

Nutritional Medicine Today

34th Annual International Conference, May 2005

# Cell Membrane Orthomolecules for Mental Performance (Part 2 of 2)

---

Parris M. Kidd, PhD

[www.dockidd.com](http://www.dockidd.com)

[dockidd@dockidd.com](mailto:dockidd@dockidd.com)

# EPA+DHA Omega-3 Fatty Acids for Brain Support

---

- ◆ Critically important for developing brain *in utero*, postnatally and throughout life
- ◆ Support membrane fluidity for brain cell functionality, including growth, synapse formation, signal transduction
- ◆ Precursors to eicosanoids that influence mood control
- ◆ Systemic anti-inflammatory action protects brain tissue, likely in MS, Parkinson's, dementia, ADHD-autism
- ◆ Likely important for brain plasticity via growth factors
- ◆ PS of neuron membranes especially enriched in PS-DHA.

# Omega-3s Benefit Mood States

---

- ◆ Bipolar disorder, major depression, ADHD, dyslexias, autism, all benefit from EPA and DHA, but not from ALA (18:3)
- ◆ Intakes used ranged high—up to 10g / day
- ◆ Not clear whether magic ratio exists of EPA / DHA
- ◆ Useful to monitor red cell membrane EPA+DHA
- ◆ Minimum 8% EPA+DHA in the RBC may represent a protective and / or therapeutic threshold

# NO! to SSRI for Depressed Minors



Drugmakers have been covering up consistent clinical trial findings that SSRIs increase suicide risk; AND that they perform no better than placebo. The only likely exception is Prozac.

Hollon SD et al. Scientific American Mind Special Issue 2004; 14(5):34

# Famous BD Sufferers

---

Ludwig von Beethoven

Winston Churchill

Charles Dickens

Ernest Hemingway

Abraham Lincoln

Sir Isaac Newton

Teddy Roosevelt

Vincent van Gogh

Virginia Woolf

Kurt Cobain

# Ring of Fire Pattern vs BD

[www.amenclinics.com](http://www.amenclinics.com)

Left: RoF Female 12-yo w/ moodiness, chronic irritability, aggressive outbursts. Center: Sarah, delusional, irritable, bipolar.  
Right: Carrie, irresponsible behavior, sleeplessness, bipolar.

Amen DG. Images of Human Behavior. Amen Clinics, 949-266-3700

[www.brainplace.com](http://www.brainplace.com)

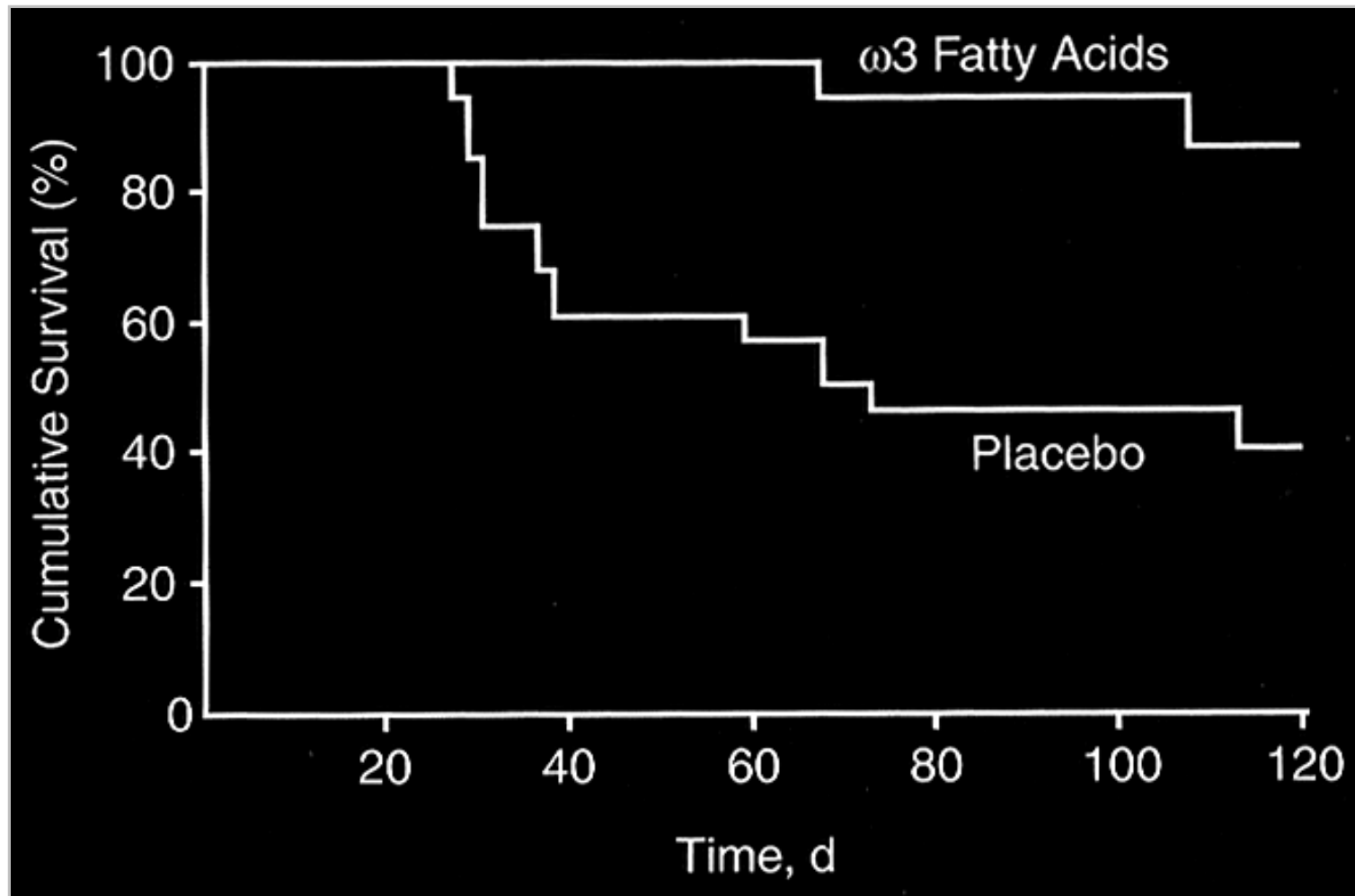
# w-3 Trial vs Bipolar Disorder

---

- ◆ Double-blind, placebo-controlled trials to date: 1
- ◆ Patients: 30 male and female, unstable BD
- ◆ Clinically significant benefits observed: longer period of remission (“survival” on graphs)
- ◆ Significant reduction in depression severity, as judged from several clinically validated scales
- ◆ \*Dose high: 6.2g EPA + 3.4g DHA, vs placebo.

