

Ceasefire needed in **war**
against cholesterol?
Health *benefits* of cholesterol

William Shaw, Ph.D.

Biochemist and Toxicologist
Board certified clinical chemist

STATIN DRUGS

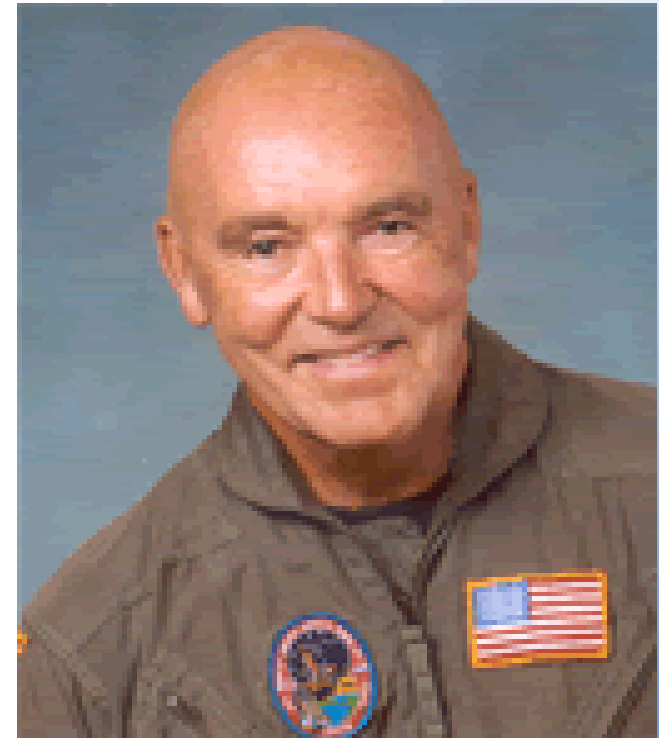
Side Effects

and the Misguided War on Cholesterol

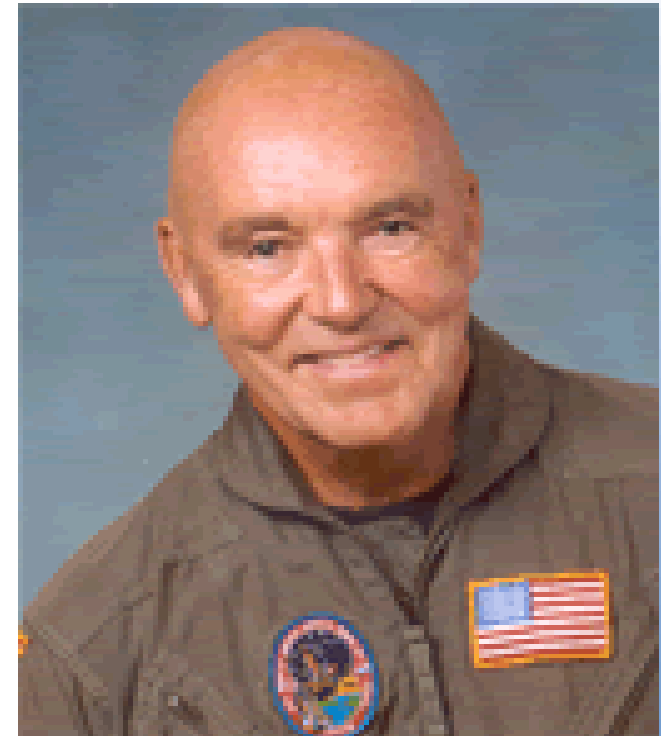
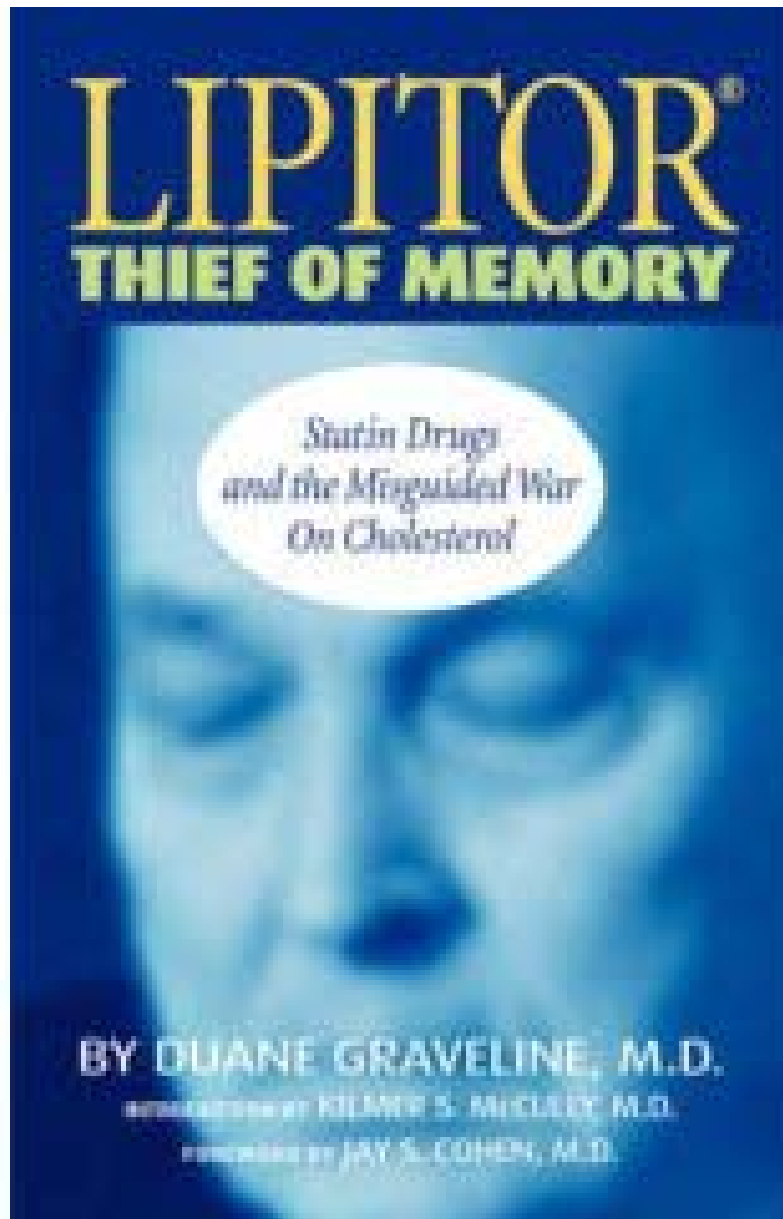
By Duane Graveline M.D.

ZOCOR.
PRAVACHOL.
LIPITOR.
MEVACOR.
CRESTOR.
V. ADVICOR.
VYTORIN.
LESCOL.

Includes
the Statin
Alternatives



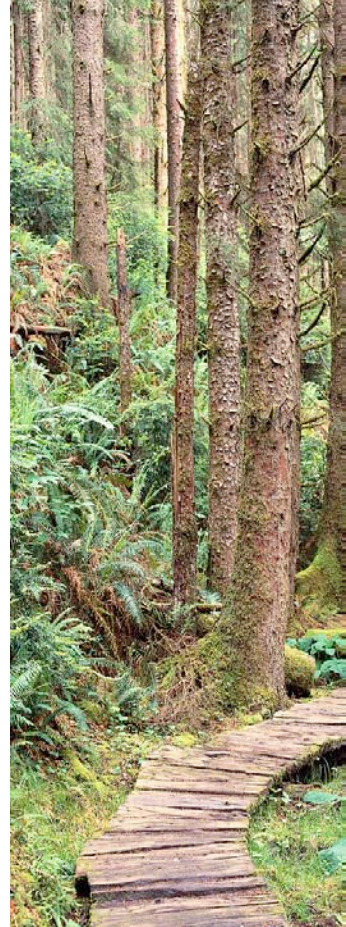
Duane Graveline MD MPH
Former USAF Flight Surgeon
Former NASA Astronaut



Duane Graveline MD MPH
Former USAF Flight Surgeon
Former NASA Astronaut

Interview with Dr. Graveline

The first episode happened after I had been prescribed Lipitor® for my modestly elevated cholesterol. I had returned from my usual morning walk in the woods when my wife noticed me walking aimlessly in our driveway as if I were lost. I did not recognize her and refused to enter our home. I reluctantly accepted cookies and milk and somehow she got me into the car to see my family doctor and neurologist. Memory back after stopping drug.

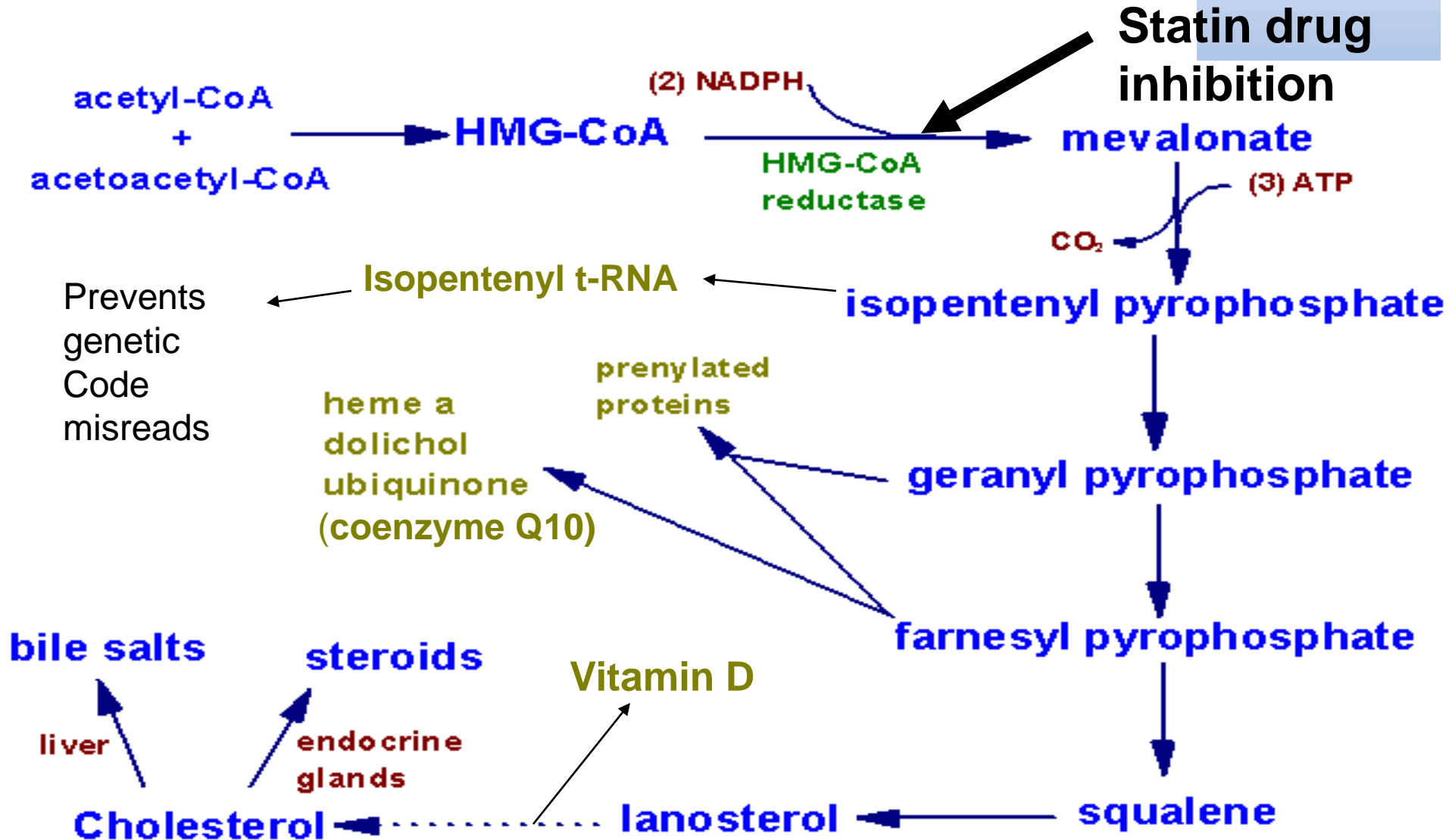


Interview with Dr. Graveline

Hours after taking Lipitor® again, my wife found me in the greenhouse with that "gone" look in my eyes again. This time, during the 12 hour episode, I regressed all the way back to my teen years with precise recall for all my high school friends and events.



