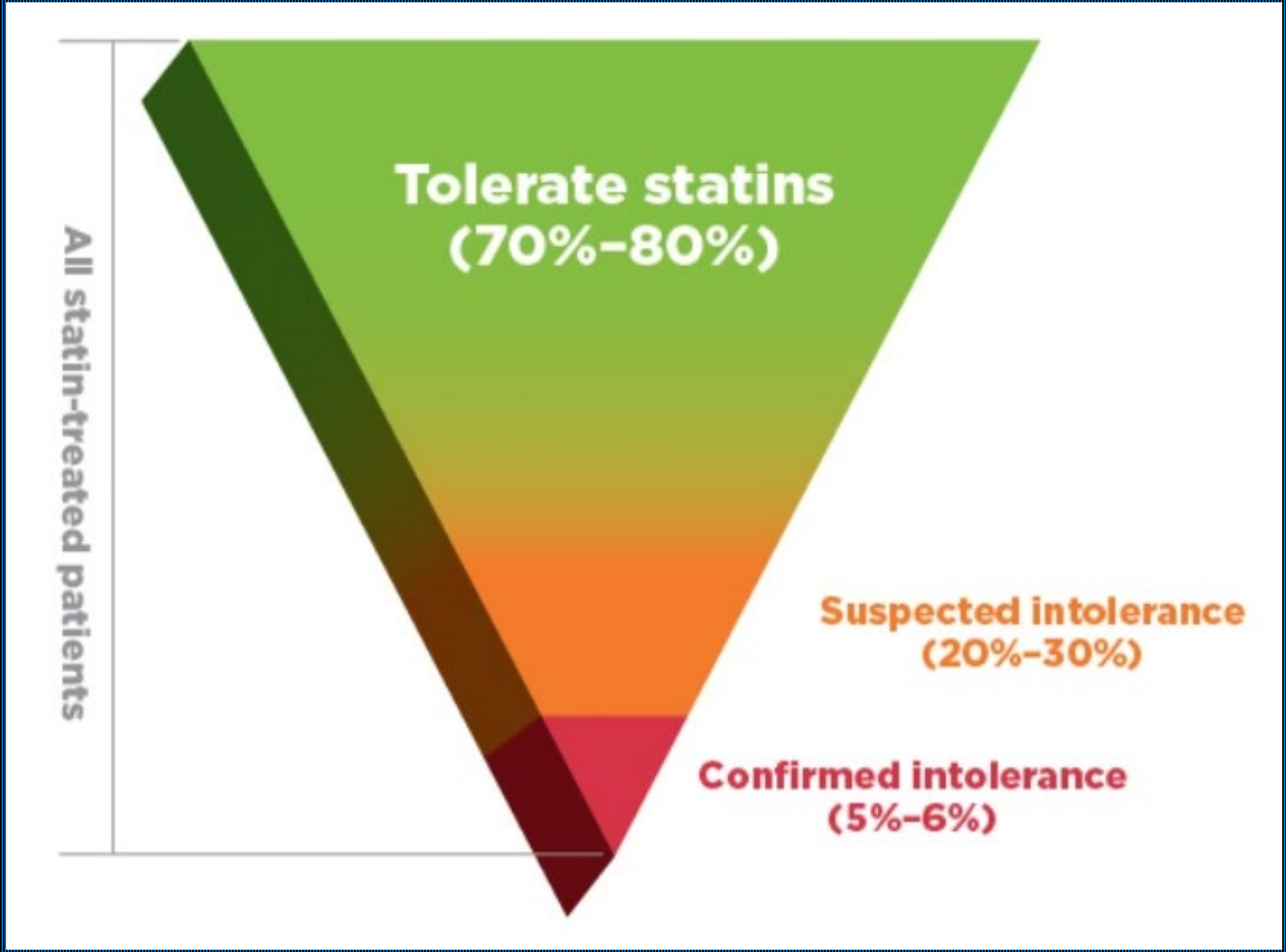
Statin intolerance: time to stop letting it get in the way of treating high risk patients

Non-adherence to statin therapy might be as high as 60% after 24 months of treatment and is associated with a 70% increase in the risk of cardiovascular disease events. [1]

In comparison, all-cause mortality is reduced by 46% in patients who adhere to the treatment. [2]

Statins and other lipid-lowering therapies are the most effective preventive drugs available in cardiology and can reduce atherosclerotic cardiovascular disease events by up to 55%. [3]

Banach, Burchart, Chllebus et.al. Arch Med Sci 2022
Martin, Jacobson, LaForge et.al. JCL 2019


All statin-treated patients
Tolerate statins
(70%–80%)
Suspected intolerance
(20%–30%)
Confirmed intolerance
(5%–6%)

Statin Intolerance Definition

NLA:

A clinical syndrome characterized by the inability to tolerate at least two statins: one statin at the lowest starting daily dose and another statin at any daily dose, due to either objectionable symptoms (real or perceived) or abnormal lab determinations, which are temporally related to statin treatment and reversible upon statin discontinuation, but reproducible by rechallenge with other known determinants being excluded (such as hypothyroidism, interacting drugs, concurrent illnesses, significant changes in physical activity or exercise and underlying muscle disease).