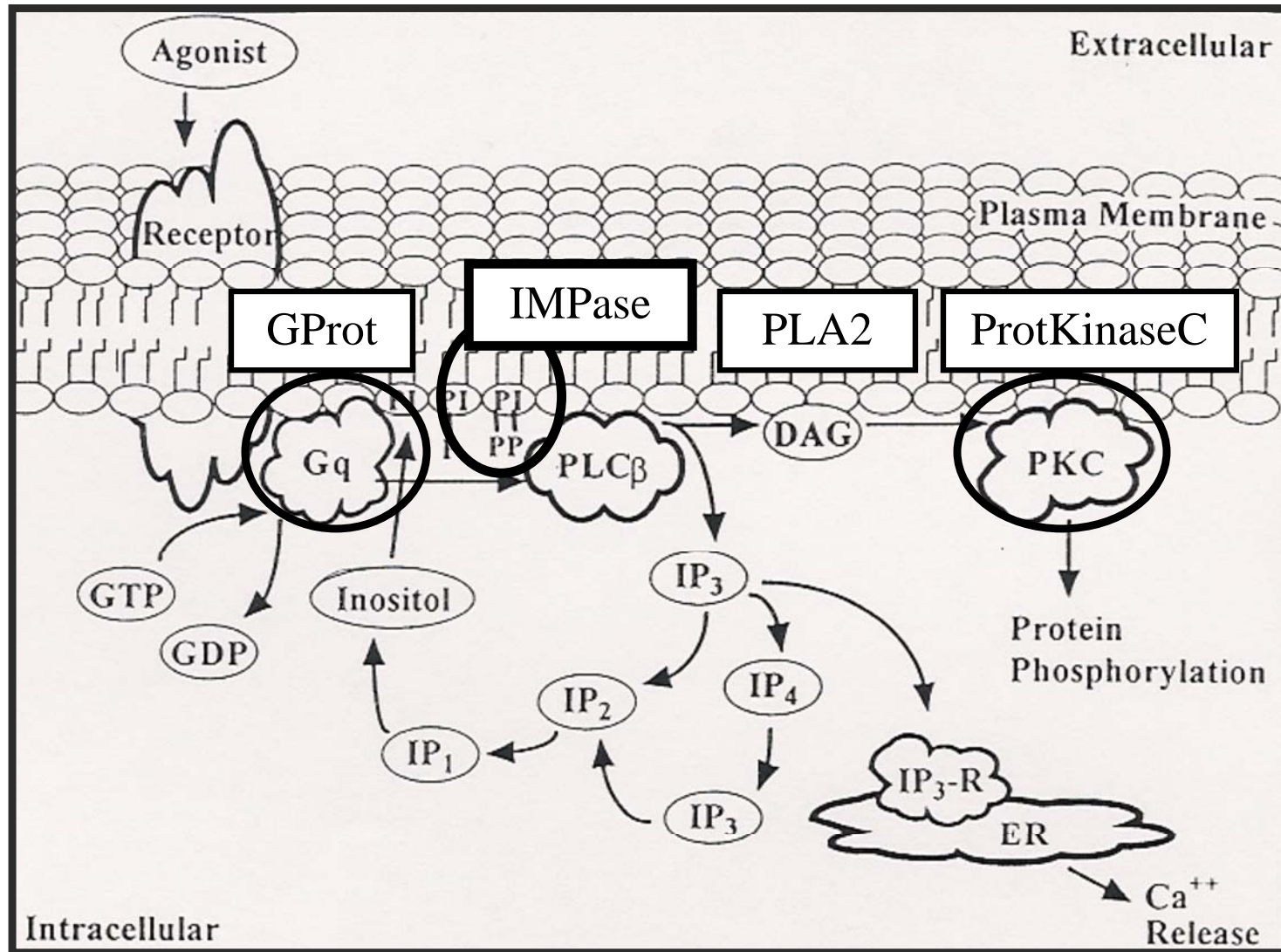
Stoll et al 1999. Arch. Gen. Psychiatry 56, 407

# Omega-3s Extend BD Remission



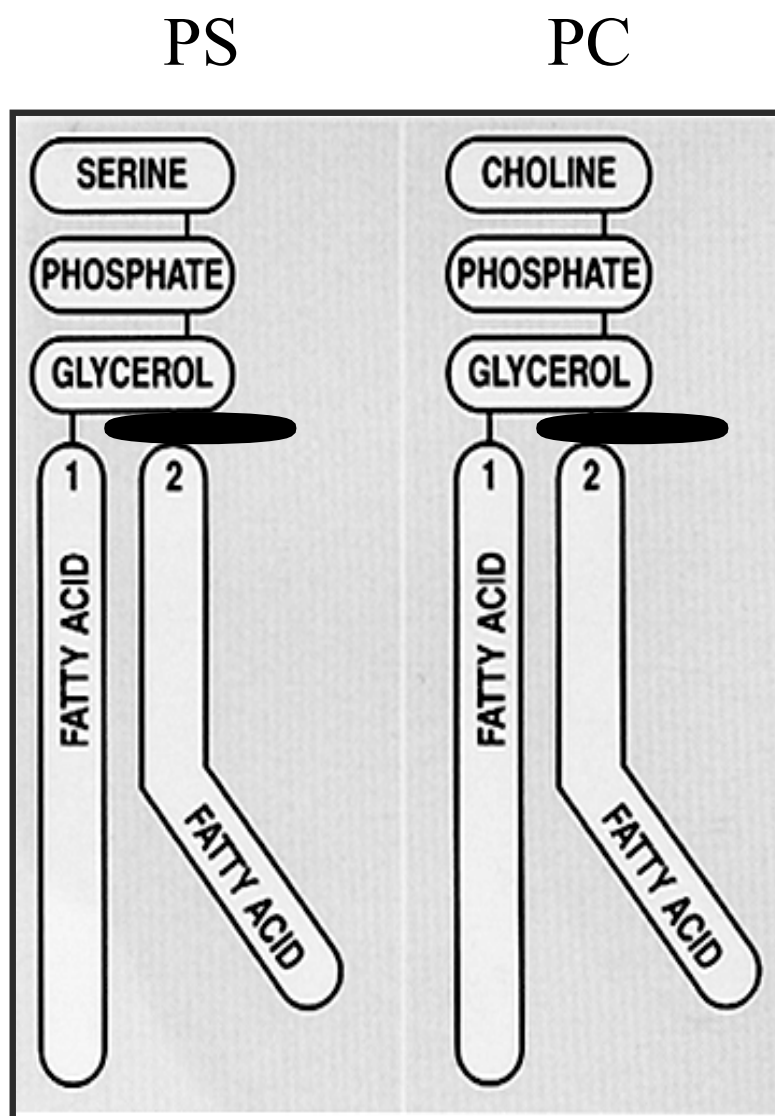
Stoll AL et al. Arch Gen Psychiatry 1999;56:407.