Effect of statin drugs on extended cholesterol pathway



Dose-related decrease of serum coenzyme Q10 during treatment with HMG-CoA reductase inhibitors. Mortensen SA, et al
Mol Aspects Med. 1997;18 Suppl:S137-44.

- A dose-related significant decline of total serum level of coenzyme Q10 was found in the pravastatin group from 1.27 +/- 0.34 at baseline to 1.02 +/- 0.31 mmol/l at the end of 18wks (mean +/- S.D.), $P < 0.01$.
- After lovastatin therapy the decrease was significant as well and more pronounced, from 1.18 +/- 0.36 to 0.84 +/- 0.17 mmol/l, $P < 0.001$.

Call
Toll Free
24 hrs/day
(866) 588-0600

Home

About the Firm ▶

DRUG SIDE EFFECTS ▶

Medical Devices ▶

Medical Malpractice

Personal Injury ▶

Pollutants & Toxic Tort ▶

Product Liability ▶

Food Poisoning ▶

Diseases ▶

Contact Us ▶

**Super
Lawyers
2007**

*Michael Schmidt
Named Super Lawyer
for Fifth Year in A
Row!*

**2003 ~ 2004
2005 ~ 2006 ~ 2007**



Helping America's Injured
Individuals and Families
Nationwide
Since 1992

Baycol® Kidney Failure & Rhabdomyolysis Lawsuit

[Send to Friend](#) | [Bookmark](#) | [Live Chat](#)

In August 2001, the extremely popular cholesterol lowering drug Baycol (generic: cerivastatin) was removed from the U.S. market due to its being linked to over 100 deaths. Specifically, Baycol was linked to "Rhabdomyolysis", which is a condition that can lead to kidney failure and death.

Do I Have a Baycol Rhabdomyolysis Lawsuit? If you or a loved one have taken Baycol or Cerivastatin and suffered from any side effects including Rhabdomyolysis, kidney failure, renal failure or death, you should [contact us](#) immediately. You may be entitled to compensation and we can help.

What's the problem?

According to the U.S. Food & Drug Administration (FDA) at the time of withdrawal, it had received 31 reports of deaths. The FDA cited that U.S. Baycol induced deaths were caused by Rhabdomyolysis associated with Baycol use.

Baycol® Resources

S&C Related Contents

>> [Baycol](#)

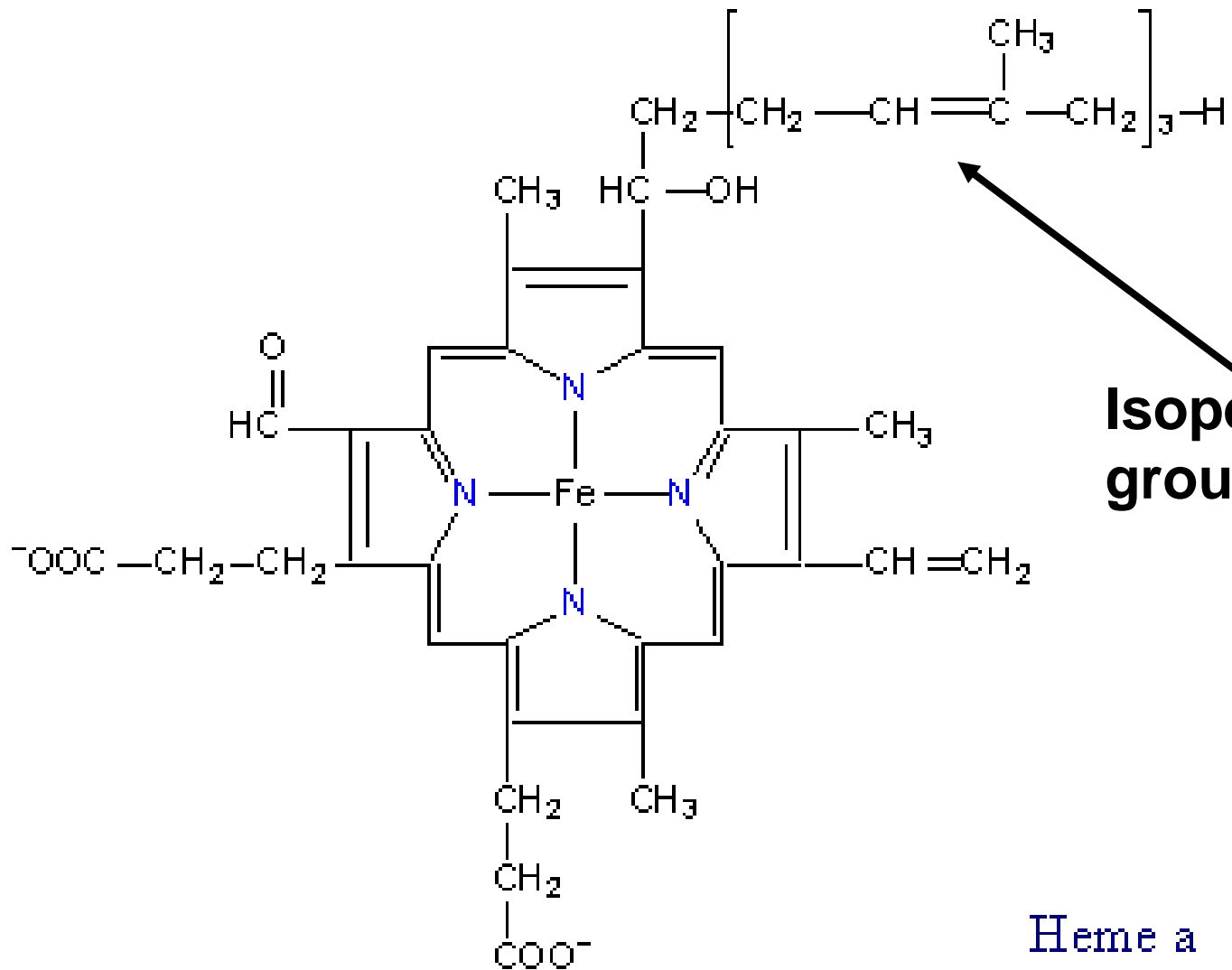
FDA Announcements

 [Baycol Talk Paper](#)

 [Baycol Questions & Answers](#)

 [FDA: Dear Healthcare Professional Letter](#)

Heme a requires isopentenyl modification- cytochrome a-electron transport



Isopentenyl
groups

Heme a

Symptoms of SLOS

- Extremely low cholesterol- some even 0 mg/dL
- High 7-dehydrocholesterol
- 75% on autistic spectrum in one study
- Fused 2nd and 3rd toes
- Lack of speech
- Severe behavior abnormality: frequent temper tantrums, hyperactivity, violent outbursts, destruction of property, self-mutilation
- UV-light sensitivity