Unified Definition from an International Lipid Expert Panel

1. The inability to tolerate at least two different statins - one statin at the lowest starting average daily dose and the other statin at any dose,
2. Intolerance associated with confirmed intolerable statin-related adverse effect(s) or significant biomarker abnormalities.

Reported Patient Complaints with Statin Therapy

Most Common: Myalgias (5-30% of patients)

- Skeletal muscle-related symptoms that can be characterized by soreness, aches, cramps, fatigue, and/or weakness without creatine kinase elevation

Less Common: Myopathy (~1 in 10,000 patients per year)

- Characterized by "Unexplained muscle pain or weakness, accompanied by creatine kinase concentration >10 times the upper limit of normal."

Rare: Rhabdomyolysis (~1 in 100,000 patients per year)

- Characterized by "creatine kinase concentration typically >40 times the upper limit of normal, which can cause myoglobinuria and acute renal failure."[1]

Other Signs or Symptoms

- Transaminase elevation, worsening glycemia, and, in rare cases, confusion and memory loss.

Myalgia (muscle pain without CK changes) is a fairly common benign side effect of statin therapy. Generaly it is mild and subsides with continued therapy.

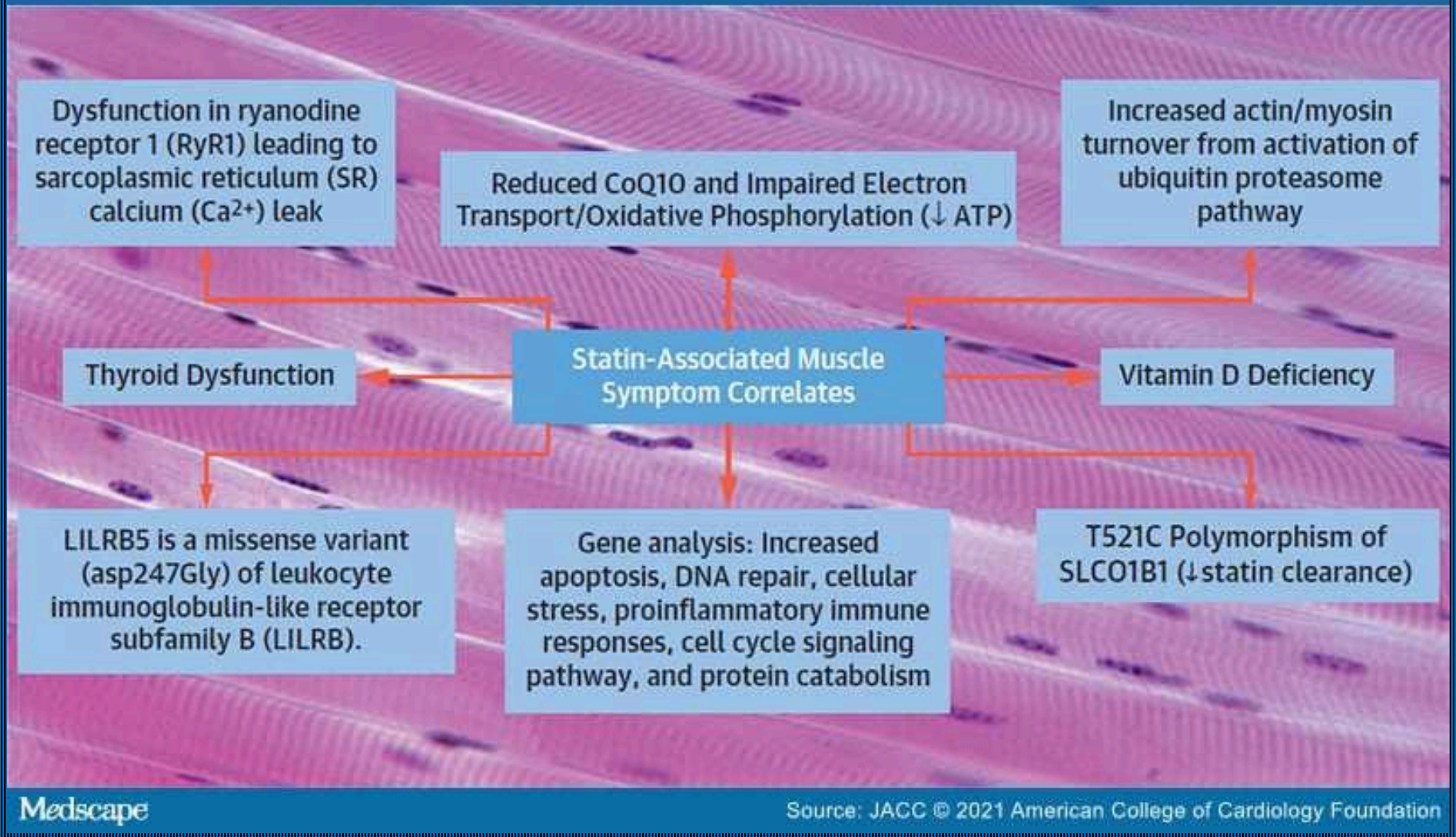
A more serious, but rare side effect of statin therapy is **myopathy,** which is defined as muscle pain, tenderness or weakness with CK elevations of 10 times the upper limit of normal.

