

# FAST-TRACKING HOMEOSTASIS WITH FOOD, PHYSICAL ACTIVITY AND COMPLEX MULTI-NUTRIENT NUTRITIONAL FORMULAS



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Robert Verkerk BSc MSc DIC PhD FACN  
Alliance for Natural Health International

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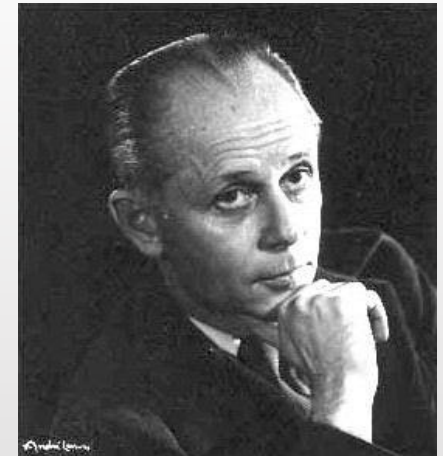
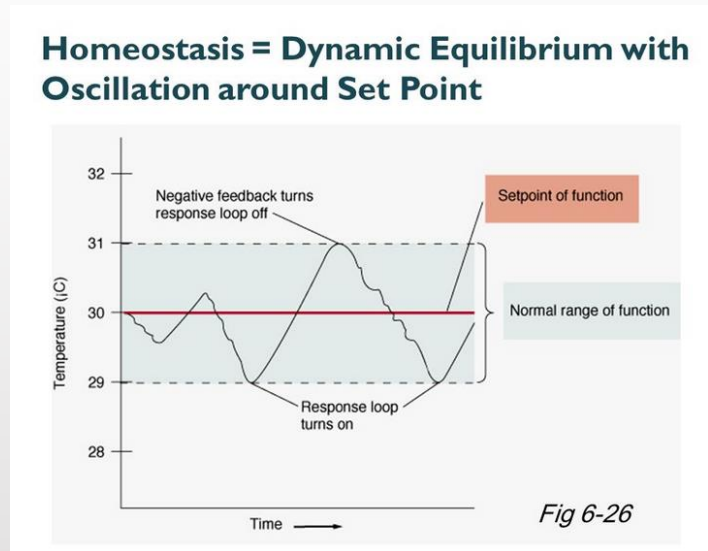
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# HOMEOSTASIS AND STRESS



Walter Cannon (1871-1945)

