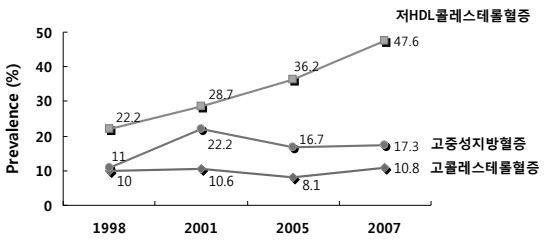
소강당

고중성지방혈증 최신지견

유병연
건양대학교병원 가정의학과

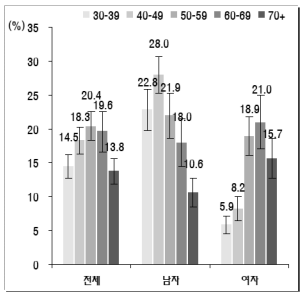
Trends in Dyslipidemia in Korean



만 30세 이상 성인, 2005년 인구추계로 연령 표준화
•고콜레스테롤: 총콜레스테롤 240mg/dL 이상, 또는 콜레스테롤 강하제 복용 분율
•저HDL콜레스테롤: HDL-C 40mg/dL 이하
•고중성지방: 중성지방 200mg/dL 이상

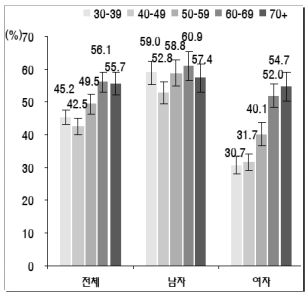
Data from National Health Nutritional Survey 2007

연령별 고중성지방혈증 유병률



※고중성지방지방혈증 유병률 : 중성지방이 200mg/dL 이상 분율, 만30세이상

연령별 저HDL콜레스테롤혈증 유병률

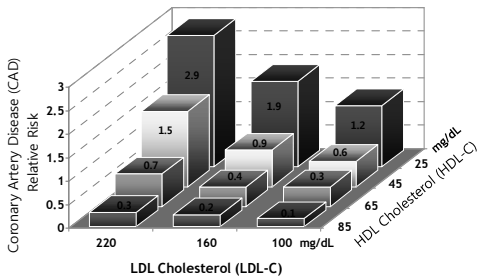


※저HDL-콜레스테롤혈증 유병률 : HDL-콜레스테롤이 40mg/dL 미만 인 분율, 만30세이상

Data from National Health Nutritional Survey 2007

Framingham Heart Study

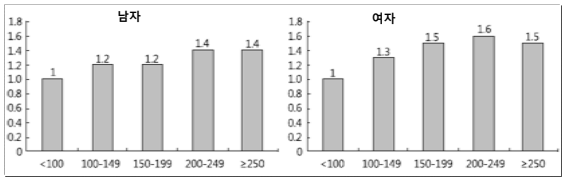
CHD risk as a function of LDL-C and HDL-C in men; aged 50 to 70 years



For any level of LDL-C, HDL-C is inversely related to CHD risk
Rule of 1's: For every 1% shift in HDL-C or LDL-C, event rates are ~1% lower

Modified from Castelli WP. *Can J Cardiol*. 1988;4:5A-10A..

중성지방과 허혈성심질환 발생 비교위험도(KOREA)



Triglyceride an CAD

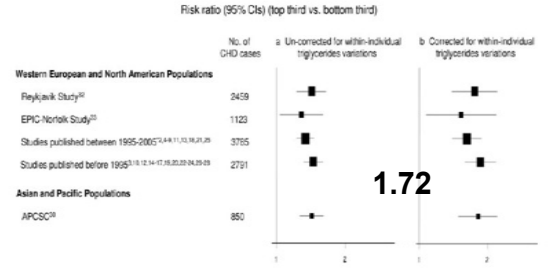
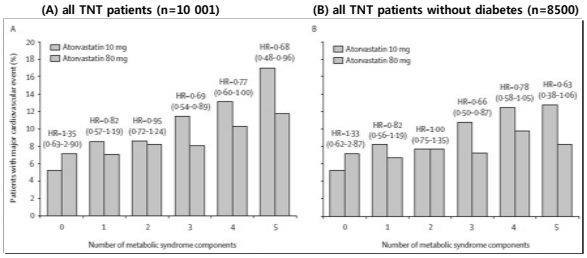


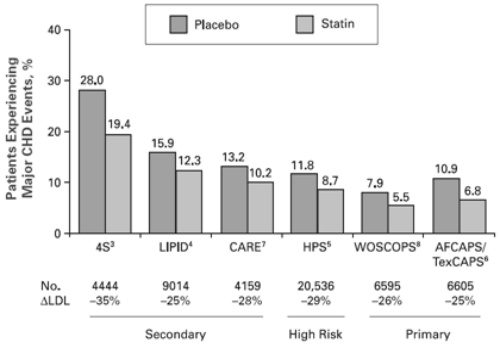
Figure 1. Available prospective studies of triglycerides and CHD in essentially general populations. APCSC indicates Asian and Pacific Cohort Studies Collaboration. *Includes 3 studies that were published before 1995 but were not included in the previous review.