Rough classification of rhabdomyolysis, based on CK level

Diagnosis	CK level	Clinical significance	Treatment needed
Normal CK level	~ 40-200 U/L		
Mild rhabdomyolysis	1,000-5,000 U/L	Low risk for kidney injury	Possibly Depends on context
Moderate rhabdomyolysis	5,000-15,000 U/L	Increased risk of renal injury	Yes
Severe rhabdomyolysis	>15,000 U/L	Increased risk of dialysis	Yes

The Internet Book of Critical Care, emcrit.org/IBCC/rhabdo

SAMS



Statin-associated muscle symptom etiology

Effects of Vitamin D Supplementation in Patients with Statin-Associated Muscle Symptoms and Low Vitamin D Levels

Carallo C et.al. Metabolic Syndrome and Related Disorders VOL. 20, NO. 10 2022

Methods: In our controlled intervention study, patients suffering from both SAMS and hypovitaminosis D underwent vitamin D replacement for 6 months. SAMS intensity and its impact on the quality of life were evaluated with a questionnaire during follow-up.

Results: Blood vitamin D levels reached 261% of baseline values. Pain intensity was reduced by 63%, and all life quality indicators improved. At follow-up, percentage variations in SAMS intensity and in vitamin D levels were inversely related ($r = 0.57$, $P = 0.002$). In a multiple regression analysis, this association was found to be independent. Among the rechallenge subgroup, 75% successfully tolerated high-intensity statins during the follow-up. The parameters of interest were unchanged in control subjects.

Conclusions: **In our findings, the amount of increase in vitamin D concentrations is directly related to SAMS improvement**. Although randomized studies are needed, 25(OH)D levels can be measured, and eventually supplemented, in all patients suffering from SAMS, and this can be done together with a statin rechallenge after 3 months for patients who are not at the LDL-C target.

Statin-Associated Muscle Symptoms Among New Statin Users Randomly Assigned to Vitamin D or Placebo

Mark A. Hlatky, MD[1]; Neil J. Stone, MD *JAMA Cardiol.* Published online November 23, 2022.

Interventions Daily cholecalciferol (2000 international units) or placebo with assessment of statin prescriptions during follow-up.

Findings The 2083 participants in a randomized, double-blind trial of vitamin D supplementation who initiated statin therapy during follow-up and responded to a survey were equally likely to develop muscle symptoms (31% vs 31%) and discontinue statin therapy (13% vs 13%), whether assigned to vitamin D or to placebo.

Meaning In this study, vitamin D supplementation did not prevent statin-associated muscle symptoms or statin discontinuation.

Effect of Statins on Skeletal Muscle: Exercise, Myopathy, and Muscle Outcomes

Beth A. Parker[1,2,3] *and Paul D. Thompson*[1,2]

[1]Division of Cardiology, Henry Low Heart Center, Hartford Hospital, Hartford; [2]School of Medicine, University of Connecticut, Farmington; and [3]Department of Health Sciences, University of Hartford, West Hartford, CT

Ex. Sport Sci. Rev. 2012;40:188

We have confirmed that eccentric exercise during statin therapy does increase CK levels more than exercise on placebo (e.g., 2011 Boston Marathon)

We recently have completed data collection of an NHBLI-funded (**STOMP** [The Effect of STatins On Skeletal Muscle Function and Performance]) study assessing CK, exercise capacity, and muscle strength before and after atorvastatin 80 mg or placebo treatment for 6 months in 420 healthy statin-naive subjects

Heavy or enduring resistance exercise

CoQ10 supplements and Statin Muscle Pain

- Treatment with statins has been associated with reduced *plasma* CoQ10 levels, and it has been hypothesised that supplementation with CoQ10 may assist with management of statin-associated muscle symptoms (SAMS).

