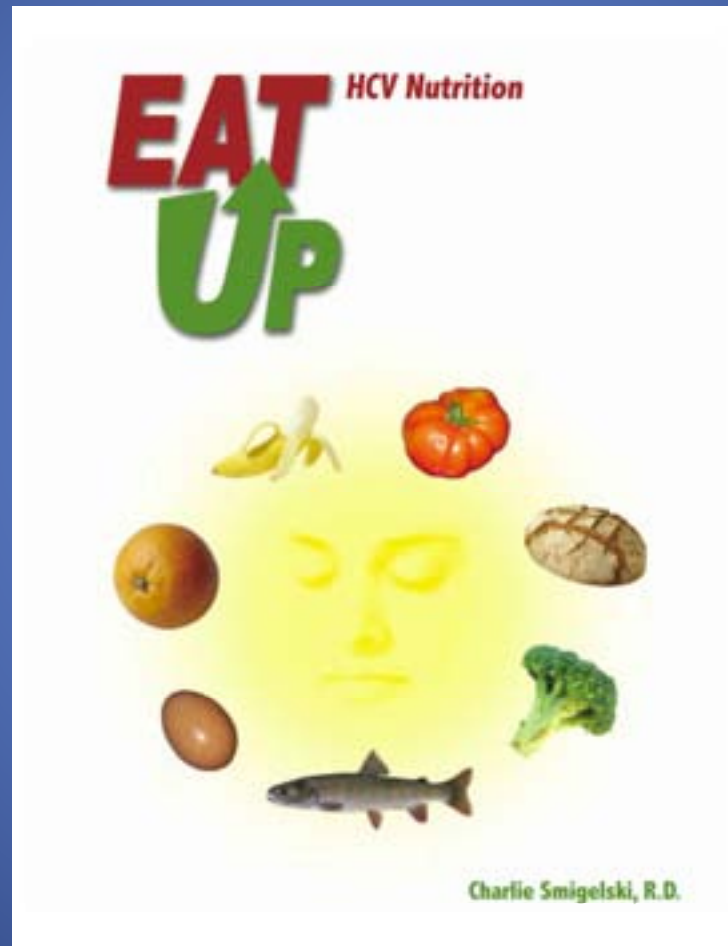


HCV Nutrition



Disclosures

Charlie Smigelski, RD was on the community speakers bureau for EMD Merk-Serono, which produces Serostim.

- HRSA Education Committee Disclosures
HRSA Education Committee staff have no financial interest or relationships to disclose.
- CME Staff Disclosures
Professional Education Services Group staff have no financial interest or relationships to disclose.

Nutrition Support For
People with HIV/HCV,
before, during & after IFN/RBV tx.

Charlie Smigelski RD
charlie@charlienutrition.com

Case Study

Gene HIV HCV co-infection age 51 ...

- 2000 IFN 6 mo. no eradication

- 2002 LFT's in 250 re-treat:

16 weeks IFN/RBV

quit ... too depressed, too sick

- 2004 LFT's 500 re-treat: IFN/RBV

What would you do to improve his chances?

Today's Nutrition Talk

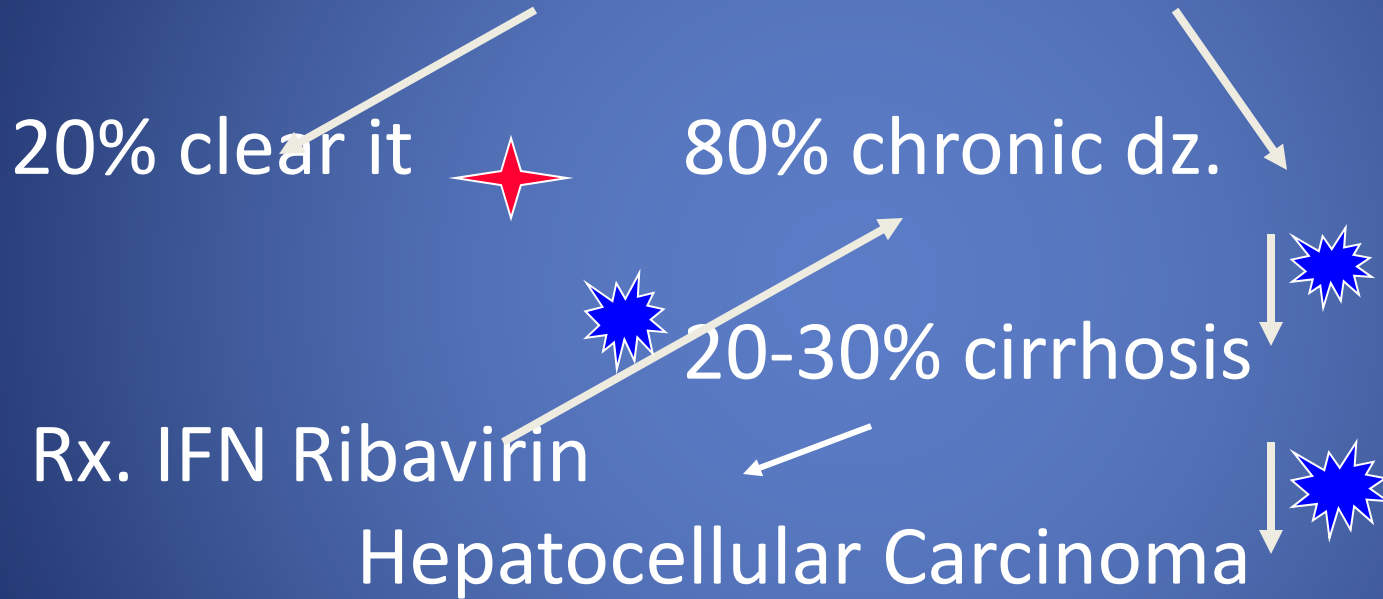
Nutritional help for immune cells.

The best diet you could be eating?

Supplements to get through IFN.