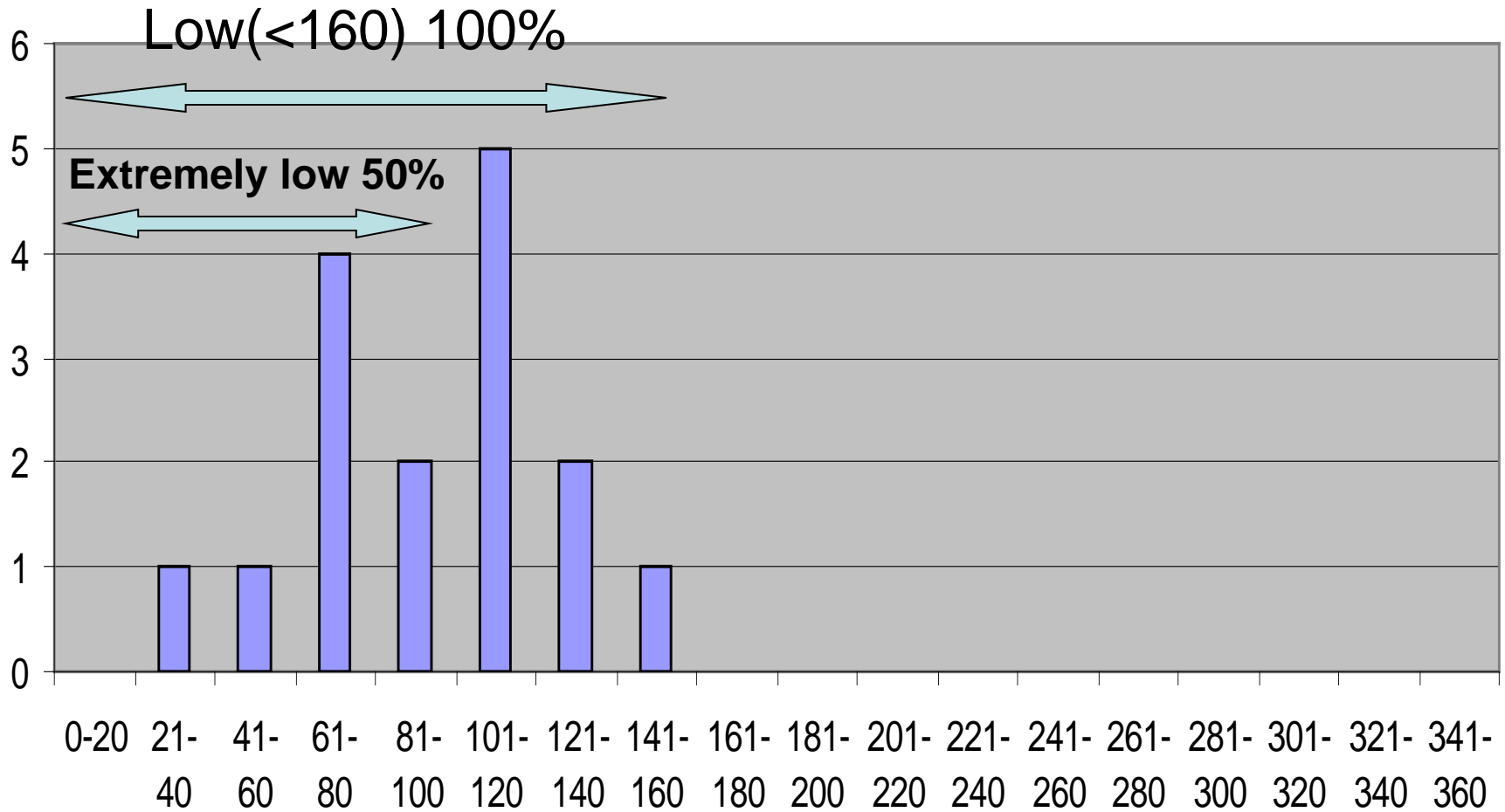
Y-shaped toe in SLOS



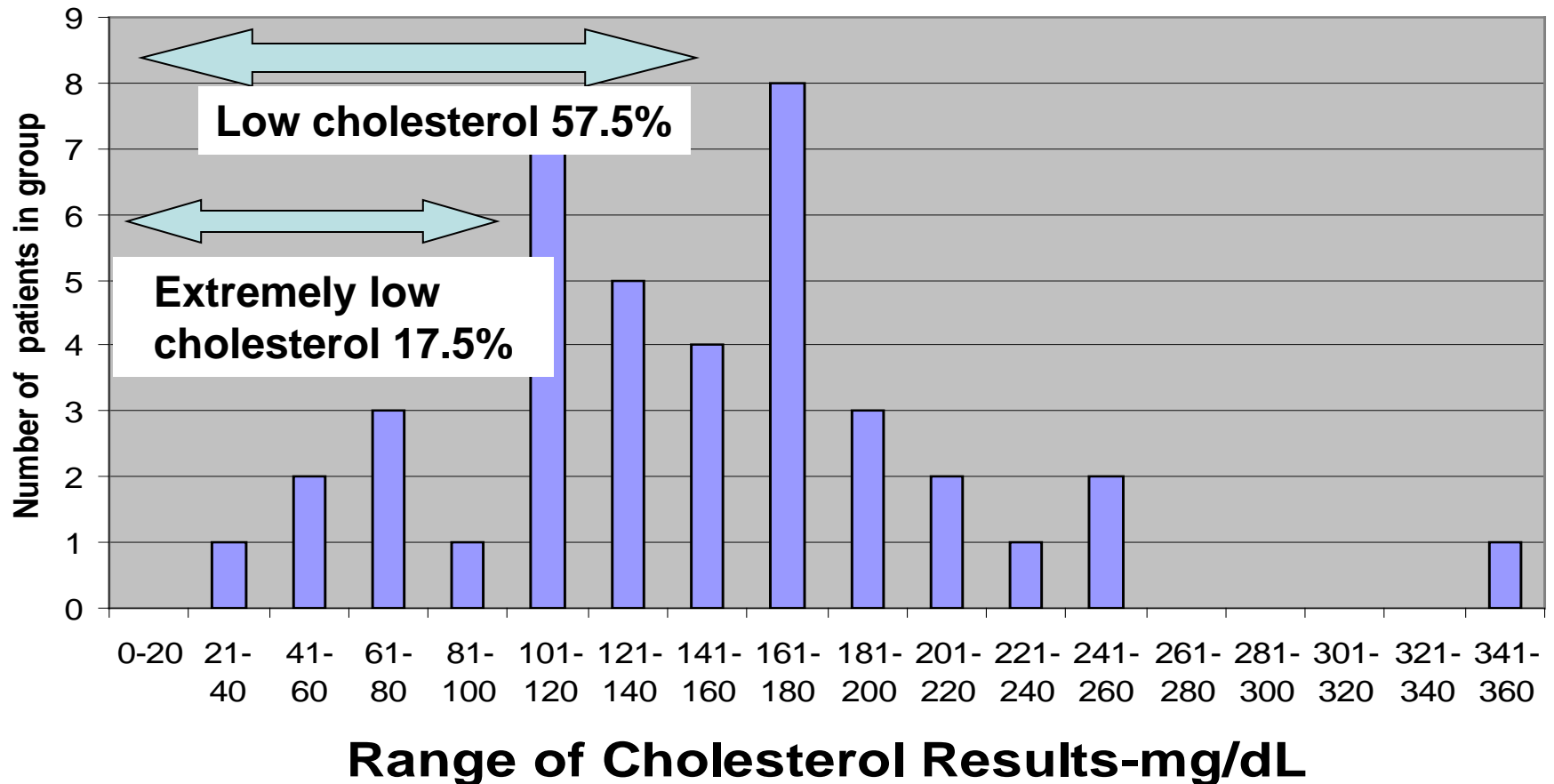
Cholesterol values in SLOS

No.	Total	Cholesterol	7-DHC
1	116.3	88.3	13.2
2	32.6	8.0	14.3
3	56.5	31.6	12.1
4	123.2	121.1	0.6
5	143.1	142.0	0.2
6	105.0	95.0	4.7
7	95.0	84.3	5.0
8	100.5	94.8	4.8
9	73.6	56.0	9.4
10	63.5	39.8	12.6
11	71.8	49.5	11.9
12	132.5	104.5	13.6
13	90.7	78.1	5.2
14	103.0	84.7	9.3
15	65.9	44.9	10.8
16	106.7	101.6	2.3
Mean	92.5	76.5	8.1
SD	29.9	35.4	4.8

Cholesterol study of children with SLOS



The Great Plains Laboratory cholesterol study Of children with autistic spectrum disorder



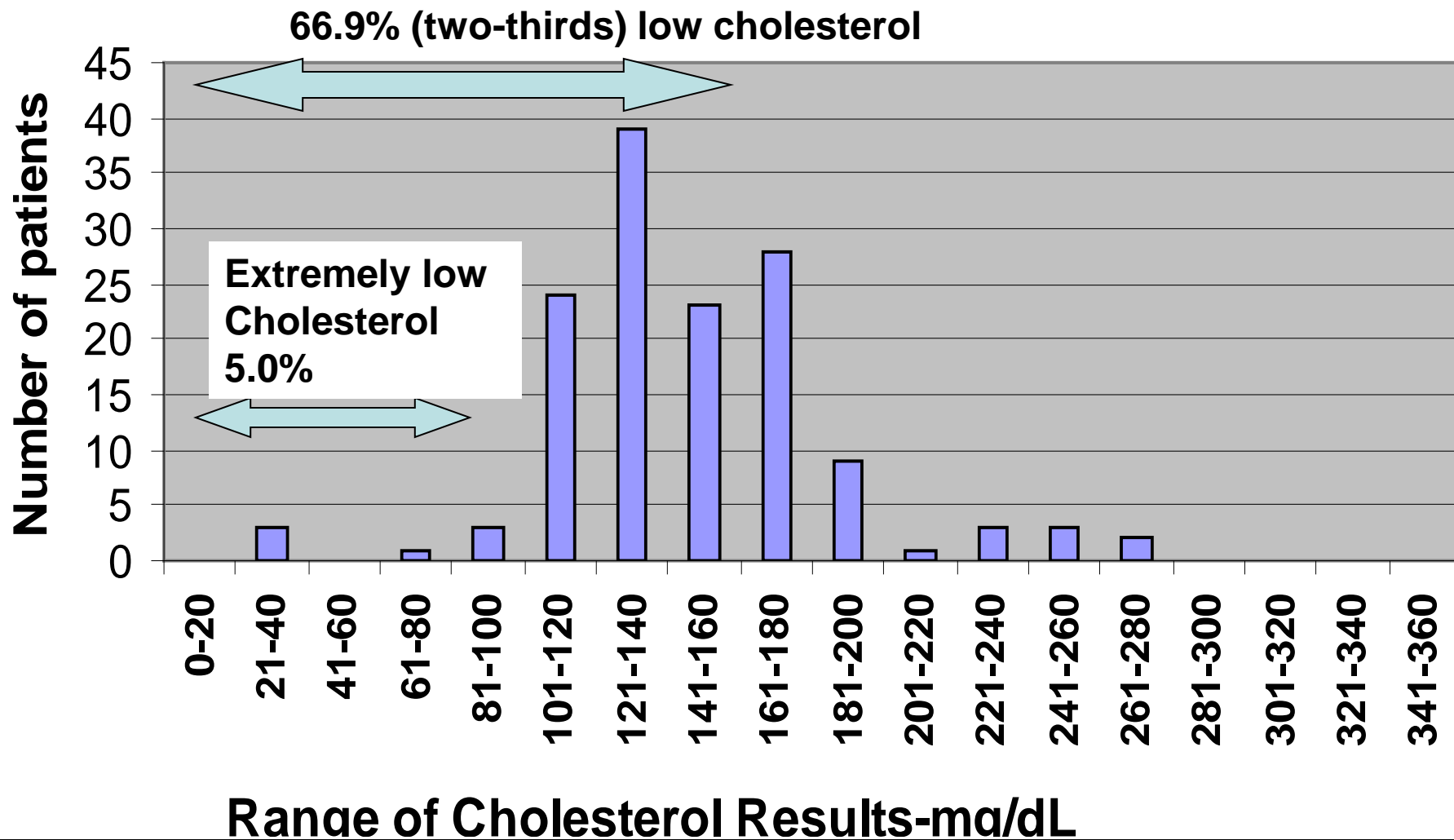
Abnormalities of cholesterol metabolism in autism spectrum disorders. Am J of Med Genetics Part B: Neuropsychiatric Genetics Vol 141B, Issue 6, Pages 666 – 668,2006. Elaine Tierney et al.

Using gas chromatography/mass spectrometry, cholesterol was quantified in 100 samples from subjects with ASD obtained from the Autism Genetic Resource Exchange (AGRE) specimen repository.

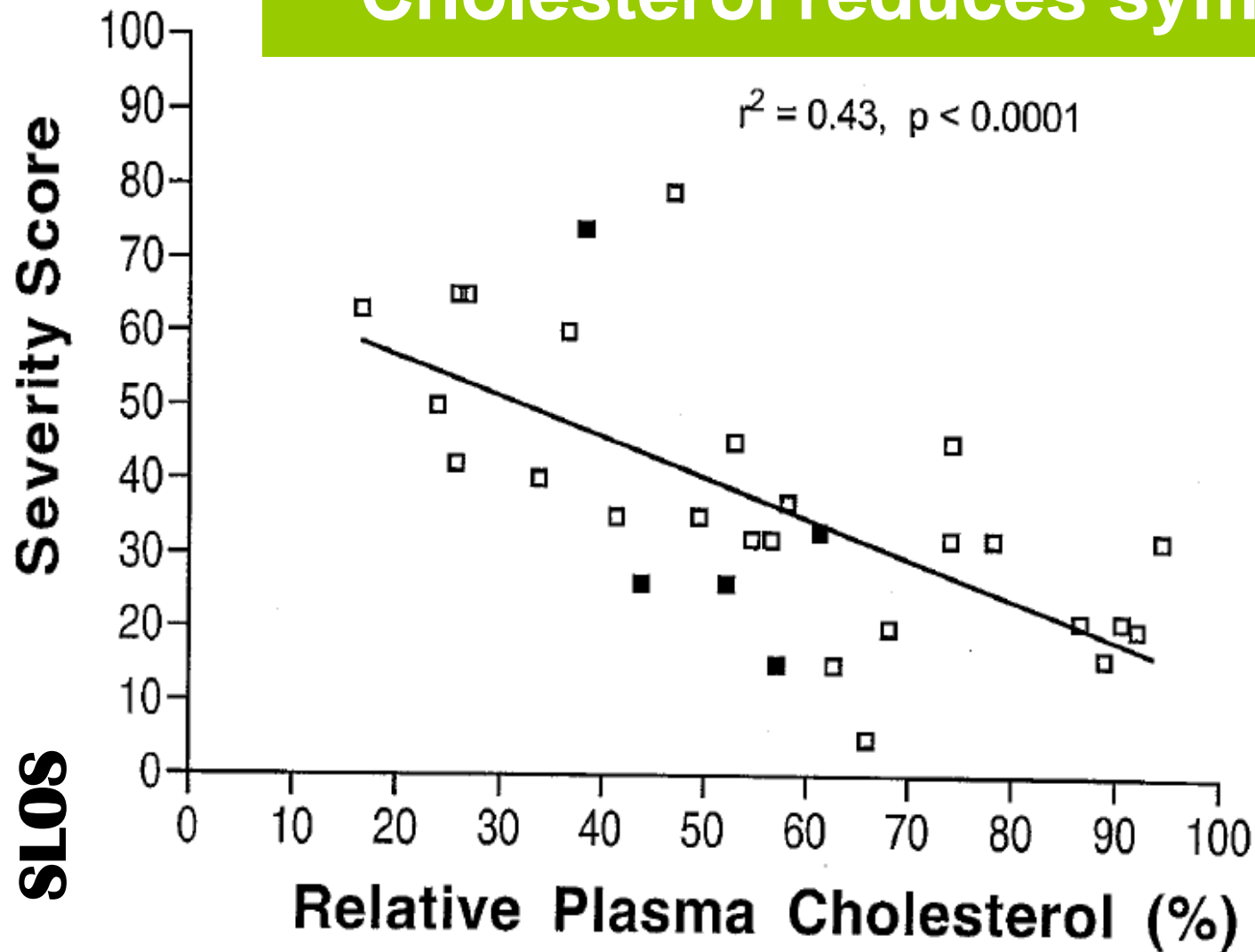
Although no sample had cholesterol levels consistent with SLOS, 19 samples (19%) had total cholesterol levels lower than 100 mg/dl, which is below the 5th centile for children over age 2 years.

These findings suggest that, in addition to SLOS, there may be other disorders of sterol metabolism or homeostasis associated with ASD.