- Evidence supporting the use of CoQ10 supplements to prevent or treat SAMs in clinical practice is inconsistent.

- If a patient chooses to take a CoQ10 supplement, exercise caution in those taking oral anticoagulants such as warfarin due to potential for interactions.

SI Conclusions

There are proven vascular benefits of statin therapy

Statins have the greatest benefit in those with existing ASCVD, familial hypercholesterolemia, and diabetes

Not everyone can take statins

Employ a systematic process for evaluating and managing SI in high ASCVD risk patients

- **Rechallenge with lower dose after several statin holidays**
- **Change to long-acting statin every other day**

NLA Scientific Statement on Statin Intolerance

A New Definition and Key Considerations for ASCVD Risk Reduction in the Statin Intolerant Patient

Statin intolerance is defined as one or more adverse effects associated with statin therapy which resolve or improve with dose reduction or discontinuation and can be classified as a complete inability to tolerate any dose of a statin, or partial intolerance with inability to tolerate the dose necessary to achieve the patient-specific therapeutic objective.

Complete Intolerance:
Patient is unable to tolerate any statin dose or regimen.

Partial Intolerance:
Ability to tolerate a lower dose of statin than is required to achieve the desired therapeutic objective.

"Nocebo" Effect:
The expectations of harm result in perceived side effects that may be unrelated to the pharmacological effects of the drug.

Qualifying a Patient as Statin Intolerant
To classify a patient as having statin intolerance, a minimum of two statins should have been attempted, including at least one at the lowest approved daily dosage.

Facts about Statins & Statin Intolerance

- Statins are **generally well tolerated**.
- Some degree of **statin intolerance is reported in 5–30% of patients** and contributes to reduced statin adherence and persistence, as well as higher risk for adverse cardiovascular outcomes.
- Statin intolerance is a clinical syndrome that **can manifest on a continuum.** Some patients experience partial intolerance while others are completely intolerant.
- **Modifiable risk factors** may contribute to statin intolerance symptoms and addressing the risk factor may improve statin tolerance in some instances.
- **Most patients can tolerate some degree of statin therapy** (agent, dose and/or regimen) if they experience symptoms.

Therapeutic Objective:
A shared decision between provider and patient that should consider desired levels of atherogenic lipoproteins, individual ASCVD risk, the potential costs, risks, and benefits of proposed therapies, as well as patient preferences.

Keep Trying Statins
Once a patient starts one or more non-statin lipid lowering medications, the effort to identify a tolerable statin treatment regimen should not be abandoned as most patients with reported statin intolerance can tolerate some degree of statin therapy (agent, dose, and/or dosing regimen).

Identifying a Tolerable Statin Regimen
To identify a tolerable statin regimen, clinicians should consider using several different strategies. Finding an acceptable regimen may require modification of the statin, statin dose, and/or dosing regimen.

"Nocebo" Effect:
It is reasonable to attribute some proportion of statin-associated symptoms to the nocebo effect. For patients with statin intolerance, it is reasonable to consider the nocebo effect as a possible cause; however, this does not make such symptoms less clinically relevant and ASCVD risk related to elevated atherogenic lipoproteins should be addressed.

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Initiation of Non-Statin Therapy
Non-statin therapy may be required for patients who cannot reach therapeutic objectives with lifestyle and maximal tolerated statin therapy.