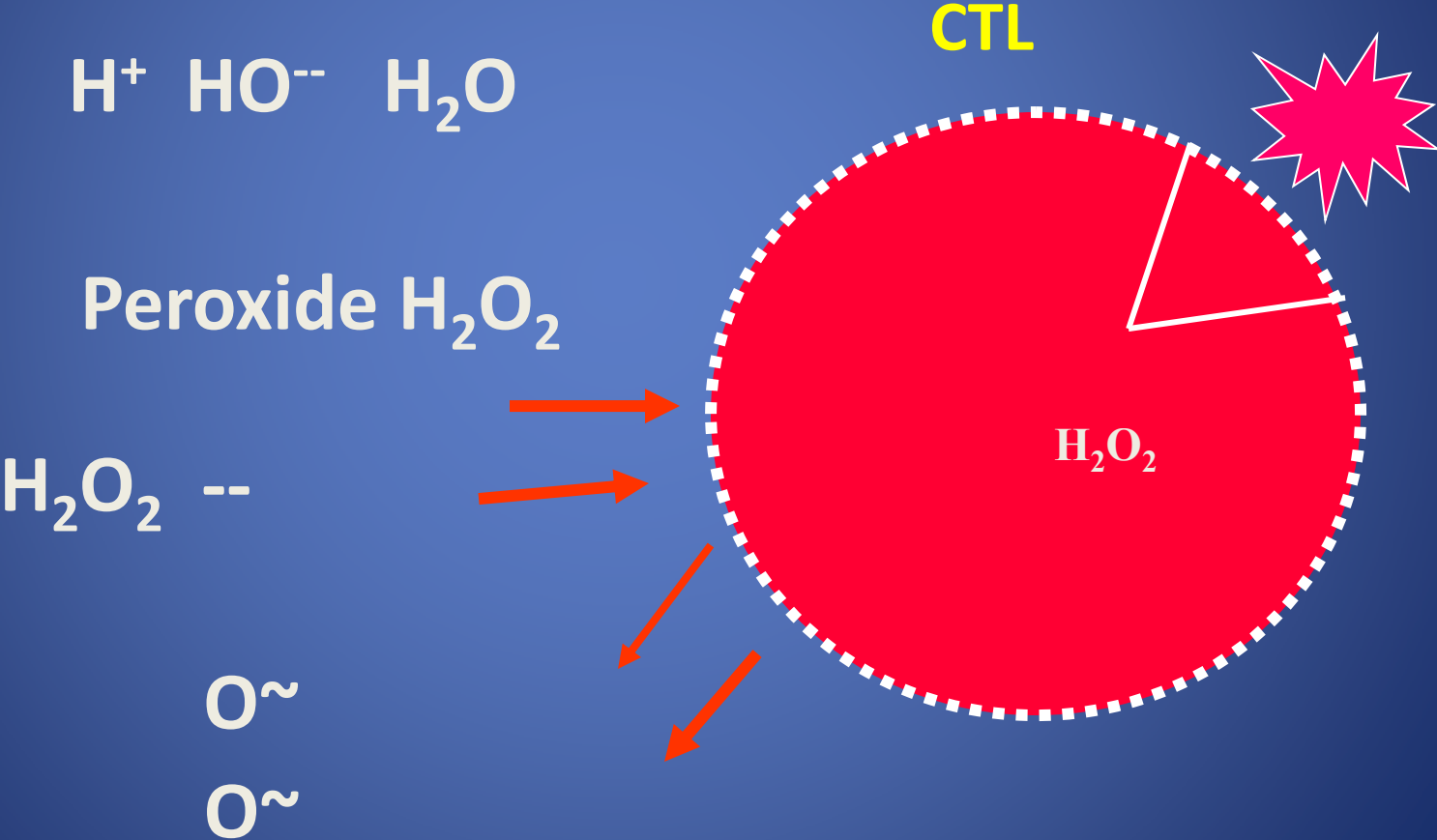
Chronic HCV

Hep C exposure

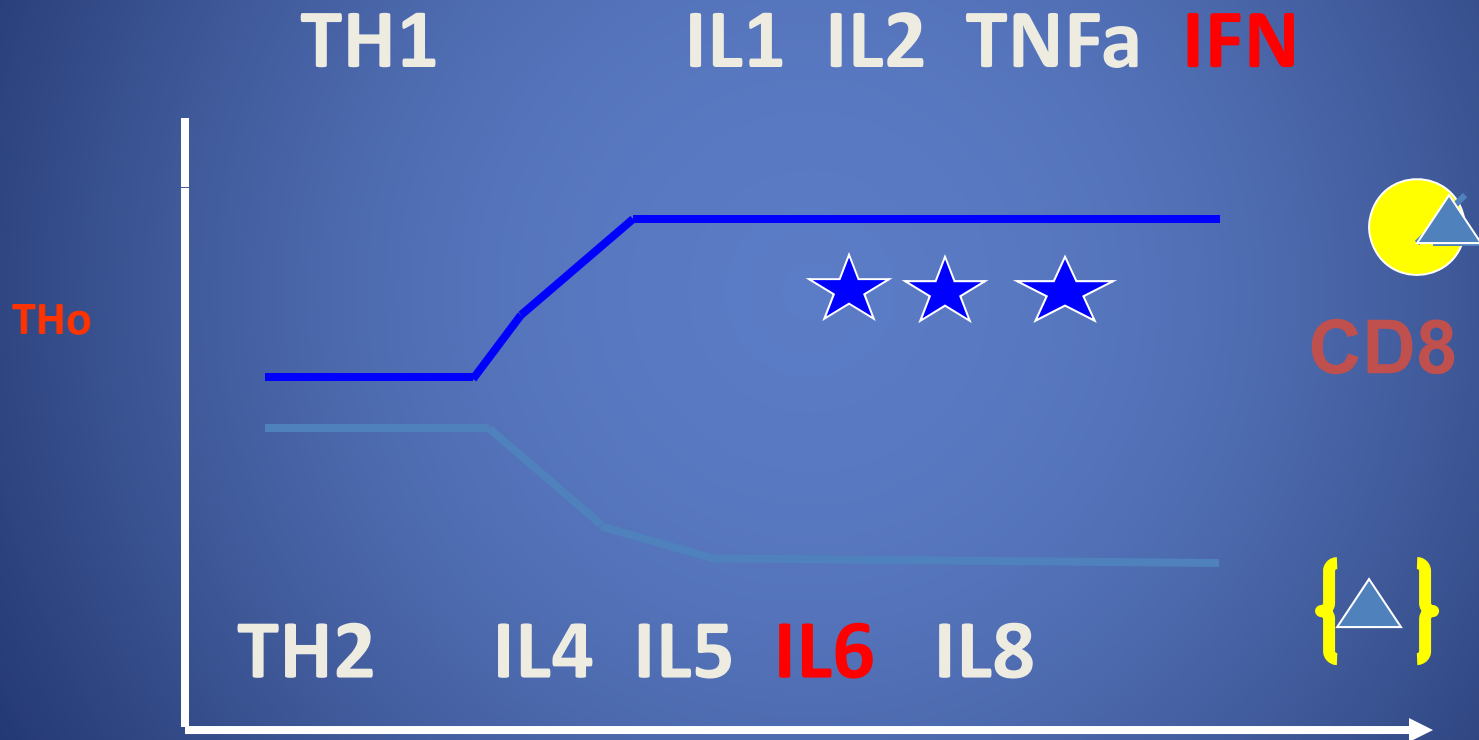


 where nutrition has an impact

CD8 Cytotoxic T Lymphocytes



IMMUNOLOGY



Lower GSH Selenium Zinc: TH1 > TH2

Zinc intake in America

RDA	12/15 mg	Mean	Median
age 20-39		12.4	10.9
age 40-59		11.9	10.5

Zinc foods: ??? (Zycam)

Hepatitis C virus encodes a **selenium**-dependent **glutathione peroxidase** gene. Implications for oxidative stress as a risk factor in progression to HCC.

Zhang ... Taylor Med Klin (Munich). 1999;94 Suppl 3:2-6.

Vit D is related to severe fibrosis and low responsiveness to interferon-based therapy

older age necroinflammation
higher ferritin lower cholesterol

all linked to fibrosis

Hepatology 2010; 51(4) 1158 – 1167.

Iron, Innocent Bystander?

N=34 IFN/RVN failures 6 yrs

(8-OHdG)* Low Fe Reg Fe

HCC 0 (16-23%)

Total, Special K, Vitamins, Ensure, etc.

Kato, Cancer Res 2001 61(24) 8697-702

*(8-oxo-7, 8-dihydro-2' doxyguanosine)

Chronic HCV

Hep C exposure

15% clear it

85% chronic dz.

Zinc Selenium Vit D

20-30% cirrhosis

Rx. IFN Ribavirin

(Fe) Se

Hepatocellular Carcinoma

FEBRUARY 23, 2004

TIME

BUSH'S
MILITARY RECORDS
IS DISNEY MOUSETRAPPED?

THE SECRET KILLER

- The surprising link between **INFLAMMATION** and **HEART ATTACKS, CANCER, ALZHEIMER'S** and other diseases
- What you can do to fight it

\$3.95US

Oxidative Stress In Symptom-free HCV carriers: relation with ALT Flare-up

N=30; median 49 yrs, (27-60), chronic HCV 1b,
-6 0 ... +18 mo. Nml ALT at enrollment
Serum markers for Oxidative stress q 2 mo.
Liver biopsy for GSH and MDA & histology
Sulphhydryl proteins (P-SH)

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

Oxidative Stress: ALT Flare-up

GSH (reduced) glutathione

GSSG (oxidized) glutathione

MDA (using thiobarbituric acid)

Vendemiale, Grattagliano, et al. *Eur J Clin Invest*
2001; 31(1):54-63.

Oxidative Stress: ALT Flare-up

... detect disease evolution based on redox capacity ...

Group A (16)

~ nml redox

GSH ≥ 3 mmol/g

MDA ≤ 75 nmol/g

Group B (14)

altered redox

< 3 mmol/g

> 75 pmol/g

ALT values comparable for first 12 months

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

Oxidative Stress: ALT Flare-up

Group A (16) Group B (14)

ALT flare 2 (13.5%) 9 (64%)

New sort No flare 19 ALT flare 11

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

Oxidative Stress: ALT Flare-up

$T_0 - T_{18}$	High ALT (11)	NML ALT (19)
GSH	8.1 > 6.7	9.3 > 9.1 mmol/L
MDA	0.5 > 0.67	0.35 > 0.35 nmol/L
Ferritin	164 > 180	93 > 84 mg/L

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

High serum ALT in HCV and more rapid development of HCC in pt's with cirrhosis.

Tarao et al. Cancer, 1999; 86(4):589-95

High ALT > cirrhosis > HCC.