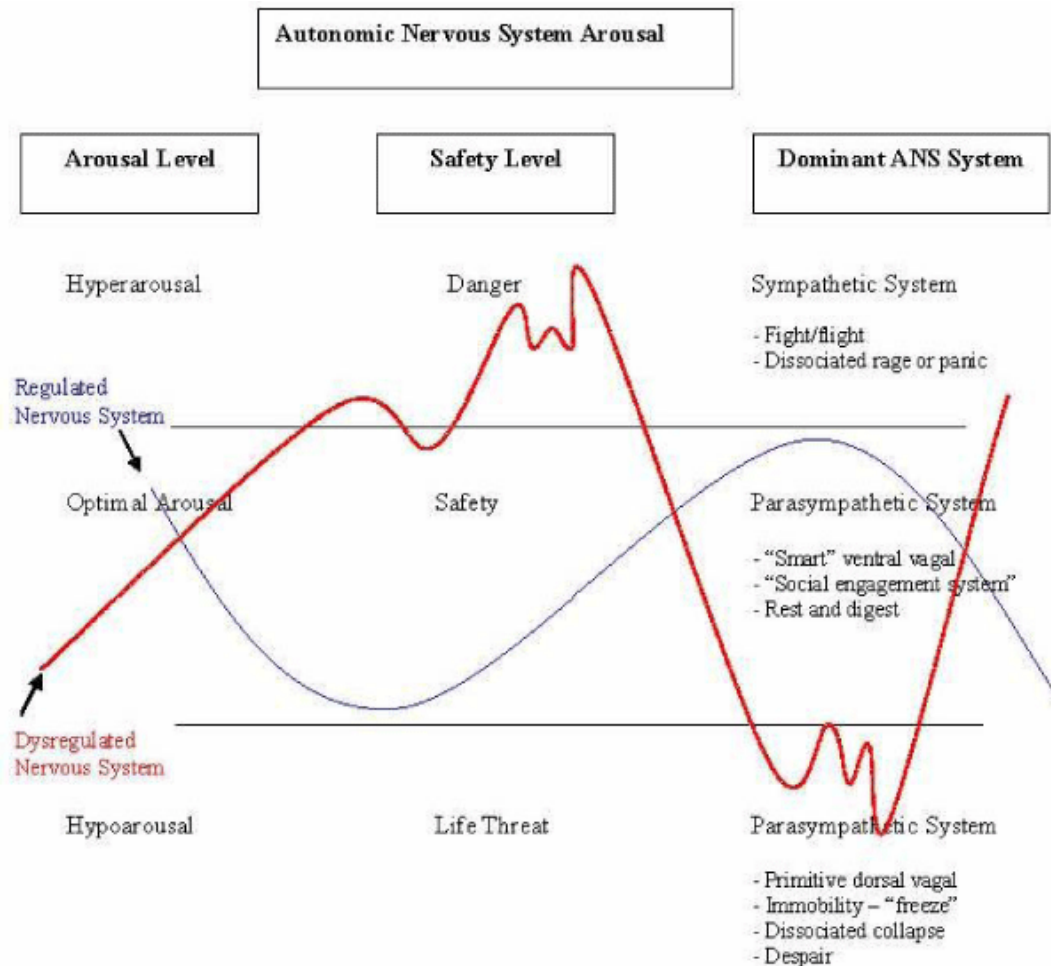


Hans Selye (1907-82)

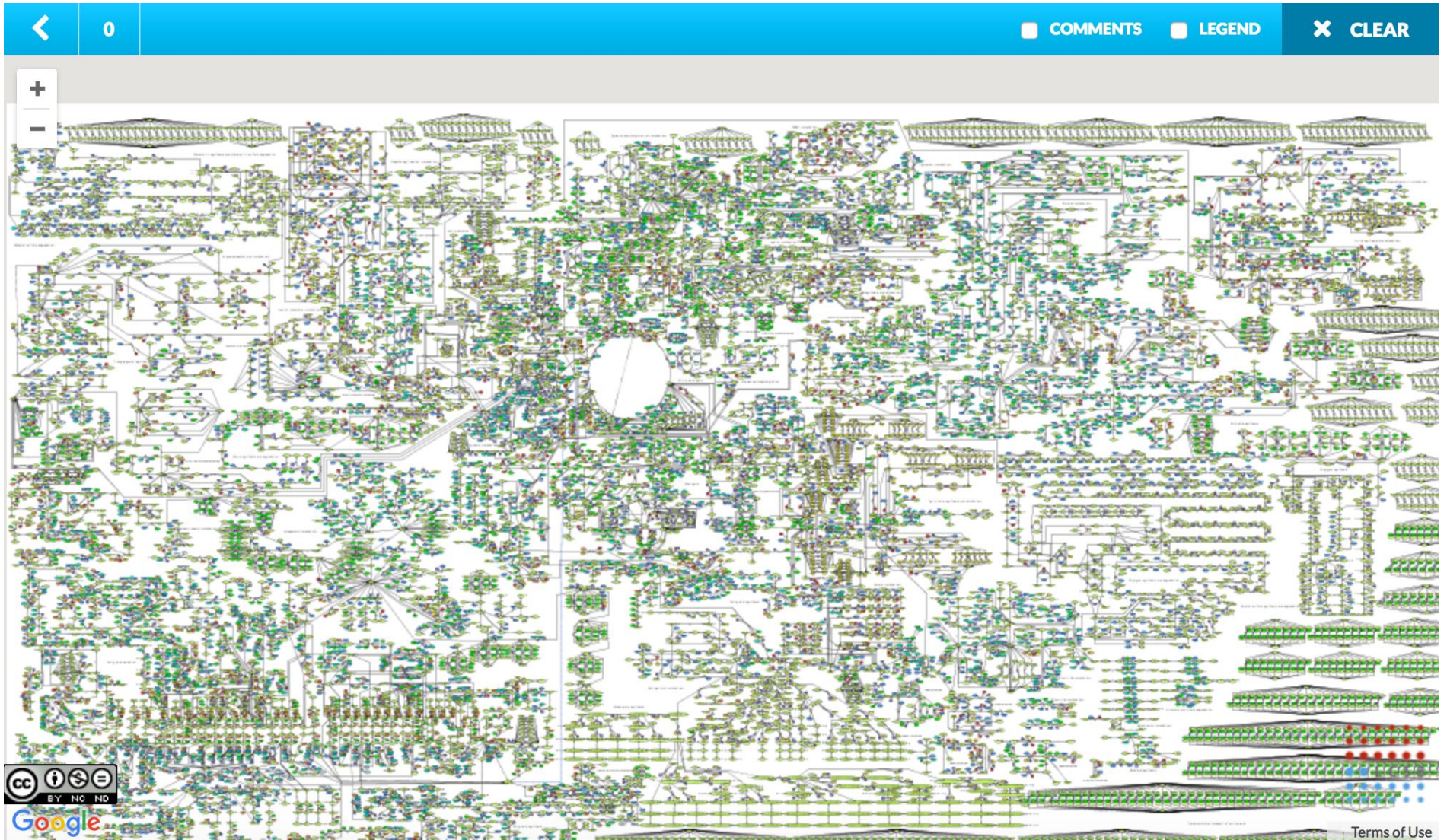
**Homeostasis (1926):** The tendency toward a relatively stable equilibrium between interdependent elements, especially as maintained by physiological processes