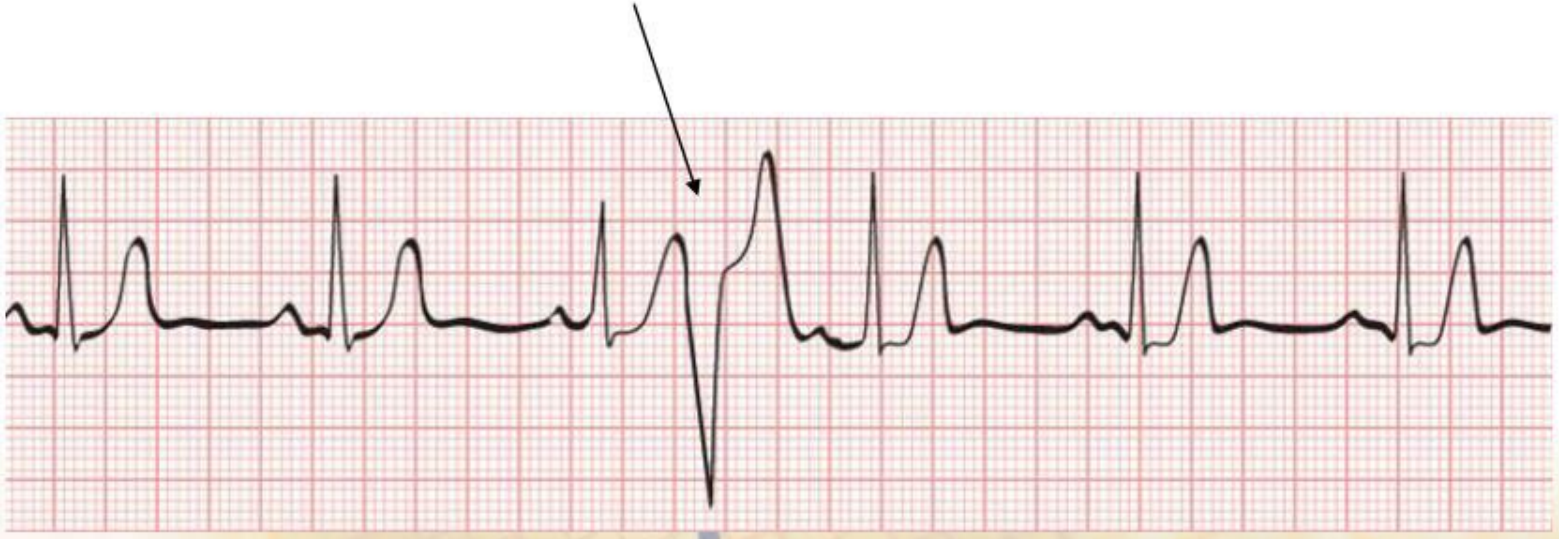
High & Very High Risk Patients
In high- and very high-risk patients who are statin intolerant, clinicians should consider initiating non-statin therapy while additional attempts are made to identify a tolerable statin regimen in order to limit the time of exposure to elevated levels of atherogenic lipoproteins. It is equally important that they do not abandon attempts to identify a tolerable statin regimen after a non-statin therapy is initiated.

file:///C:/Users/rlafo/Downloads/nla_statinintolerance_infographic_v2.pdf

Exercise and cardiac dysrhythmias

Interpolated PVCs

- PVCs that fall between two regular complexes and do not disrupt the normal cardiac cycle are called interpolated PVCs



Several points about PVC's

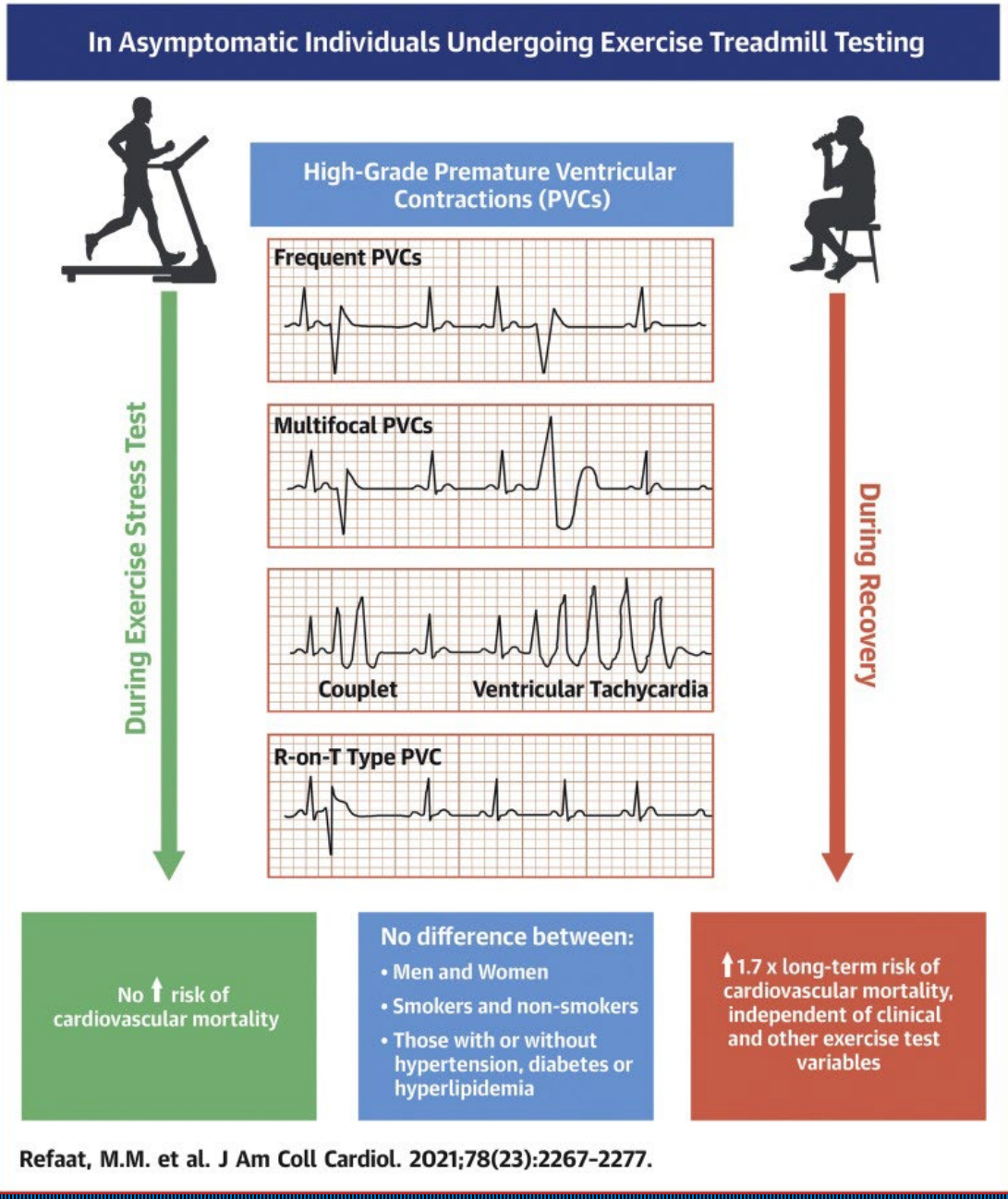
May be felt as "palpitations"