69 HCV cirrhosis (Child's A)

A/28 B/13 C/28

ALT: < 80 Variable > 80

HCC	7.1%	5 yr	53.6%
-----	------	------	-------

HCC	25%	10 yr	71.4%
-----	-----	-------	-------

Tarao et al. Cancer, 1999; 86(4):589-95

HCV HIV Care

Vitamins to support immune system
... CTL's = Pacman cells

Take antioxidants to clean up debris
and reduce inflammation

Chronic HCV

Hep C exposure

15% clear it

85% chronic dz.

Zinc Selenium Vit D

Rx. IFN Ribavirin

20-30% cirrhosis

(Fe) Se

Hepatocellular Carcinoma

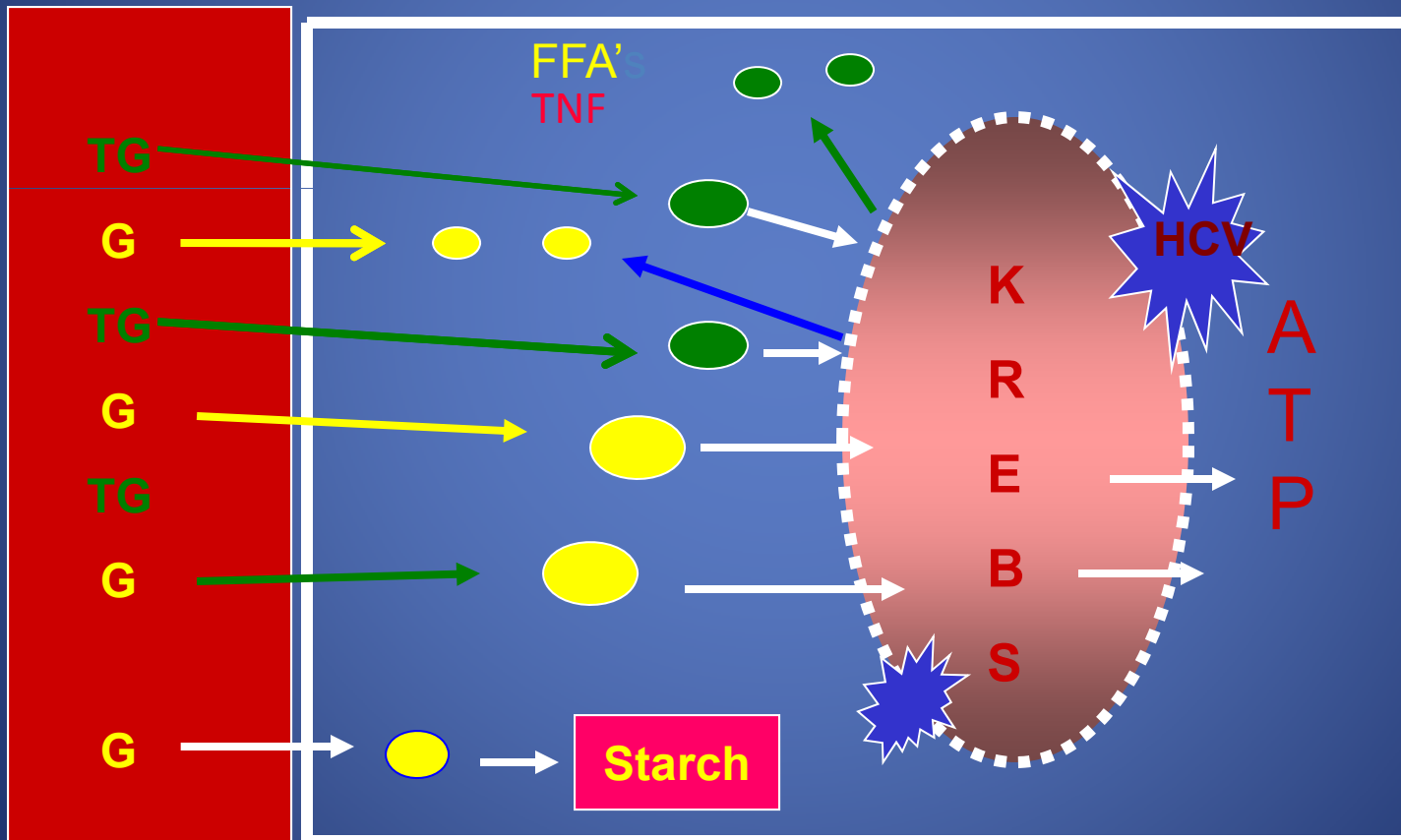
...thinking about food and diet



Mitochondrial Injury, Oxidative
Stress, and Antioxidant Gene
Expression Are Induced By
Hepatitis C Virus Core Protein

Okuda et al. Gastroent 2002;122(2):366-75

Making Energy: ATP



HCV Insulin Resistance

Age >40: 3x the diabetes rate in HCV+ people

Normal GTT, but higher fasting Insulin levels

Feeding High Fat diet led to overt diabetes

Higher TNFa

Shintani, et al. Gastroent 2004;126:840-8.

HCV Insulin Resistance

- HCV confers insulin resistance in liver
- Other elements generate overt diabetes:

Obesity Aging Inflammation

Shintani, et al. Gastroent 2004;126:840-8.

The Fats Of Life

$\eta - 6$

LA - corn oil

GLA – primrose

(Hihomo GLA)

AA arachidonic

(Cyclo-ox PGE₂)

$\eta - 3$

D-6*

D-5*

D-4*

ALA - flax, walnuts - soy

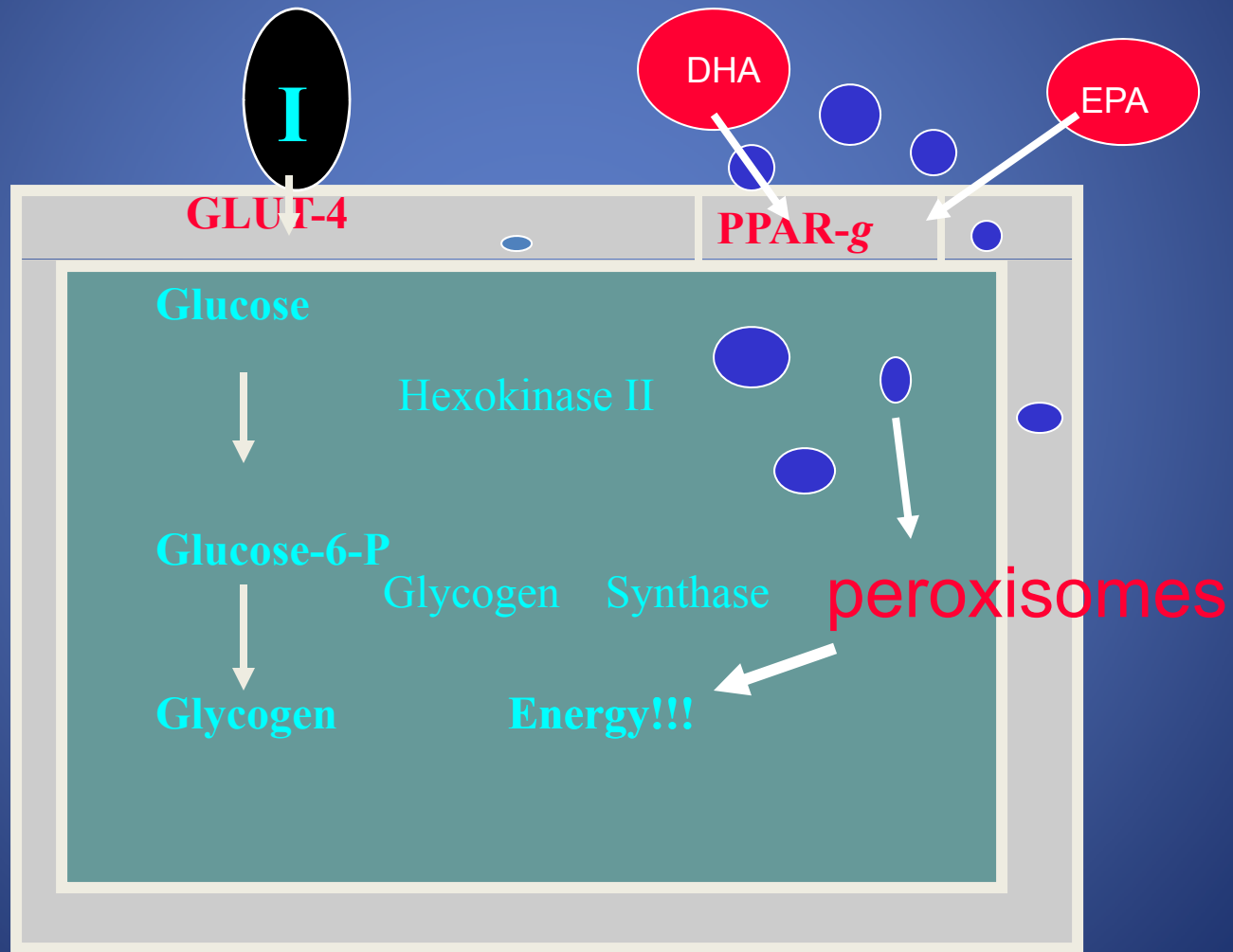
EPA

DHA - fish oils

(PGE₃)