**Stress (1936):** the non-specific response of the body to any demand placed upon it

# EXAMPLE: EMOTIONAL STRESS AND ANS



# WHAT ARE WE DEALING WITH?



<http://vmh.uni.lu/#mapnavigator>

# WHAT ARE WE DEALING WITH?

- ~ 19,000 genes

Ezkurdia et al. Hum Mol Genet. 2014 Nov 15;23(22):5866-78.

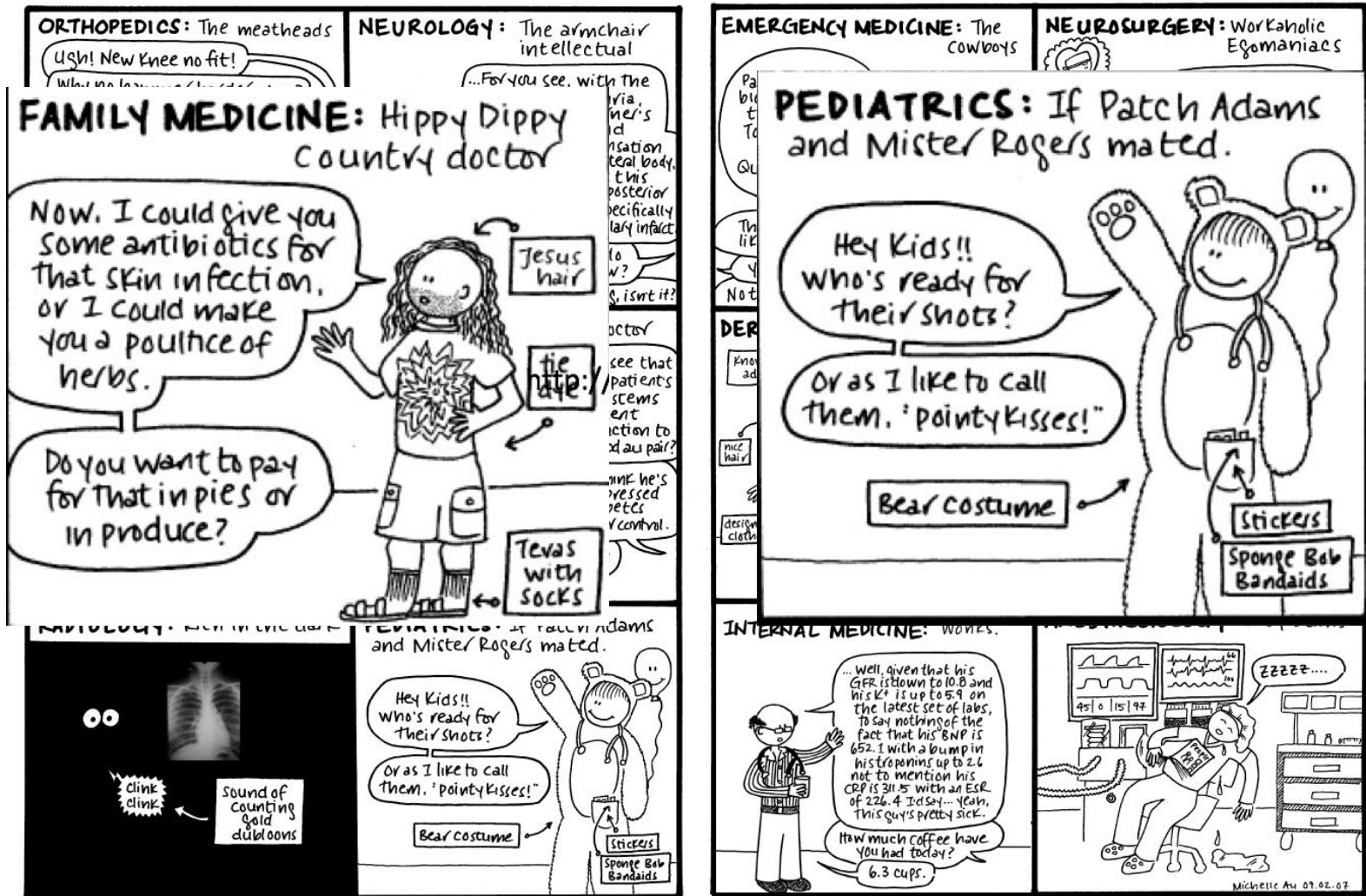
- 2,709 human enzymes to 896 bioreactions
- 622 of the enzymes are assigned roles in 135 predicted metabolic pathways