Isolated PVC's are most often benign

Runs of PVC's (>3 more more) may be felt as lightheadedness, dizziness)

Early onset exercise may induce isolated PVC's fading as heart rate increases

CENTRAL ILLUSTRATION: Prognostic Value of Exercise-Induced Premature Ventricular Contractions in Asymptomatic Individuals



Refaat, M.M. et al. J Am Coll Cardiol. 2021;78(23):2267-2277.

Post-Exercise PVCs Tied to Higher CV Mortality Risk

Reefat et.al. J Am Coll Cardiol. 2021 Dec, 78 (23) 2267–2277 Beruit

December 02, 2021

A cohort of 5,486 asymptomatic individuals who took part in the Lipid Research Clinics prospective cohort h

Evaluated the association of exercise-induced *high-grade PVCs (defined as either frequent (>10 per minute), multifocal, R-on-T type, or ≥2 PVCs in a row)* with all-cause and cardiovascular mortality.

High-grade PVCs occurring during recovery were associated with long-term risk of cardiovascular mortality in asymptomatic individuals, whereas PVCs occurring only during exercise were not associated with increased risk.

The mechanism for the association of high-grade PVCs during recovery but not during exercise with cardiovascular mortality remains to be determined," Mora commented.

"One strong possibility could relate to insufficient vagal reactivation post-exercise, as it is known that the parasympathetic system kicks in right after stopping exercise in order to counteract the sympathetic system of the autonomic nervous system.