*Delta 6, 5, 4 desaturase/elongase enzymes

EPA/DHA Action on Cells

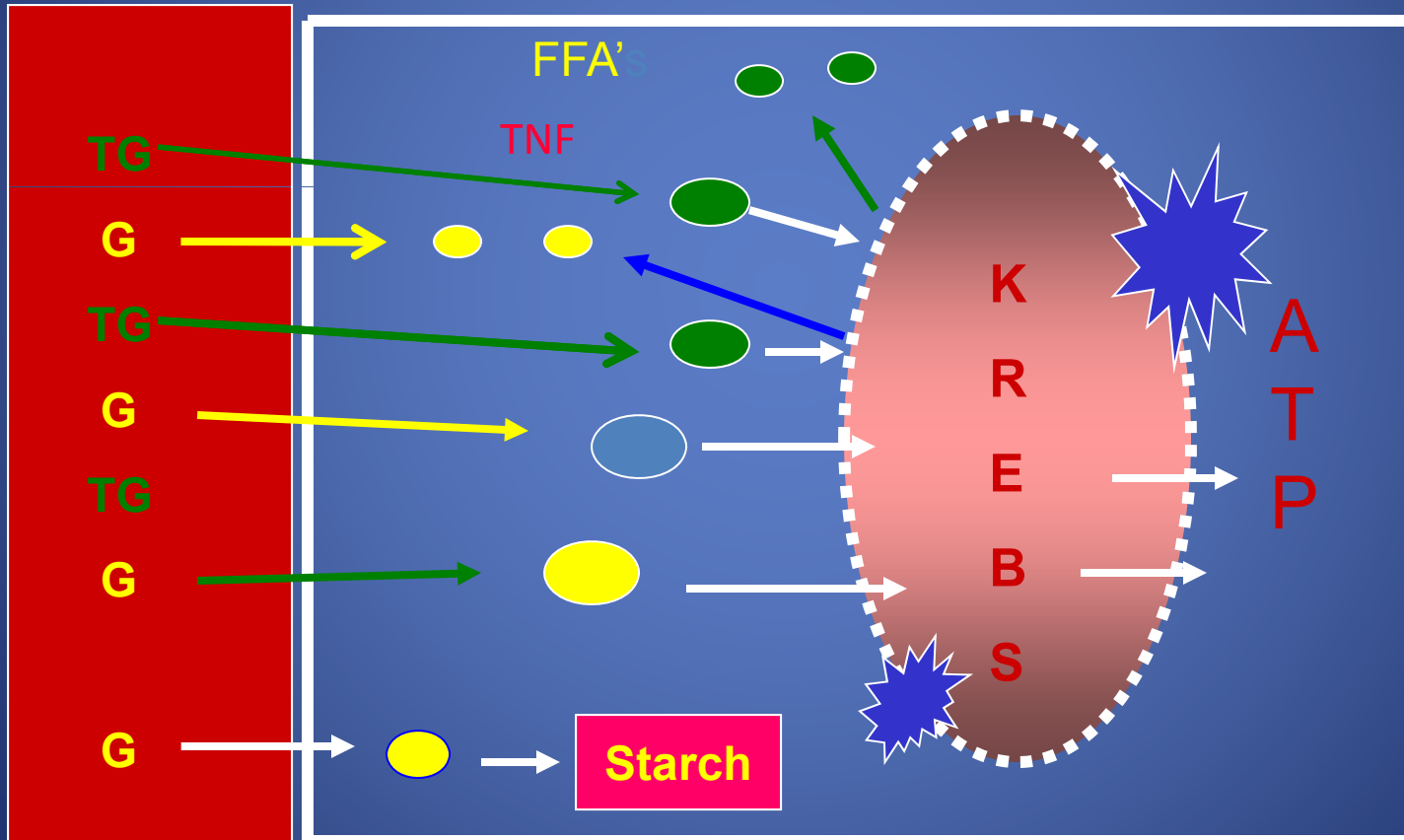


HCV inhibits TG's and VLDL secretion:

- Interfering with hepatic assembly and secretion of triglyceride-rich VLDL.
- Reduction in microsomal transfer protein (MTP)

Perlemuter et al. FASEB J. 2002; 16(2): 185

Grease, Sugar, Leaks & TNF α



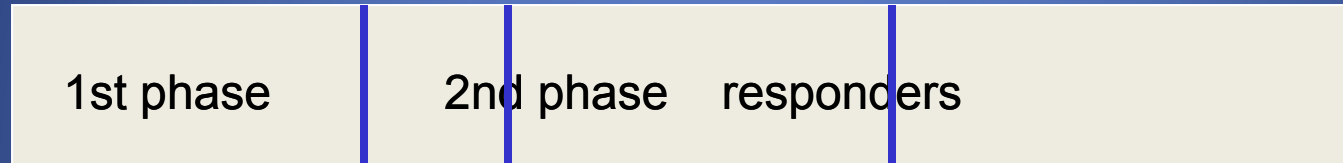
HCV Pathophysiology

Repair Issues:

- Oxidative stress
- Damaged mitochondria
- Improve fat metabolism
- Preserve glucose tolerance
- Reduce IFN Tx : wasting

Vit E improves ALT status

N=23 2 x 400iu/d 12 wks alpha-tocopherol



0 12 16 28 (weeks)

Von Herbay et al. Free Radic Res 1997; 27(6):599-605.

Vit E 400 iu bid

11/23 were responders: 48%

ALT down: 17%, 23%, 24% (4, 8, 12 wks)

11 responders: > 35% drop

ALT resp: 31%, 40%, 46% (4, 8, 12 wks)

Von Herbay et al. Free Radic Res 1997; 27(6):599-605.

Vit E improves ALT status

N=23 2 x 400iu/d 12 wks alpha-tocopherol



0 12 16 28 (weeks)

Von Herbay et al. Free Radic Res 1997; 27(6):599-605.

Vit E improves ALT status

Washout: ALT rises again,

... **retreat**: ALT drop 42%

serum vit E rose equally in all treated.

~ 25 >> 52 $\mu\text{mol/l}$

Glutathione enzyme

- What does glutathione do ?
- What groceries support better levels?
- What supplements help liver make more ?

Improve Glutathione Levels ?

GSH-sparing:

Vitamin C , Vitamin E:

GSH-boosting:

Higher Protein Diet, N-acetylcysteine,
L-glutamine, alpha lipoic acid:

L-Carnitine for repair

Spackling compound for
mitochondrial outer walls

1-2 grams/day esp. during IFN Tx.

Carnitine reduces steatosis

Group A:

IFN alpha 3 MIU 3X/w & 1,000 mg
ribavirin per day for 12 months

Group B:

IFN & RBV & 2 g carnitine /d.