Sarwar N et al. Circulation 2007;115:450-8

Number of patients with major cardiovascular events by presence of metabolic syndrome components



Residual CVD Risk After Statin Therapy



치 료

Factors associated with elevations in serum triglyceride levels

- **Lifestyle factors**
  - Excess caloric intake
  - High carbohydrate intake
  - Excess alcohol intake
  - Physical inactivity
- **Diseases and conditions**
  - Insulin resistance
  - Metabolic syndrome
  - Type 2 diabetes
  - Chronic kidney disease
  - Chronic renal failure
  - Cushing's syndrome
  - HIV disease
  - Hypothyroidism
  - Nephrotic syndrome
  - Pregnancy
- **Medications**
  - Atypical antipsychotics
  - β-Blockers
  - Corticosteroids
  - Estrogens
  - HIV protease inhibitors
  - Retinoids
  - Tamoxifen
  - Thiazide diuretics
- **Genetic factors**
  - Familial combined hyperlipidemia
  - Familial dysbetalipoproteinemia
  - Familial hypertriglyceridemia

Comparison of serum triglyceride (TG) categories from the Second and Third Reports of the NCEP ATP II and ATP III, along with ATP III treatment goals for elevations in serum TG.

Serum TG category	ATP II	ATP III	ATP III Treatment Goals
Borderline high	200-400 mg/dL	150-199 mg/dL	Achieve LDL-C goal
High	>400-1000 mg/dL	200-499 mg/dL	Primary: Achieve LDL-C goal Secondary: Achieve non-HDL-C goal (30 mg/dL above LDL-C goal)
Very high	>1000 mg/dL	≥500 mg/dL	Primary: Prevent pancreatitis Secondary: Prevent CHD

Borderline high(150-199 mg/dL)

- **Primary goal: Achieve LDL-C goal**
- **First-line therapy: Lifestyle changes**

- Weight control
- Regular physical activity
- Smoking cessation
- Restriction of alcohol use (when consumed in excess)
- Avoid high carbohydrate intake (>60% of calories)

High(200-499 mg/dL)

- **First-line therapy: Lifestyle changes**
- **Second-line therapy: Drugs to achieve non-HDL-C**

- Emphasize weight reduction and increased physical activity
- Drugs to achieve non-HDL-C goal (statin, fibrates, niacin)
- Caution: Increased frequency of myopathy with statins + fibrates

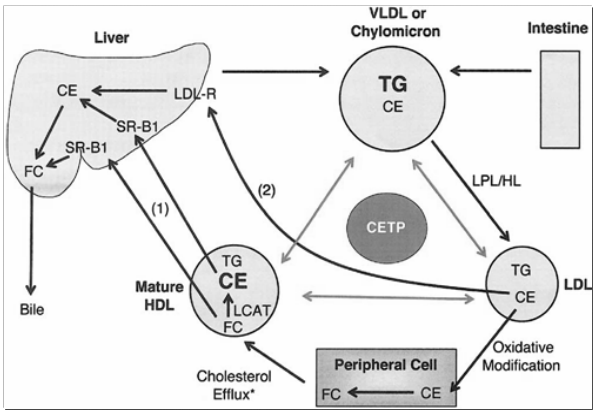
Very High(>500 mg/dL)

- **Primary goal: Prevent pancreatitis**
- **Secondary goal: Prevent CHD**

- Institute weight reduction/physical activity
- Very low fat diet (<15% total calories as fat)
- Fish oils (replace some long-chain TG in diet)
- TG-lowering drugs (fibrates, niacin, omega-3-acid ethyl esters)
- TG가 500 mg/dL 미만으로 낮아지면 LDL-C 목표

Moderate physical activity for healthy adults (4-7 kcal/min)

- Brisk walking (3-4 mph for 30-40 minutes)
- Swimming laps for 20 minutes
- Bicycling 5 miles in 30 minutes
- Volleyball (noncompetitive) for 45 minutes
- Raking leaves for 30 minutes
- Pushing a powered lawn mower for 30 minutes
- Heavy housework (cleaning)
- Basketball for 15 to 20 minutes
- Golf(pulling a care or carrying clubs)
- Social dancing for 30 minutes



J. Am. Coll. Cardiol. 2006;47:492-499

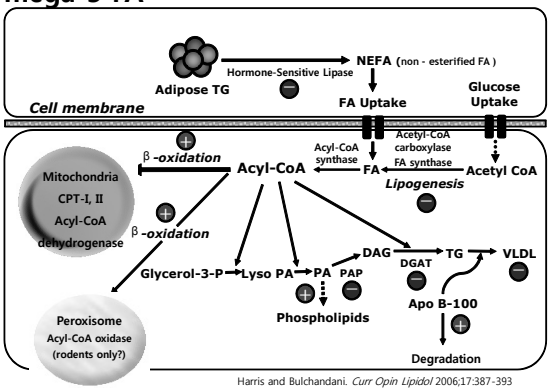
Drug Therapy for Hypertriglyceridemia & low HDLC

- Niacin (nicotinic acid)
- Fibrates
- Statins (HMG-CoA reductase inhibitors)
- Omega-3 fatty acids

Effect of various pharmacologic therapies on lipoprotein levels.