# BD and Signal Transduction



Kidd PM. Alternative Med Review 2004; 9(2):107

# \*PLA2—The Psychosis Gene?



PLA2 separates fatty acid tails from position 2 (EPA+DHA or AA, mostly)

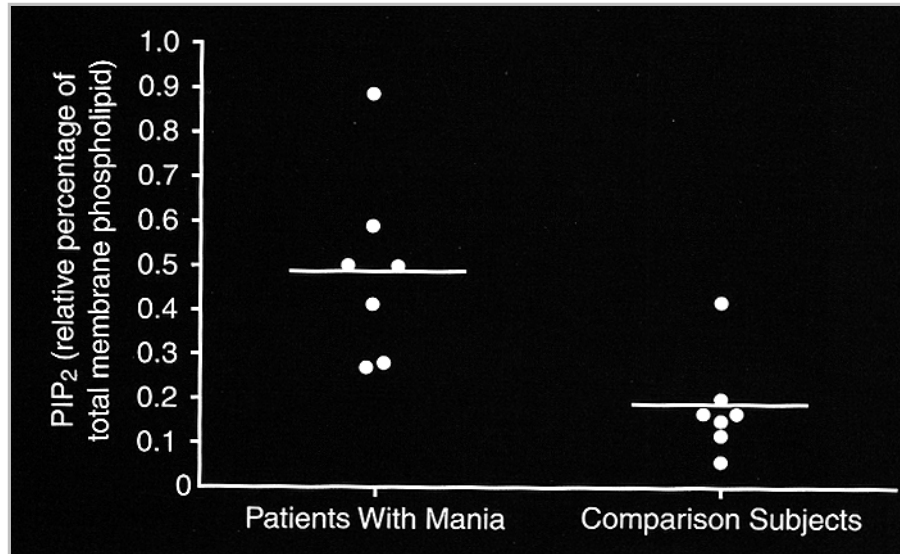
Of all the signal transduction enzymes, PLA2 is most sensitive to lithium

PLA2 driven by 5HT2 and D2 receptors; PLA2 down-regulates catechol and serotonin

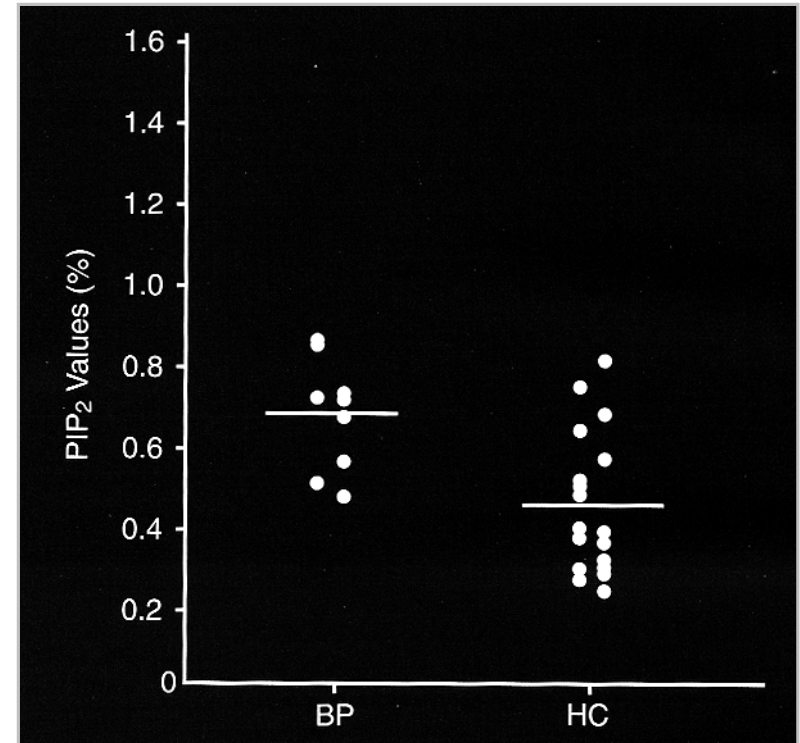
PLA2 christened “the psychosis gene” by Horrobin

