



Welcome To Today's Webinar

What is Integrative Sports Nutrition?

Presented by
Ian Craig

About today's webinar



Today's webinar is being produced jointly by the British Association of Sport and Exercise Sciences (BASES) and Human Kinetics.

It is scheduled to last for about an hour and will be recorded and made available for download and playback.

You will receive an email containing a link to the recording when it is available.

All microphones and phone lines are muted so we ask that you submit questions by typing them into the question box located in the lower right corner of your screen and click "send."

We'll collect any questions sent throughout the presentation for Ian and he will answer as many as possible during the Q&A segment at the end.

Join the conversation through Twitter #SportsNutritionWebinar

@ian_tNI

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About today's presenter



Ian Craig is an exercise physiologist, nutritional therapist, NLP practitioner and an endurance coach.

He was a competitive middle-distance runner for 20 years and is now a more leisurely runner and cyclist.

Ian specialises in Functional and Integrative Sports Nutrition, a fast-evolving discipline that considers both health and performance of an athlete from an integrative health perspective.

He is the editor of *Functional Sports Nutrition* magazine and is conference leader of Sports Nutrition Live. Additionally, Ian runs a private nutritional therapy practice in Johannesburg, South Africa.



What is Integrative Sports Nutrition?

SECOND EDITION
SPORT NUTRITION
JEUKENDRUP
GLEESON
HUMAN KINETICS

ADVANCED SPORTS NUTRITION
BENARDOT
HUMAN KINETICS

SECOND EDITION
Endurance Sports Nutrition
Girard Eherle
HUMAN KINETICS

FOOD FOR SPORT COOKBOOK
KAREN INGE & CHRISTINE ROBERTS
NEW HOLLAND

SECOND EDITION
Nancy Clark's SPORTS NUTRITION GUIDEBOOK
CLARK
HUMAN KINETICS

Advances in EXERCISE IMMUNOLOGY
Mackinnon
HUMAN KINETICS

Antioxidants and EXERCISE
KARLSSON
HUMAN KINETICS

THE FUTURE OF SPORTS NUTRITION
NUTRIENT TIMING
John Ivy, Ph.D., & Robert Portman, Ph.D.
Basic Health

STRENGTH BAND TRAINING
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NUTRIENT TIMING for Peak Performance
Skolnik • Cherrus
HUMAN KINETICS

OPTIMUM SPORTS NUTRITION
Your Competitive Edge
Dr. Michael Colgan
Advanced Research Press

International Journal of SPORT NUTRITION
VOLUME 5 • GSSI SUPPLEMENT 1995

SPORTS NUTRITION GUIDE Dr. Michael Colgan
APPLE PUBLISHING

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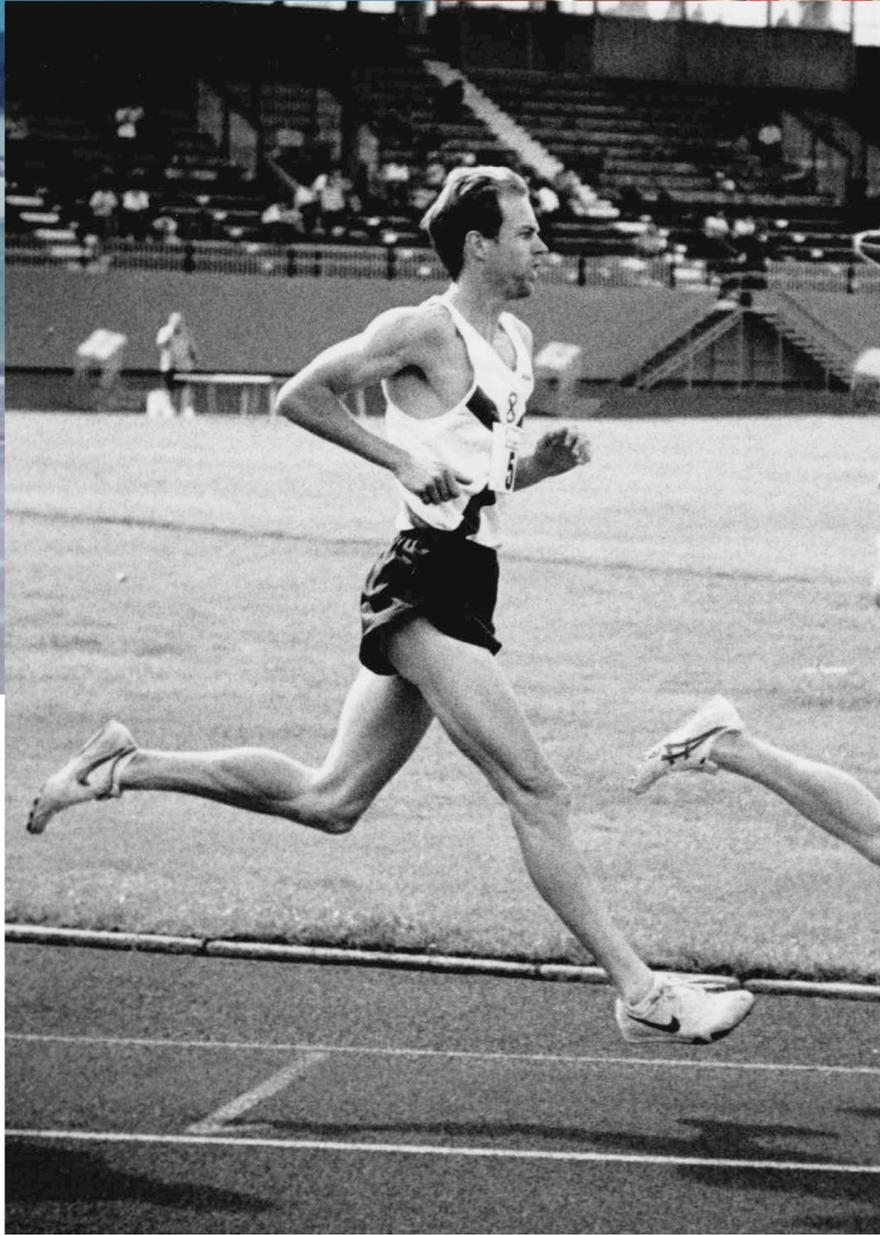
Fallowfield
Wilkinson
Improving Sports Performance in Middle and Long-Distance Running
VELO Press

NEWSHOLME
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RUNNERS WORLD THE RUNNER'S BODY
ROSS TUCKER, PhD, and JONATHAN DUGAS, PhD
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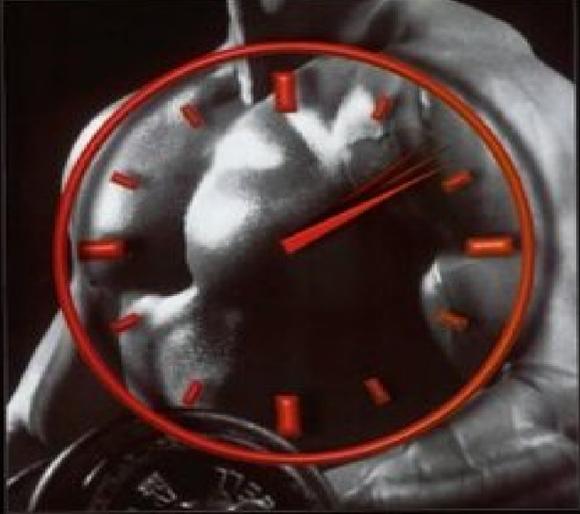




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THE FUTURE OF SPORTS NUTRITION

NUTRIENT TIMING



The revolutionary system that adds the missing dimension to optimum sports nutrition—the dimension of time.

John Ivy, Ph.D., & Robert Portman, Ph.D.

Foreword by William Kraemer, Ph.D.



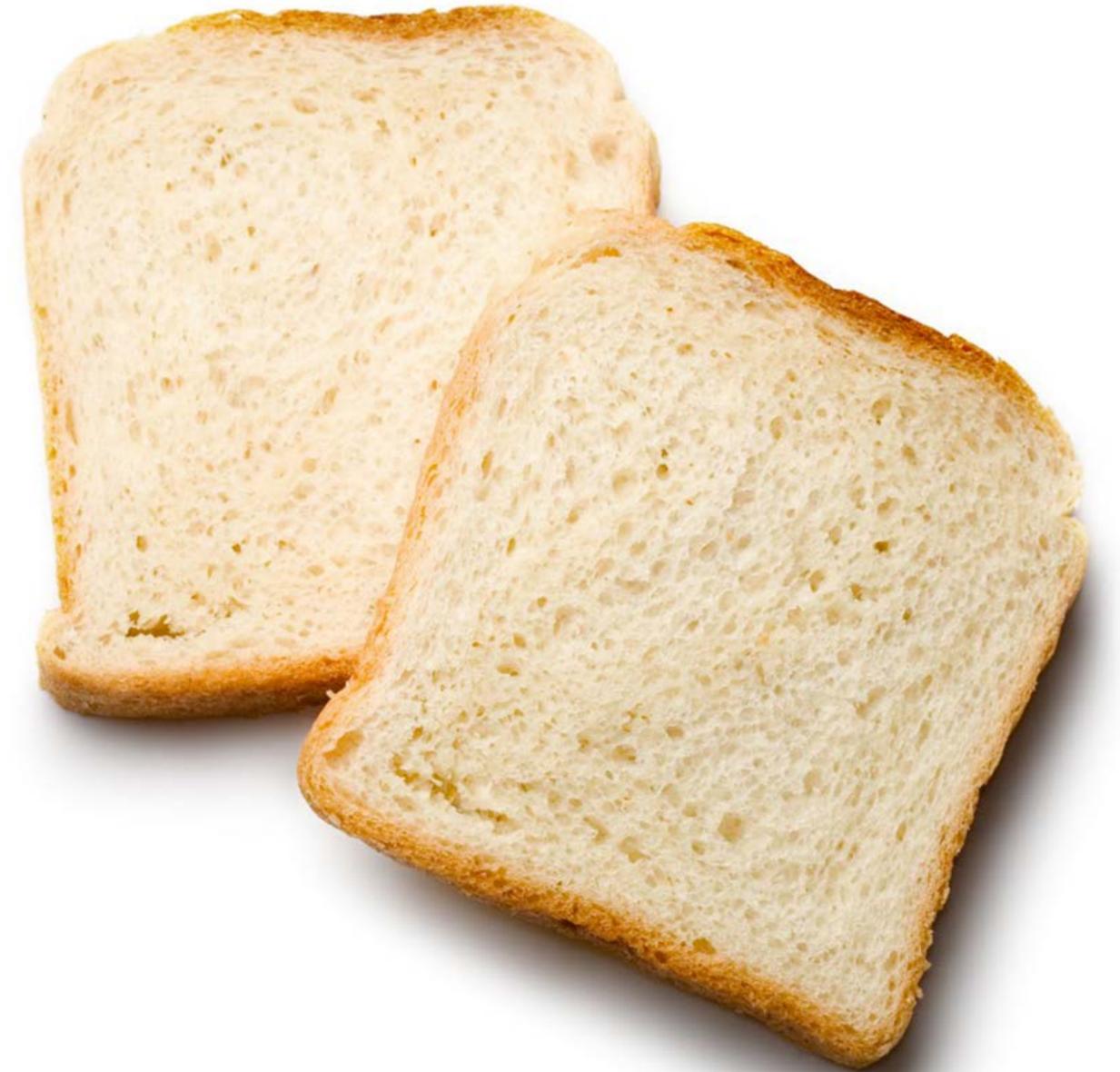
American College of Sports Medicine, Academy of Nutrition & Dietetics and Dietitians of Canada – Position Statement on Nutrition and Athletic Performance (2016)