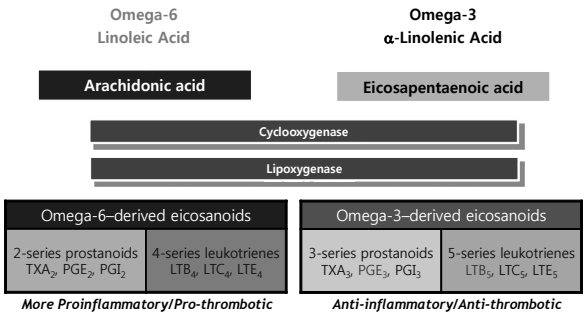
Drug	TC	LDL-C	HDL-C	TG
Statin	↓15-60%	↓20-60%	↑3-15%	↓10-40%
Niacin	↓ 25%	↓10-15%	↑15-35%	↓20-50%
Fibrate	↓ 15%	↓0-15%	↑6-15%	↓20-50%
Fish oil	↑or neutral	↑or neutral	↑or neutral	↓20-50%
Ezetimibe	↓ 12%	↓ 18%	↑ 1%	↓ 8%

Triglyceride-Lowering Mechanisms of Omega-3 FA



Harris and Bulchandani. *Curr Opin Lipidol* 2006;17:387-393

Synthesis of Eicosanoids From Omega-6 and Omega-3 FA

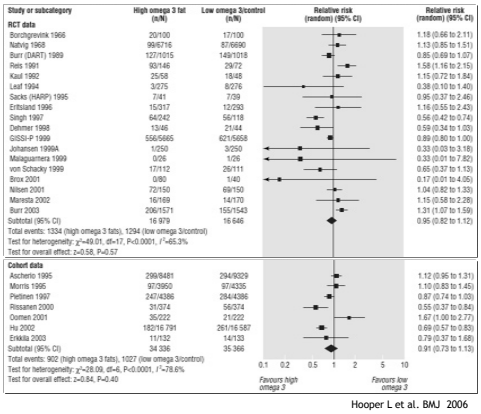


Adapted from Din JN et al. *BMJ*. 2004;328:30-35.

Omega 3 PUFA – Clinical Trials

- **DART** (N=2033 Men post MI)
  - Fish intake (2-3 portions/wk) reduced all-cause death by 29% over 2 years
- **Lyon Diet Heart Study** (N=302 Men Post MI)
  - Mediterranean diet reduced CV Death and MI by 73% over 2 years
- **GISSI Prevenzione** (N=11,324 People Post MI)
  - Open label randomization to DHA+EPA; Vit E; both or neither X 3.5 years
  - Reduced *death*, MI, or stroke by 15%
- **Japan EPA Lipid Intervention Study (JELIS)**
  (N=14,981 for primary, 3,664 for secondary prevention)
  - Open label randomization to EPA 1.8g/d + statin : statin x 4.6 yrs
  - Reduced major coronary events 19%, and UAP, but not SD

Effect of omega 3 fatty acids on cardiovascular events.



Hooper L et al. BMJ 2006

Mechanism of Nicotinic acid

- Niacin은 (1)지방세포 (2)간세포 (3)말초세포에 다 작용 한다
- **중성지방 저하 작용**
  - Antilipolytic effect in adipocytes; HM-74A 수용체를 통해 지방세포에서 지방산을 혈중으로 유리시키지 못하게 한다(즉 원료를 원천적으로 차단)
  - 간에서는 지방산이 합쳐져 중성지방 되는 경로를 차단
- **HDL 콜레스테롤 증가 작용**
  - 여러 경로를 통해 ABCA1 수용체를 활성화

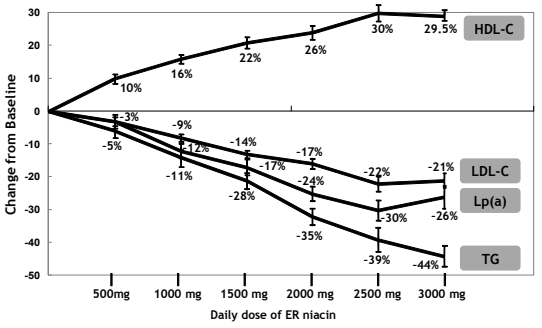
Effects of Niacin on Lipoprotein Metabolism Summary

- Partial inhibition of release of FFAs from adipose tissue, leading to a decrease in TG synthesis by the liver
  - Decreased TG synthesis reduces the synthesis of VLDL, the precursor of LDL-C, and eventually decreases LDL-C
- Inhibition of synthesis of apo B, which is needed for the formation of VLDL particles and enhanced VLDL catabolism
- Favorable LDL particle size transformation, with shift from small, dense to large, bouyant particles
- Reduced extraction and catabolism of apo A-1 from HDL-C, maintaining structure and function of HDL-C particles
- Stimulation of the expression of membrane cholesterol transporter ABCA1

FFAs=free fatty acids; TG=triglyceride; VLDL=very low-density lipoprotein; LDL-C=low-density lipoprotein cholesterol; apo B=apolipoprotein B; apo A-1=apolipoprotein A-1; HDL-C=high-density lipoprotein cholesterol; ABCA1=adenosine triphosphate-binding cassette transporter A1

McKenney J. *Am J Health-Syst Pharm*. 2003;60:995–1005; Carlson LA. *J Intern Med*. 2005;258:94–114.