“The predicted pathways closely match the known nutritional requirements of humans.”

Romero et al [Genome Biol.](#) 2005; 6(1): R2.

# SPECIALISM AND REDUCTIONISM?

## The 12 Medical Specialty Stereotypes



# 12 BODY SYSTEMS



**▲ MUSCULAR SYSTEM**  
The muscular system consists of layers of muscles that cover the bones of the skeleton, extend across joints, and can contract and relax to produce movement.



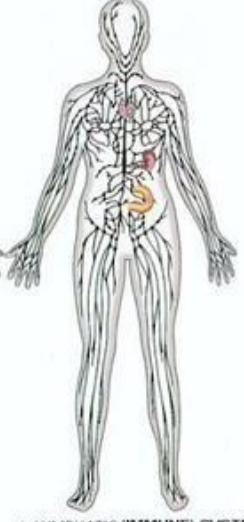
**▲ SKELETAL SYSTEM**  
The skeleton is a strong yet flexible framework of bones and connective tissue. It provides support for the body and protection for many of its internal parts.



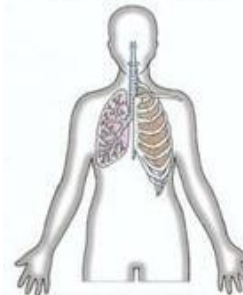
**▲ CIRCULATORY SYSTEM**  
This system consists of the heart and a network of vessels that carry blood. It supplies oxygen and nutrients to the body's cells and removes waste products.



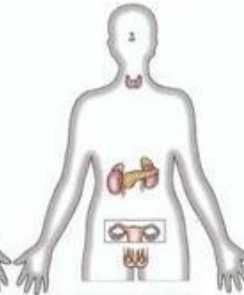
**▲ NERVOUS SYSTEM**  
The nervous system is the body's main control system. It consists of the brain, the spinal cord, and a network of nerves that extend out to the rest of the body.



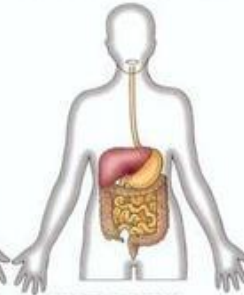
**▲ LYMPHATIC (IMMUNE) SYSTEM**  
This system is a network of vessels that collects fluid from tissues and returns it to the blood. It also contains groups of cells that protect the body against infection.



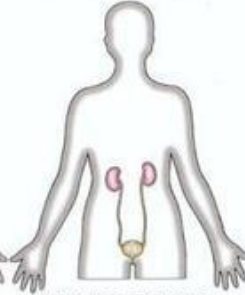
**▲ RESPIRATORY SYSTEM**  
The respiratory system is centered on the lungs, which work to get life-giving oxygen into the blood. They also rid the body of a waste product, carbon dioxide.



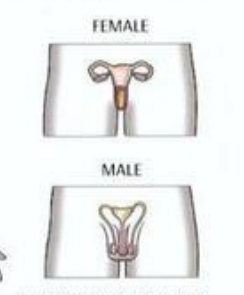
**▲ ENDOCRINE SYSTEM**  
Many body processes, such as growth and energy production, are directed by hormones. These chemicals are released by the glands of the endocrine system.