- Carbohydrates are important to maintain blood-glucose levels during exercise and to replace muscle glycogen. Recommendations for athletes range from 3 to 12 g/kg body weight per day depending on activity.
- Protein requirements are slightly increased in highly active people. Recommendations for athletes are 1.2 to 2.0 g/kg body weight per day, depending on mode, volume and intensity of training.
- Athletes should be discouraged from consuming less than 20% of energy from fat. High-fat low-carb diets are not recommended for athletes, although further research is warranted.

My food mottos:

QUALITY BEFORE QUANTITY

FOOD BEFORE NUTRIENTS



Example of macronutrient over-analysis

Sports Med (2014) 44:655–670
DOI 10.1007/s40279-013-0137-7

SYSTEMATIC REVIEW

**Effects of
and Reco
A System**

Stefan M. Pasi
Tom M. McLe

“However, to date, when protein supplements are provided, acute changes in post-exercise protein synthesis and anabolic intracellular signalling have not resulted in measurable reductions in muscle damage and enhanced recovery of muscle function.”

Published online: ...
© Springer International Publishing Switzerland (outside the USA) 2014

Abstract

Background Protein supplements are frequently consumed by athletes and recreationally-active individuals, although the decision to purchase and consume protein supplements is often based on marketing claims rather than evidence-based research.

as well as performance metrics during single or repeat bouts of exercise.

Study Appraisal and Synthesis Methods Papers were evaluated based on experimental design and examined for confounders that explain discrepancies between studies such as dietary control, training state of participants,



Andrew Bosch, University of Cape Town

FitCon conference, Johannesburg 2016

**“There is enough of a question mark
to warrant using protein to aid
recovery”**

Example of micronutrient confusion

Vit C can reduce DOMS (Bryer & Goldfarb 2006)	Vit C can prolong DOMS (Close et al 2005)
<ul style="list-style-type: none">• 18 healthy men either took 3 g/day Vit C or a placebo for 3 weeks• They performed 70 eccentric elbow extensions with non-dominant arm• Muscle soreness was significantly reduced for the first 24 hours with Vit C• Vit C attenuated the creatine kinase increase at 48 hours after exercise• Vitamin C prevented the increase in oxidised glutathione, that was found with placebo	<ul style="list-style-type: none">• Subjects were given 1 g/day Vit C or a placebo 2-days before and 14-days after a downhill running bout• Downhill running resulted in DOMS in both groups• The Vit C group attenuated oxidative stress• Muscle function was impaired post-exercise in both groups, although a delayed recovery was noted in the Vit C group

