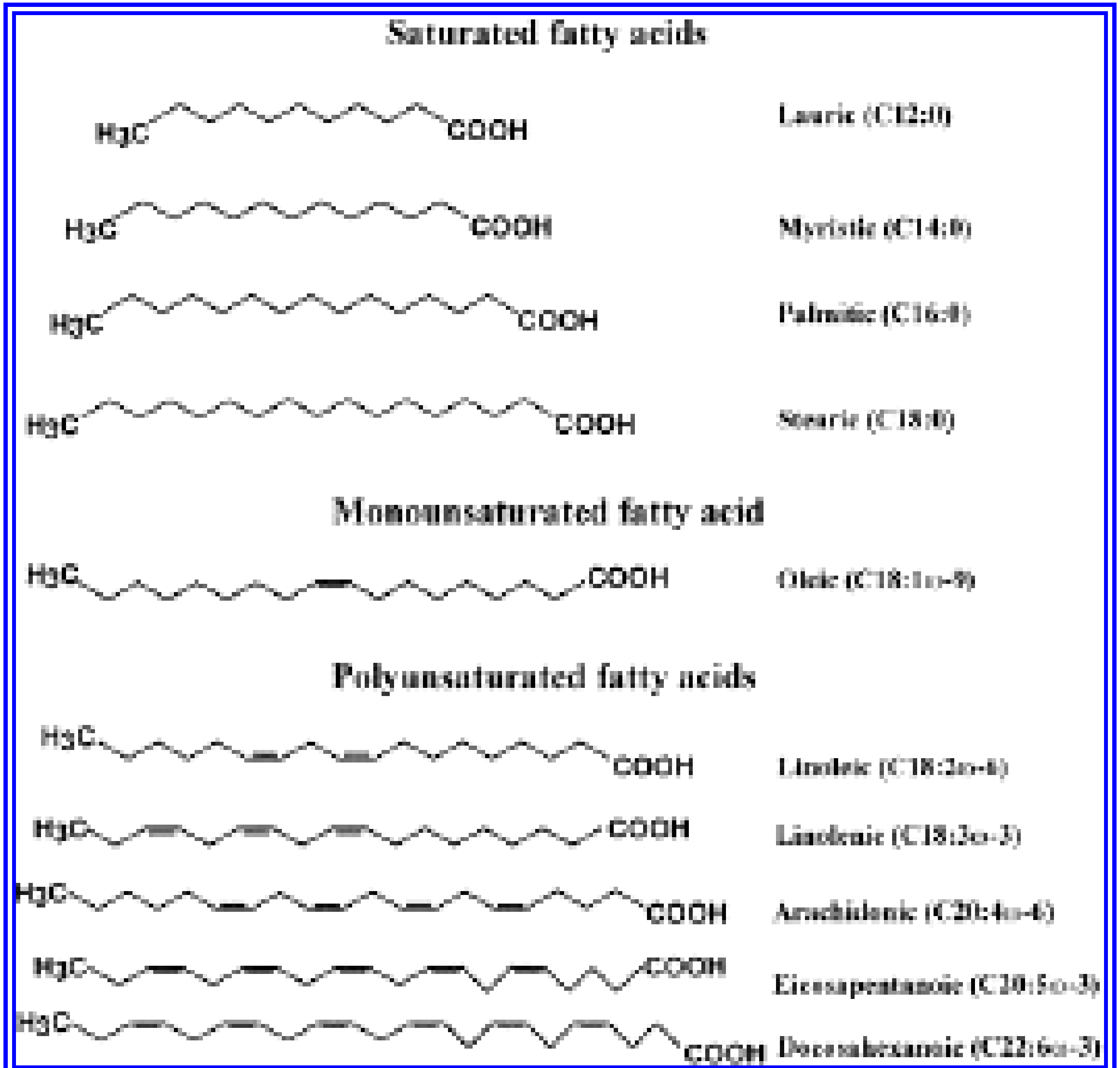
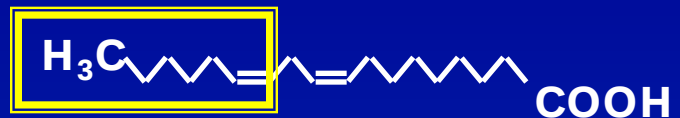
Postavenie omega-3 mastných kyselín pri znižovaní rizika kardiovaskulárnych chorôb