Dig Dis Sci. 53(4):1114-21. 2008 (70p)

Carnitine reduces steatosis

Test	Group A	Group B
ALT	-68	-95 IU/ml *
Chol	0.08 -	0.91 mmol//d.*
TG	+0.25	-20 mmol/l *

*(P < 0.05)

Dig Dis Sci. 53(4):1114-21. 2008

Carnitine reduces steatosis

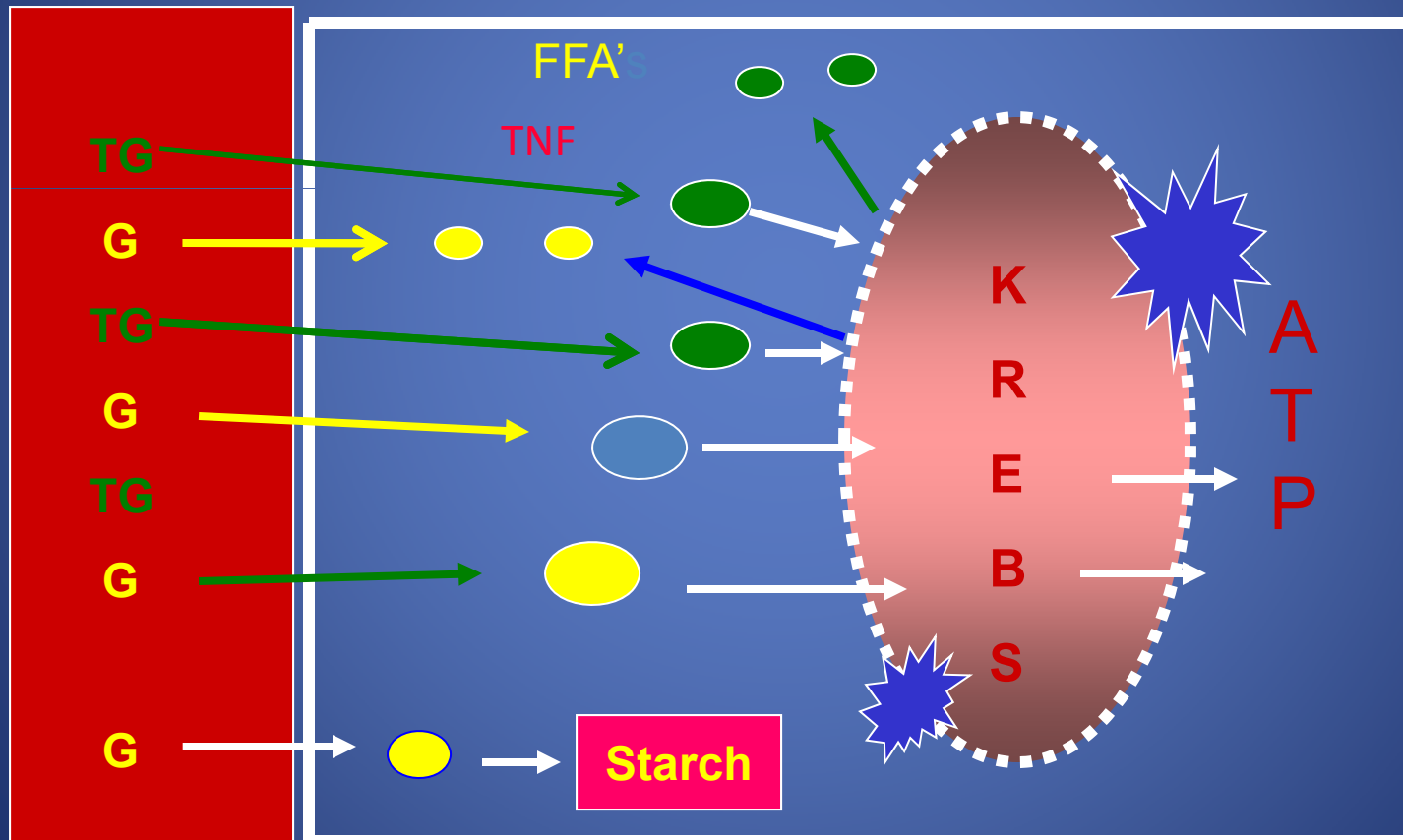
Test	Group A	Group B
Response	48%	56%
Sustained response	39%	46%

Co-enzyme Q10 for repair

Velvet lining for
mitochondrial inner walls

100 milligrams/day

Mitochondria: ATP/Energy !



... what is the best diet ...



Caveperson Breakfast

Salmon

Walnuts

Berries

Cottage Cheese

Pecans

Peaches

Designer Whey

Flax Seeds Banana
(smoothie)



breakfast
for the
modern
person

Caveman Lunch

Salmon White beans Large salad Vinegar

Ham and Lorraine Swiss on Rye, & a large carrot and 2 tomatoes

Cottage Cheese Humus Raw Vegetables

Caveman Snacks

Nuts and seeds, berries and fruits

red grapes and cashews

dried apricots and Brazil nuts

apple and sunflower seeds

pumpkin seeds and mango

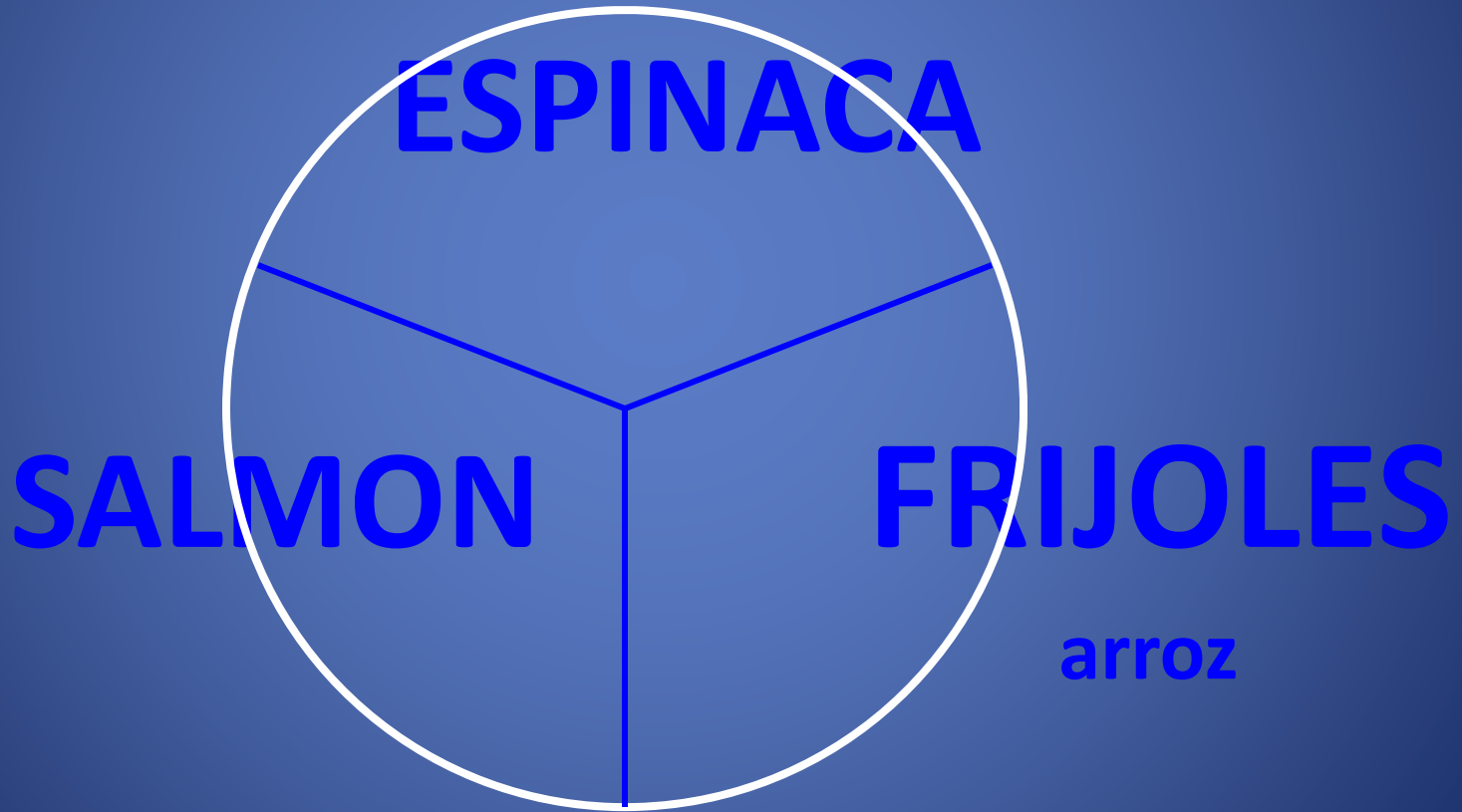
Caveperson Supper

Salmon Green Peas Carrots Pignolis

Chicken Sw. Potato Gr. beans Almonds

Pork loin Black beans Spinach Walnuts

Nuestro Plato



Caveperson Supper

H. Choice Froz. Corn Carrots Smart Balance
Turkey Kielbasa Tub Margarine

Rotisserie Bk. Potato Froz. Broccoli same marg.
Chicken

(pizza slice)

Turkey Meatballs a box of green beans

SHIP ANYWHERE IN THE U.S.