Supps

**Performance
nutrition**

**Functional nutrition for
health**

**Seasonal organic
nature-made food**

History of Integrative or Functional Medicine



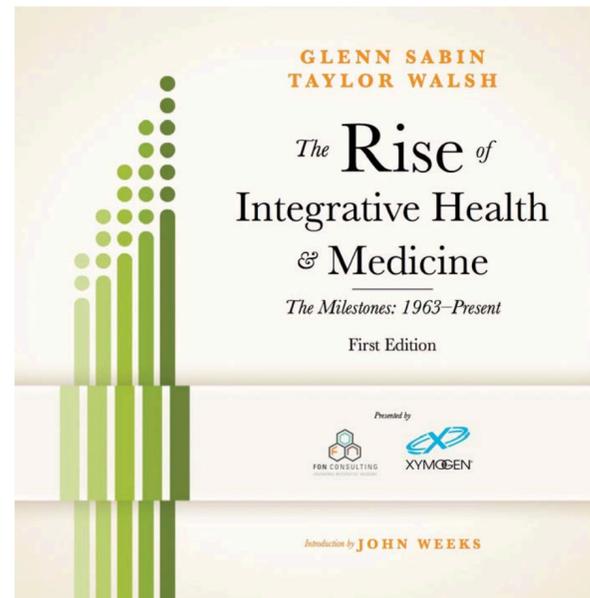
1983



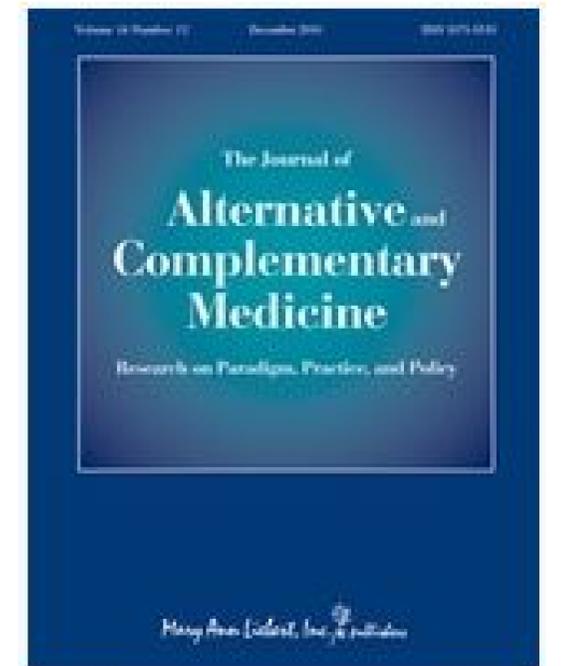
1994



1983



1991

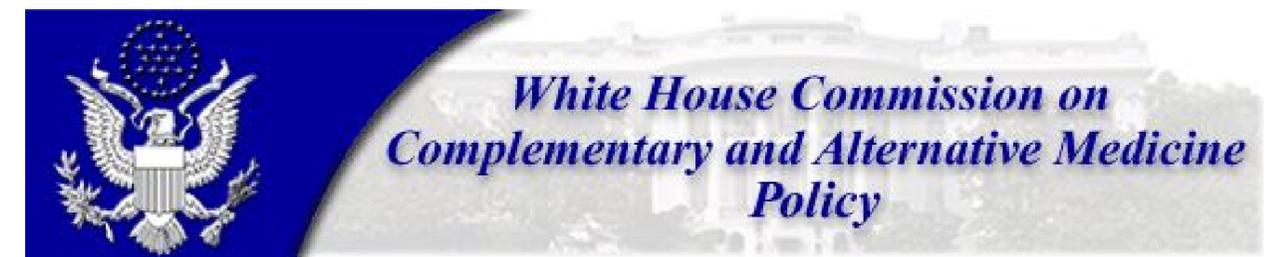


1995



1991

2002



History of Nutritional Therapy

1984



1997



2001



2002



2013

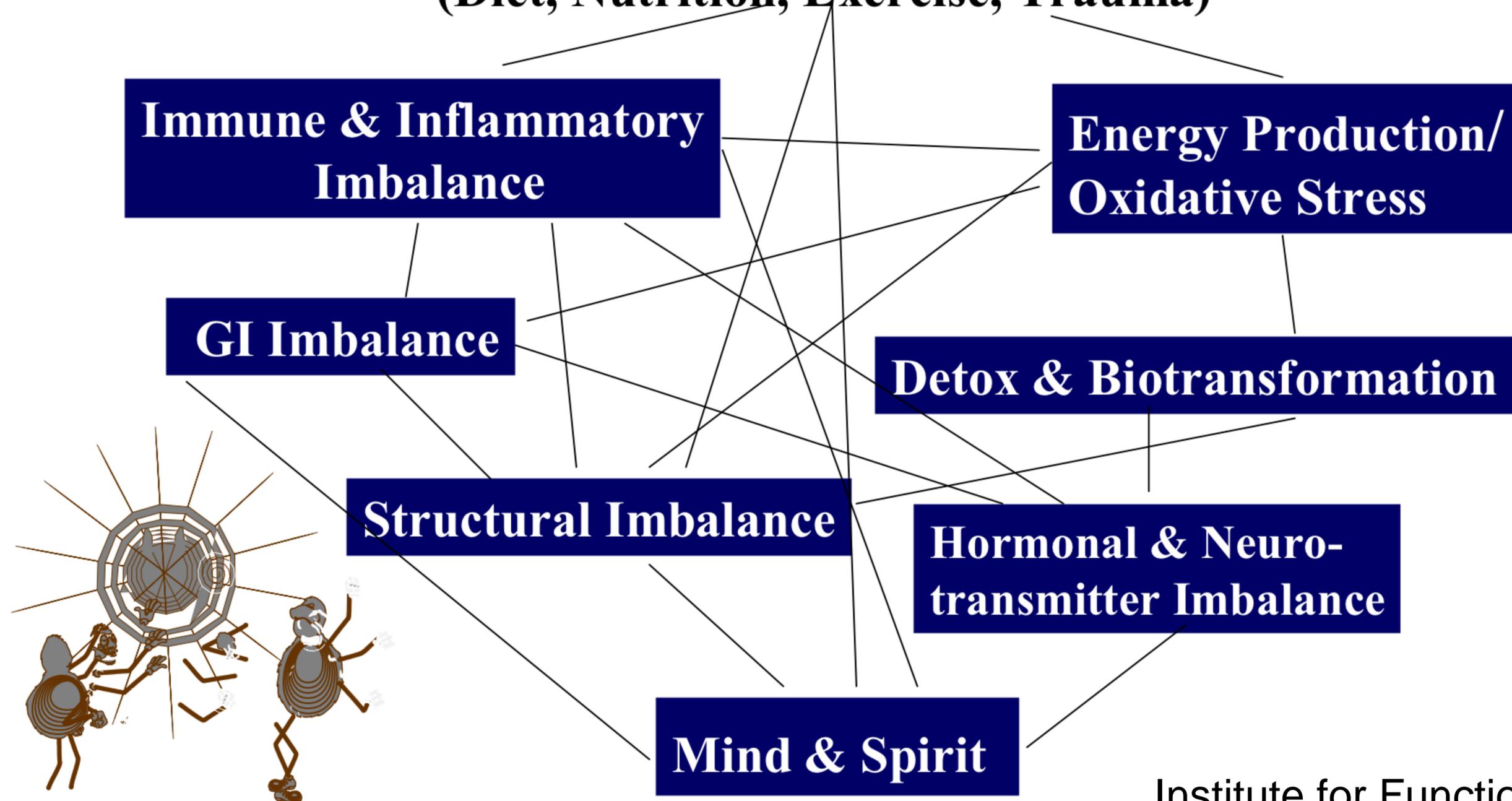


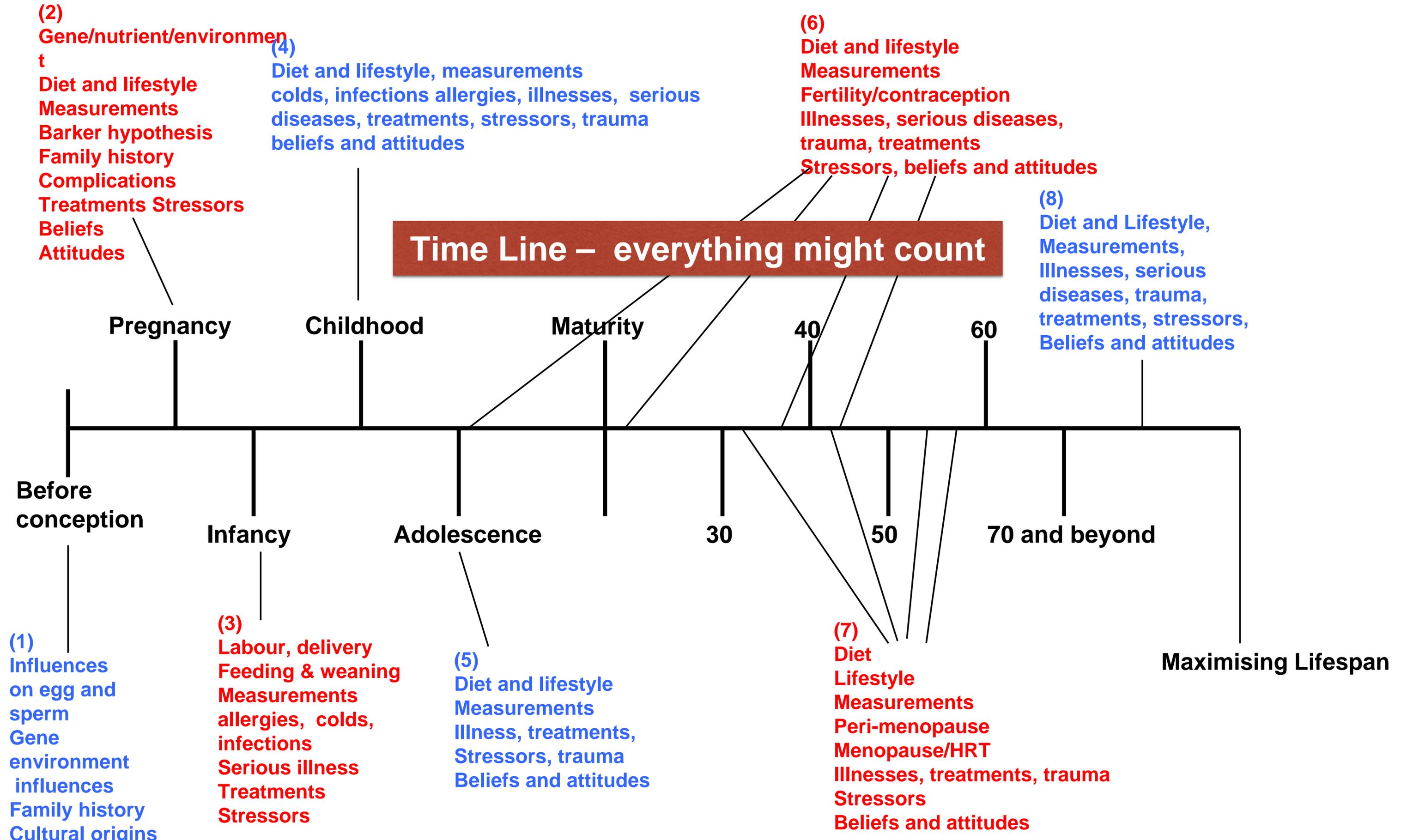


THE FUNCTIONAL MODEL

The Web

Environmental Inputs
(Diet, Nutrition, Exercise, Trauma)





Retelling the Patient's Story

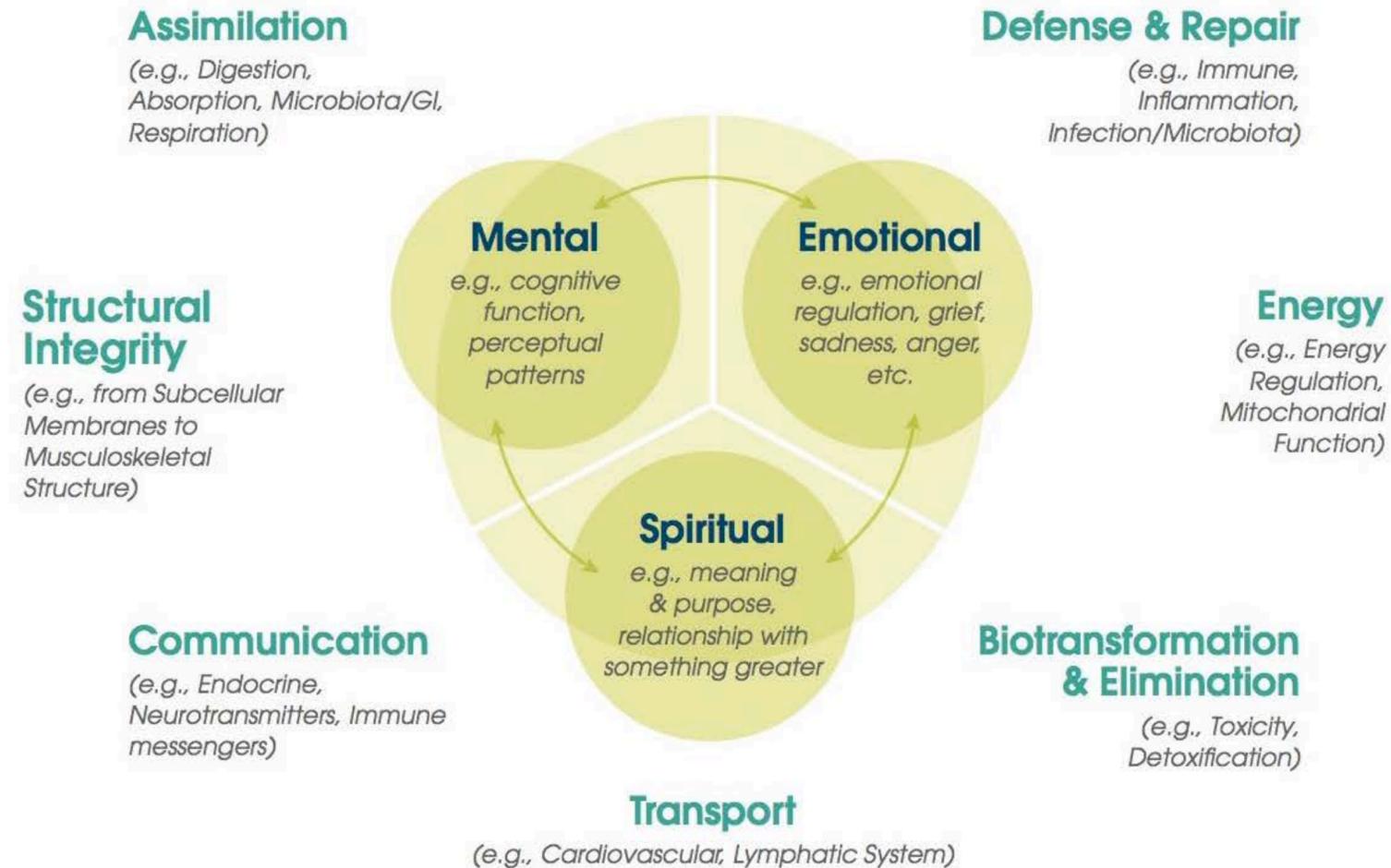
Antecedents

(Predisposing Factors—
Genetic/Environmental)

Triggering Events (Activators)

Mediators/Perpetuators (Contributors)