Venezuela ASD cholesterol values



Cholesterol reduces symptoms



Benefits of cholesterol feeding in SLOS

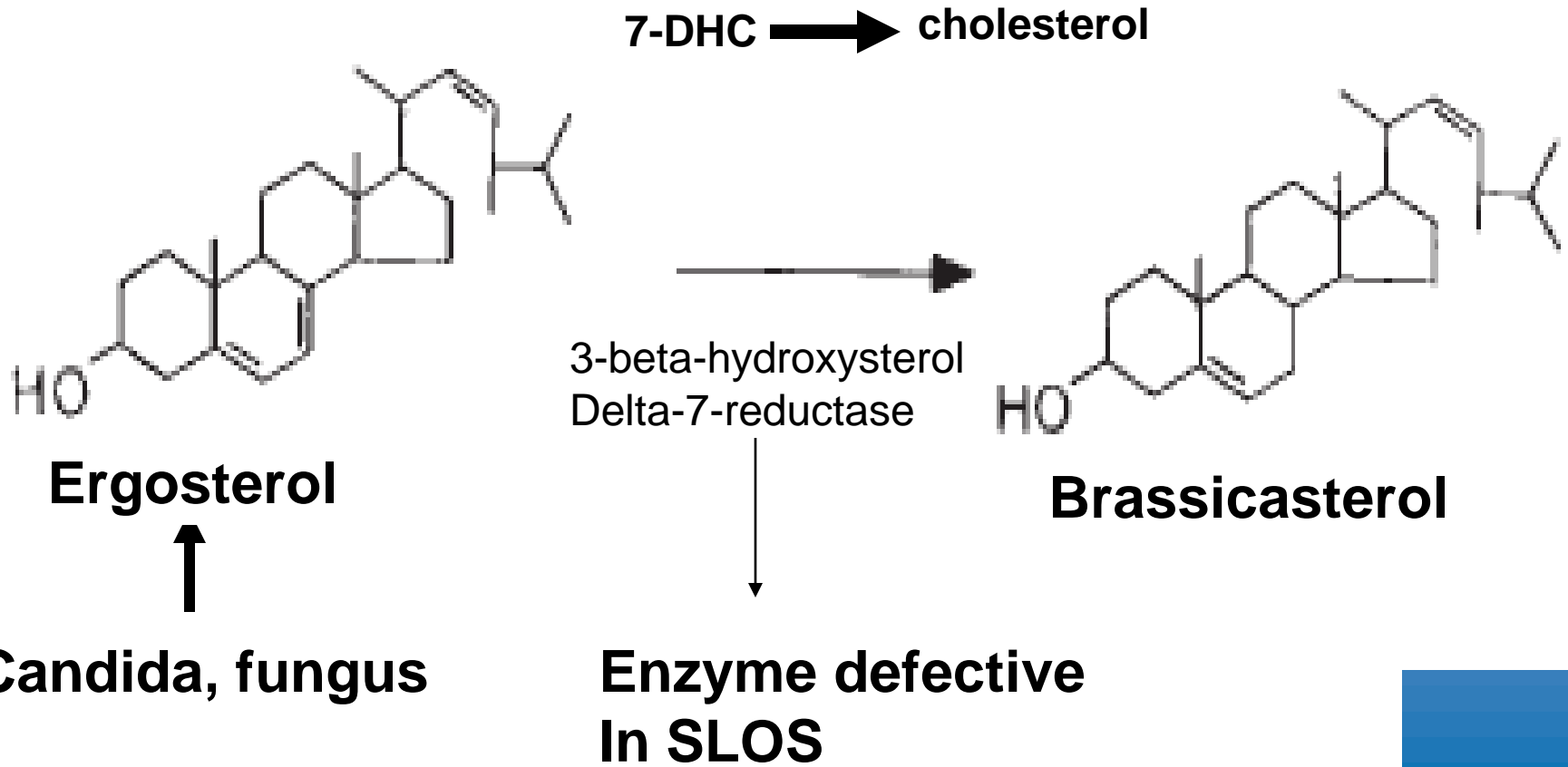
Adv Pediatr 2000;47:1-53 Inborn errors of cholesterol biosynthesis.

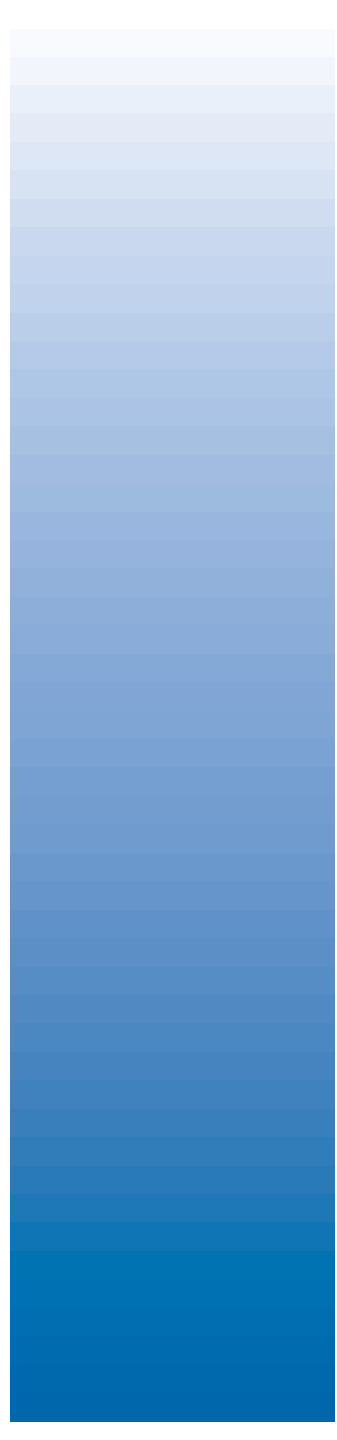
Kelley RI

- Beginning to walk
- Start to run
- Growth improvement
- Less infections
- Less UV light sensitivity
- Increased alertness
- Head banging stops
- Decreased tactile defensiveness
- Increased sociability

- Behavior improves
- Talking has started in adults who were not talking before
- Verbal people say they feel better
- Many improvements in only a few days after supplement
- Decreased irritability
- Increased muscle tone

Candida ergosterol interferes in cholesterol synthesis, simulating SLOS





High cholesterol foods-

- Eggs



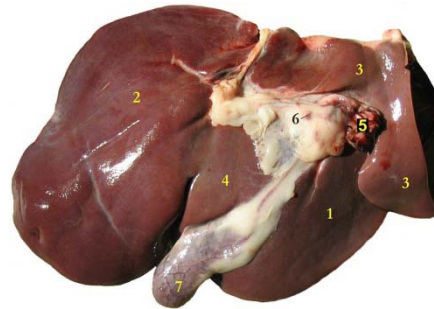
2 egg yolks-
500 mgs

- Brain



3 oz-1000 mg

- Liver



3oz-372 mg

Cholesterol as a supplement

- Purified cholesterol available with >99% purity and complete freedom from heavy metals, toxic chemicals, etc
- www.nbnus.com –New Beginnings

Other new reports of Sonic® cholesterol supplements in autism- Case 1

- Neurologist: Marked reduction in anxiety in 17 year old girl with autism. In addition, the girl had normal menstrual periods for the first time.

Other new reports of cholesterol supplements in autism-Case 2

- A woman called to say that her son is significantly less aggressive when on just one capsule of Sonic® Cholesterol.
- He stopped head banging and being aggressive toward others. In addition, after a couple of months on the product, her son started to spell for the first time.
- She stopped it for one week and his aggressiveness came back so she is a believer.

Other new reports of cholesterol supplements in autism-Case 3

- I wanted to let you know that my son's cholesterol went up 20 points to 131 after taking Sonic® for a month. He is improving wonderfully. However, the proof is in way more than the numbers. Babbling is back and he is watching my lips when I talk to him. He understands and follows verbal commands. He learned to give himself a drink from a cup (I used to give him a bottle) during the first month on sonic, two weeks ago he learned to climb stairs and yesterday he fed himself with a spoon. Best of all, he is happy now! He smiles and laughs -- with people!!! At 12 months of age my son would be best described as catatonic, rather than autistic -- he was extremely severe.

Other new reports of cholesterol supplements in autism-Case 4

- My son's cholesterol number came back at 106, the lowest our DAN's office had seen. We have been on Sonic® cholesterol for 2 days and my son has been making great eye contact and been very interested in connecting with me. I haven't done anything else new in a while so I am pretty excited that this might be doing something.

Other new reports of cholesterol supplements in autism-Case 5

- “Sonic cholesterol raised my son's cholesterol level from 117 to 159.
- We have to give him 5 capsules/day to maintain that cholesterol level but we had a dramatic decrease in his aggression at school overnight when we started it.
- His teachers and therapists all asked us what we were doing.
- He is allergic to eggs, but we couldn't have given him enough eggs to make a difference anyway. It was a amazing for us.”

Formation of cholesterol

Fat, carbohydrates, proteins

Acetyl CoA

Lanosterol

7-dehydrocholesterol

**Genetic defect
in SLOS**



Cholesterol

Vitamin D

**Activates
Sonic hedgehog**

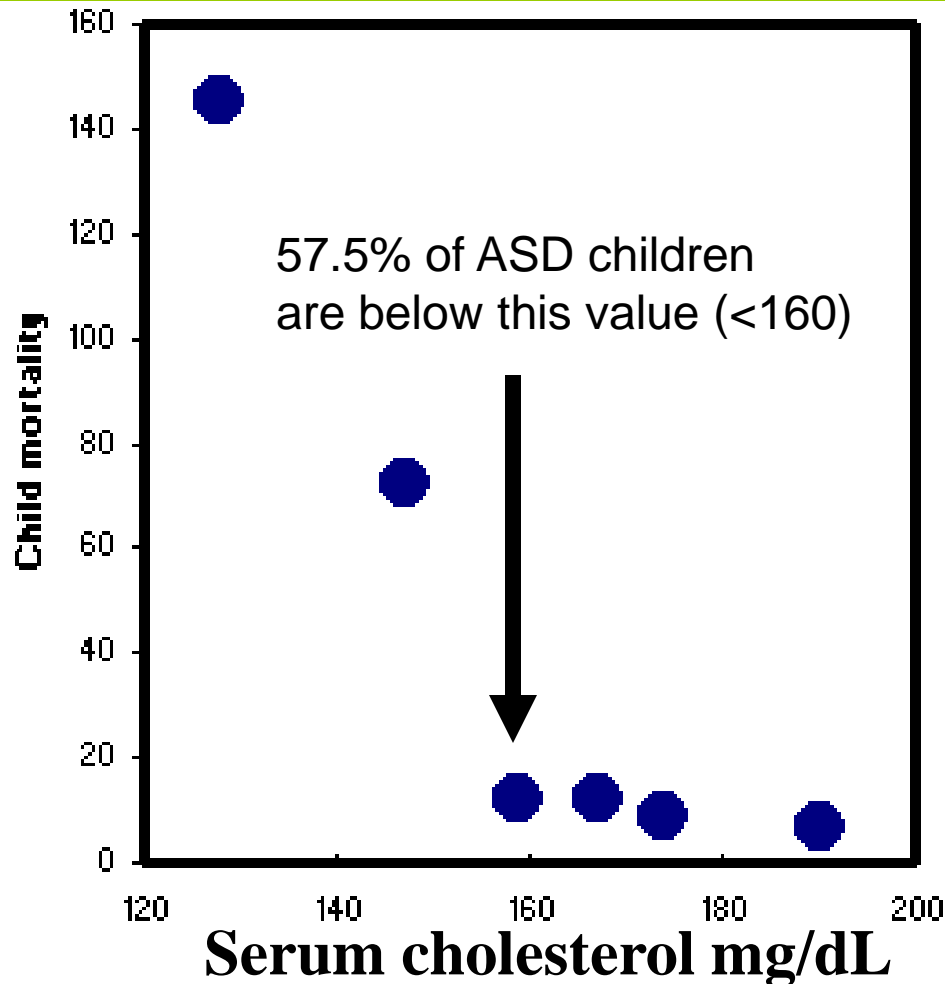
**Bile salts
Fat digestion
Vitamin absorption**