DELIVERY TO DOWNTOWN HOTELS
ORDER ONLINE
WWW.FRESH SEAFOOD.COM
CALL 1-800-892-1474

WE SHIP SEAFOOD ANYWHERE

WE SHIP SEAFOOD ANYWHERE



FRESH BEST QUALITY
CITY SALMON
\$3.99/lb

WE TAKE FROM
72-84 PER
49 PER LB

WITH
JUMBO
SHRIMP

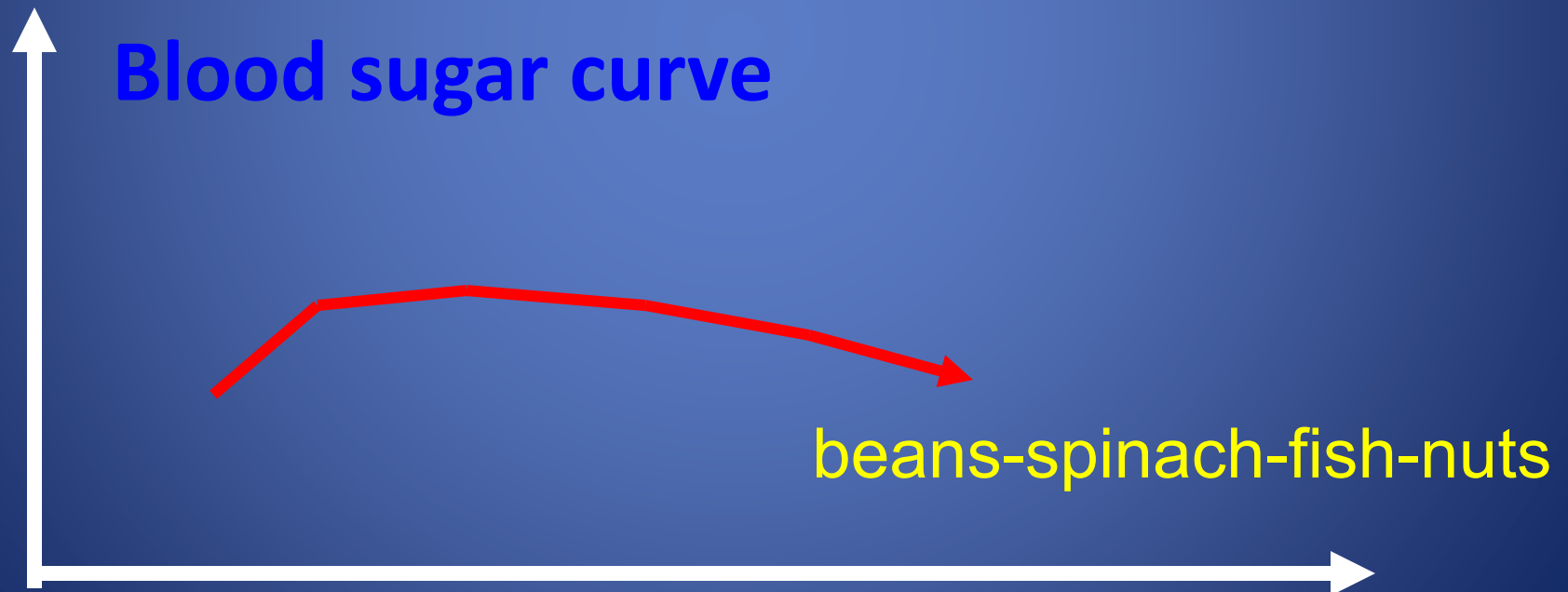
JUMBO
SHRIMP

JUMBO
SCALLOPS



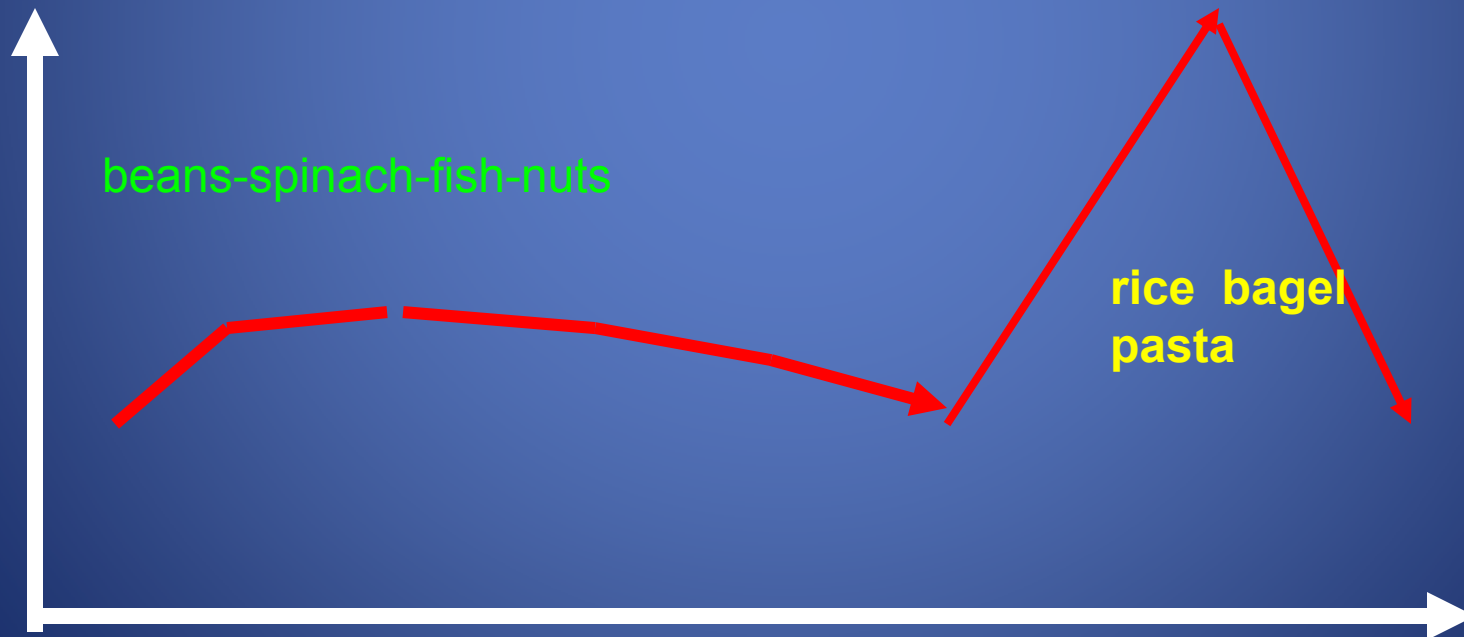
AT
SE

Insulin: 1. move sugar,
2. build fat
3. retain sodium
4. make hungry



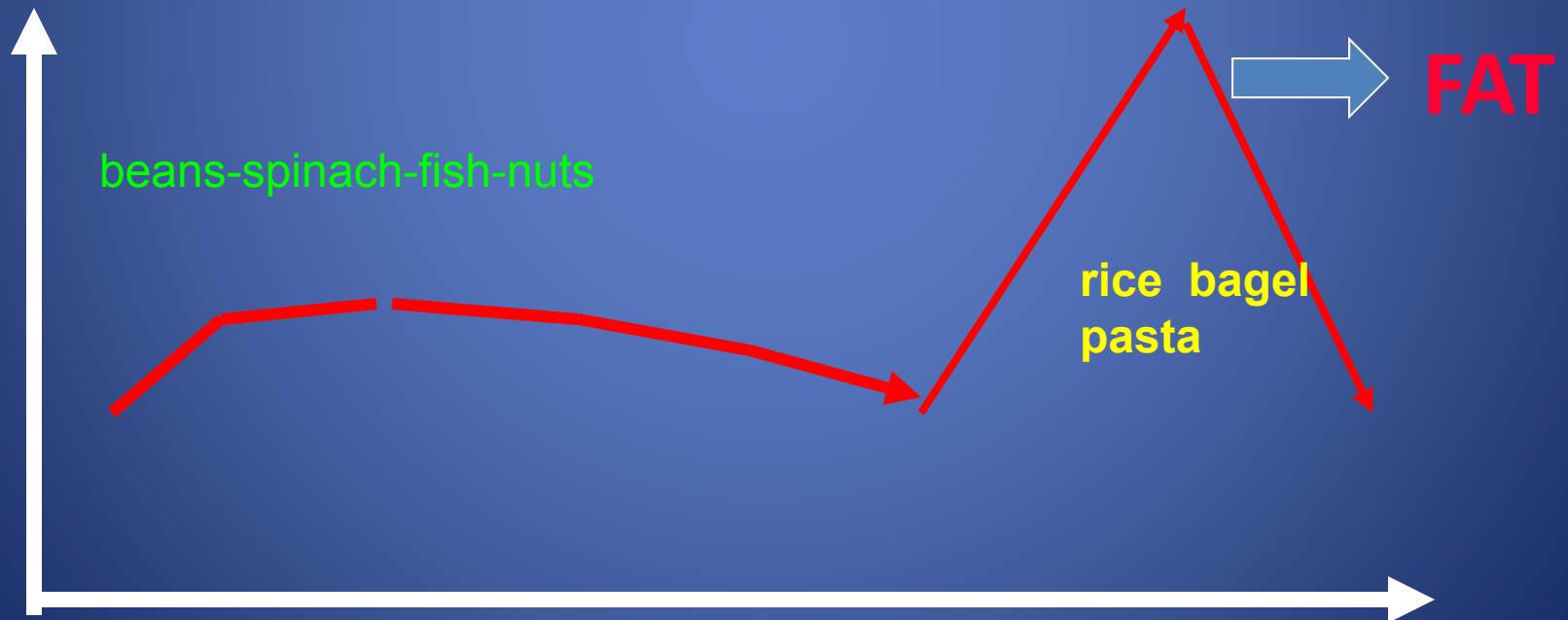
Cocoa Puffs, Bagels, Pasta Subs, Rice, Beans, Tortillas