# Membrane PIP<sub>2</sub> (IMPase) Elevated in Manic and Depressive Bipolars

Manic state

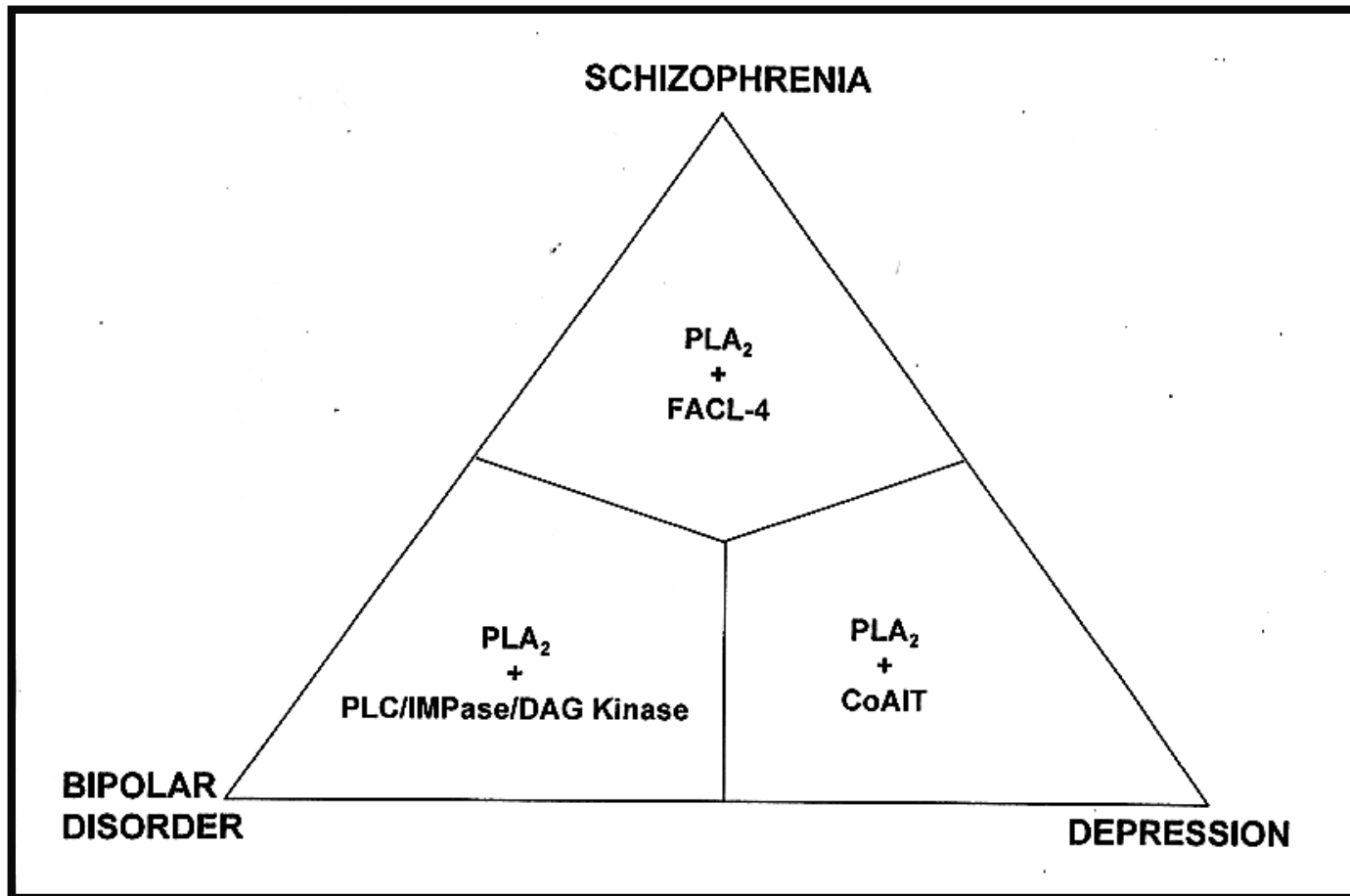


Depressed state



Kidd PM. Alt Med Rev 2004; 9(2):107

# Genic Commonalities in Affective Disorders?

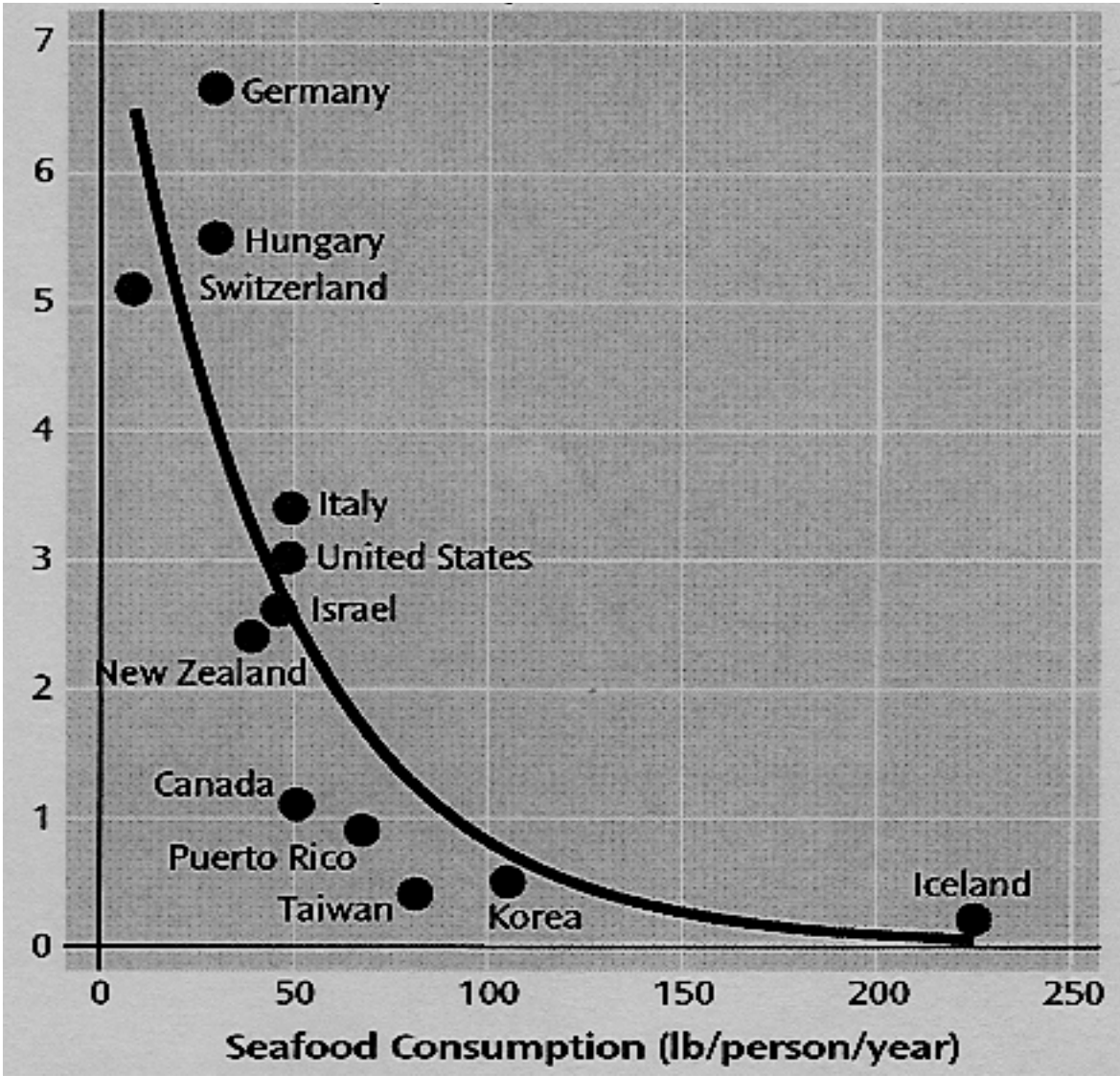


From David Horrobin

# Seafood Intake Correlates with BD

Vert axis:  
Lifetime BD  
prevalence  
rate (%)

Noaghiul and  
Hibbeln, Am J  
Psychiatry 2003;  
160:12.