**Steroid hormones
Estrogens, testosterone
Cortisol, aldosterone**



High cholesterol in children is associated with *decreased* mortality

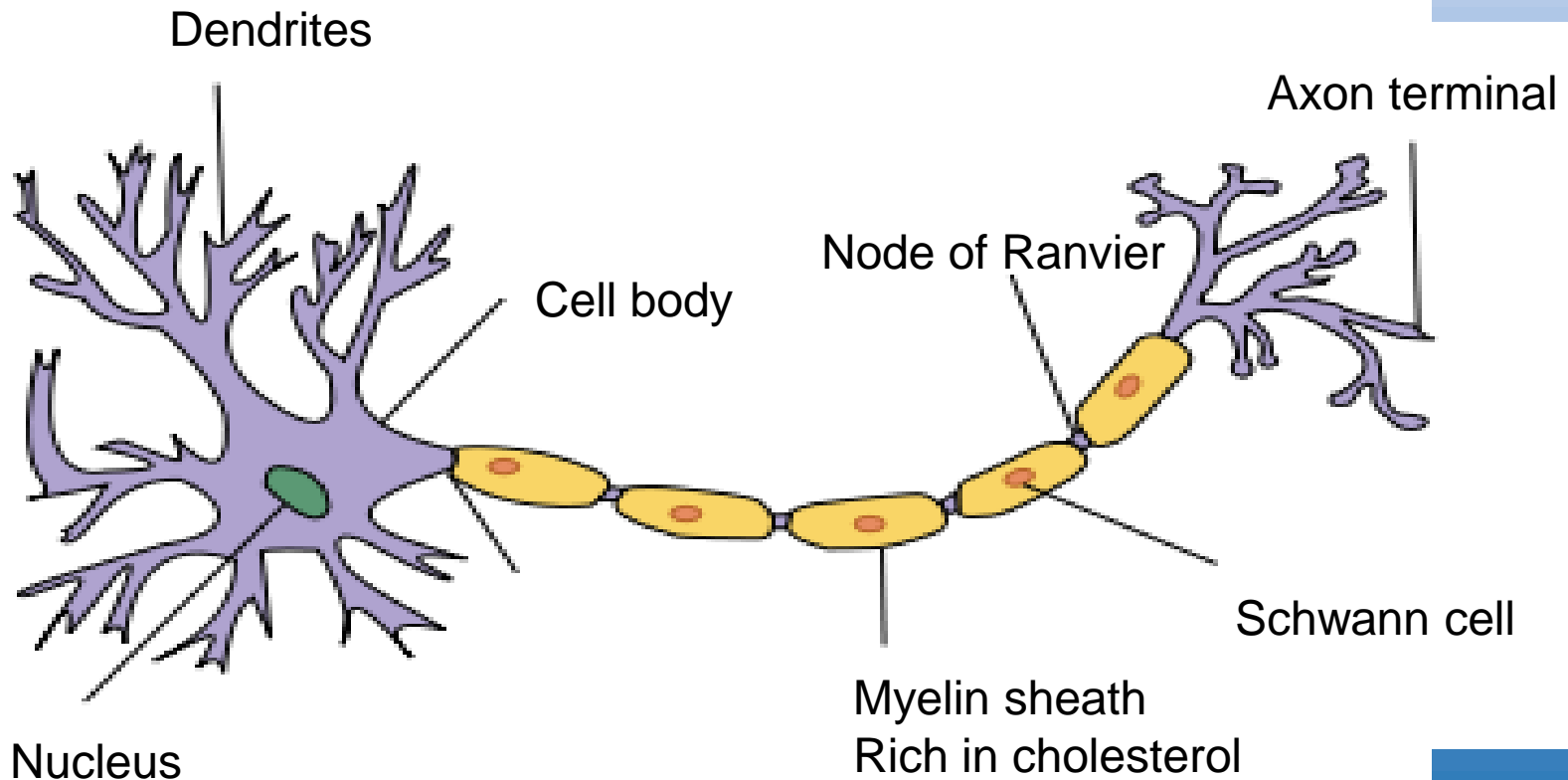
Child mortality rate in Different countries



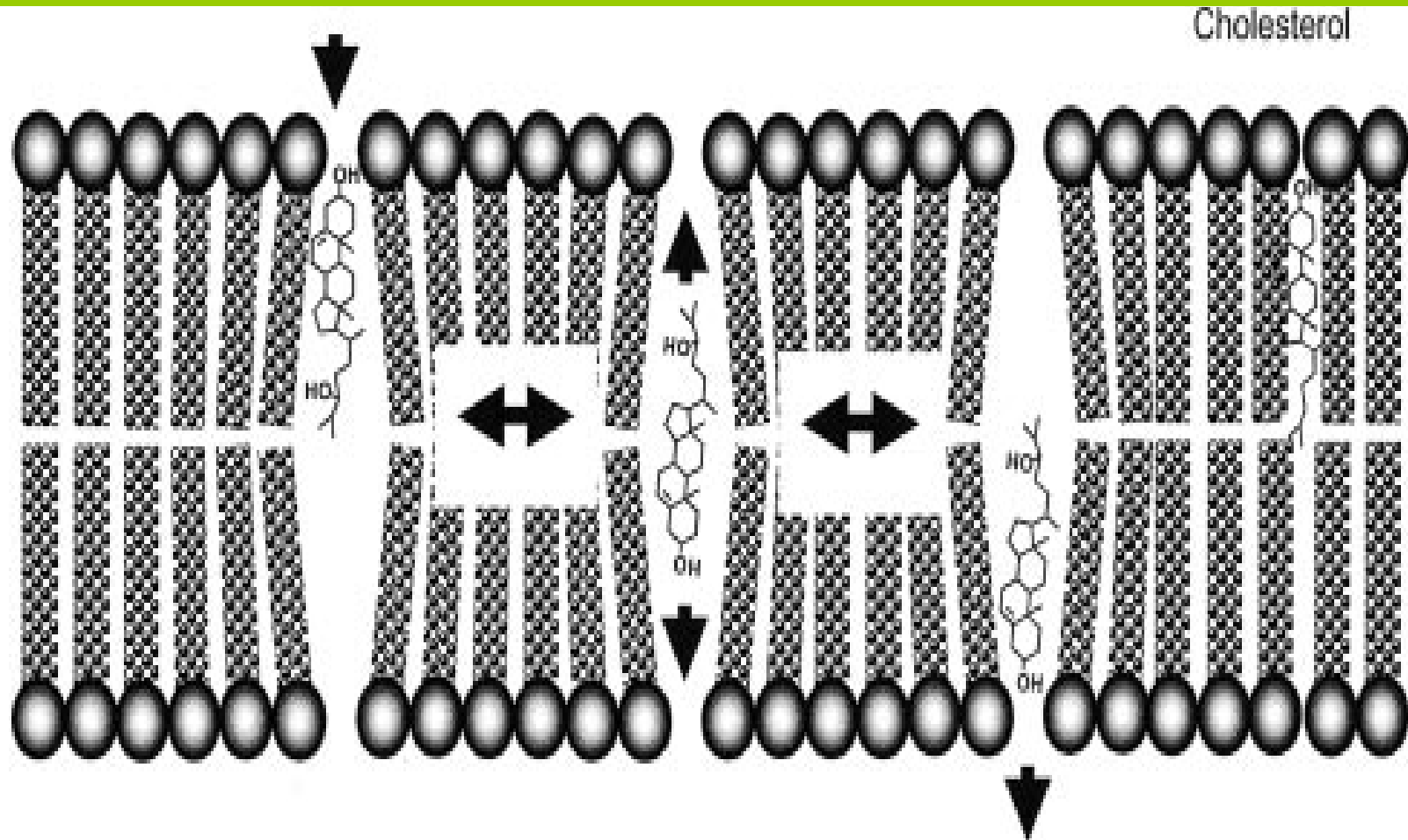
Importance of cholesterol in brain

- It has been estimated that up to 70% of the brain cholesterol is associated with myelin.
- Half of the white matter may be composed of myelin
- Brain is the most cholesterol-rich organ in the body.
- The concentration of cholesterol in the brain, and particularly in myelin, is consistent with an essential function related to its membrane properties.

Nerve cell with myelin sheath



Brain cholesterol in cell membranes



Risks from low total cholesterol

- Increased cancer
- Increased chronic fatigue syndrome
- Increased violent behavior, aggression
- Increased infection susceptibility such as tuberculosis and gastrointestinal infections
- Increased anxiety, suicide
- Increased depression, bipolar disorder
- Double the death rate in older adults
- Increased stroke rate
- Increased cataracts
- Increased rate of school suspension
- More difficulty in kicking drug addiction
- References on website

www.greatplainslaboratory.com Cholesterol frequently asked questions

“Hedgehog”



Sonic hedgehog-new mutant associated with altered brain development named after video game character



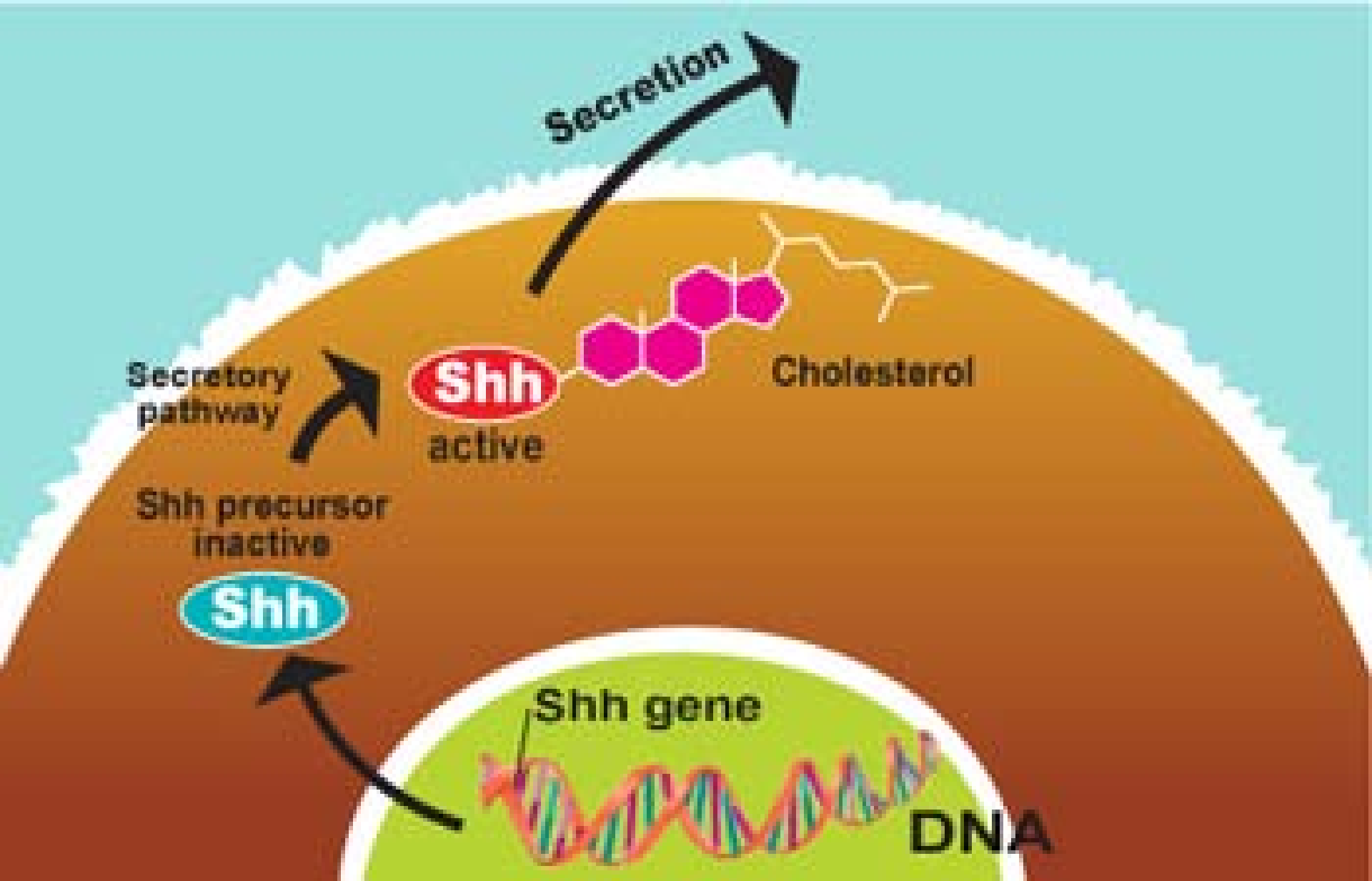
video

Hedgehog protein

- Geneticists discovered a mutant fruit fly (*Drosophila*) whose larvae had bristles that resembled the animal called a hedgehog
- The entire development of the fly was altered by this mutation.