Lipid Effects of Niacin Extended-Release (ER)



Goldberg A et al. *Am J Cardiol*. 2000;85:1100-1105.

Niacin reduces CV events: results from secondary prevention studies

Study	Treatment(s)	Duration (y)	Efficacy results
Coronary Drug Project (CDP)	Nicotinic acid	5	Nonfatal MI ↓27%
			Stroke/TIA ↓24%
		15	Total mortality ↓11%
Stockholm Ischaemic Heart Disease study (IHD)	Nicotinic acid + clofibrate	5	Total mortality ↓26%
			IHD mortality ↓36%

CDP Research Group. *JAMA* 1975;231:360-81; Canner PL et al for the CDP Research Group. *J Am Coll Cardiol* 1986;8:1245-55; Carlson LA & Rosenhamer G. *Acta Med Scand* 1988;223:405-18

Aggressive Management of Combination Therapy: Niacin and Statin

COMPELL:

Comparative Effects on Lipid Levels of Combination Therapy

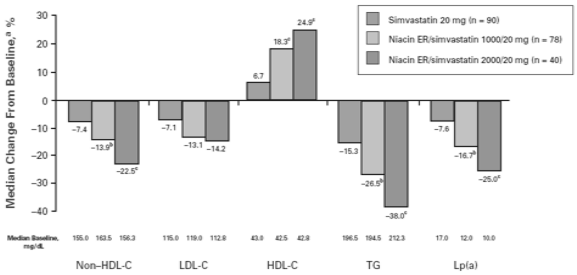
Therapy	LDL-C	HDL-C	TG	Lp(a)
Atorvastatin 40mg/Niacin ER 2000mg	-56%	+22%	-47%	-14%
Rosuvastatin 20mg/Niacin ER 1000mg	-51%	+24%	-40%	-5%
Simvastatin 40mg/Ezetimibe 10mg	-57%	+10%*	-33%*	+7%*
Rosuvastatin 40mg	-53%	+7%*	-25%*	+18%*

12 weeks, randomized, multicenter, open-label study, 292 subjects

* p≤0.05 vs. atorvastatin/niacin ER

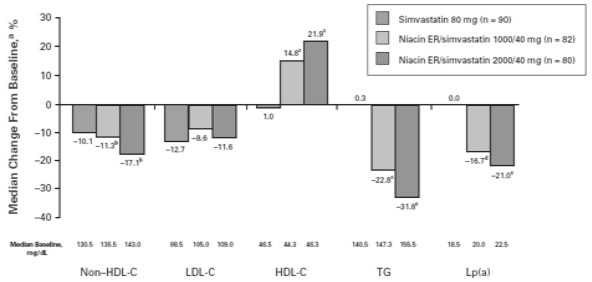
McKenney J.M. et al. Atherosclerosis 2007;192(2):432-437.

Efficacy of niacin ER/simvastatin combination therapy: SEACOAST I



a. Simvastatin 20 mg at baseline.
b. *P* <.01 vs simvastatin 20 mg.
c. *P* <.001 vs simvastatin 20 mg.

Efficacy of niacin ER/simvastatin combination therapy: SEACOAST II

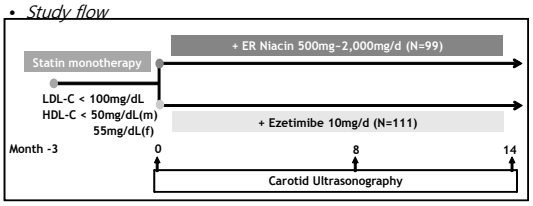


a. Simvastatin 40 mg at baseline.
b. Comparable to simvastatin 80 mg.
c. *P* <.001 vs simvastatin 80 mg.
d. *P* <.01 vs simvastatin 80 mg.

ARBITER 6-HALTS:

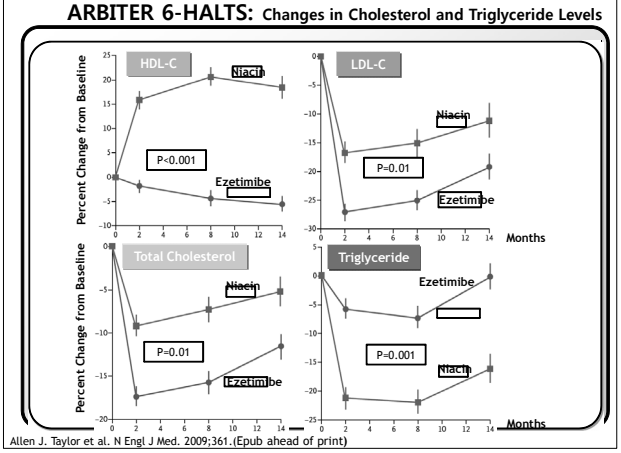
Arterial **B**iology for the **I**nvestigation of the **T**reatment **E**ffects of **R**educing Cholesterol **6**–**H**DL and **L**DL **T**reatment *S*trategies

- Prospective, randomized, parallel-group, open-label study involving the blinded evaluation of end points
- Subjects with either known atherosclerotic coronary or vascular disease or a coronary heart disease risk equivalent
- Primary end-point: Change in mean CIMT after 14 months
- *Study flow*