**▲ DIGESTIVE SYSTEM**  
The digestive system takes in the food the body needs to fuel its activities. It breaks the food down into units called nutrients and absorbs the nutrients into the blood.

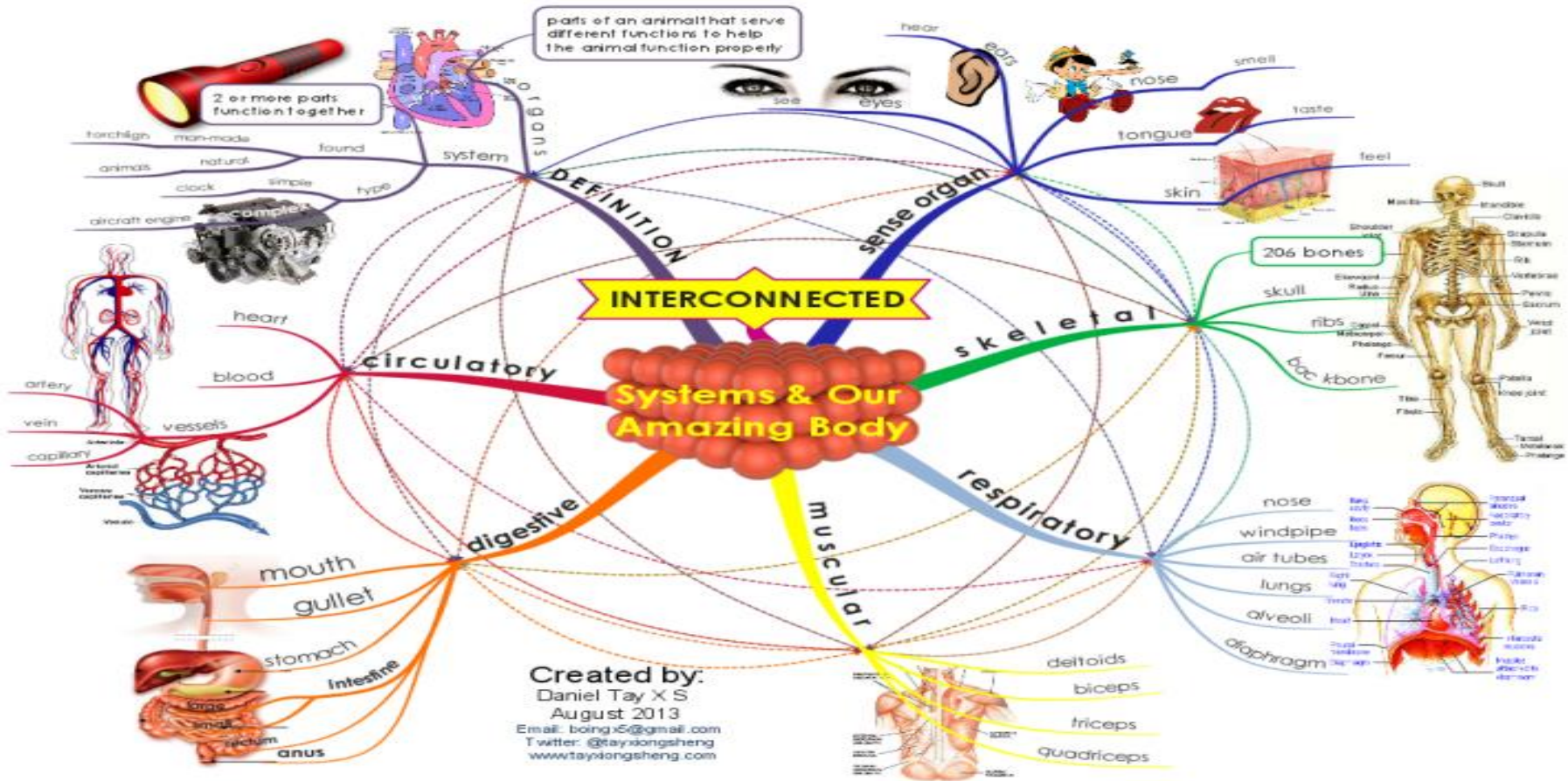


**▲ EXCRETORY SYSTEM**  
The body's cells produce waste products, many of which are eliminated in urine. The job of the urinary system is to make urine and expel it from the body.