Functions of sonic hedgehog

- Plays a central role in developmental patterning, especially of the nervous system and the skeletal system.
- Promotes the proliferation of adult stem cells from various tissues, including primitive hematopoietic cells, breast, and neural stem cells
- Stimulates the development of T cells in the thymus..
- Some mutations of the SHH gene causes a severe brain disorder that causes cleft lip and palate, a single central incisor, and impaired brain differentiation.
- Other mutations cause only behavioral disorder.



Functions of sonic hedgehog

- Different levels of SHH cause different types of cells to be formed in the developing embryo.
- SHH is a transcription regulating protein that alters which genes function at a given time.
- SHH is involved in the separation of the single eye field into two bilateral fields. Some mutations of the SHH gene can cause complete cyclopia, a single eye in the center of the head.
- Purkinje neurons secrete SHH to stimulate stem cells and brain development..
- Plays an important role in limb development.

Generic Lipoprotein

Apoprotein

Apoprotein

POLAR
SURFACE COAT

NONPOLAR
LIPID CORE

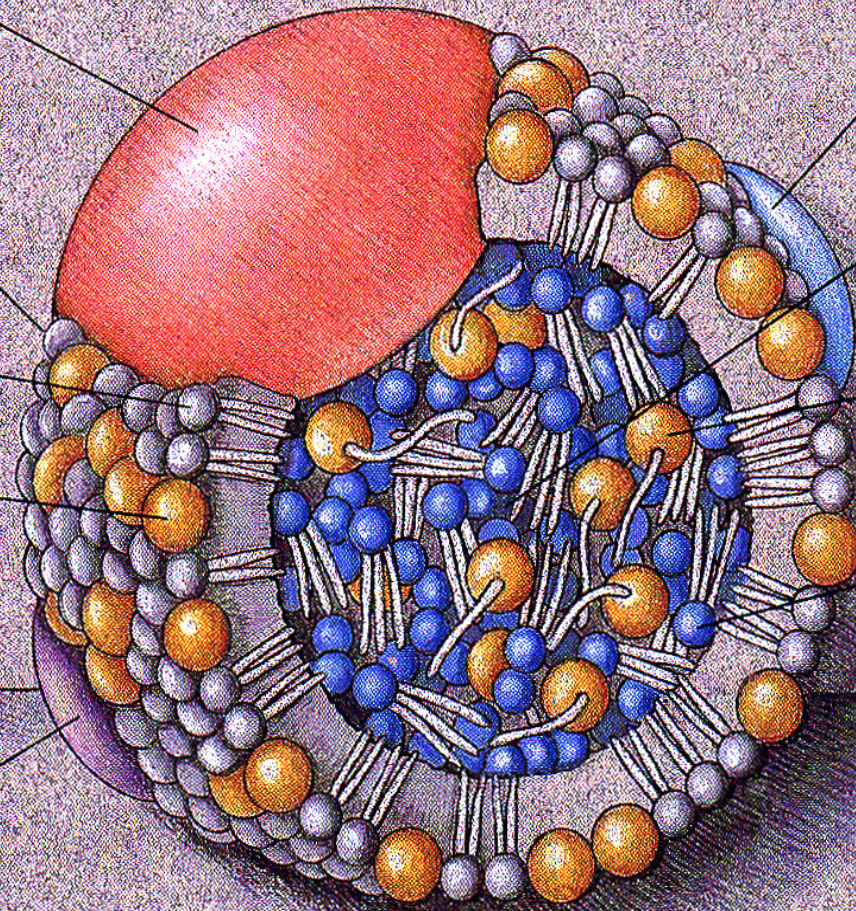
Phospholipid

Cholesterol
Ester

Unesterified
Cholesterol

Triglyceride

Apoprotein



Apolipoproteins

- Lipo=lipid or fat
- Protein=large molecule made up of amino acids
- Apolipoprotein= transport protein for fats without the fat attached to it
- Main apolipoproteins are termed A,B,C,E,a



ORIGINAL ARTICLE

A proteomic study of serum from children with autism showing differential expression of apolipoproteins and complement proteins

BA Corbett^{1,2}, AB Kantor³, H Schulman³, WL Walker^{2,4}, L Lit^{2,4}, P Ashwood^{2,5}, DM Rocke⁶ and FR Sharp^{2,4}

¹*Department of Psychiatry and Behavioral Sciences, University of California at Davis, Sacramento, CA, USA;* ²*Department of Psychiatry and Behavioral Sciences, MIND Institute, University of California at Davis, Sacramento, CA, USA;* ³*PPD Biomarker Discovery Sciences, Menlo Park, CA, USA;* ⁴*Department of Neurology, University of California at Davis, Sacramento, CA, USA;* ⁵*Department of Medical Microbiology and Immunology, University of California at Davis, Sacramento, CA, USA and* ⁶*Department of Public Health Sciences, Division of Biostatistics, University of California at Davis, Sacramento, CA, USA*

Normalized Peak Area

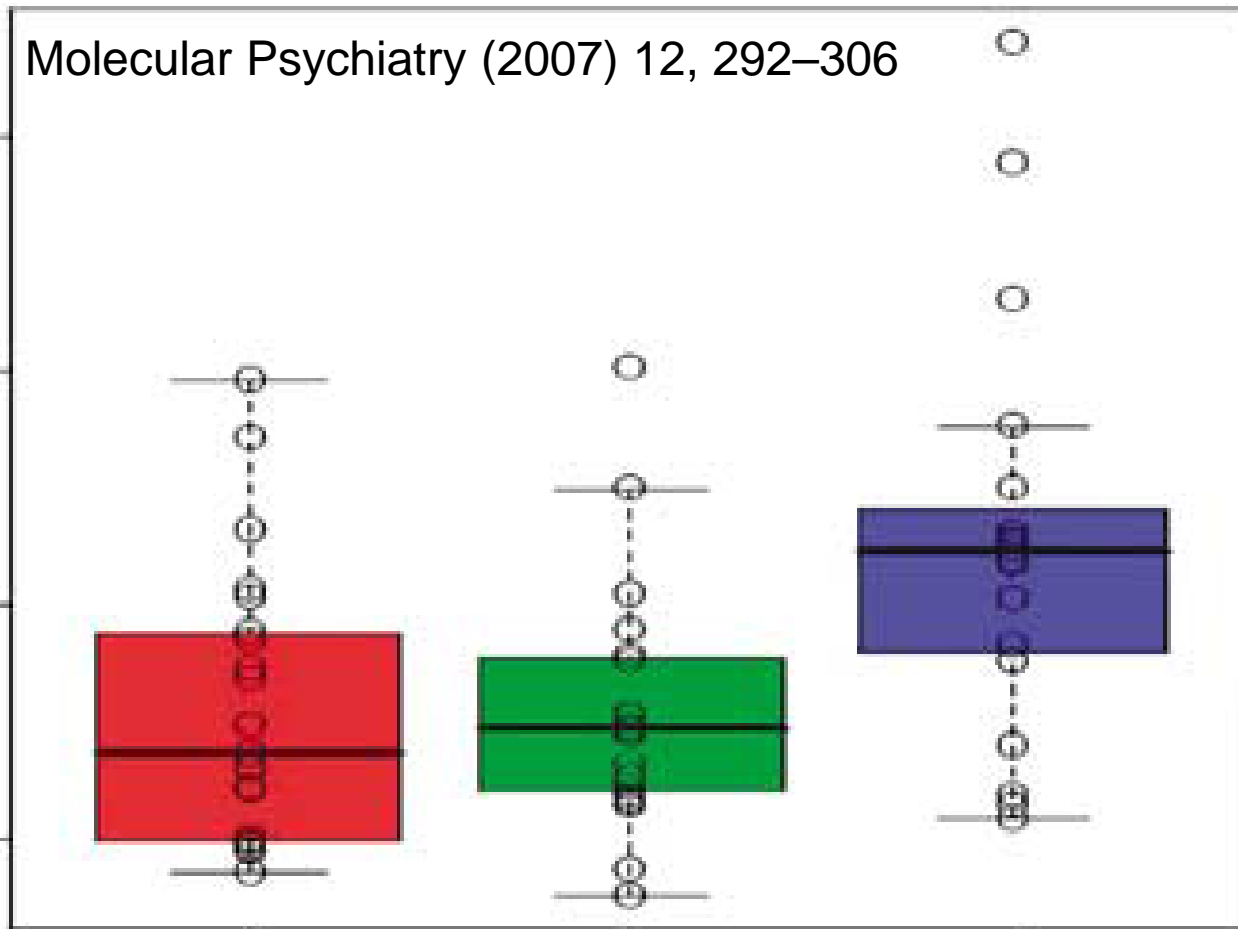
60
50
40
30

LFA

HFA

Typical

Apolipoprotein B-100 precursor peptide
sequence SEILAHWSPAK



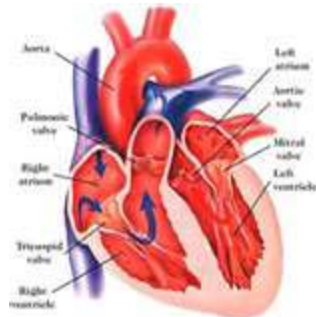
Types of cholesterol



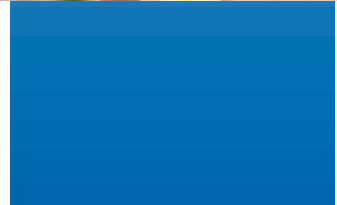
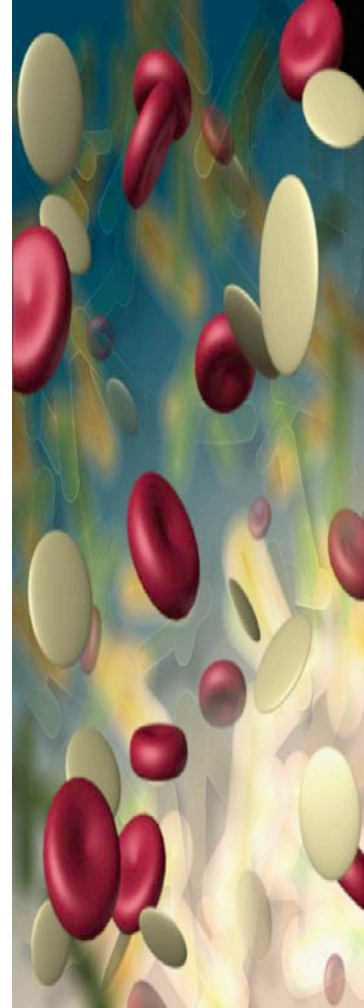
- HDL cholesterol-high density lipoprotein cholesterol- “good” cholesterol
- LDL cholesterol- low density lipoprotein cholesterol – “bad” cholesterol

Vredevoe DL et al. Skin test anergy in advanced heart failure secondary to either ischemic or idiopathic dilated cardiomyopathy. *American Journal of Cardiology* 82, 323-328, 1998

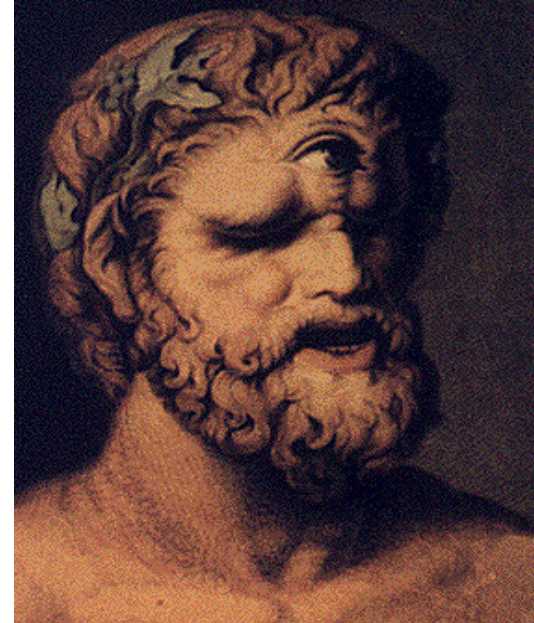
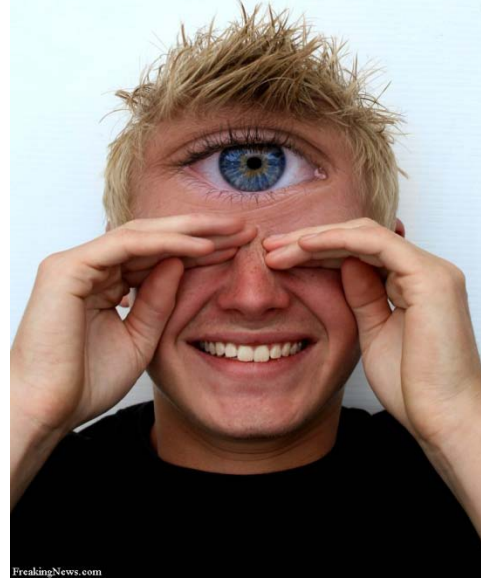
- Mortality was higher in heart failure patients with the lowest lipid values, including total cholesterol, LDL-cholesterol and HDL-cholesterol as well as triglycerides



- LDL cholesterol (so-called bad cholesterol) protects humans against infection.
- Deadly staphylococcus bacteria produce endotoxins that have the ability to kill human cells including red blood cells.
- LDL was found to protect human red blood cells from this toxic effect of endotoxin while HDL was not protective.
- Men with LDL-cholesterol below 160 mg/dl had a significantly lower number of white blood cells than men with LDL-cholesterol above 160 mg/l.