Allen J. Taylor et al. N Engl J Med. 2009;361.(Epub ahead of print)

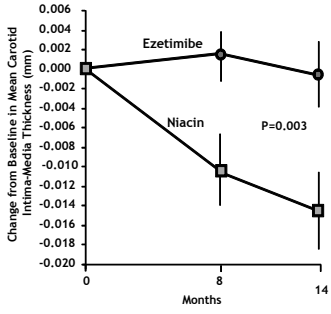
ARBITER 6-HALTS: Changes in Cholesterol and Triglyceride Levels



Allen J. Taylor et al. N Engl J Med. 2009;361.(Epub ahead of print)

ARBITER 6-HALTS:

Changes in the Mean Carotid Intima-Media Thickness

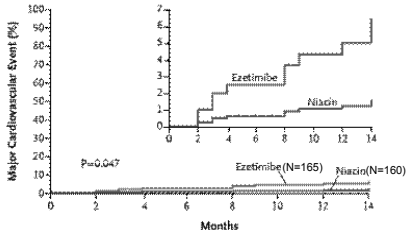


- **Changes in mean CIMT after 14 months**
  - Niacin (N=99): -0.0142±0.0041 (P=0.001)
  - Ezetmibe (N=111): -0.0007±0.0035 (P=0.84)
- **Post hoc analysis**
  A significant inverse relationship between the changes in LDL-C level and the CIMT in the ezetimibe group (R=-0.31, P<0.001)
  supposedly due to the unintended disruption of reverse cholesterol transport.

Allen J. Taylor et al. N Engl J Med. 2009;361.(Epub ahead of print)

ARBITER 6-HALTS:

Kaplan-Meier Estimates of the Incidence of a Major Cardiovascular E



- Major Cardiovascular Event: Myocardial infarction, Coronary revascularization procedure, Cardiovascular death
- Composite clinical cardiovascular endpoint: Niacin group, 2 of 160 patients(1%); Ezetimibe group, 9 of 165 patients(5%) (P=0.04 by the chi-square test)

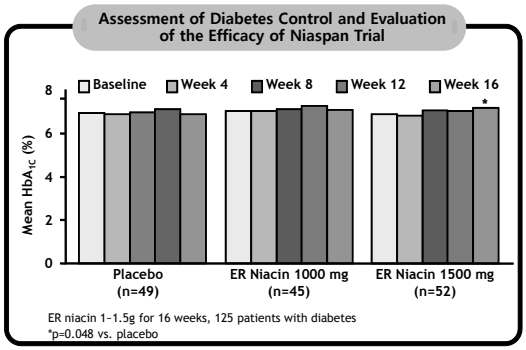
Allen J. Taylor et al. N Engl J Med. 2009;361.(Epub ahead of print)

Safety Issue of Niacin

Side effect of Niacin

- Dose dependent and fully reversible given timely discontinuation
- Flushing
- Hyperglycemia
- Hepatotoxicity
  - IR<SR, ER
  - LFT: 치료 전, 첫 6개월 동안 매 12주마다, 이후 6개월 마다
- Myopathy
- 기타: gout, retinal macular edema etc.

Use of Niacin in Diabetic Patients: ADVENT



Grundy et al, *Arch Intern Med.* 2002;162:1568-76.

Use of Niacin in Diabetic Patients: ADA

AMERICAN DIABETES ASSOCIATION, 2008

... Recent studies demonstrate that at modest doses (750 –2,000 mg/day), significant improvements in LDL cholesterol, HDL cholesterol, and triglyceride levels are accompanied by only modest changes in glucose that are generally amenable to adjustment of diabetes therapy.

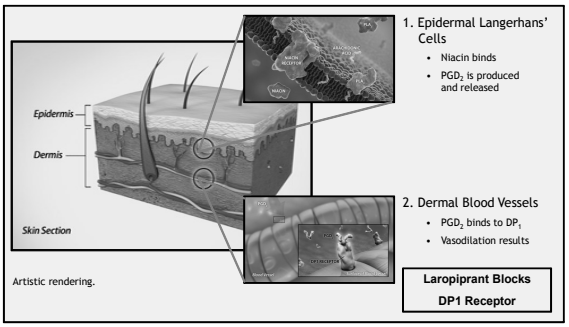
Diabetes Care 2008;31(Suppl1):S12-S54.

Niacin-Induced Flushing

- Niacin에 의한 홍조는 niacin의 간 대사 물질이 피부에서 prostaglandin D_2를 생성시킴으로 인해 발생한다.
- 홍조는 전형적으로 안면에서 시작되며, 흔히 온열감과 가려운 느낌이 동반된다. 종종 팔과 가슴 부위로 확장된다.
- 홍조 지속 시간은 보통 1시간 미만이지만, 불쾌한 감각 때문에 약물 복용 중단으로 이어질 수 있다.
- 홍조의 onset은 niacin 복용 후 20분에서 1시간 사이이다.
- 홍조에 대한 자연 내성은 PGD_2 분비에 대한 tachyphylaxis의 발생으로 나타나며, 보통 치료 시작 1주일 후에 나타난다.