# Populations Defective in FA Desaturation

---

- ◆ Aging
- ◆ Overweight / Obesity
- ◆ High cholesterol
- ◆ Trans-fatty acids
- ◆ Chronic enveloped virus infection
- ◆ Alcoholism
- ◆ Atopic Dermatitis
- ◆ Diabetes
- ◆ Premenstrual Syndrome
- ◆ Hypertension

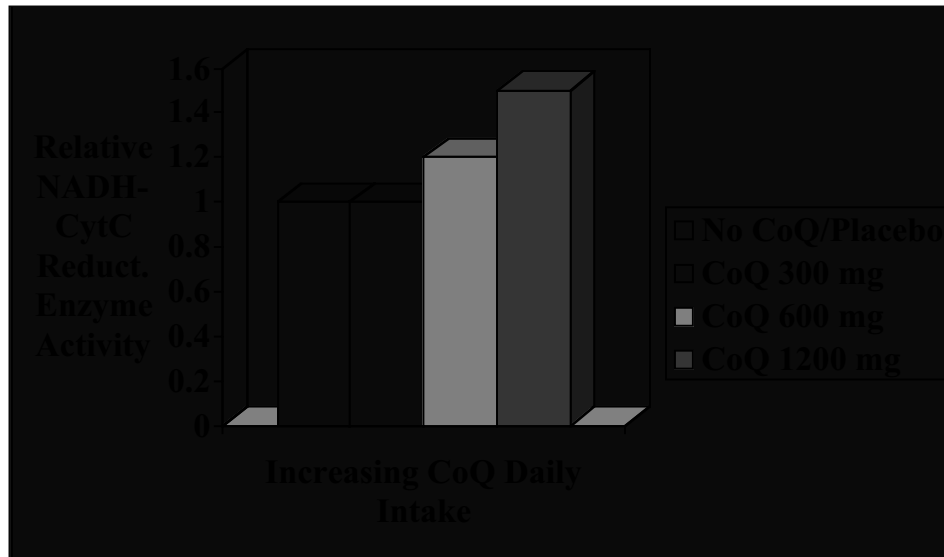
# Antioxidants and Membrane Functions

---

- ▶ Energy production—ubiquinone (Coenzyme Q10, CoQ)
- ▶ Free radical production—CoQ, carotenoids perhaps
- ▶ Free radical scavenging—tocopherols, carotenoids, CoQ
- ▶ Prostaglandin/eicosanoid modulation—tocopherols
- ▶ Redox/Protection of protein active sites
- ▶ Fluidity maintenance, via conserving double bonds
- ▶ Other functions, yet to be determined.

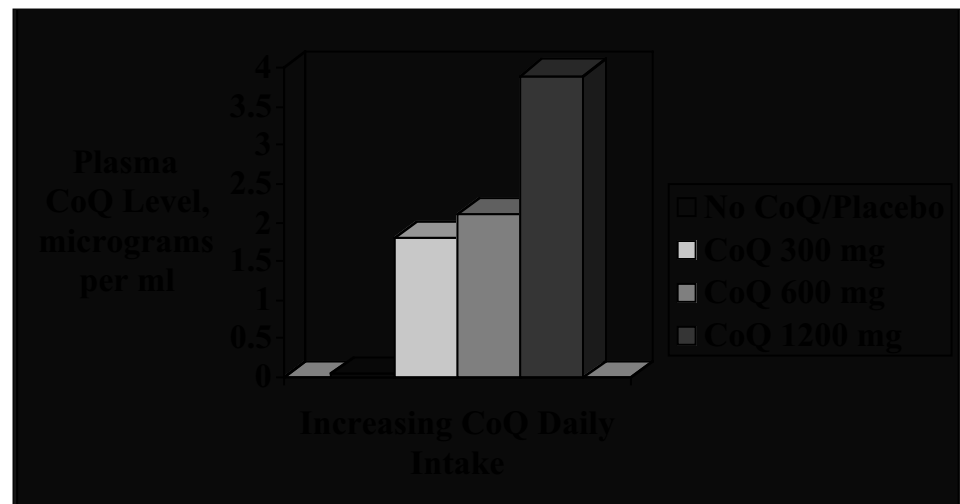
# CoQ Boosts Energy, Treats Parkinson's

Shults et al. Arch. Neurol. 2002;1541



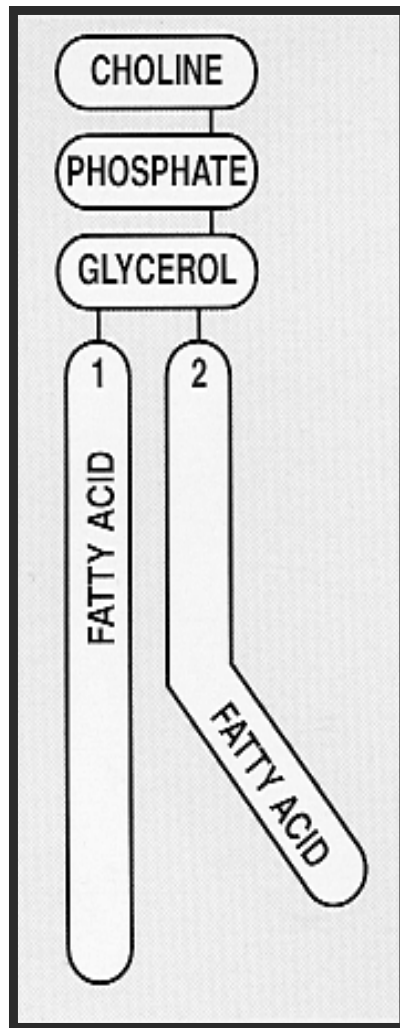
Randomized trial with 80 Parkinson's patients. Those on 1200 mg CoQ evidenced slowing of decline by the 2nd month. [In other studies, Huntington's, Friedrich's Ataxia improved at 600 mg CoQ per day]

Mitochondrial Complex I activation (platelets) correlated with very high CoQ plasma levels after 16 months' high daily intakes.