Reefat 2021

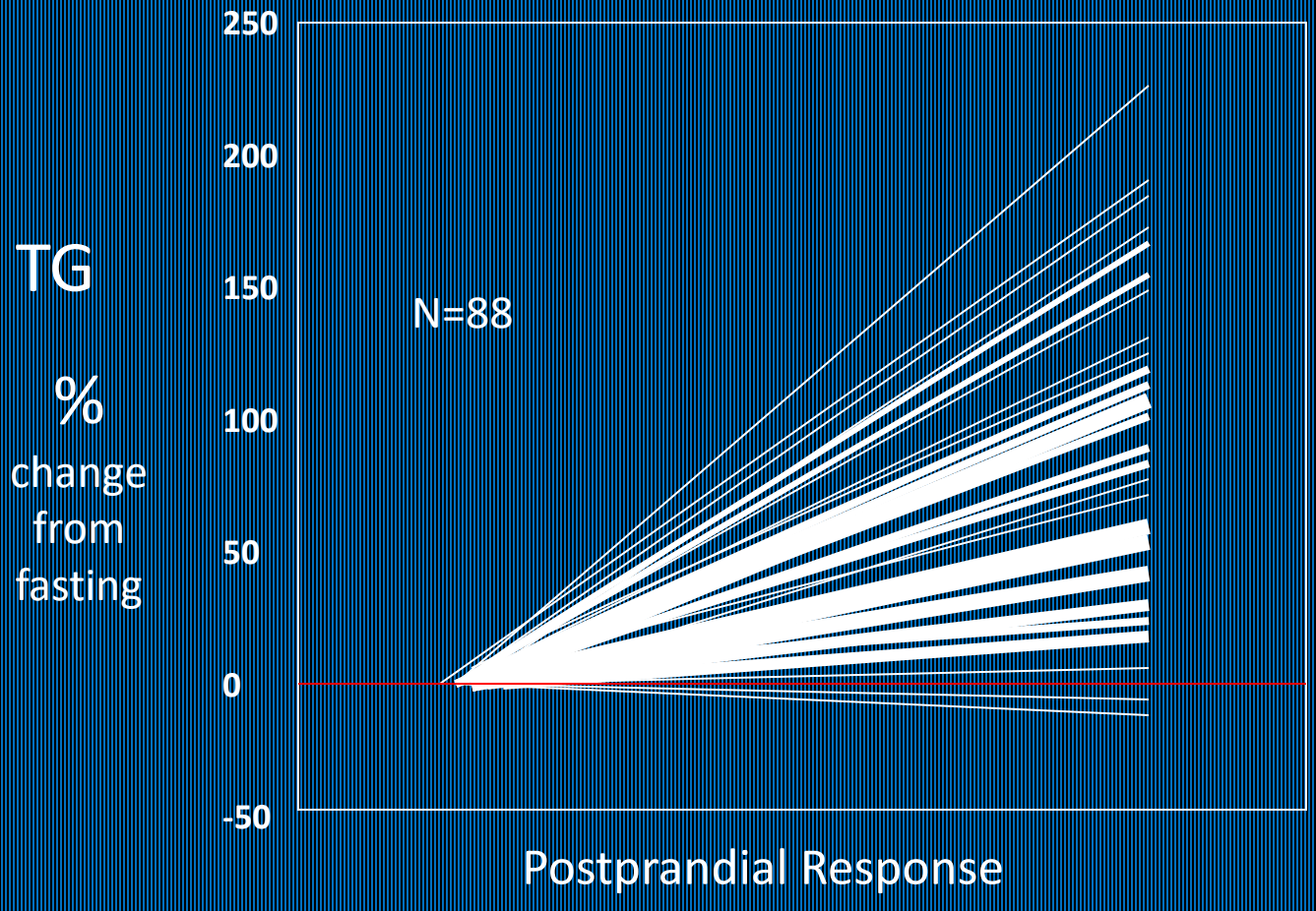
Resting PVC’s can be caused by certain medications, alcohol, drug misuse, stimulants, anxiety and even sudden onset vigorous exercise

Only high-grade PVCs during recovery, and not the exercise phase, independently associate with cardiovascular mortality

Postprandial Lipemia

Variability in Plasma TG Response to Fatty Meal

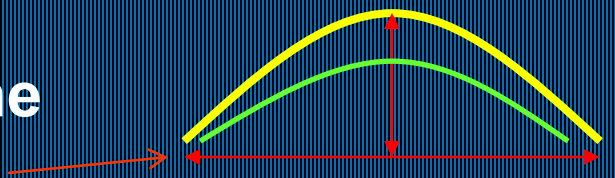
(2 sausages, 2 eggs, 2 muffins @ McD)



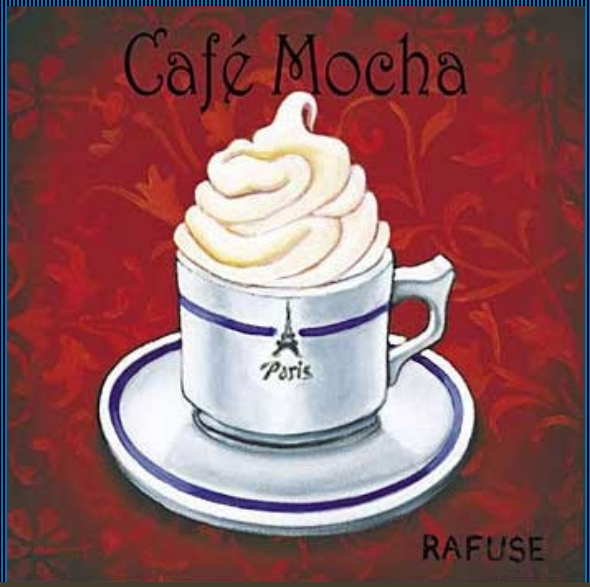
Schaefer EA Am J Clin Nut 2002;75:191

Postprandial Lipemia (TG) Issues

- TG time/area under the curve greater with T2D, visceral ob, & MetSyn



- Decreased arterial endothelial function
- Decreased HDL-C response
- Increased IDL and VLDL remnant exposure