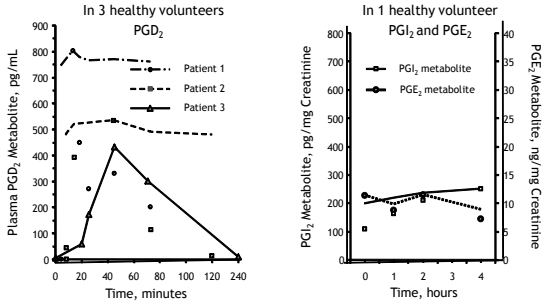
MH Davidson *Am J Cardiol.* 2008;101[suppl]:14B-19B.

Niacin-Induced Flushing Pathway: 2 Separate Sites of Action



PGD_2 = prostaglandin D_2; DP_1 = prostaglandin D_2 receptor 1.
Benyó Z et al. *Mol Pharmacol.* 2006;70:1844–1849; Morrow JD et al. *J Invest Dermatol.* 1992;98:812–815; Cheng K et al. *Proc Natl Acad Sci U S A.* 2006;103:6682–6687; Pike NB et al. *J Clin Invest.* 2005;115:3400–3403.

The Niacin Effect on Prostaglandins Is Largely PGD_2-Specific in Humans



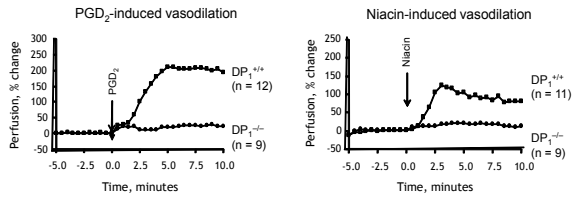
- Niacin induces large changes in PGD_2 metabolite levels
- Niacin has little or no effect on PGI_2 and PGE_2 urinary excretion

PGD_2 metabolite = 9α,11β-PGF_2; PGI_2 metabolite = 2,3-dinor-6-keto-$PGF_{1\alpha}$; PGE_2 metabolite = 11-hydroxy-9,15-dinor tetranorprostane-1,20-dioic acid.
Adapted from Morrow JD et al. *Prostaglandins.* 1989;38:263-274.

Mouse Model

DP1 Mediates Niacin- and PGD2-Induced Vasodilation

- Genetic knockout of DP_1 abrogates niacin-induced vasodilation



- Female mouse ear vasodilation was measured using laser Doppler perfusion imaging. PGD_2 (50 µg) or niacin (2.5 mg) was subcutaneously injected at 0 minutes
- A DP_1 agonist causes cutaneous vasodilation; DP_2 agonist does not
- Residual vasodilation was seen in male DP_1–/– and was resistant to Tredaptive (ER niacin/ laropiprant), but was completely blocked by ASA 400 mg/kg

Adapted from Cheng K et al. *Proc Natl Acad Sci U S A.* 2006;103:6682-6687.

Early Phase 1/Phase 2 Data: Formulation of ER Niacin/Laropiprant

Laropiprant: Selective DP1 receptor antagonist
Blocks PGD2 from binding to DP1 receptor

Extensive phase 2 program demonstrated:

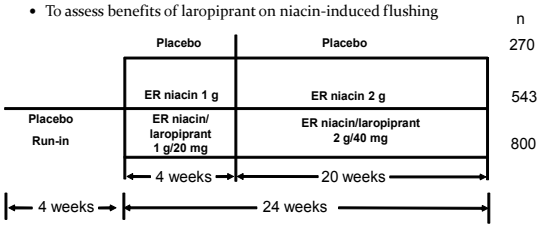
- ER niacin formulation was generally well tolerated and effective
- Laropiprant dose reduced niacin-induced flushing: 1 g/20 mg and 2 g/40 mg (ER niacin/laropiprant)
- Simplified dosing regimen to assess in phase 3 program:
  - 1 tablet (ER niacin 1 g/laropiprant 20 mg) once daily for 4 weeks, advancing to 2 tablets (ER niacin 2 g/laropiprant 40 mg)
- ER niacin/laropiprant (Tredaptive) is a bi-layer product containing both ER niacin and laropiprant
- The matrix must remain intact to maintain controlled release; tablet should not be split or cut prior to administration

EMEA. CHMP Assessment Report for Tredaptive. http://www.emea.europa.eu/humandocs/PDFs/EPAR/tredaptive/H-889-en6.pdf. Accessed Nov 5, 2008; Tredaptive Summary of Product Characteristics. http://www.ema.europa.eu/humandocs/PDFs/EPAR/tredaptive/emea-combined-h889en.pdf. Accessed Mar 8, 2010.

ER Niacin/Laropiprant Program
Phase 3 Data: Lipid Efficacy

Lipid/Flushing Study: Design

- Objectives:
  - To assess lipid-altering benefits of ER niacin/laropiprant alone and in combination with any statin
  - To assess benefits of laropiprant on niacin-induced flushing

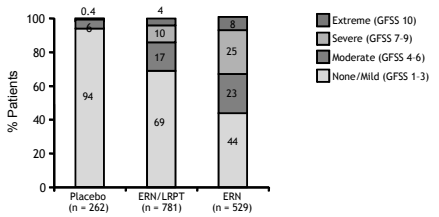


Maccubbin DL et al. *Int J Clin Pract.* 2008;62:1959-1970.