Štefan Farský, Dom srdca Martin



Rodina esenciálnych MK

ω-6 family



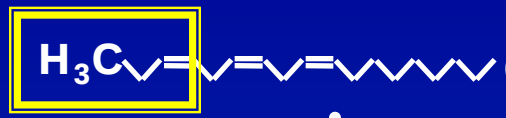
C18:2 ω-6 **Linolová**

- kukuričný olej
- slnečnicový

C20:4 ω-6 **Arachidonic**

Protrombotický a prozápalový účinok

ω-3 family



C18:3 ω-3 **α-Linolénová**

- ľanový olej
- repkový olej
- sójový olej

C20:5 ω-3 **Eikozapentaénová (EPA)**

C22:6 ω-3 **Dokozapentaénová (DHA)**

- rybí olej
- kapsuly

Metabolity: menej sa tvoria tromby, protizápalové

Vzťah medzi pomerom omega-6 : omega-3 v strave a KV mortalitou

populace	Poměr* omega-6 : omega-3	mortalita	strava
sběrači-lovci (paleolit)	2:1	?	měkkýši, ryby
rybáři-lovci (Grónsko)	1:1	7%	ryby, zvěř
rybáři-zemědělci (Japonsko)	5:1	12%	ryby, rostliny
industriální (Evropa, USA)	40:1	45%	technologizovaná (vysoce sterilní, westernizovaná)
ČR	50 : 1	51%	technologizovaná (vysoce sterilní, westernizovaná)

* odhad dle literatury

Rybí olej z morských rýb

- Olej z morských rýb, bohatý na omega-3 MK, znižuje hladinu triglyceridov a je efektívny v kombinácii so statínmi pri liečbe pac. s kombinovanou dyslipidémiou
- Rybí olej plus statín môže byť dobrou alternatívou k th. fibrát plus statín
- Rybí olej okrem toho má aj iné kardiovaskulárne účinky:
  - redukcia malignych komorových dysrytmií a SCD
  - spomalenie srdcovej frekvencie
  - antitrombotické účinky
  - zlepšenie endoteliálnej dysfunkcie a cievnej funkcie
  - protizápalové účinky
  - ľahké zníženie krvného tlaku
  - zlepšenie diastolického plnenia ľavej komory

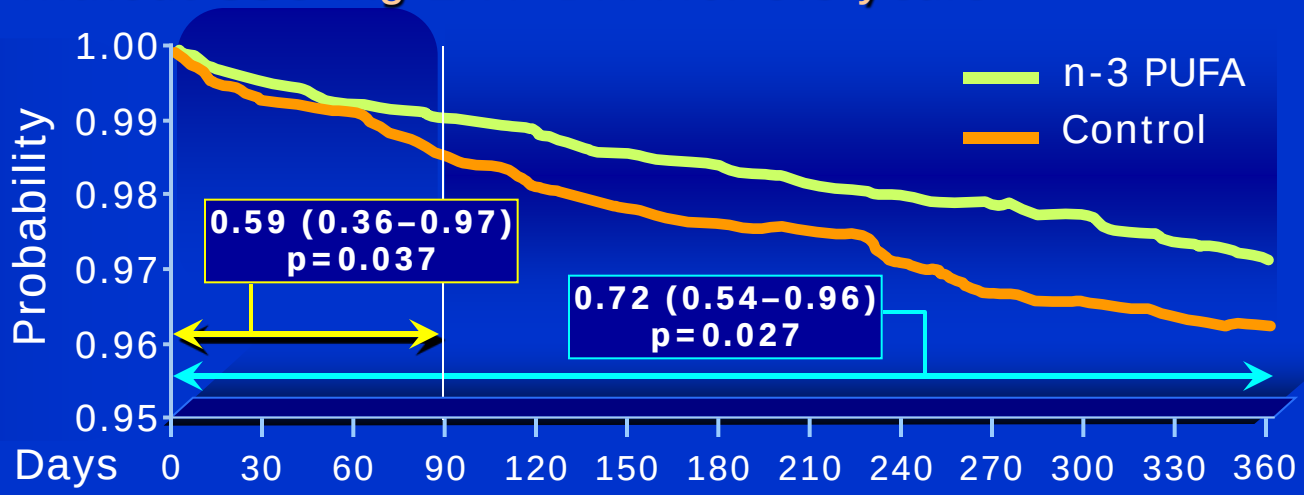
Bays HE et al. *Expert Opin Pharmacother* 2003;4:1901-1938.
Kris-Etherton PM et al. *Circulation* 2002;106:2747-2757.