spike & crash your blood sugar

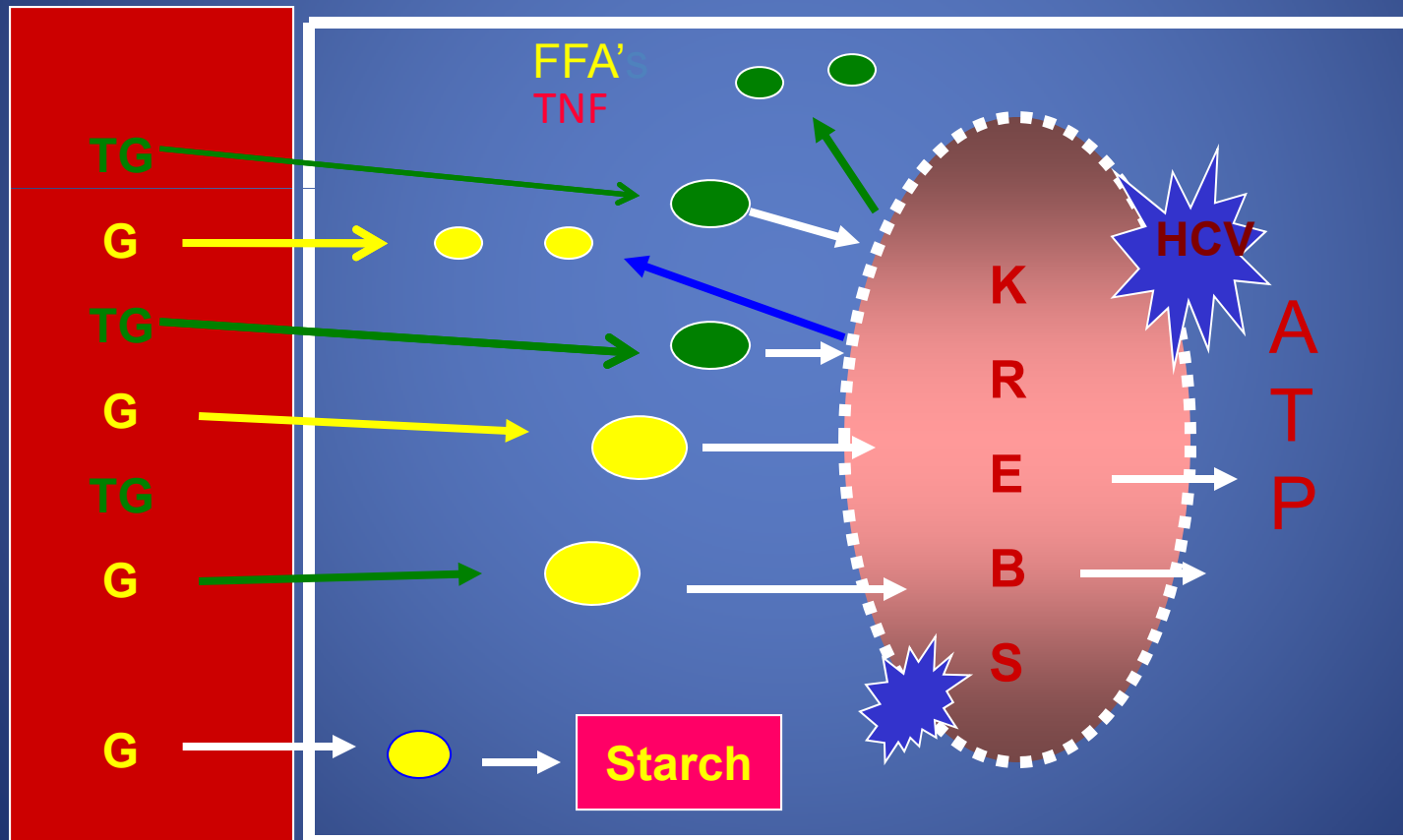


Cocoa Puffs, Bagels, Pasta Subs, Rice, Beans, Tortillas

spike & crash your blood sugar



Grease, Sugar, TNF>> Insulin resistance

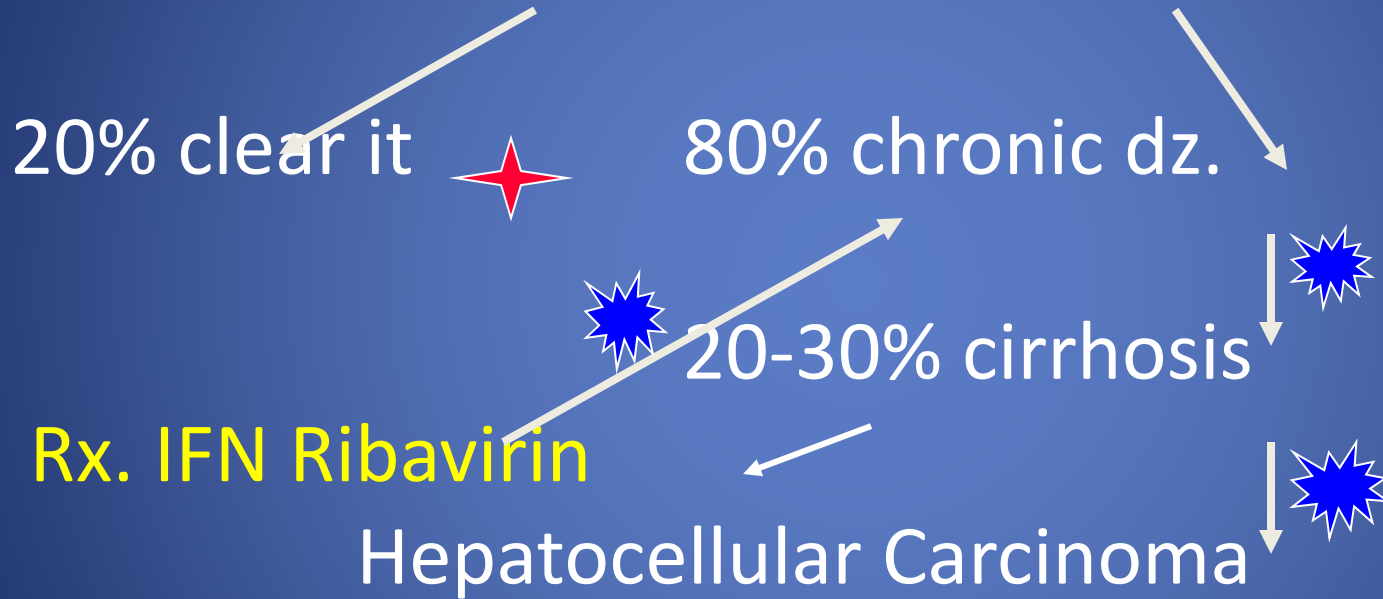


Conditions to manage

- Intracellular fat and insulin issues
- Antioxidant capacity
- Glutathione support
- Dietary elements: fats, carbs, antioxidants
- Weight status
- Alcohol intake
- Iron intake

Chronic HCV

Hep C exposure



 where nutrition has an impact

Case Study

Gene HIV HCV co-infection age 51 ...