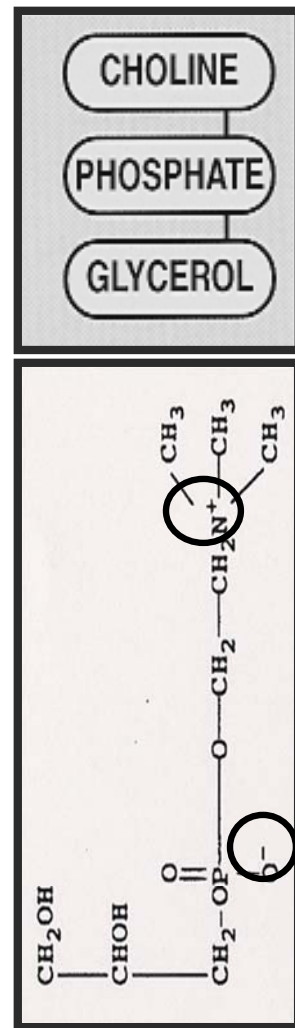


# What is GPC?

## Glycero(3)phosphocholine



PC



GPC

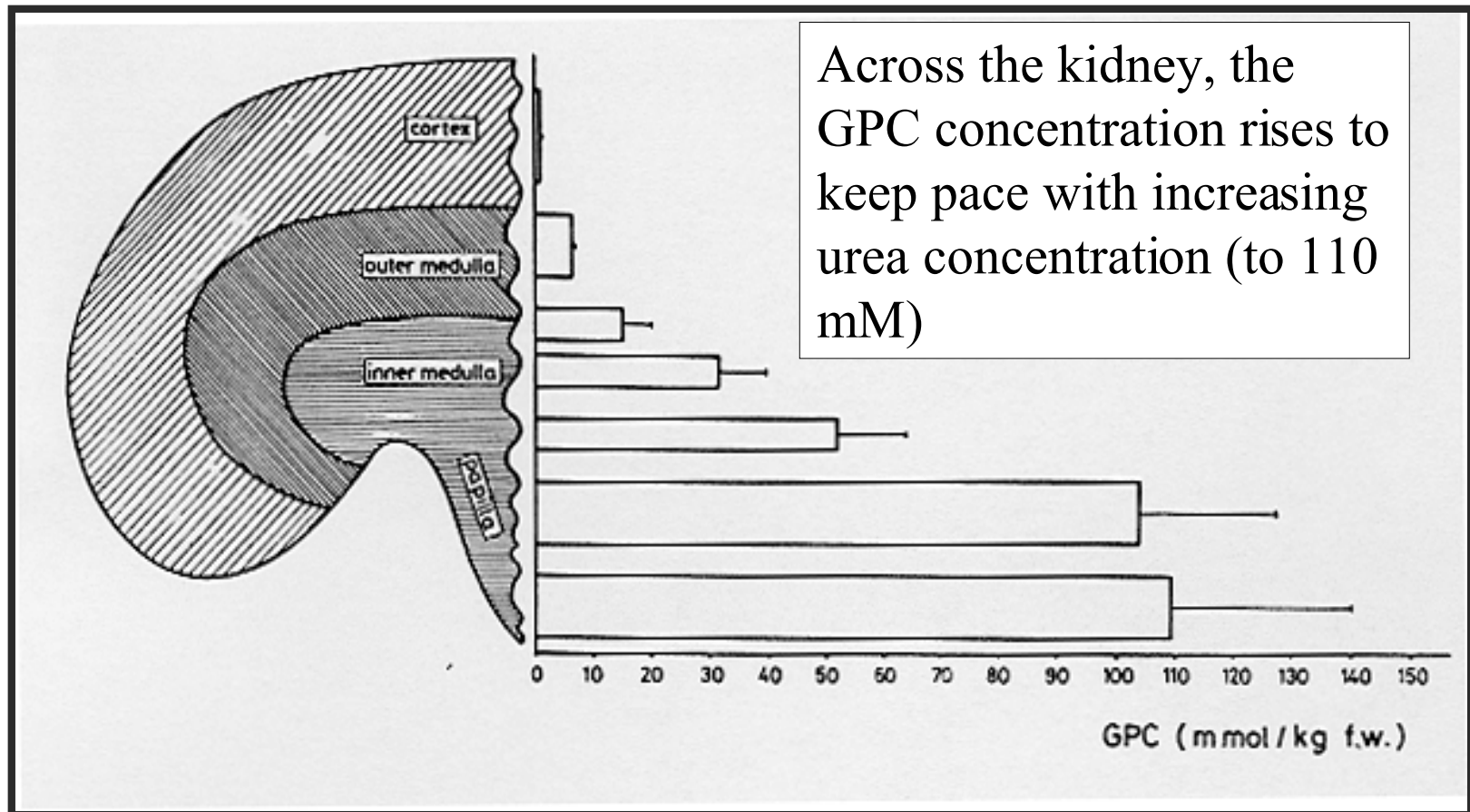
Cell Protector: vs osmotic stress from toxin buildup

Membrane Builder: water-phase phospholipid, readily accepts fatty acid "tails," especially DHA omega-3

Systemic choline reservoir: methyl group regulation

AcetylCholine source: key transmitter for the CNS, autonomic system, nerve-muscle junctions throughout the body.

# GPC as Osmoprotectant



# GPC Benefits Mental Performance

---

- ◆ Healthy men and women subjected to scopolamine amnesia; pretreatment with GPC protected attention, reasoning, and immediate recall.
- ◆ GPC boosted their baseline immediate recall.
- ◆ Dementia, vascular and Alzheimer's: 11 trials with GPC, 1,799 pts total, 1,083 in controlled trials vs placebo.
- ◆ Cognition, mood, sociability improved markedly over placebo (>20%) in 50%-70% of the patients.
- ◆ GPC outperformed idebenone, aniracetam, oxiracetam, acetylcholine citicoline, in direct comparison trials.