Physiology and Function: Organizing the Patient's Clinical Imbalances



Personalizing Lifestyle Factors

Sleep & Relaxation

Exercise & Movement

Nutrition & Hydration

Stress & Resilience

Relationships & Networks

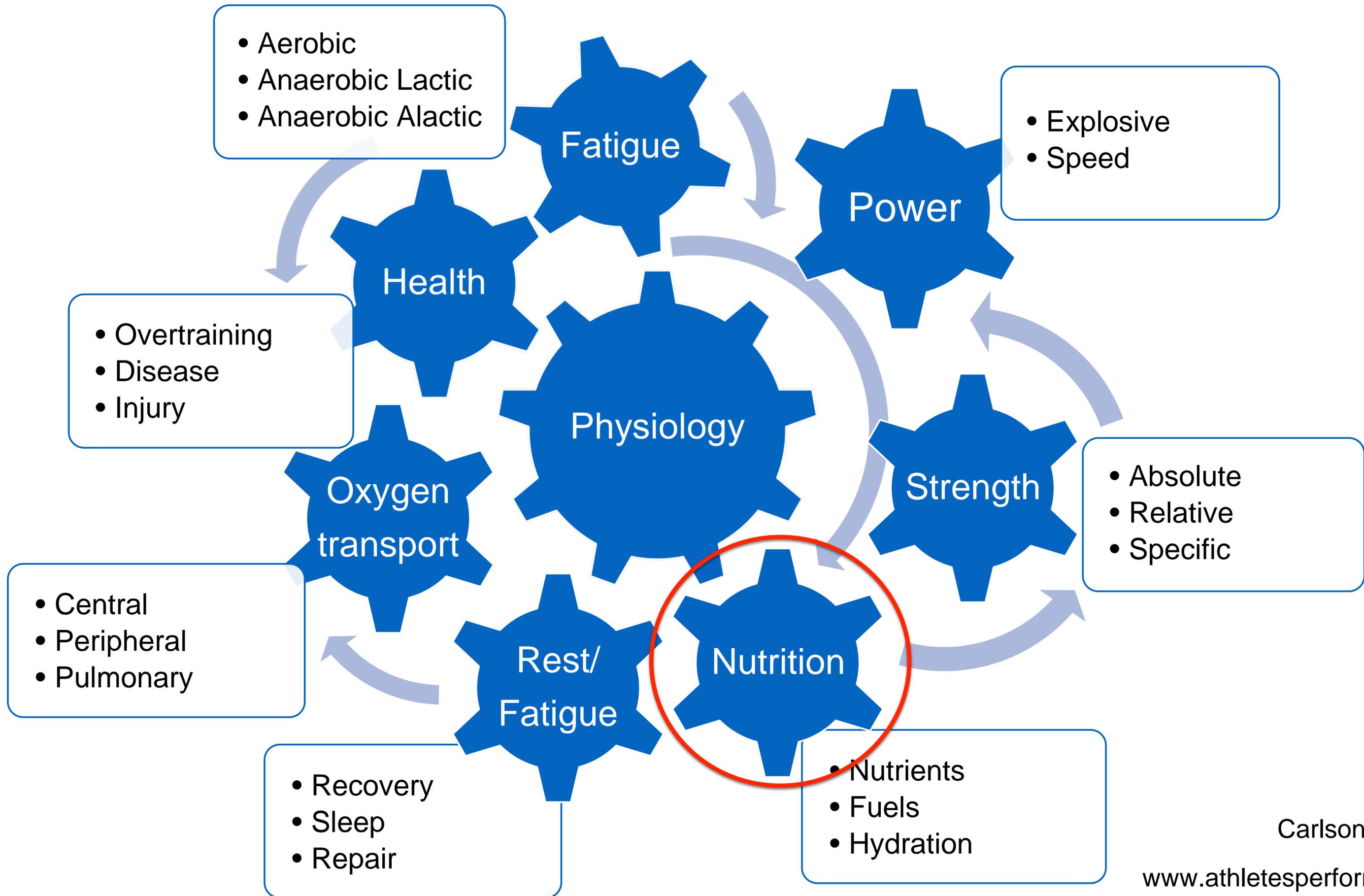
HIGH PRIORITY

MODERATE PRIORITY

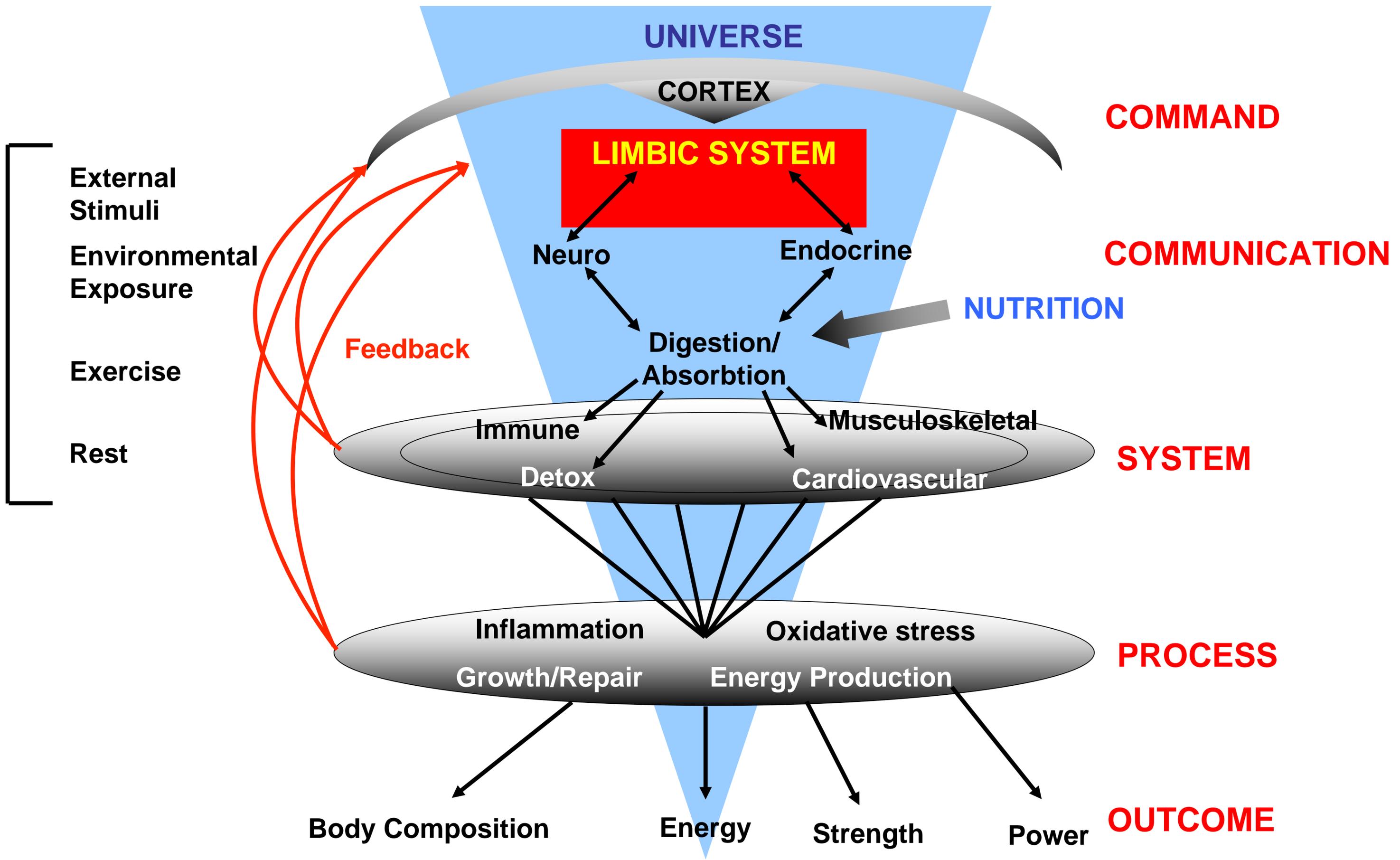
LOW PRIORITY

I Gastrointestinal (GI)				II Liver/GB	III Endocrine		IV Glucose Regulation		V Cardio-vascular		VI Mood			VII Immune	VIII Uro-logical	IX Musculoskeletal			X CNS & Brain		XI Male	XII Female					
A. Gastric Function	B. GI Inflammation	C. Small Intestine & Pancreas	D. Colon	Hepatobiliary Function	A. Thyroid	B. Adrenal	A. Dysglycemia-L	B. Dysglycemia-E	A. Heart	B. Circulation	A. Depression	B. Anxiety	C. Anger	Eyes, Ears, Nose, Throat & Lungs	Kidney & Bladder	A. Bone Integrity	B. Connective Tissue	C. Muscle & Nerves	A. Central Nervous System	B. Cognition	Prostate Health	A. Premenstrual Balance	B. Menstruation	C. Reproductive Tissue Inflammation	D. Hormone Balance	E. Ovarian Function	F. Estrogen/ Progesterone Decline
56	72	80	72	120	120	96	128	80	56	96	72	112	64	112	96	72	104	112	128	72	64	176	80	76	144	88	120
44	56	64	58	94	98	72	102	66	45	72	59	89	51	87	80	56	80	88	100	62	50	142	64	60	116	74	96
32	40	48	44	68	76	48	76	52	34	48	46	66	38	62	64	40	56	64	72	52	36	108	48	44	88	60	72
20	24	32	30	42	54	24	50	38	23	24	33	43	25	37	48	24	32	40	44	42	22	74	32	28	60	46	48
X	X	X				X							X				X	X	X		X						
8	8	16	16	16	32	16	24	24	12	16	20	20	12	12	32	8	8	16	14	2	8	40	16	12	32	32	24
7	7	14	14	14	28	14	22	22	11	14	18	18	11	11	26	7	7	14	14	28	7	32		10	26	26	20
6	6	12	12	X	12	12	20	20	10	12	16	16	10	10	20	6	6	12	12	24	6	24		8	20	20	16
5	5	10	X	10	10	20	10	18	18	9	10	14	9	9	14	5	5	10	10	20	5	16		6	14	14	12
4	4	8	8	8	16	8	16	16	8	X	12	12	8	8	8	X	4	8	8	16	4	8	8	4	8	8	8
3	3	6	6	6	12	6	12	12	6	6	9	9	6	6	6	3	3	6	6	12	3			3	6	6	6
2	2	4	4	4	8	4	8	8	4	4	X	6	4	4	4	2	2	4	4	8	2			2	4	4	4
1	1	2	2	2	4	2	4	4	2	2	3	3	2	2	2	1	1	2	2	4	1			1	2	2	2

Health Appraisal Graph



Carlson (2006)



A woman with long brown hair, wearing a grey short-sleeved t-shirt and a red skirt, is shown from the waist up. She is holding her right hand to her stomach, specifically the lower abdominal area, suggesting discomfort or pain. The background is a soft, out-of-focus green, likely representing a natural outdoor setting. In the bottom left corner, there is a close-up, slightly blurred image of a bamboo stalk. The overall tone is health-related and natural.