- 2000 IFN 6 mo. no eradication
- 2002 LFT's in 250 re-treat:
16 weeks IFN/RBV
quit ... too depressed, too sick
- 2004 LFT's 500 re-treat: IFN/RBV

Case Study

Gene HIV HCV co-infection age 51 ...

- 2000 IFN 6 mo. no eradication
- 2002 16 weeks IFN/RBV
- 2004 LFT's 500 re-treat: IFN/RBV

What would you do now?

- Fatigue
- LFT's

see handout ... steps 1, 2, 3)

Case Study

- Gene HIV HCV co-infection age 51 ...
- 2000 IFN 6 mo. no eradication
 - 2002 16 weeks IFN/RBV
 - 2004 LFT's 500 re-treat: IFN/RBV

What would you do now?

- Immune cells
- Glutathione LFT's
- Fatigue ...ATP ...Mitochondria

see handout ... steps 1, 2, 3)

Triple Antioxidant Approach

HCV Esoph varices, portal HTN

Mitochondria: B-complex, Co Q10

2 gm vit C, 800 iu vit E

Cell support: 900 mg Milk Thistle

400 mcg selenium

600 mg alpha lipoic acid

Berkson. Triple Antioxidant *Med Klin (Munich)* 1994

Case Study

Gene HIV HCV co-infection age 51 ...

- 2000 IFN X 6 mo. ... no eradication
- 2002 LFT's 250 treat: 16 weeks ... IFN/RBV
quit ... too depressed, too sick
- 2004 LFT's 500 re-treat: IFN/RBV
(see handout ... steps 1, 2, 3)

36 weeks: LFT's in the 80's now

Vit D is related to severe fibrosis and low responsiveness to interferon-based therapy

Older age, necroinflammation, higher ferritin:

167 pts on IFN/RBV tx.

70 (41%) SVR

steatosis, low vit D, low cholesterol assoc with poor response.

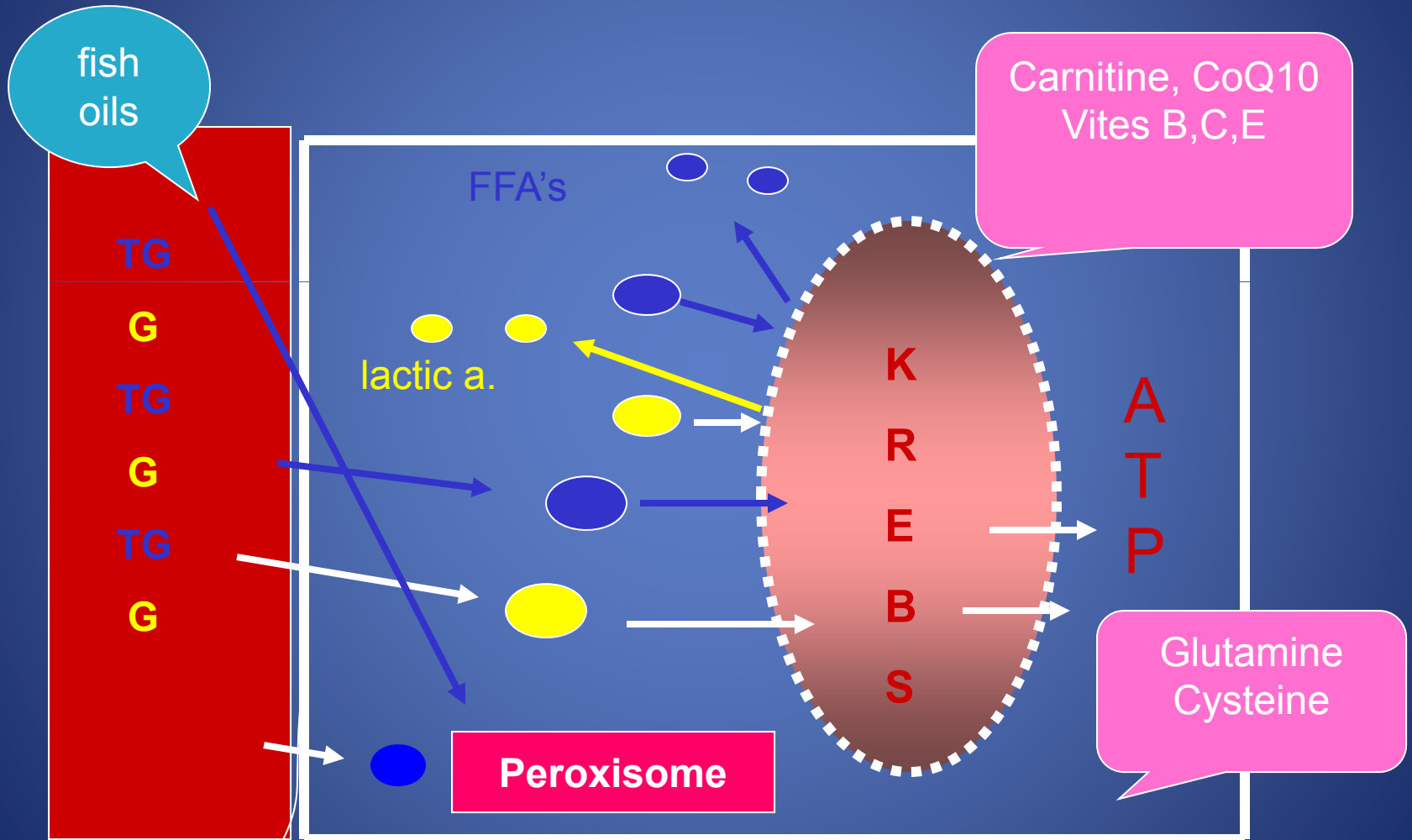
Vit D **25.07** +/- 9.92 microg/L vs **43.06** +/- 10.19 cntrls

Hepatology 2010; 51(4) 1158 – 1167.

Peg linterferon-Ribavirin



What to support :



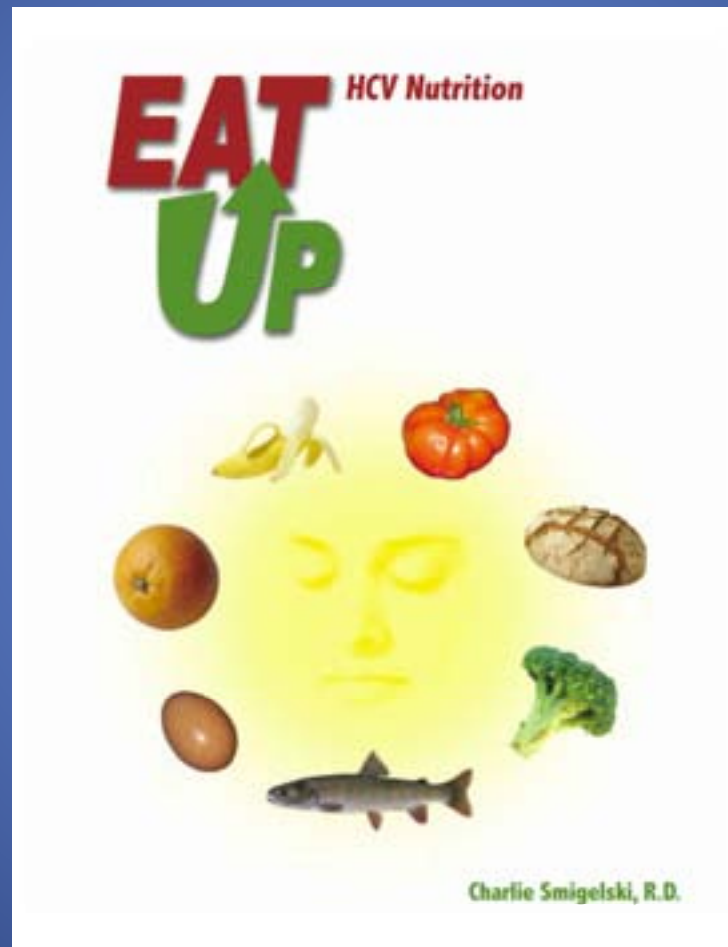
Protein: FISH Glutamine N-acetylcysteine

Thanks for your attention

Charlie Smigelski, RD

www.eatupbooks.com

www.eatupbooks.com



tong ren therapy

Charlie Smigelski, RD

www.eatupbooks.com