Slide Source
Lipids Online Slide Library
www.lipidsonline.org

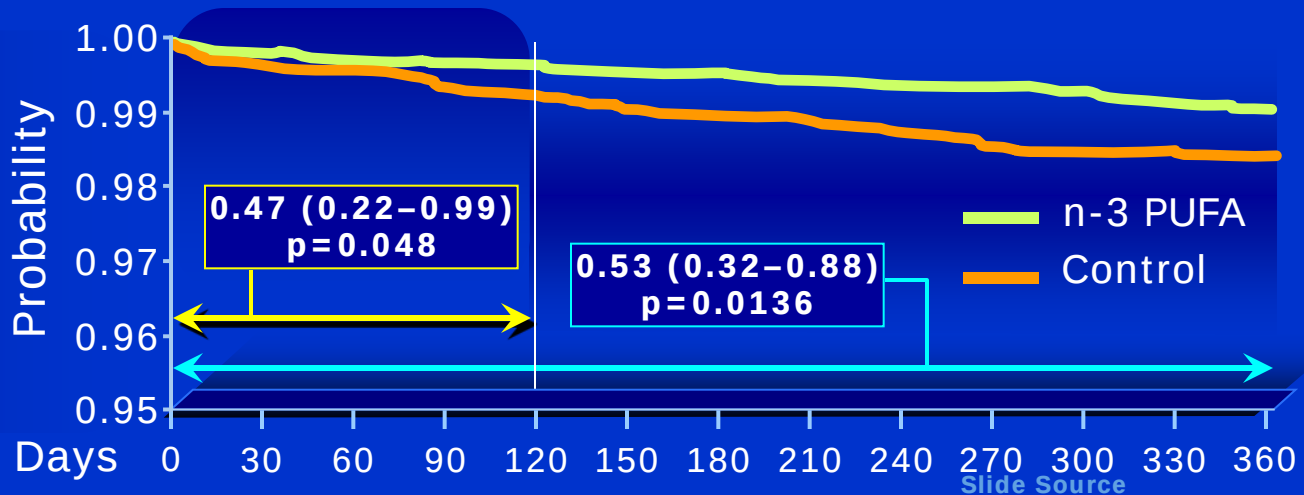
GISSI-Prevenzione: *Time Course of Clinical Events*

>11,300 post-MI patients were given usual care with or without **850** mg EPA+DHA for 3.5 years

Total mortality reduced by 28% (p=0.027)