GASTROINTESTINAL HEALTH

Gastrointestinal Problems in Runners

– an example of Physiological Stress

- Gastrointestinal symptoms are experienced by 30 to 65% of long distance runners and although less studied, no doubt many other athletes
- Blood flow to the splanchnic system declines from 1.56 l/min at rest to 0.3 l/min at maximal exercise
- Mucosal compromise associated with running seems to allow entry of endotoxins into the portal circulation

Simons & Kennedy (2004)

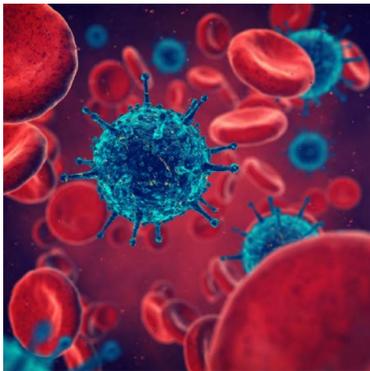
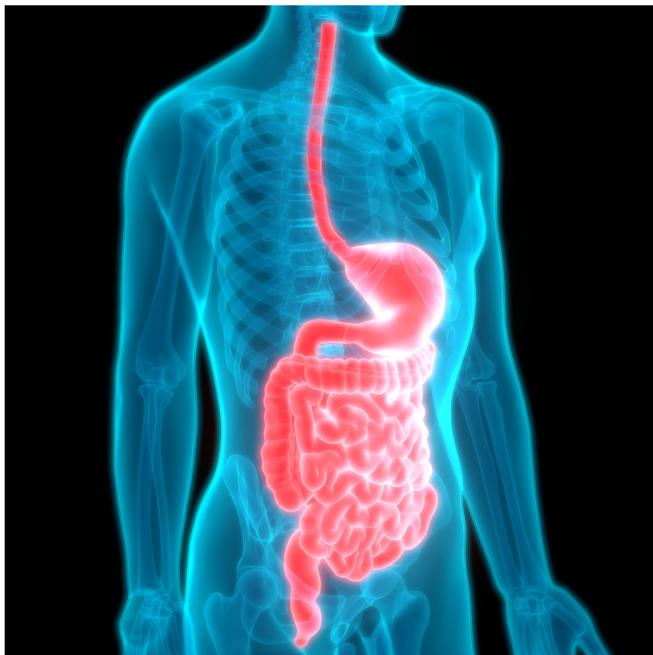
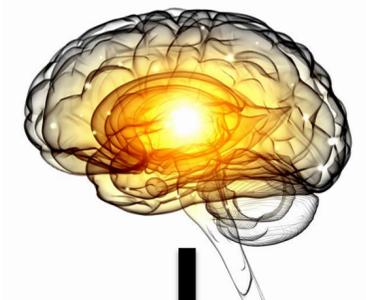
Justin Roberts - SNL 2016

Minimise/Eliminate

- Before
 - Lower fat, fibre, protein content
 - Total sugar load
 - Lactose
 - NSAIDs
 - Caffeine
 - Wheat/gluten
- During
 - Single CHO/fructose

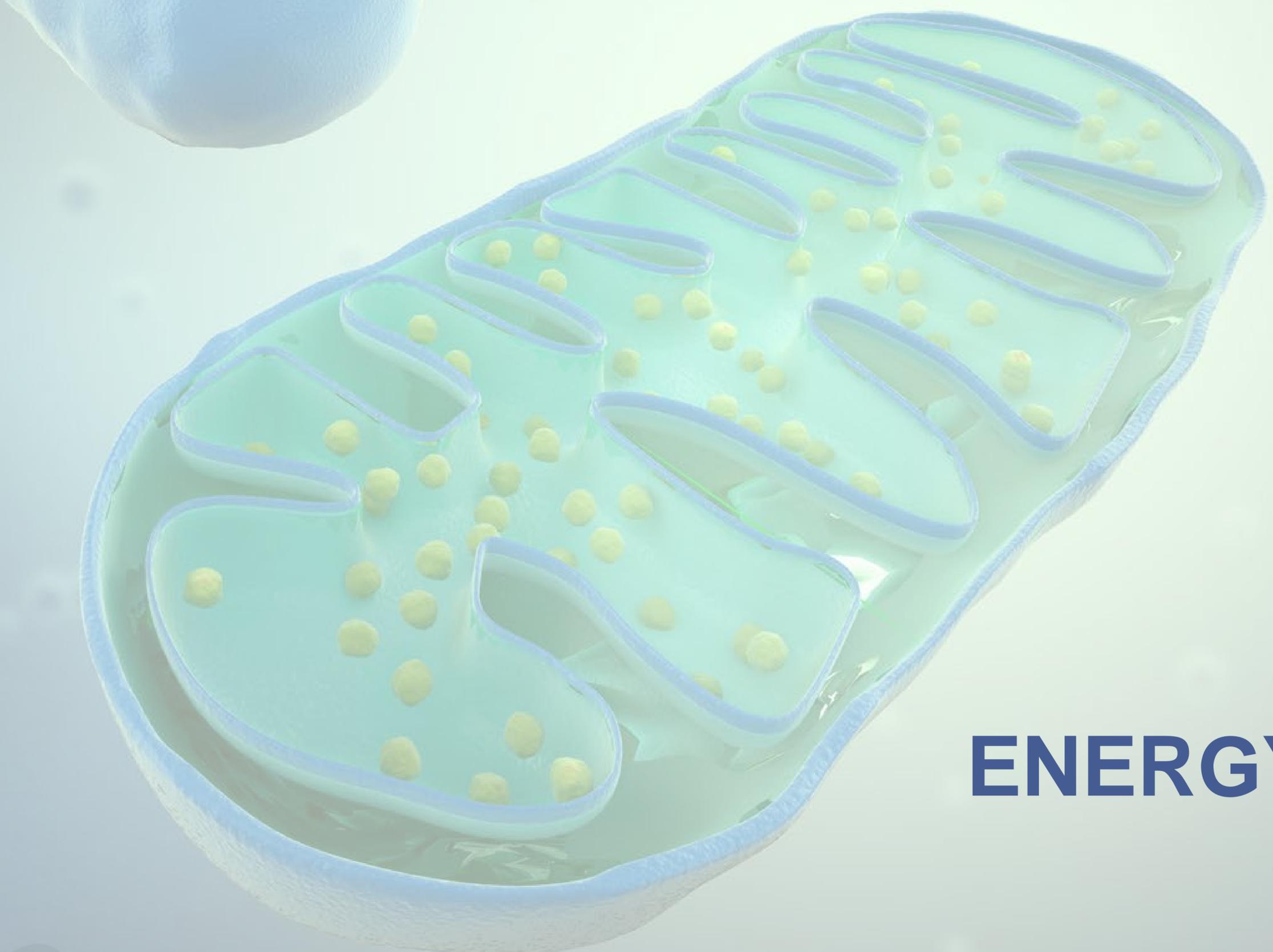
Positive/Interactive

- Before
 - Probiotics
 - Prebiotics
 - Colostrum
 - L-glutamine/zinc
 - Habitual flavonoids
 - Anti-inflammatory diet (inc. EFAs)
 - NO stimulation (nitrates)
 - Low residual/FODmaps
- During
 - Multiple transportable CHO
 - Maintain hydration intake



The 4R GI Programme

1. **Remove** food sensitivities, toxicity, pathogens
2. **Replace** stomach acid and digestive enzymes
3. **Reinoculate** pre and probiotics
4. **Repair** intestinal lining