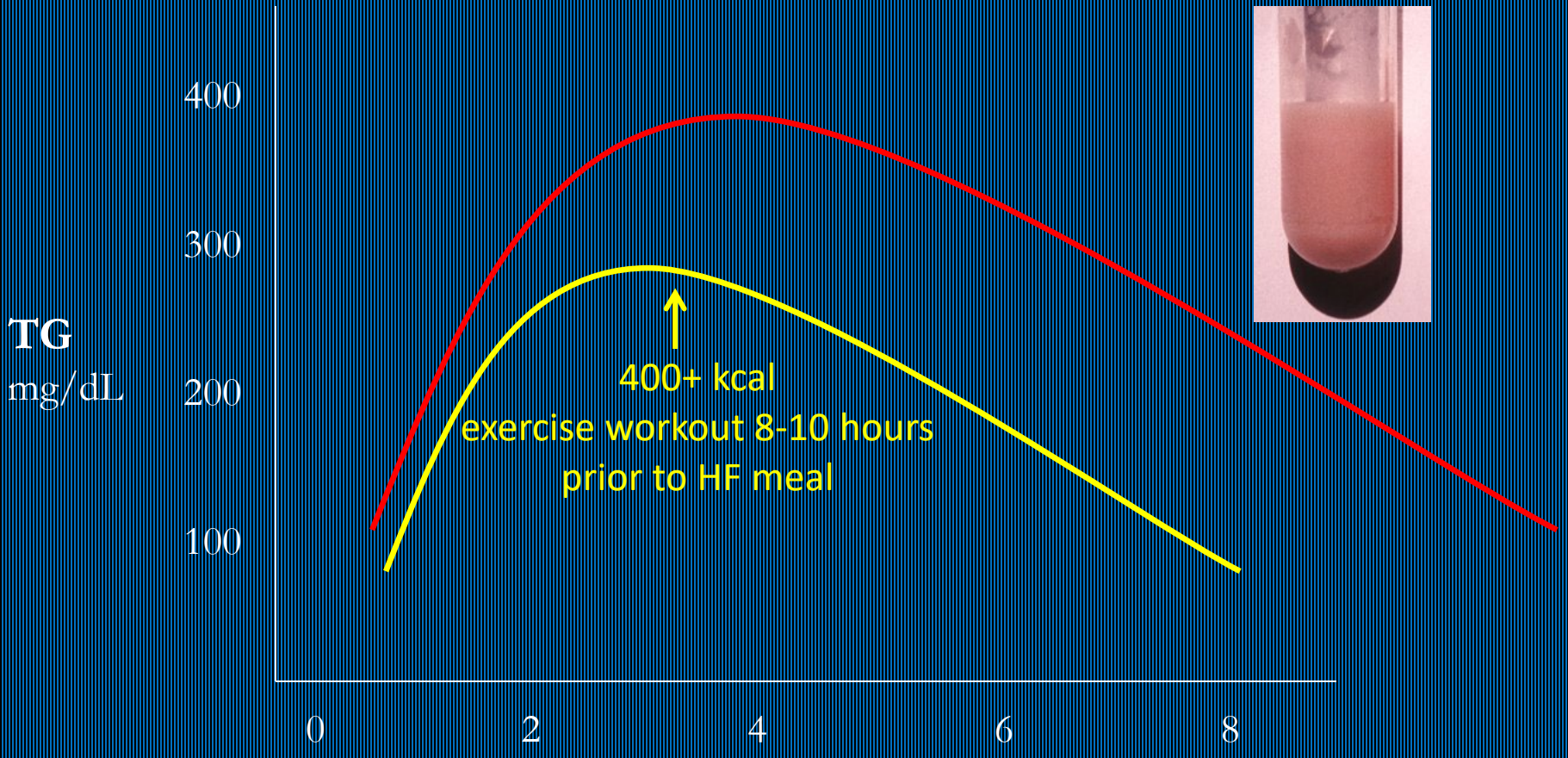


Fat load (12 - 22 grams)
and/or glycemic load

+

Caffeine load (40-200 milligrams)

Exercise and Postprandial Lipemia



Post Exercise Peak Lipoprotein Lipase and TG Activity

Thomas T & La Fontaine T ACSM Res. Man., 2001

Rx for Postprandial Lipemia

for High Cardiometabolic Risk Patients

1. Keep single high fat meals <40g fat

2. Preprandial exercise ~12 hrs or at least every other day for ≥ 400 kcal/session

3. n-3 fatty acids and statin therapy also reduce PPTG

Summary Points

- LDL targets & statin dosages
- Intensive statin therapy for high risk T2D
- Statin intolerance protocol for ASCVD pts
- Other targets Apo B (nonHDL) and Lp(a)
- LDL > 190 – investigate FH possibility
- Postprandial lipemia issue for big fatty meals
- Exercise generated dysrhymias main issue post ex