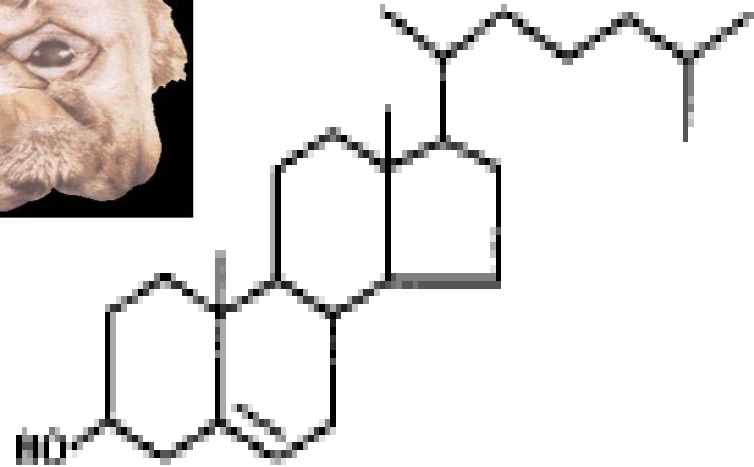
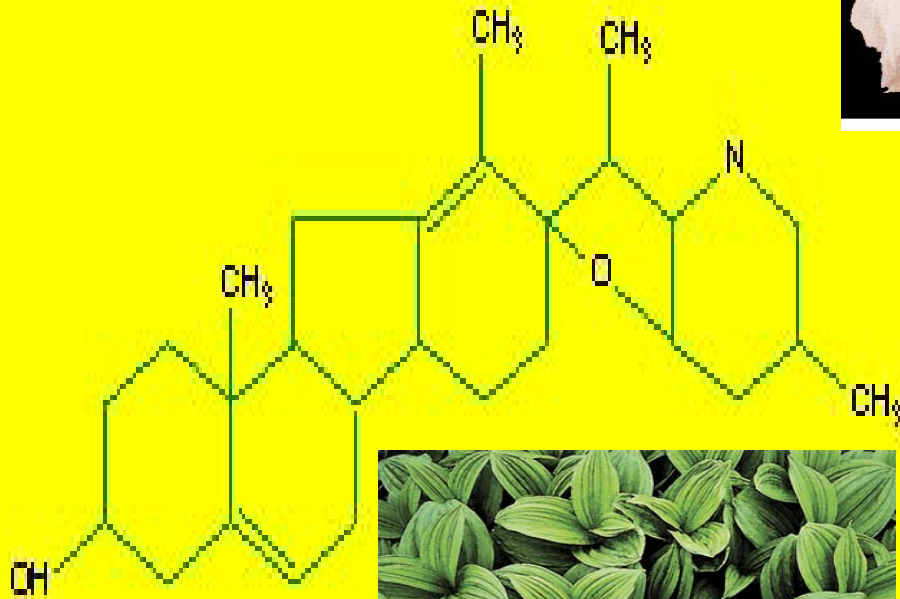
Sheep in Greek islands have plants containing cholesterol analogs



Mutations in sonic hedgehog cause cyclops disorder in humans. *Nature Genetics* 14, 357 - 360 (1996)

Cholesterol analogs cause severe developmental disorder

Cyclopamine



CHOLESTEROL

**Veratrum-Used in
herbal/Chinese
Medicine/homeopathy**

Child whose mother was treated with cycloamine



Fleck CJ et al. *Pediatr Res.* 1994 May;35(5):602-10.
Hypocholesterolemia (low cholesterol), hypertriglyceridemia, suicide, and suicide ideation in children hospitalized for psychiatric diseases.

- Children having adjustment disorders with depression had much lower covariance-adjusted Total Cholesterol value than control schoolchildren (3.91 versus 4.29 mmol/L, $p = 0.003$)
- Children having adjustment disorders with concomitant depression had the highest group suicide tendencies (attempts and ideation) and the lowest covariance-adjusted Total Cholesterol value.
- Substance abuse in patients was an independent **inverse** determinant of TC value $p = 0.05$

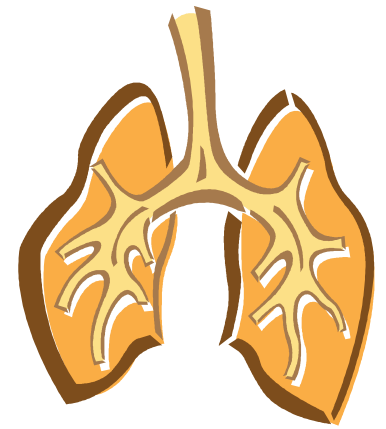
Cholesterol deficiency common in CFS. Second World Congress on Chronic Fatigue Syndrome and Related Disorders. Brussels, 9-12 September, 1999. Dr Hugh Dunstan, University of Newcastle, Australia

- Our very extensive studies on fatty acids in 4000 patients show that CFS patients have lower cholesterol levels – two thirds were very low, one third were closer to normal.
- A very low cholesterol will impact on membrane function and integrity.
- Low cholesterol results in reduced bile production and problems absorbing essential fatty acids.
- As cholesterol is a precursor to steroid hormones, it is likely there is an impact on steroid hormone production, with substantial follow on effects.

Serum Cholesterol and Cognitive Performance in the Framingham Heart Study. P. K. ELIAS, PhD, et al Psychosomatic Medicine 67:24–30 (2005)

- 789 men and 1,105 women evaluated for relationship between total cholesterol and cognitive performance
- Found that those who had the lowest total cholesterol (200 mg/dL) performed more poorly on tests of word similarities, word fluency and attention and concentration ability than patients with higher cholesterol levels.
- Lowest scores were on those less than 180 mg/dL

A Cholesterol-Rich Diet Accelerates Bacteriologic Sterilization in Pulmonary Tuberculosis



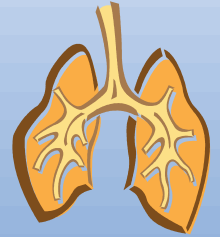
Carlos Pérez-Guzmán, Mario H. Vargas, Francisco Quiñonez, Norma Bazavilvazo, Adriana Aguilar and the Instituto Nacional de Enfermedades Respiratorias Tuberculosis Outpatient Service Team

Chest 2005;127;643-651
DOI 10.1378/chest.127.2.643

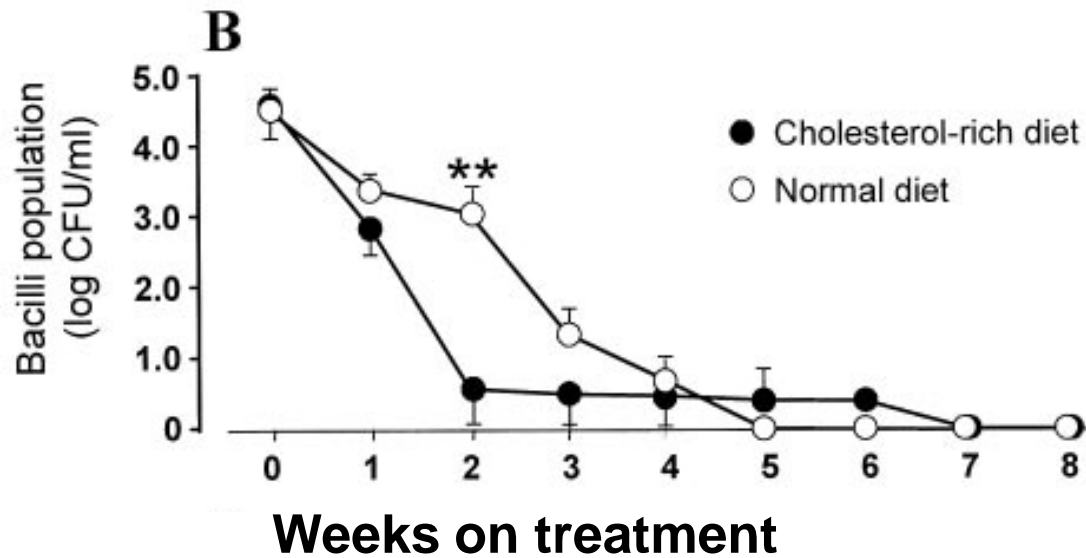
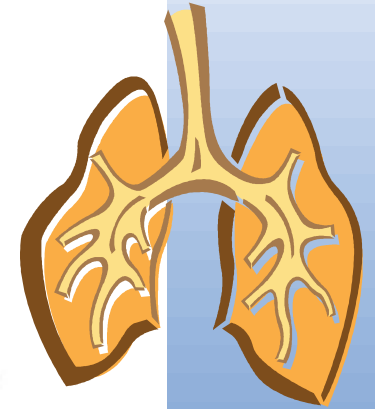
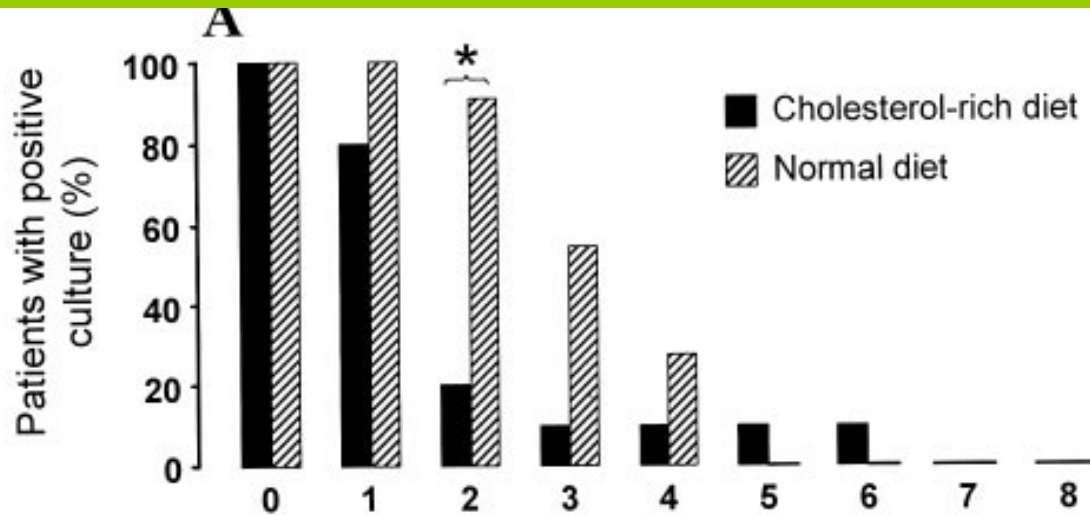
The online version of this article, along with updated information and services can be found online on the World Wide Web at:

<http://chestjournal.org/cgi/content/abstract/127/2/643>

- Mycobacterium tuberculosis causes tuberculosis
- Treated with 4 drug cocktail of antibiotics
- Hypocholesterolemia is common among tuberculosis patients and is associated with mortality.
- *In vitro* studies have shown that cholesterol is necessary for the good functioning of macrophages and lymphocytes.
- *Conclusions:* A cholesterol-rich diet accelerated the sterilization rate of sputum cultures in pulmonary tuberculosis patients, suggesting that cholesterol should be used as a complementary measure in antitubercular treatment.