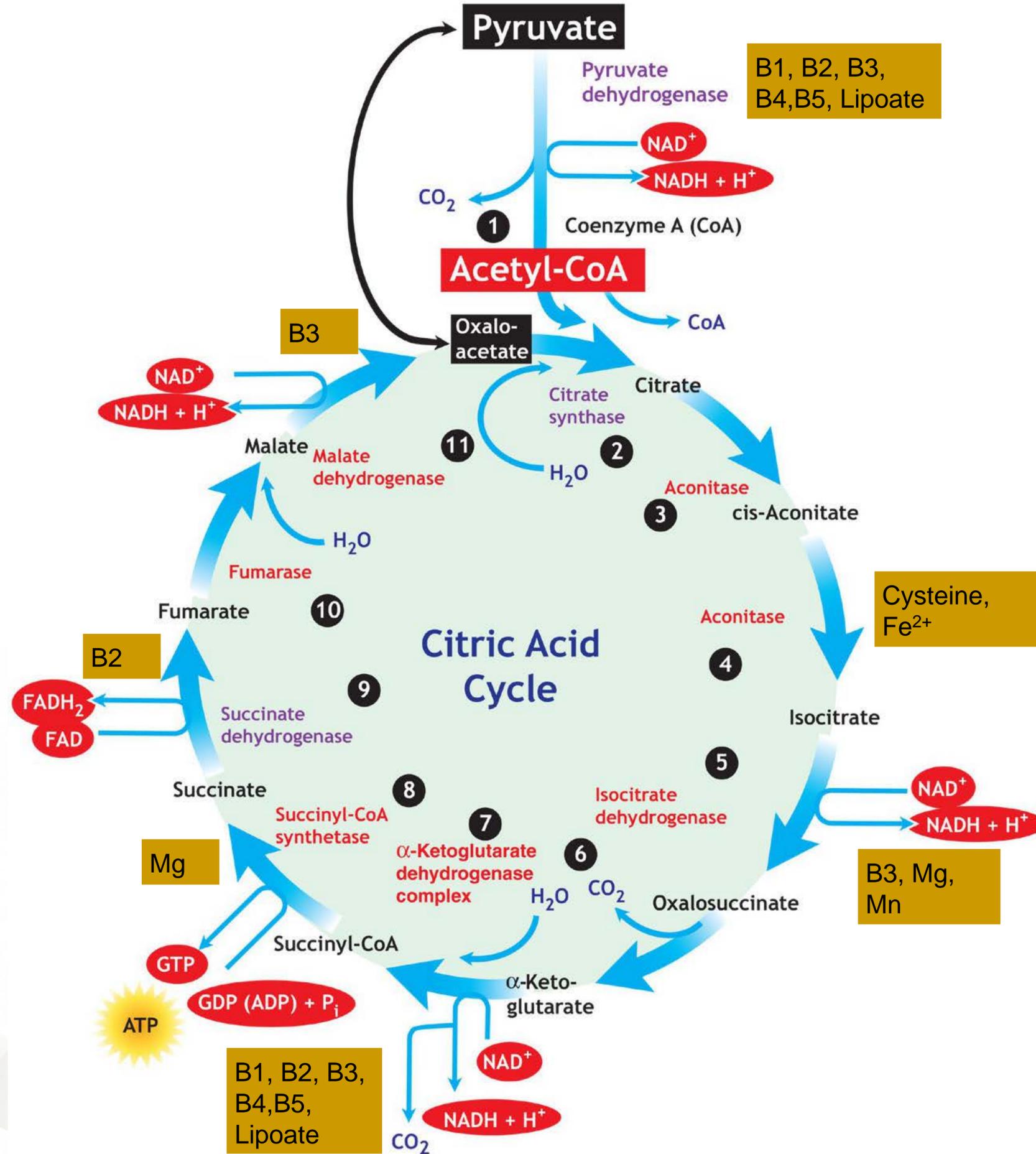
ENERGY

Mitochondria and Communication

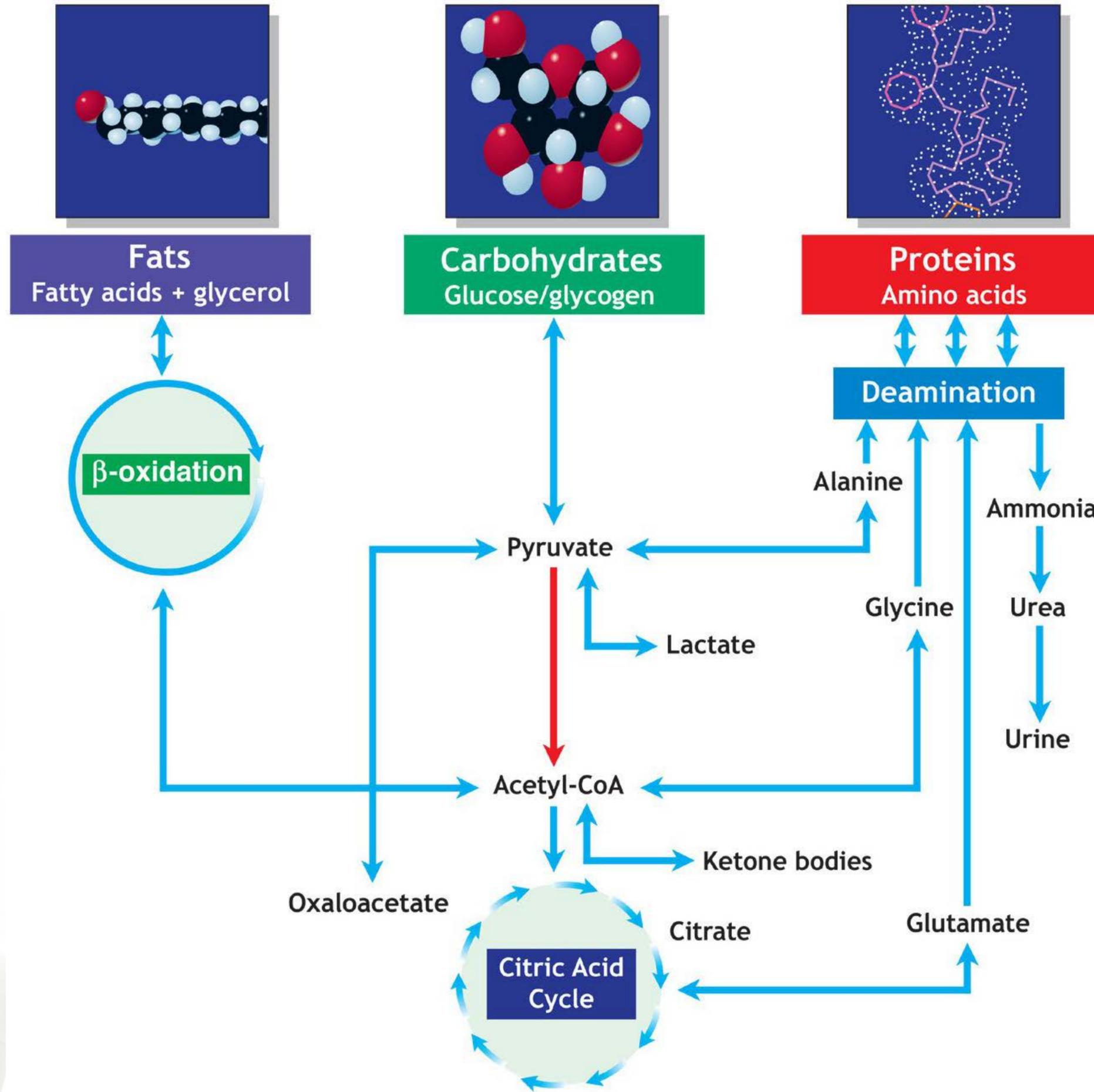
“The postulation has been made that decreased energy production may result in hypothalamic dysfunction, which then manifests as hormonal imbalances, insomnia, immune system dysfunction with resultant frequent infections, and autonomic dysfunction.”

Teitelbaum et al 2006

Nutrients from Lord & Bralley (2008)

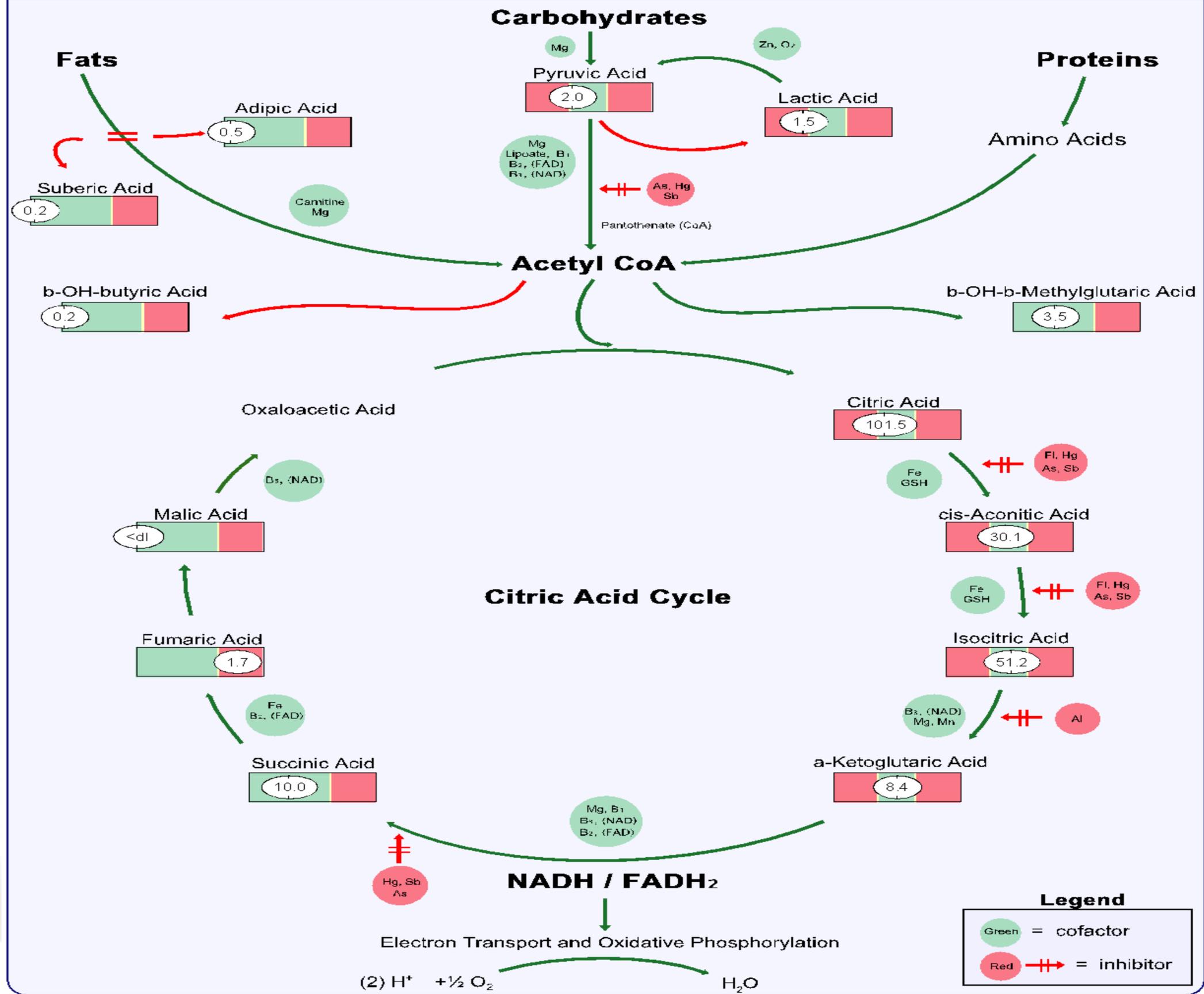


McCardle, Katch & Katch - Fig 6.18



McCardle, Katch & Katch - Fig 6.18

Krebs Cycle at a Glance



Organic Acids
lab test

Mitochondria sample results

ATP (adenosine triphosphate), studies on neutrophils

ATP is hydrolysed to ADP and phosphate as the major energy source in muscle and other tissues. It is regenerated by oxidative phosphorylation of ADP in the mitochondria. When aerobic metabolism provides insufficient energy, extra ATP is generated during the anaerobic breakdown of glucose to lactic acid. ATP reactions require magnesium. ADP to ATP conversion can be blocked by environmental contaminants as can the translocator [TL] in the mitochondrial membrane. [TL] efficiency is also sensitive to pH and other metabolic-factor changes. [TL] defects may demand excessive ADP to AMP conversion (not re-converted to ADP or through to ATP). Defects in Mg-ATP, ADP – ATP conversion and enzyme or [TL] blocking can all result in **chronic fatigue – a factor in any disease where biochemical energy availability is reduced.**

ATP whole cells:

With excess Mg added (Standard method of measuring ATP)	1.86	nmol/10 ⁶ cells	1.6 – 2.9
Endogenous Mg only (Measured ATP result is lowered during intracellular magnesium deficiency)	1.09	nmol/10 ⁶ cells	0.9 – 2.7
Ratio ATP/ATP ^{Mg}	0.59	> 0.65

ADP to ATP conversion efficiency (whole cells):

ATP ^{Mg} (from above)	1.86	nmol/10 ⁶ cells	(1*)	1.6 – 2.9
ATP ^{Mg} (inhibitor present)	0.07	nmol/10 ⁶ cells	(2*)	< 0.3
ATP ^{Mg} (inhibitor removed)	1.34	nmol/10 ⁶ cells	(3*)	> 1.4
ADP to ATP efficiency [(3* - 2*) / (1* - 2*)] x 100 =	70.9	%		> 60

Blocking of active sites (2*/1*) x 100 = **3.8 % up to 14**

ADP-ATP TRANSLOCATOR [TL] (mitochondria, not whole cells):

	<u>ATP</u> (pmol/10 ⁶ cells)	<u>Ref. range</u>	<u>change %</u>	<u>ref. range</u>
Start	338	290 – 700		
[TL] ‘out’	485	410 – 950	43.5	over 35% (<i>Increase</i>) (in-vitro test) reflects ATP supply for cytoplasm
[TL] ‘in’	90	140 – 330	73.4	55 to 75% (<i>Decrease</i>) (in-vitro test) reflects normal use of ATP on energy demand



Review article

Oxidative mechanisms in the toxicity of metal ions ☆

S.J. Stohs , D. Bagchi

Cadmium, mercury, and nickel, as well as lead, deplete glutathione... resulting in the production of reactive oxygen species..... as a consequence, enhanced lipid peroxidation, DNA damage... occur....