Lipid/Flushing Study: Initiation Phase

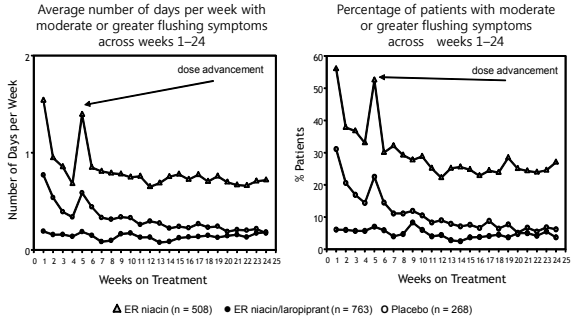
Initiation phase (first week treatment: ERN 1 g, ERN/LRPT 1 g/20 mg)

- Significantly fewer ERN/LRPT vs ERN patients experienced:
  - Moderate or greater flushing: 31% vs 56%
  - Severe or greater flushing: 14% vs 33%
- 69% of patients on ERN/LRPT had none/mild flushing during week 1



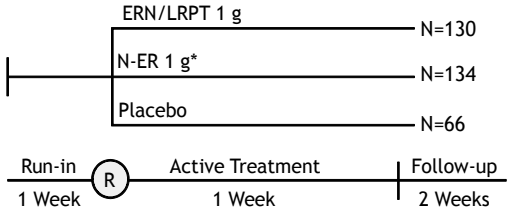
EMEA. CHMP Assessment Report for Tredaptive. http://www.emea.europa.eu/humandocs/PDFs/EPAR/tredaptive/H-889-en6.pdf. Accessed Nov 5, 2008; Maccubbin DL et al. *Int J Clin Pract.* 2008;62:1959-1970.

Lipid/Flushing Study: Lower Incidence of Moderate or Greater Flushing vs ER Niacin



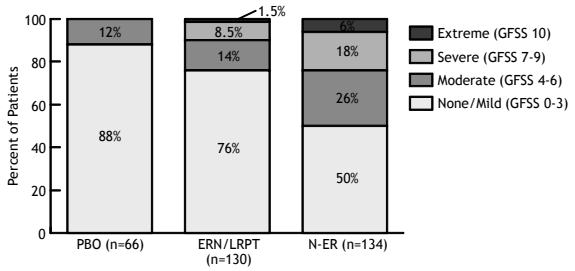
Maccubbin DL et al. *Int J Clin Pract.* 2008;62:1959-1970.

Lipid-Modifying Efficacy of Extended Release Niacin/Laropiprant in Asian Patients with Primary Hypercholesterolemia or Mixed Hyperlipidemia -Korea, China, Singapore-



*Given as NIASPAN™

Maximum GFSS, Presented as Percent of Patients



- ERN/LRPT patients had significantly (p<0.001) less flushing vs. N-ER patients, as measured by maximum GFSS categorized as none/mild, moderate, severe, or extreme.
- Significantly fewer ERN/LRPT vs. N-ER patients had:
  - Moderate or greater flushing: 24% vs. 50% (p<0.001)
  - Severe or greater flushing: 10% vs. 24% (p=0.003)
  - Discontinuation due to flushing: 0.8% vs. 3.7% (p<0.001)

Conclusion

- Niacin decreases FFA release and stimulates RCT, resulting in decreased triglycerides and LDL-C and increased HDL-C
- Niacin also favorably affects HDL and LDL particle size and has antiinflammatory effects
- These varied effects make niacin unique in its ability to broadly modify lipoprotein levels in a way that is beneficial for CVD risk
- An important drawback to niacin use is the skin flush that occurs in some patients shortly after dosing
- **Laropiprant, a PG D2 receptor-1 antagonist(Tredaptive)**

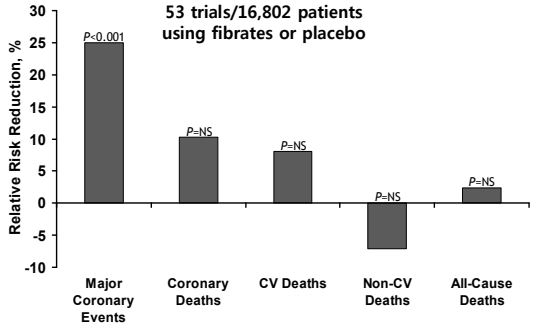
Fibrates and Their Benefits on Management of Lipids

MOA	Fibrates inhibit fatty acid synthesis in the liver and increase the elimination of TG-rich particles from plasma. They also increase the synthetic rate of HDL-C.
Efficacy	TC: ↓
	TG: ↓ (by 25%–45%)
	LDL-C: ↓ (by 10%–20%)
	HDL-C: ↑ (by 10%–15%)
	LDL-C/HDL-C: ↓
	VLDL: ↓
	apo B: ↓
Side effects	Abnormal liver function tests, dyspepsia, gallstones, myopathy
Indications	Treatment of hypercholesterolemia, hypertriglyceridemia
Contraindications	Hypersensitivity to fenofibrate, hepatic or severe renal dysfunction, preexisting gallbladder disease

MOA=mechanism of action; TG=triglycerides; HDL-C=high-density lipoprotein cholesterol; TC=total cholesterol; LDL-C=low-density lipoprotein cholesterol; VLDL=very low-density lipoprotein cholesterol; apo B=apolipoprotein B

Young CE et al. *Cardiol Rev.* 2004;12:107–119; LOFIBRA® [package insert]; 2005.