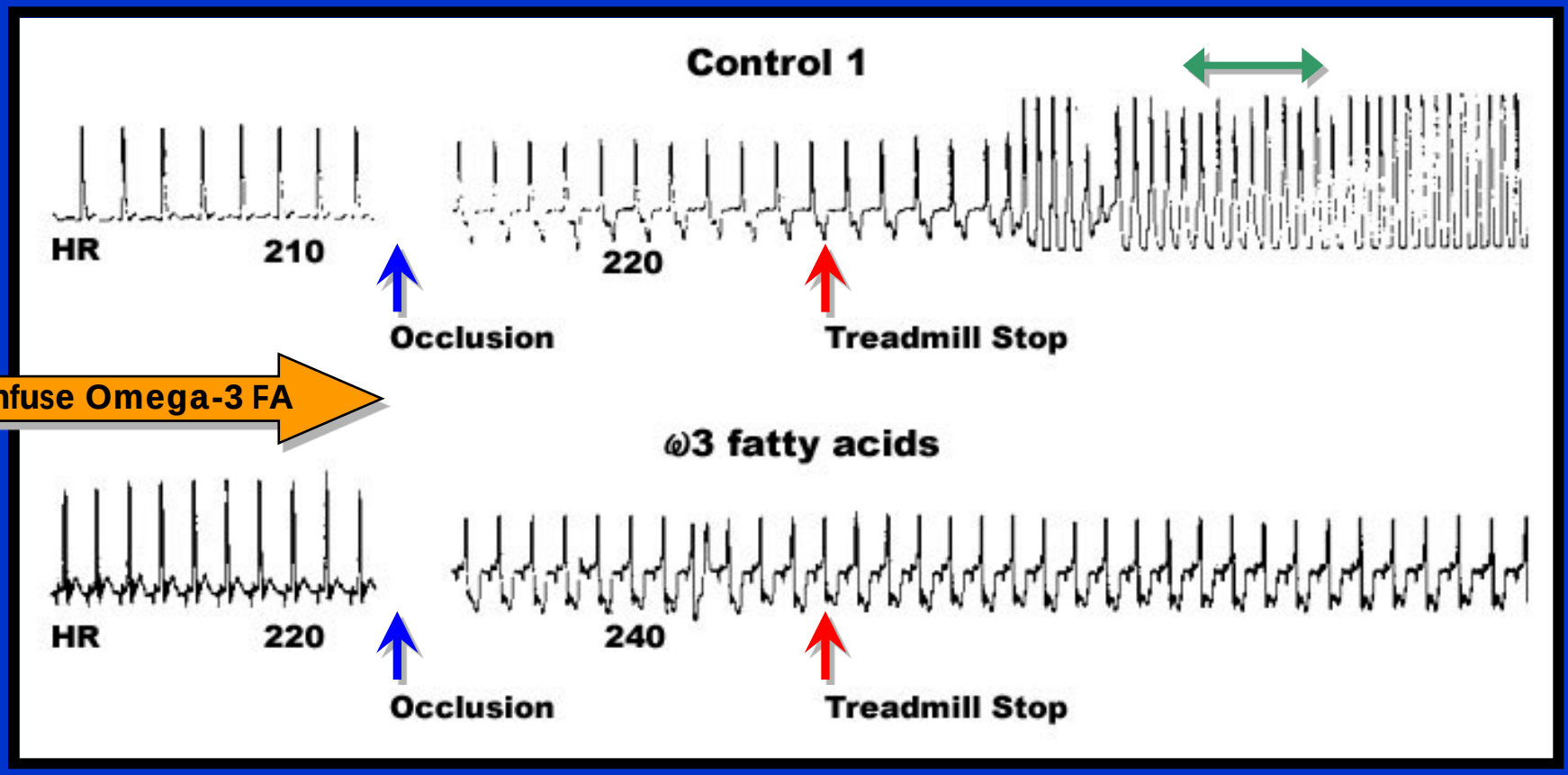


Sudden death reduced by 47% (p=0.0136)



Marchioli R et al. *Circulation* 2002;105:1897-1903.

Omega-3 FA Infusion Prevents Ventricular Tachyarrhythmias in Dogs

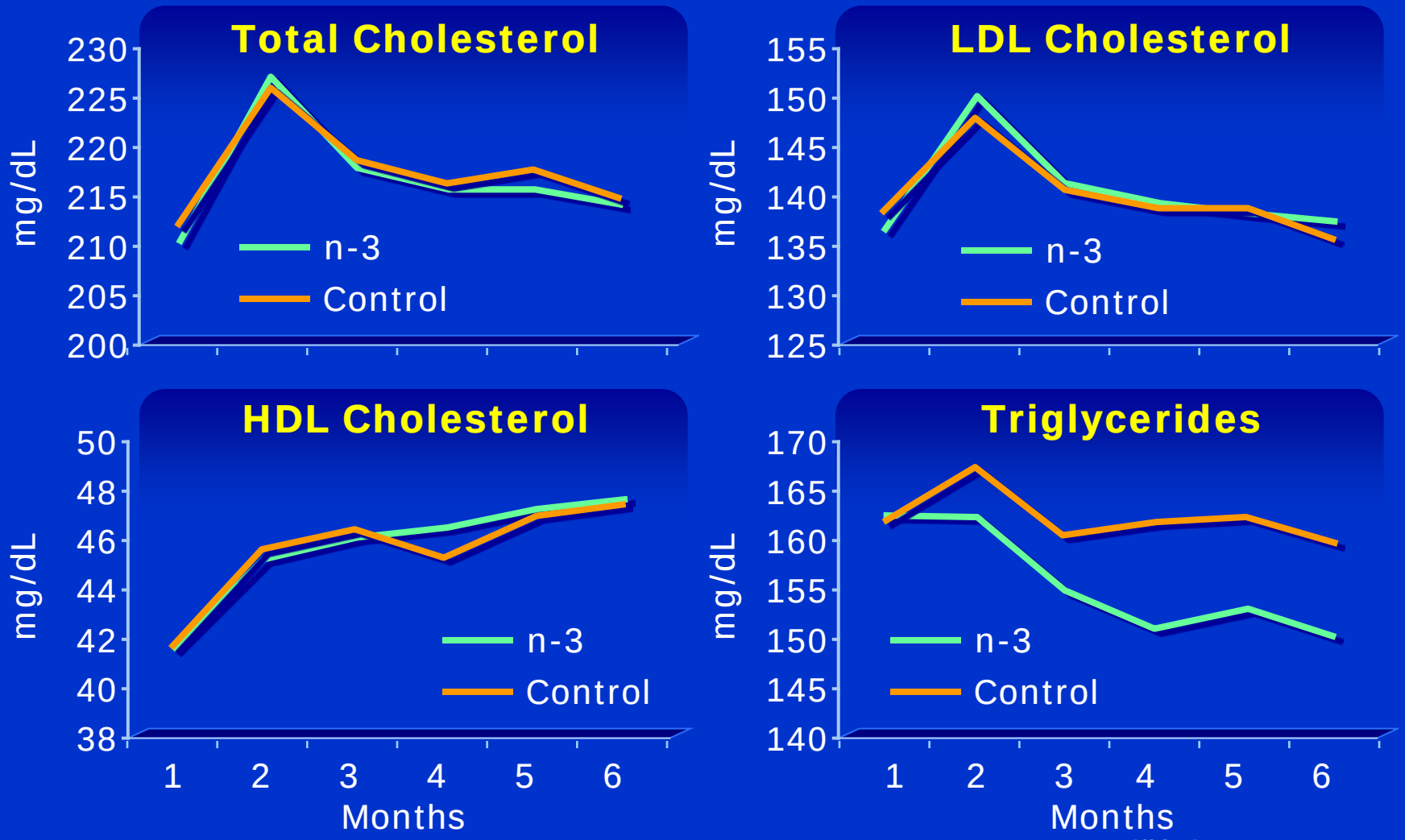


Billman GE et al. *Proc Natl Acad* Sci U S A 1994;91:4427-4430.