# GPC Injectable - Stroke Trials

---

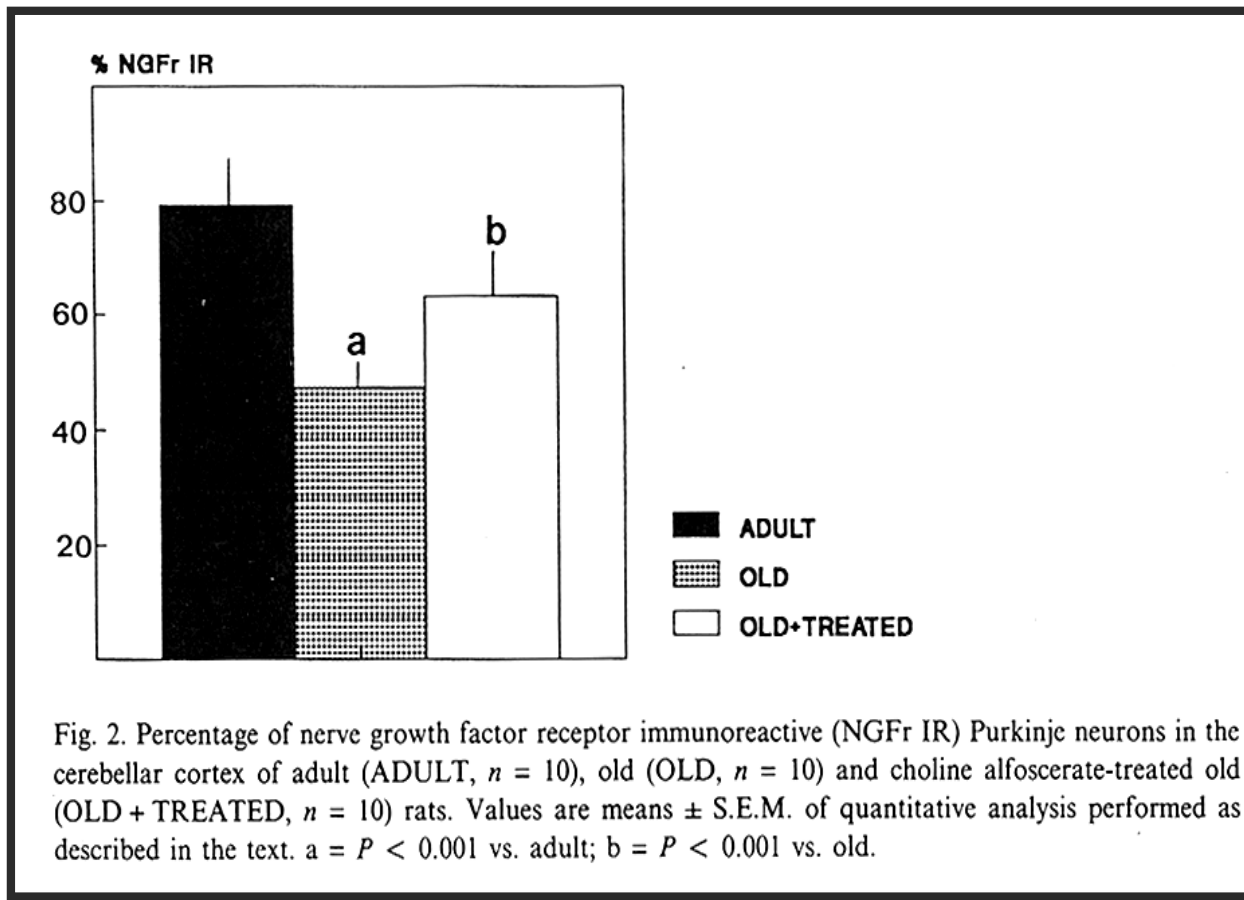
- ◆ Five trials, total 2,972 patients, as own controls
- ◆ GPC 1 month i.m. 1000 mg/day, 5 mos oral 1200 mg
- ◆ First month: improved 2x usual pace (consciousness, language, space-time orientation, general invalidity)
- ◆ By 6 months: life quality was considerably improved (memory, other cognition, behavior)
- ◆ Investigators concurred: GPC is uniquely effective.

# GPC Injectable - Indications

---

- ◆ Stroke
- ◆ Post-surgical “encephalopathy,” incl. bypass
- ◆ Brain injury-hematomas, contusions, concussions
- ◆ Dementia—vascular / Alzheimer’s
- ◆ Personality deterioration, social withdrawal
- ◆ Growth hormone/ ant. pituitary revitalization