Effects of Fibrates on Coronary End Points: Results of a Meta-analysis



NS=not significant; CV=cardiovascular

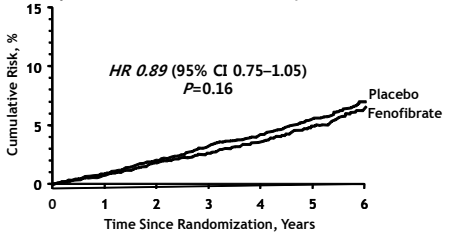
Birjmohun RS et al. *J Am Coll Cardiol.* 2005;45:185–197.

Fibrate와 대규모 임상연구

Trial(drug)	Primary endpoint Entire cohort (p value)	Lipid subgroup criterion	Primary endpoint subgroup (p value)
HPS (gemfibrogil)	-34%(0.02)	TG > 200 mg/dL LDL-C/HDL-C >5.0	Post-hoc -71%(<0.005)
BIP (bezafibrate)	-7.3%(0.24)	TG ≥ 200 mg/dL	Post-hoc -39.5%(0.02)
VA-HIT (gemfibrozil)	-22%(0.006)	TG ≥ 150 mg/dL	Post-hoc -27%(0.01)
FIELD (fenofibrate)	-11%(0.16)	TG ≥ 204 mg/dL HDL-C < 42 mg/dL	Post-hoc -27%(0.005)
ACCORD (fenofibrate)	-8%(0.32)	TG ≥ 204 mg/dL HDL-C ≤ 34 mg/dL	Prespecified -31%(0.06)

Cumulative Risk Curve of Time to First Event Showing Nonsignificant Risk Reduction in CHD Events FIELD Study

In a 5-year, randomized, placebo-controlled study of 9795 diabetic patients 50–75 years old, CHD events (nonfatal MI plus CHD death)



Numbers at risk							
Placebo	4900	4835	4741	4646	4547	2541	837
Fenofibrate	4895	4837	4745	4664	4555	2553	850

CHD=coronary heart disease; FIELD=Fenofibrate Intervention and Event Lowering in Diabetes; MI=myocardial infarction; HR=hazard ratio; CI=confidence interval

FIELD study investigators. *Lancet.* 2005;366:1849–1861.

Effects of Combination Lipid Therapy in Type 2 Diabetes Mellitus

The ACCORD Study Group*

ABSTRACT

BACKGROUND

We investigated whether combination therapy with a statin plus a fibrate, as compared with statin monotherapy, would reduce the risk of cardiovascular disease in patients with type 2 diabetes mellitus who were at high risk for cardiovascular disease.

METHODS

We randomly assigned 5518 patients with type 2 diabetes who were being treated with open-label simvastatin to receive either masked fenofibrate or placebo. The primary outcome was the first occurrence of nonfatal myocardial infarction, nonfatal stroke, or death from cardiovascular causes. The mean follow-up was 4.7 years.

N Engl J Med 2010

ACCORD lipid

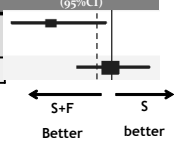
31% reduction in events in pts with atherogenic dyslipidemia

% of events (no. in group)

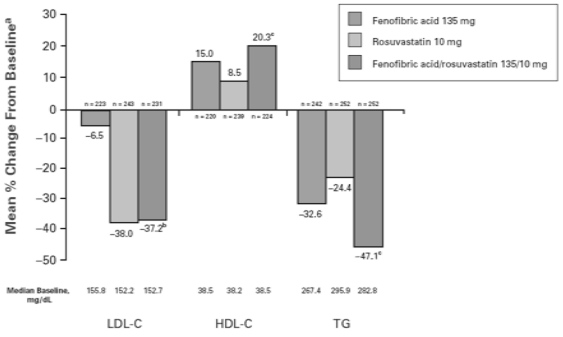
	Simvastatin + fenofibrate	Simvastatin
TG > 204 mg/dl & HDL < 34 mg/dl	12.37(485)	17.32(456)
All others	10.11(2264)	10.11(2284)

P value 0.06

Hazard Ratio (95%CI)



Fenofibric Acid and Rosuvastatin Combination Therapy in Patients With Mixed Dyslipidemiaa



CLINICAL CONSIDERATIONS WHEN ADDING A SECOND AGENT TO STATIN THERAPY FOR TX OF MIXED DYSLIPIDEMIA

Agent	Baseline Lab. Needed	Potential Adverse Effects to Monitor
Fibrates	LFT, BUN/Cr Consider CK	Gallstone, increased AST/ALT: Myopathy/rhabdomyolysis
Niacin	LFT, glucose, Uric acid	Increased AST/ALT, DM, Gout, Flush
Ezetimibe	LFT	Increased AST/ALT
Omega-3 FA	None	GI symptoms Interaction with warfarin, aspirin?

** Omega-3 FA reduce CAD event irrespective of their effect on TG level