Možné antiarytmické mechanizmy: >N-3MK v srdcových membránach

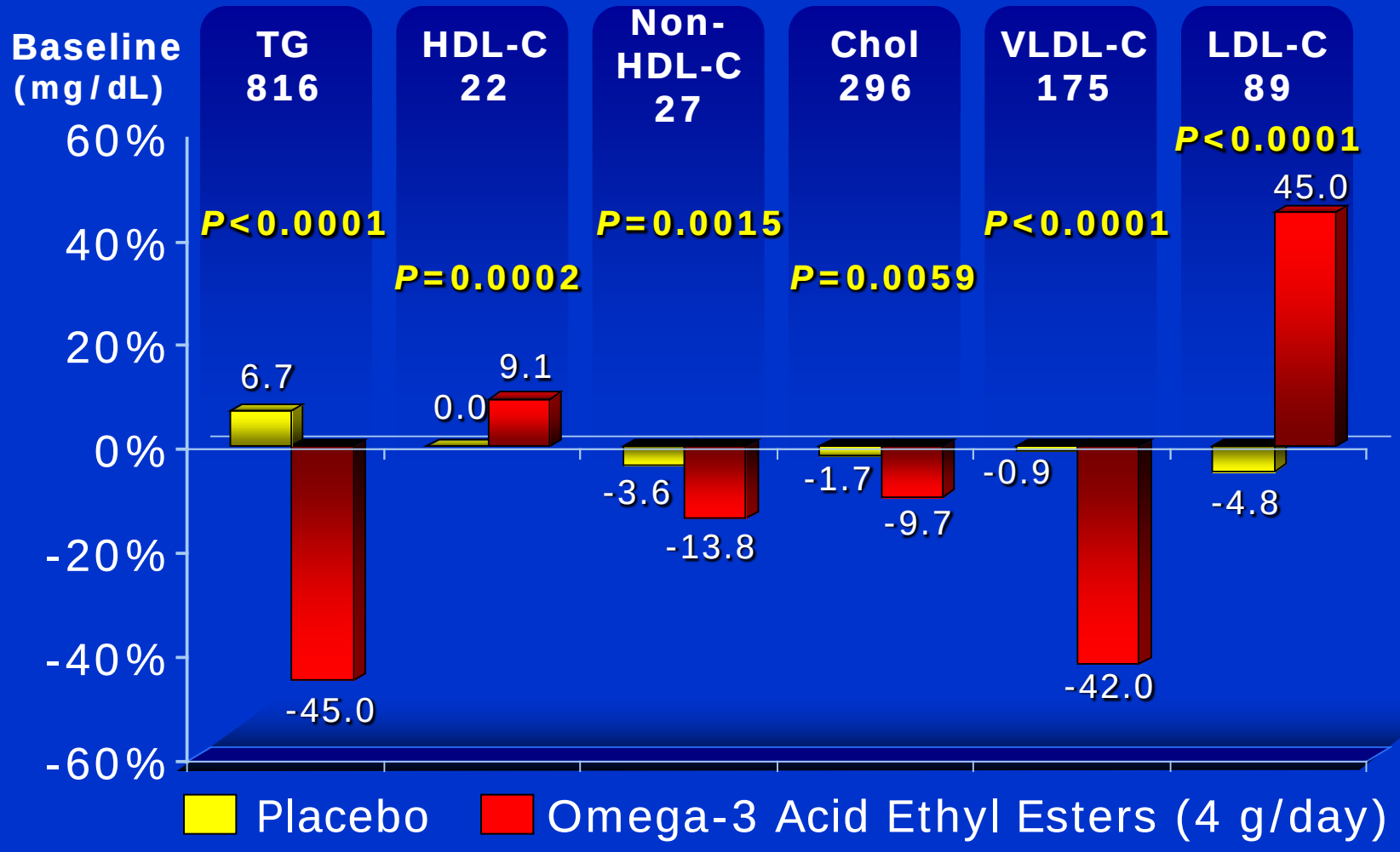
- hyperpolarizácia ischemických bunkových membrán, predĺženie ERP
- väzba na sodíkové kanály, podobne ako Ic trieda
- inhibícia influxu Ca do bunky cez L-kanály pri ischemickom Ca overloade
- zvýšenie variablity, zníženie frekvencie u pac. po IM s EF < 0,4 (cez ANS?)