Fenton-like reactions may be commonly associated with most membranous fractions including mitochondria, microsomes, and peroxisomes... metal ions may enhance the production of TNF α and..... induce the production of stress proteins.

(TNF α) and activate protein kinase C, as well as induce the production of stress proteins. Thus, some mechanisms associated with the toxicities of metal ions are very similar to the effects produced by many organic xenobiotics. Specific differences in the toxicities of metal ions may be related to differences in solubilities, absorbability, transport, chemical reactivity, and the complexes that are formed within the body. This review summarizes current studies that have been conducted with transition metal ions as well as lead, regarding the production of reactive oxygen species and oxidative tissue damage.



**INDIVIDUALITY and
RESEARCH**

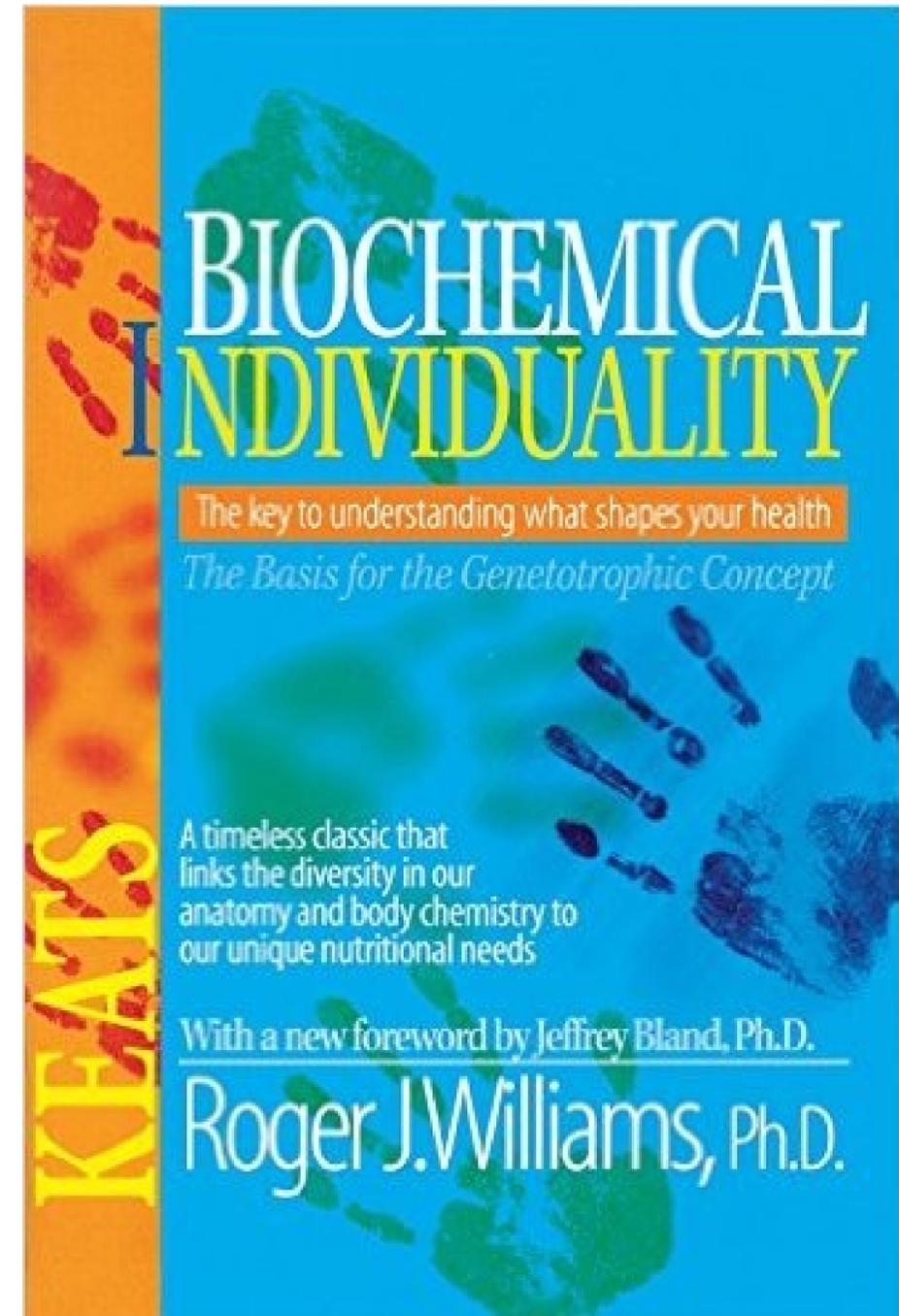
Biochemical Individuality

– Dr Roger Williams 1956

Dr Williams's major contributions

- Individual dietary needs
- Questioning of RDA's
- Gene-Nutrient-Environmental interactions

“nutrition applied with due concern for individual genetic variations, which may be large, offers the solution to many baffling health problems”



Kate Neil

“Individuals are multivariable, non-linear, high order, differential and adaptive systems that interact in a multivariable, non-linear, high order, differential and adaptive environment.”

Paul Greenhaff

“It has been suggested by some researchers in the ergogenics field, that the same supplement can produce favourable results in some individuals, neutral effects in others and occasionally detrimental effects in some.”

Greenhaff et al. (1994)

Welcome to the Science of Sport where we bring you the **second, third, and fourth** level of analysis you will not find anywhere else.

Be it doping in sport, hot topics like **Caster Semanya** or **Oscar Pistorius**, or the **dehydration myth**, we try to translate the science behind sports and sports performance. Consider a donation if you like what you see here!

Low carbohydrate diets: A plea for balance, scientific rigour & death to dogma

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05 Apr 2016

Posted by Ross

Category: [Physiology](#), [Sports Science](#), [Uncategorized](#)

The article below is a slightly longer, African newspaper, The Cape Argus, manner in which the diet 'war' about South Africa.

For personal reasons, this was a ver in the making. I've been watching t science unfold from the front row, a rather than the occasional comment

The intention in this entire debate, I motives of many), is to drive healthi protagonists in this debate, particula their positions somewhat.

The first reality, proven scientifically, depends on that adherence – a practical truth that is often lost in the theoretical battles that are so needlessly fought on this issue.

The second reality is that if our intentions are genuine, and we want the best possible outcome for the highest possible number of people, then recognising what I've tried to explain below will help, because we'll see that some people benefit

“if our intentions are genuine, and we want the best possible outcome for the highest possible number of people..... we'll see that some people benefit more from X, and others from Y. If we are rigid, and defensive, and if we own our own position too strongly, then we make it **LESS LIKELY** that this ever happens.”

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Low carbohydrate diets: A plea for balance, scientific rigour & death to dogma

Planning the tackle in rugby: A lesson A vs Z

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► Talent ID & Management Part 5: Early vs Late Specialisation?

“Knowledge changes, but sound thinking, logic and common sense do not. And so we have a responsibility to push back against hypocritical, narrow and incomplete debating methods, more than the actual content.”

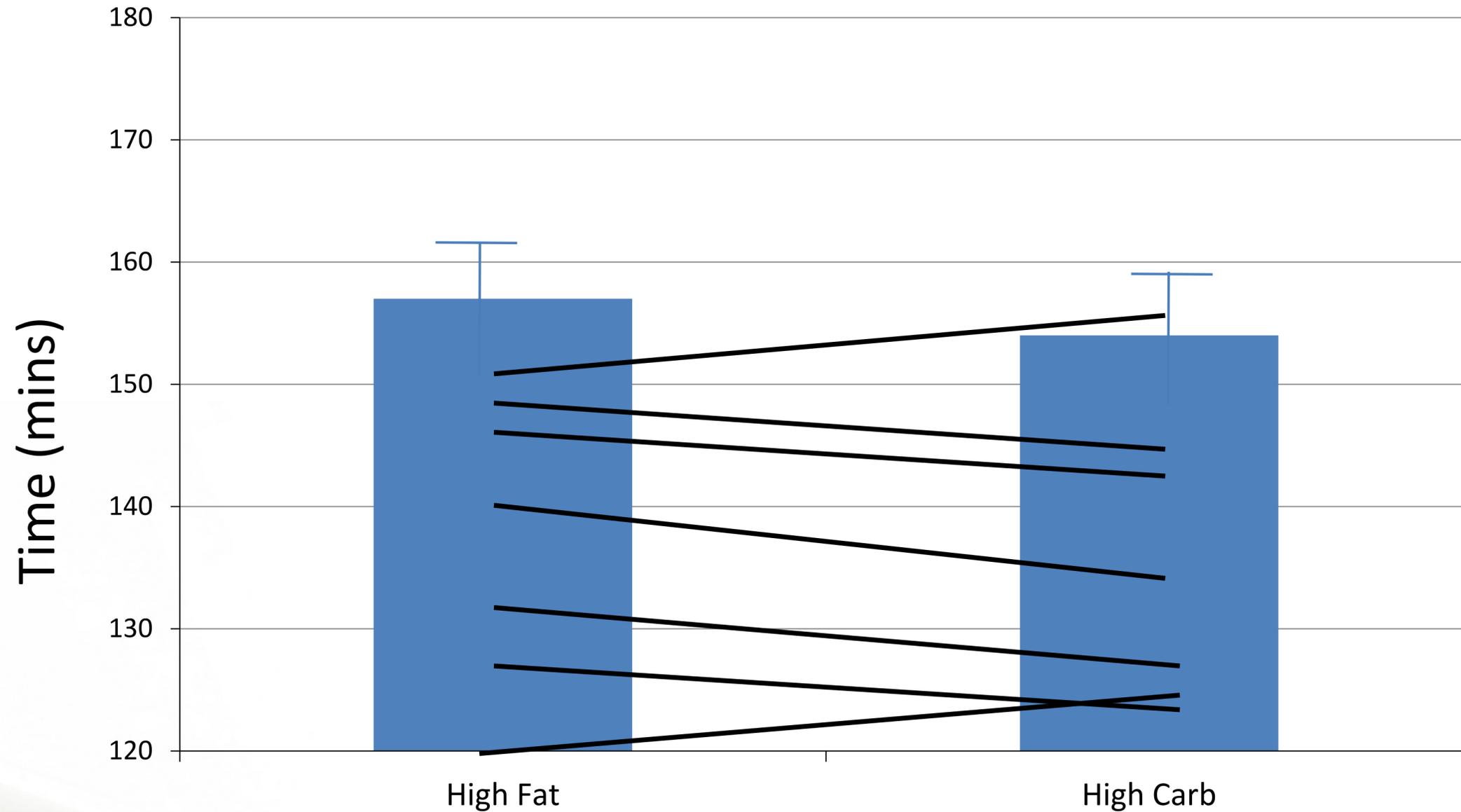
Ross Tucker

“The human body is centuries in advance of the physiologist, and can perform an integration of heart, lungs and muscles, which is too complex for the scientist to analyse”

Sir Roger Bannister

A cycling study

High Carb vs High Fat



Havemann L et al 2006

(Havemann L, West SJ, Goedecke JH, Macdonald IA, St Clair Gibson A, Noakes TD, Lambert EV)

Variability in exercise capacity and metabolic response during endurance exercise after a low carbohydrate diet

Int J Sport Nutr Exerc Metab. 2005 Apr;15(2):97-116.