# GPC Boosts Nerve Growth Factor (NGF) Receptors

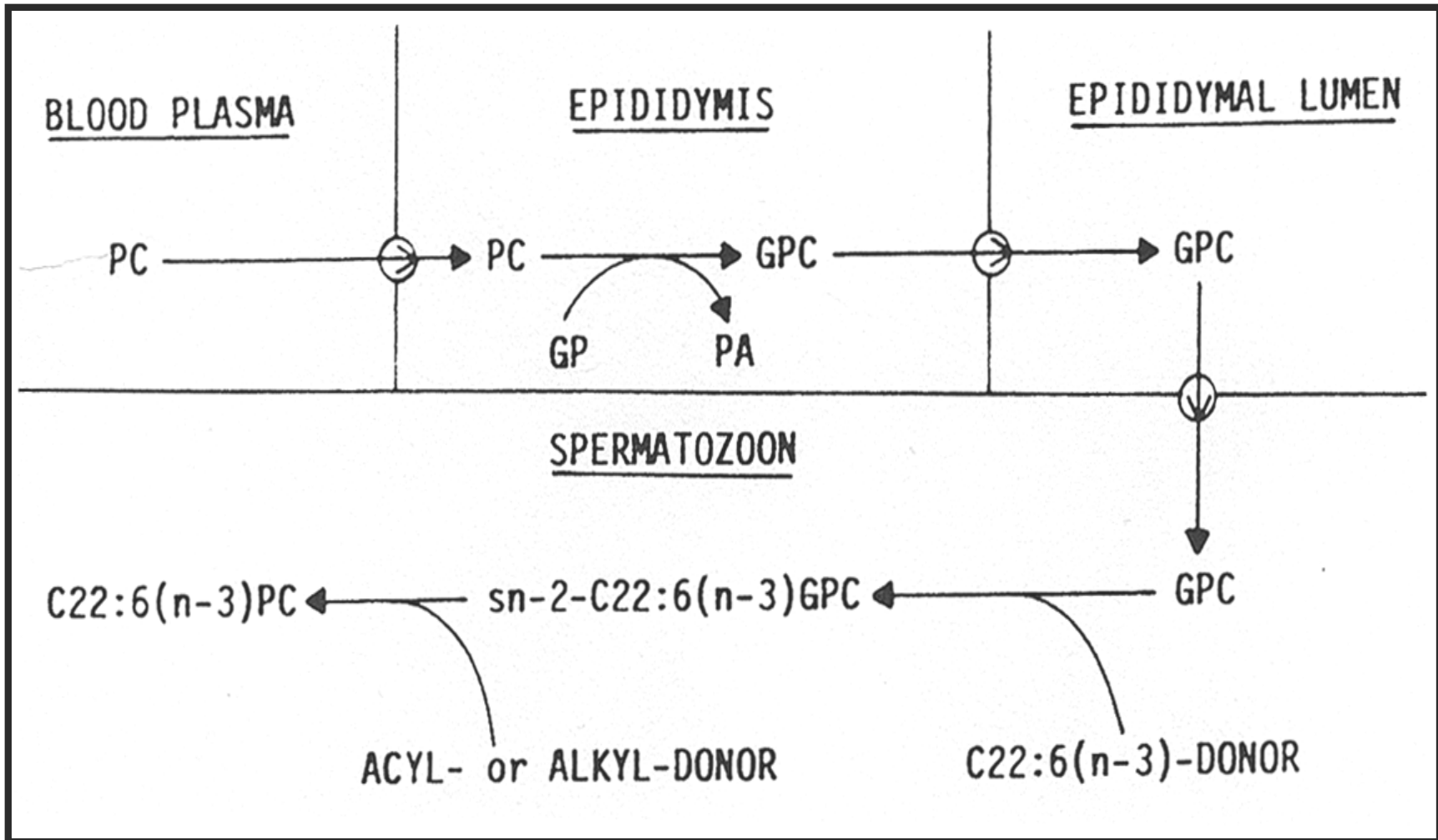


# GPC's Privileged Relationship with DHA omega-3

---

1. GPC's conversion to PC is facile, being highly energy-efficient (> citicoline). DHA is a preferred fatty acid.
2. PC-DHA is common in the brain. The most active cell membranes have high PC-DHA (retina has di-DHA)
3. In skeletal muscle, the fastest fibers carry the highest GPC. PC-DHA may support calcium exchange.
4. GPC is involved in sperm maturation and fertilization. Low sperm motility features low GPC.  
DHA+GPC = DHA-PC

# Sperm: GPC-DHA Union

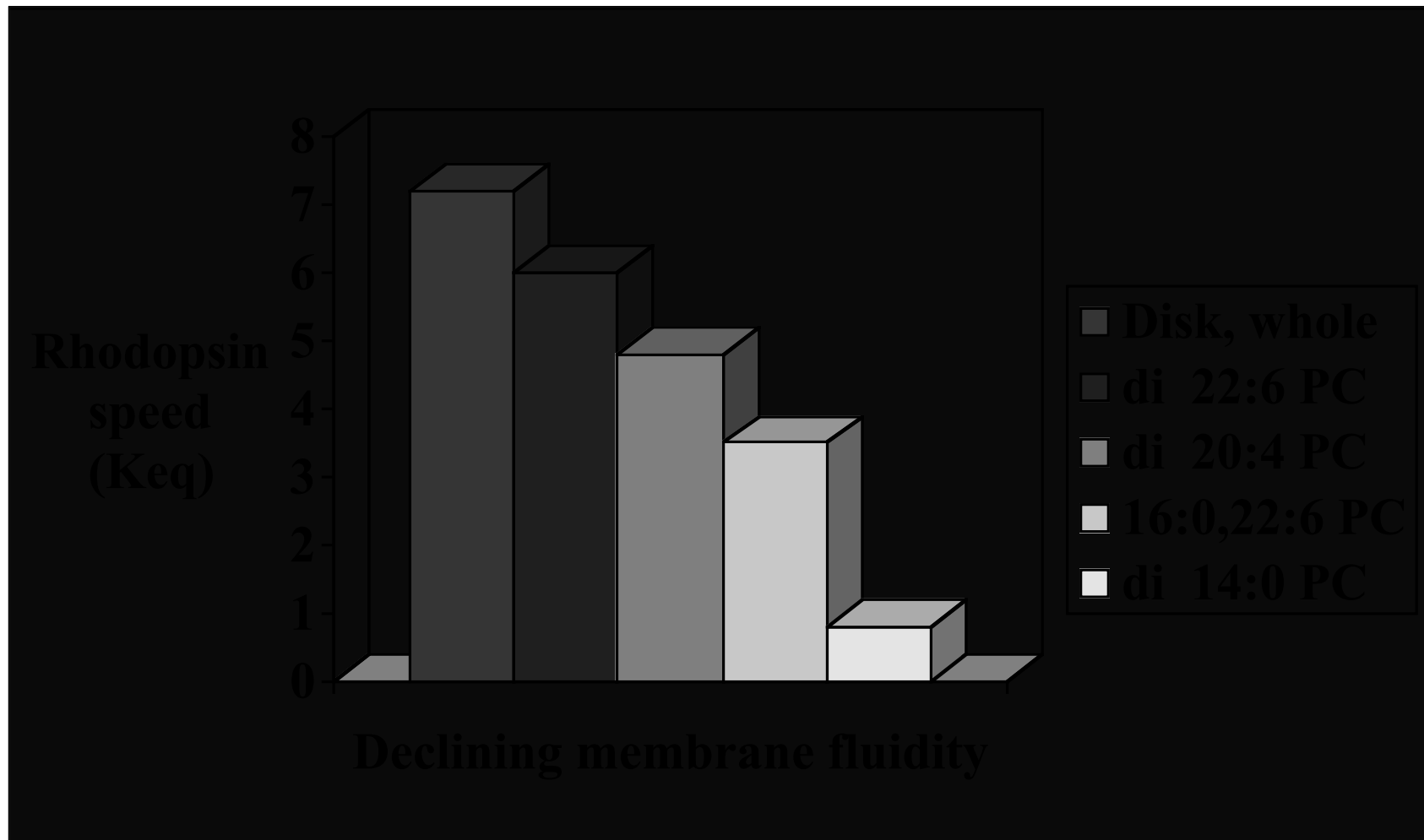


# Membranes, Pacemakers of Metabolism

---

- ◆ Metabolic rate correlates with degree of membrane unsaturation, across vertebrate species
- ◆ Membrane polyunsaturation enables activity level of membrane-bound enzymes, receptors, transporters
- ◆ Carbon-carbon double bonds transfer more energy with each molecular collision, than do single bonds
- ◆ Membranes highest in DHA (C<sub>22:6n-3</sub>) support the most kinetically active proteins.

# Rhodopsin And Membrane Fluidity



Litman, Mitchell. Lipids 1996; 31:S193

Cell membrane fatty  
acid / fluidity balance AND  
oxidant / antioxidant balance  
synergistically determine  
metabolic performance, which  
is amplified into whole-body  
performance

# Recommended Intakes

---

- ◆ EPA+DHA: Maintenance  $\geq 850$ mg/day. Greater than 1g/day for heart attack survivors, over 3g/day for mood disorders (up to 10g/day for 3 months)
- ◆ CoQ: Up to 1200 mg/day indefinitely.
- ◆ PS: 300-500 mg/day w/meals for 2 months, then ongoing or maintain at 100 mg/day.
- ◆ GPC: 1200 mg/day between meals for 1 month, then 600-1200 mg/day thereafter. Injectable: 1g/day i.m. for 1st 30 days, i.v. more severe cases.

End of Part 2  
End of Presentation

[www.dockidd.com](http://www.dockidd.com)

[dockidd@dockidd.com](mailto:dockidd@dockidd.com)