GISSI-Prevenzione: *Effects of 850 mg/d of EPA+DHA on Serum Lipids*



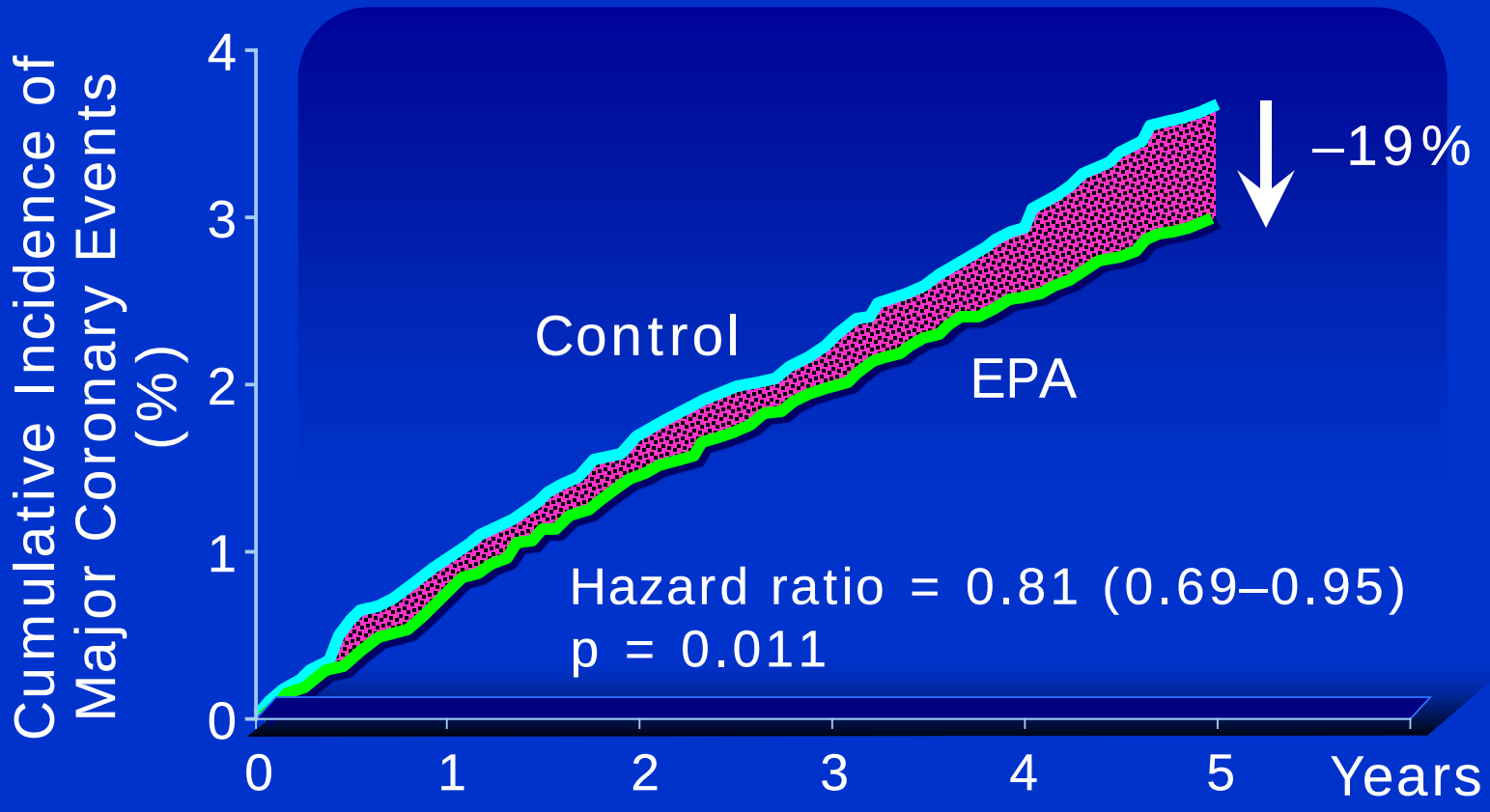
Marchioli R et al. *Circulation* 2002;105:1897-1903.

Omega-3 Ethyl Esters and Lipid Levels in Patients with Triglycerides >500 mg/dL



Pooled analysis: Harris WS et al. *J Cardiovasc Risk* 1997;4:385-391. | Pownall HJ et al. *Atherosclerosis* 1999;143:285-297.