Variability in exercise capacity and metabolic response during endurance exercise after a low carbohydrate diet.

[Claassen A¹](#), [Lambert EV](#), [Bosch AN](#), [Rodger IM](#), [St Clair Gibson A](#), [Noakes TD](#).

+ Author information

Abstract

The impact of altered blood glucose concentrations on exercise metabolism and performance after a low carbohydrate (CHO) diet was investigated. In random order, 1 wk apart, 9 trained men underwent euglycemic (CI) or placebo (PI) clamps, while performing up to 150 min of cycling at 70% VO₂(max), after 48 h on a low CHO diet. The effect of CI on exercise capacity was large (28 +/- 26%, P < 0.05). Fifty-six percent of subjects in CI failed to complete 150 min of exercise, despite being hypoglycemic. Similar amounts of muscle glycogen were used in both groups. The effect is highly variable between individuals, independent of changes in CHO oxidation.

PMID: 16089270 [PubMed - indexed for MEDLINE]



the effect is highly variable
between individuals and
independent of changes in CHO
oxidation

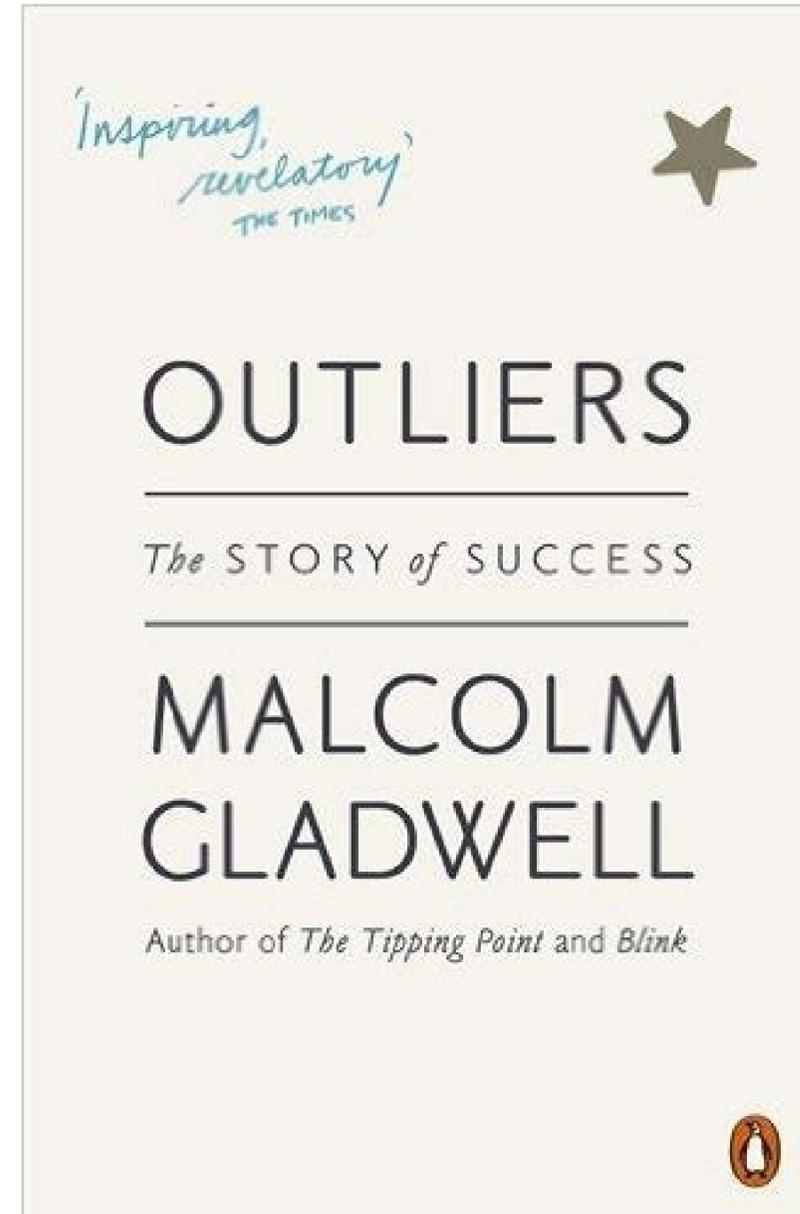
LACK OF EVIDENCE IS NOT EVIDENCE OF LACK

PARALYSIS BY ANALYSIS

Individuality

n = 1

**we are all
outliers in one
sense or
another**

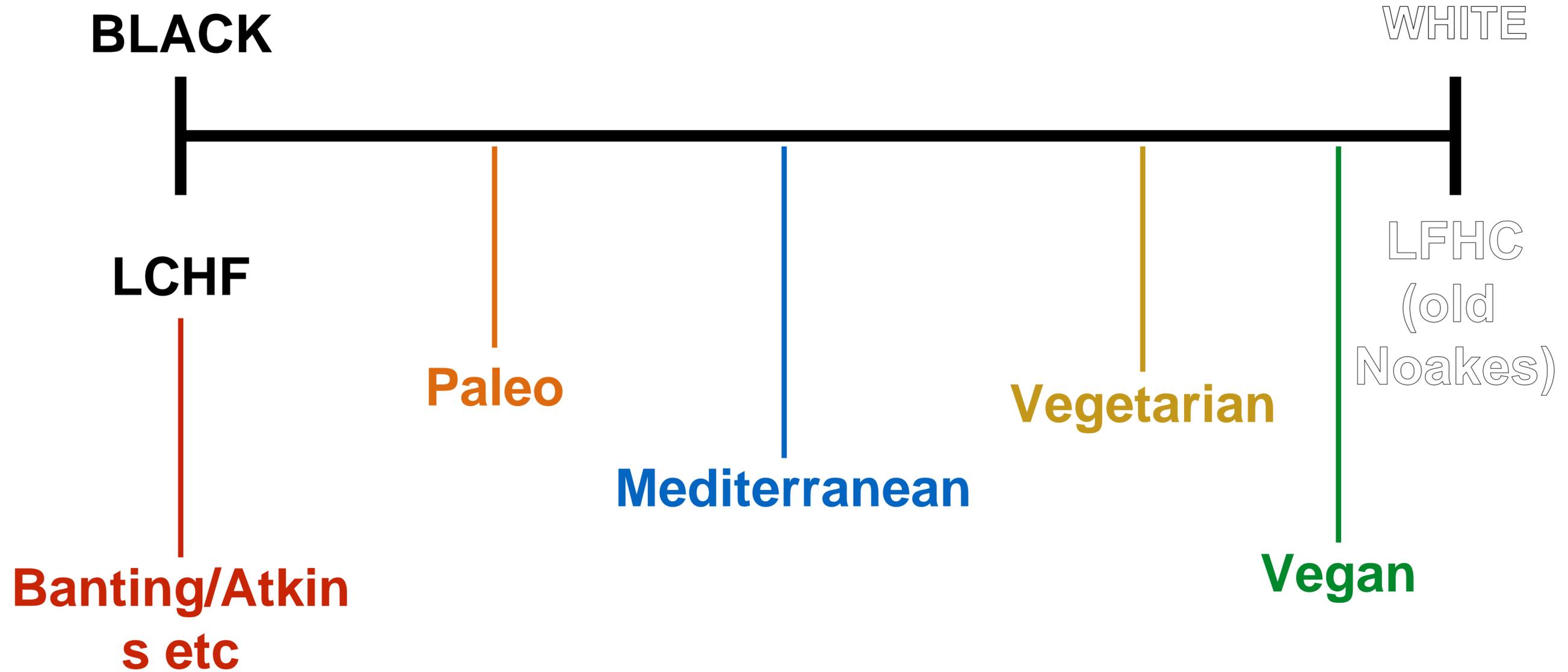


A 10x4 grid of 40 squares, each representing a different shade of grey. The shades transition from white in the top-left corner to black in the bottom-right corner, following a smooth grayscale gradient. The text "50+ SHADES OF GREY" is centered in the middle of the grid.

50+ SHADES OF GREY

MACRONUTRIENT BALANCE

where are you??



Future of Sports Nutrition - ISSN

The field of sports nutrition is a dynamic one – the understanding of exercise physiology, psychology, integrated metabolism and biochemistry are integral to success

References

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http://www.sportsnutrition society.org/site/conf_powerpoint_files.php?id=2 (Accessed March 2007).
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Any Questions?



We have already received quite a number of questions and we will now try and answer as many as possible in the time remaining.

Any that remain unanswered will be forwarded to Ian and he'll try and email you a reply in due course.

Join Us Next Time



This was the first webinar of a 4 part series by Ian Craig

Join us for the 2nd part next week on Wednesday 8th March 2017 for the next webinar:

“Overtraining from a functional health perspective”

You can find details on the Human Kinetics website at:

www.humankinetics.com/webinars

Thank you for joining us



Thank you to everyone for joining us today and thanks also to Ian for such an interesting presentation.

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