TB and cholesterol deficiency



Modai I, Serum cholesterol levels and suicidal tendencies in psychiatric inpatients. 1: J Clin Psychiatry 1994 Jun;55(6):252-4.

- Hospitalized patients who had attempted
- suicide had significantly lower serum cholesterol than nonsuicidal patients
- These results were not influenced by age, sex, ethnicity, weight, disease severity, or physical health.
- Our findings may imply that an association exists between low cholesterol, suicide, and depression.



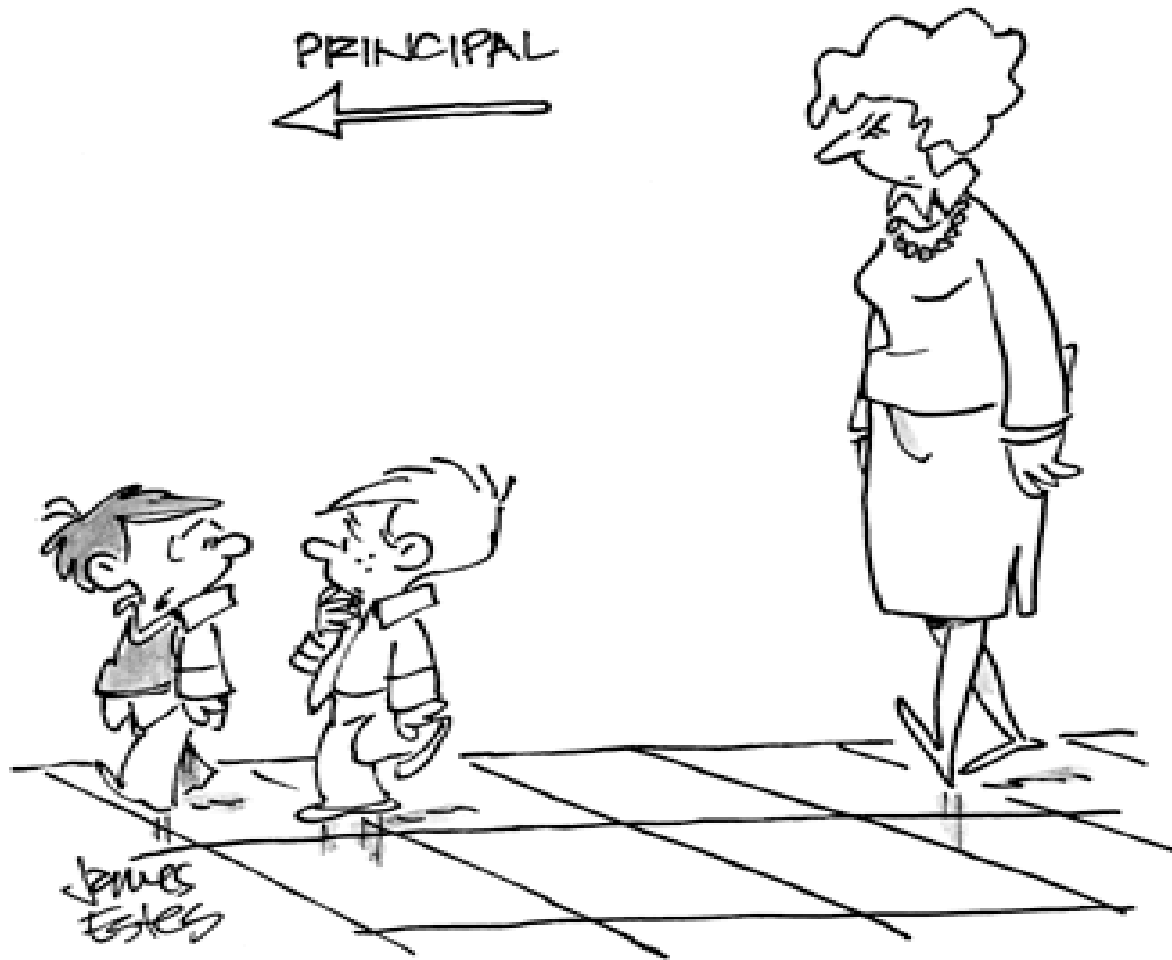
Polly Curtis, Health Correspondent

Monday January 15, 2007

The Guardian, UK

- Study compared 124 people diagnosed with Parkinson's with a control group of 112.
- They found that the people with low levels of "bad" LDL cholesterol were in excess of three times more likely to be in the Parkinson's group than those with high LDL cholesterol.





"Can she really have him throw us into a dank, dark dungeon where we won't see the light of day until we're old and gray?"

Jian Zhang et al. Association of Serum Cholesterol and History of School Suspension among School-age Children and Adolescents in the United States.
Am J Epidemiol 2005;161:691–699



- Non-African-American children with a serum total cholesterol concentration below the 25th percentile (<145 mg/dl) were almost threefold more likely to have been suspended or expelled from schools than controls with higher cholesterol.

Laure Buydens-Branchey, MD and Marc Branchey, MD

Association Between Low Plasma Levels of Cholesterol and Relapse in Cocaine Addicts

Psychosomatic Medicine 65:86-91 (2003)



- Comparisons of the cholesterol levels (obtained during hospitalization) of relapsers and nonrelapsers revealed significantly lower cholesterol values in patients who relapsed at 3 months ($p = .046$), 6 months ($p = .030$), and 12 months ($p = .019$) after discharge.

Laure Buydens-Branchey, MD and Marc Branchey, MD
Association Between Low Plasma Levels of Cholesterol
and Relapse in Cocaine Addicts
Psychosomatic Medicine
65:86-91 (2003)

TABLE 2. Total Cholesterol in Relapsing and Nonrelapsing
Cocaine Addicts^a

Time After Discharge	No Relapse	Relapse	<i>p</i>
3 months	167 ± 32 (N=23)	142 ± 16 (N= 9)	.046
6 months	169 ± 32 (N=21)	142 ± 15 (N=11)	.030
1 year	170 ± 33 (N=20)	143 ± 15 (N=12)	.019

^a Values (mean ± SD) are expressed in mg/dl. Comparisons between groups were made with ANCOVAs with age and weight as covariates.

Laure Buydens-Branchey, MD and Marc Branchey, MD
Association Between Low Plasma Levels of Cholesterol
and Relapse in Cocaine Addicts
Psychosomatic Medicine
65:86-91 (2003)

CHOLESTEROL AND RELAPSE IN COCAINE ADDICTS

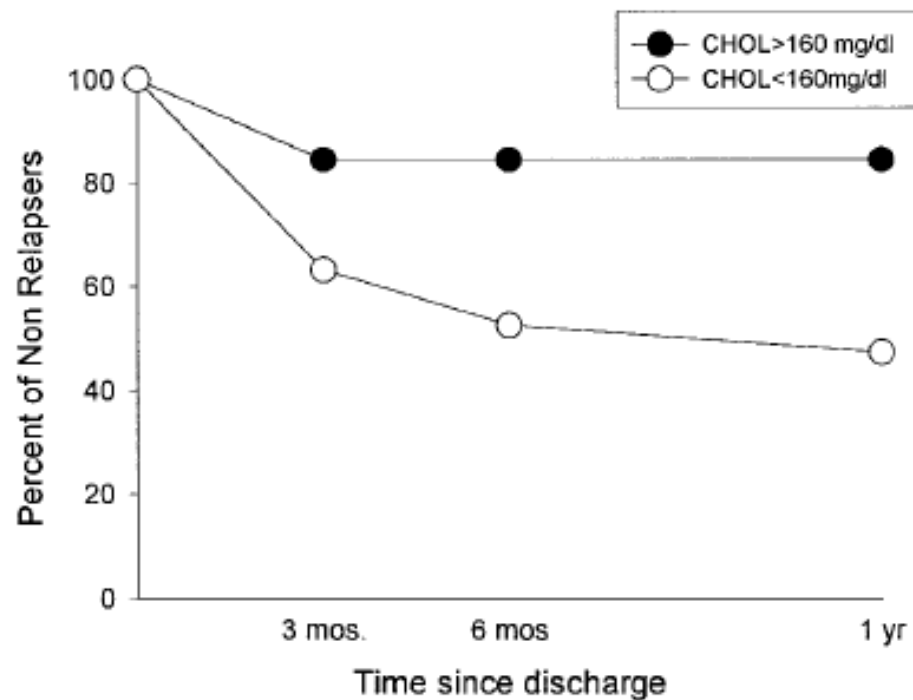
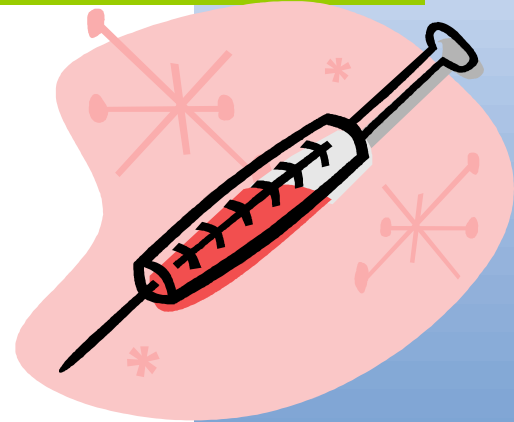


Fig. 1. Percentages of cocaine addicts who did not relapse during a 1-year follow-up period as a function of index admission cholesterol level.

Drug Alcohol Depend. 1991 Dec 31;29(2):183-7.
Plasma cholesterol and triglycerides in heroin
addicts. Maccari S, et al

- After comparing 23 control subjects with the heroin addicts the result was that the latter have significantly lower mean values of total cholesterol and of HDL-cholesterol and higher values of triglycerides.
- Addicts also have significantly higher prevalences of cases of hypocholesterolemia and of hypo-HDL-cholesterolemia.





Demonstration of an association among dietary cholesterol, central serotonergic activity, and social behavior in monkeys. *Psychosom Med.* 1994 ;56(6):479-84. Kaplan J



- Monkeys that consumed a low-cholesterol diet were more aggressive, less affiliative, and had lower cerebrospinal fluid concentrations of feel-good neurotransmitter serotonin metabolite (5-HIAA) than did their high-cholesterol counterparts ($p < .05$ for each)

Robin J. Edison, et al Adverse Birth Outcome Among Mothers With Low Serum Cholesterol. Pediatrics 2007; 120: 723-733

- Prevalence of preterm delivery among 118 mothers with low total cholesterol (<160 mg/dL) was 12.7%, compared with 5.0% among 940 control subjects with values > 160 mg/dL
- Term infants of mothers with low total cholesterol weighed on average 150 g less than those who were born to control mothers.
- A trend of increased microcephaly (small head) among neonates of mothers with low total cholesterol was found.

Summary

- Cholesterol is an essential nutrient, although humans can make some
- Deficiency of cholesterol is associated with preterm delivery, abnormally small head size
- Low cholesterol leads to increased infections and higher incidence of many psychiatric diseases and social ills
- Optimum cholesterol appears to be between 160-200 mg/dL blood serum
- Cholesterol < 160 mg/dL associated with increased mortality and increased risk of psychiatric disorders, neurological disorders, infectious diseases, and cancer

Summary

- In 2 studies of autism, more than 50% of ASD children were deficient
- Mind Institute study shows cholesterol transport proteins (apolipoprotein B) low in autism
- Symptoms of autism in severe genetic disorder (SLOS) reversed by high dose cholesterol supplements
- Statin drugs reduce other substances such as CoQ-10, Heme-a, specialized t-RNA, and others, which causes rhabdomyolysis, renal disease, memory loss
- Suggest supplementation with CoQ-10 and not decreasing cholesterol below 160 mg/dL

Summary

- Candida effects in autism and other disorders may be mediated by ergosterol, which simulates the biochemical abnormality of SLOS
- Sonic hedgehog (SHH), one of the most important proteins in human development and brain function, requires cholesterol and palmitate to function

Thank you!

William Shaw Ph.D.