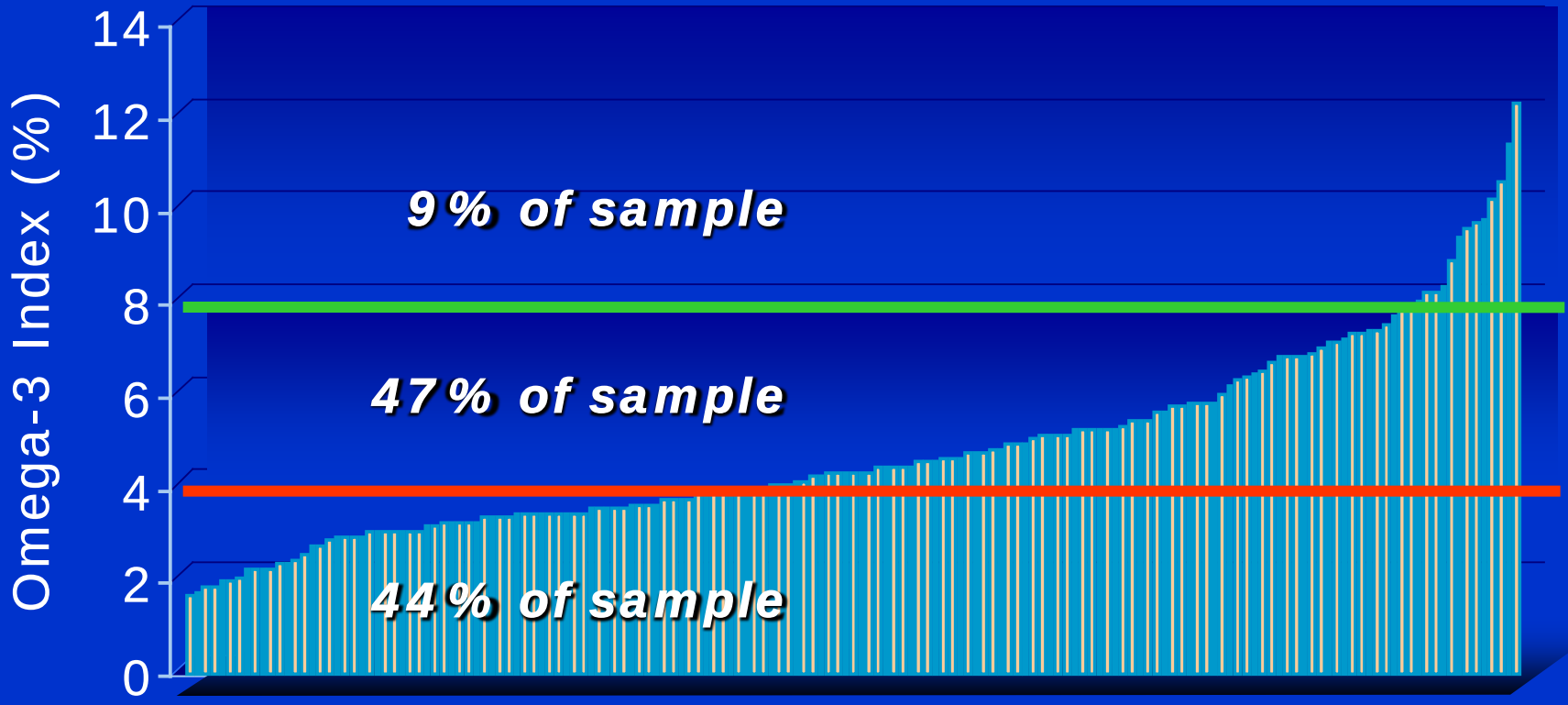
Japan EPA Lipid Intervention Study (JELIS)



18,645 Japanese (70% women, mean age 61 years) randomized to statin alone or statin + EPA (1.8 g/d) and followed for 5 years

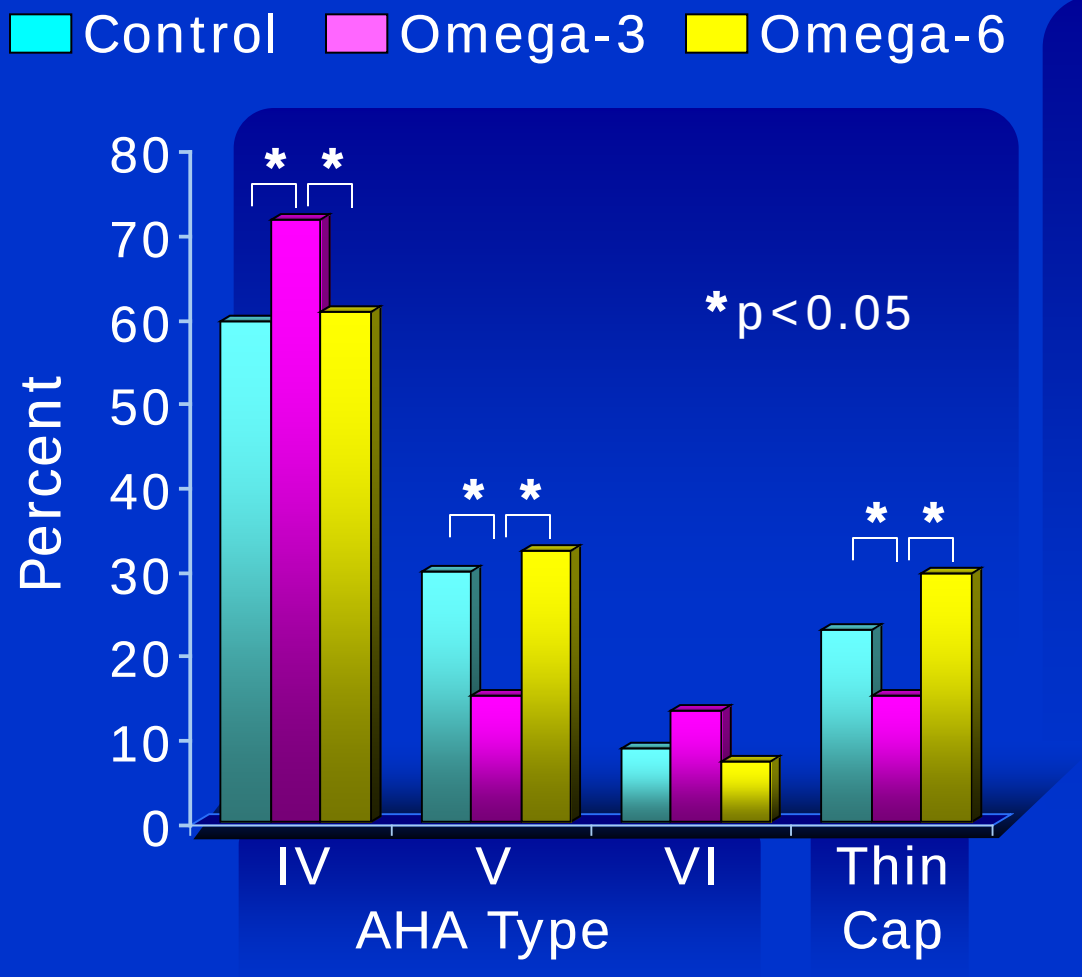
Yokoyama M. Presented at American Heart Association Scientific Sessions, Dallas, Texas, 14 November 2005.

Distribution of Omega-3 Index in 163 Adults Not Taking Omega-3 Supplements



Sands SA et al. *Lipids* 2005;40:343-347.

Omega-3 FA and Plaque Stability: *Plaque Characteristics*



- Patients awaiting carotid endarterectomy (n=188) were randomized to control, fish oil (omega-3), or sunflower oil (omega-6) supplementation for median 34, 46, and 43 days preprocedure
- Plaques in omega-3 patients appeared to be more stable

Theis F et al. *Lancet* 2003;361:477-485.

AHA Recommendations for Omega-3 FA Intake

Population	Recommendation
Patients without documented CHD	Eat a variety of (preferably oily) fish at least twice a week. Include oils and foods rich in α-linolenic acid (flaxseed, canola, and soybean oils; flaxseeds; and walnuts)
Patients with documented CHD	Consume ~1 g of EPA+DHA per day, preferably from oily fish. EPA+DHA supplements could be considered in consultation with the physician
Patients needing triglyceride lowering	2–4 grams of EPA+DHA per day provided as capsules under a physician's care

Kris-Etherton PM et al. *Circulation* 2002;106:2747-2757.

Food sources of long-chain omega-3 polyunsaturated fatty acids

Common dietary sources	EPA, mg/100 g	DPA, mg/100 g	DHA, mg/100 g	EPA + DHA mg/100 g
Slede	909	71	1105	2014
Losos z farmy	862	393	1104	1966
Losos voľný	411	368	1429	1840
Pstruh	259	235	677	936
Makrela	504	106	699	1203
Sardinky	473	0	509	982
Morský jazyk	168	34	132	300
Tuniak	91	17	237	328

DHA = docosahexaenoic acid; DPA = docosapentaenoic acid; EPA = eicosapentaenoic acid

Ako získať 1 g/d EPA+DHA/deň:

- **Rybie mäso**
  - 60-90g slede, losos, sardinky, makrely
- **Potravinové doplnky a lieky**
  - *Nízky obsah:* 300 mg EPA+DHA/g (bežné kapsuly; 3 g/d)
  - *Stredný obsah:* 500–700 mg EPA+DHA/g (účinnejšie kapsuly; 2 g/d)
  - *Vysoký obsah:* 850-1000 mg EPA+DHA/g (Omega-3 acid etyl estery; 1 g/d)
- **Olej z treščej pečene**
  - 1 čaj.lyž. (RDA vitamín D; 2× RDA vitamín A)