**▲ REPRODUCTIVE SYSTEM**  
The male and female parts of the reproductive system produce the sperm and eggs needed to create a new person. They also bring these tiny cells together.

# INTERCONNECTED SUPER-SYSTEM



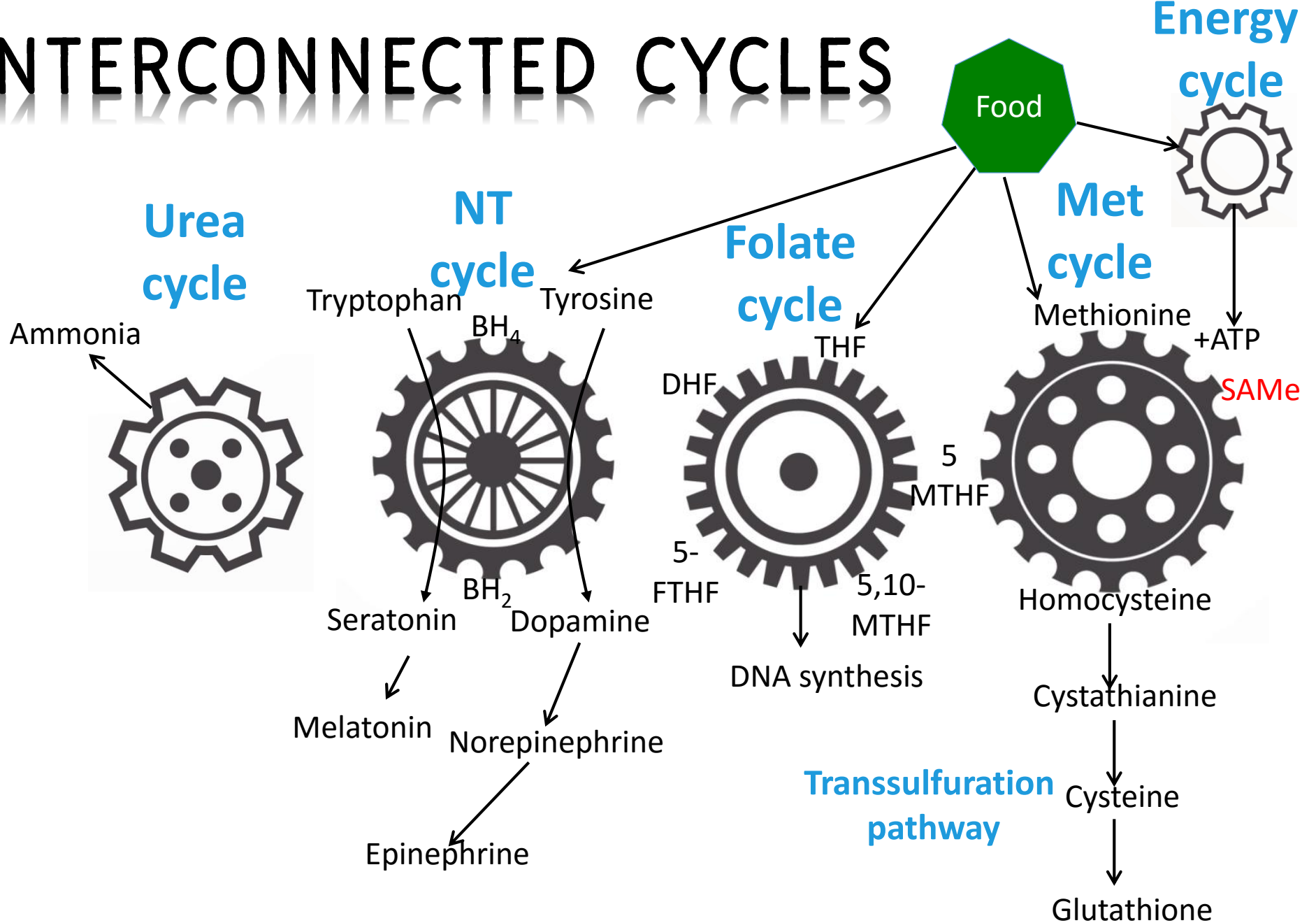
<https://imindmap.com/blog/back-to-school-10-mind-maps-that-every-student-and-teacher->



# OUR ROOTS



# INTERCONNECTED CYCLES



**The key? Balance / homeostasis**

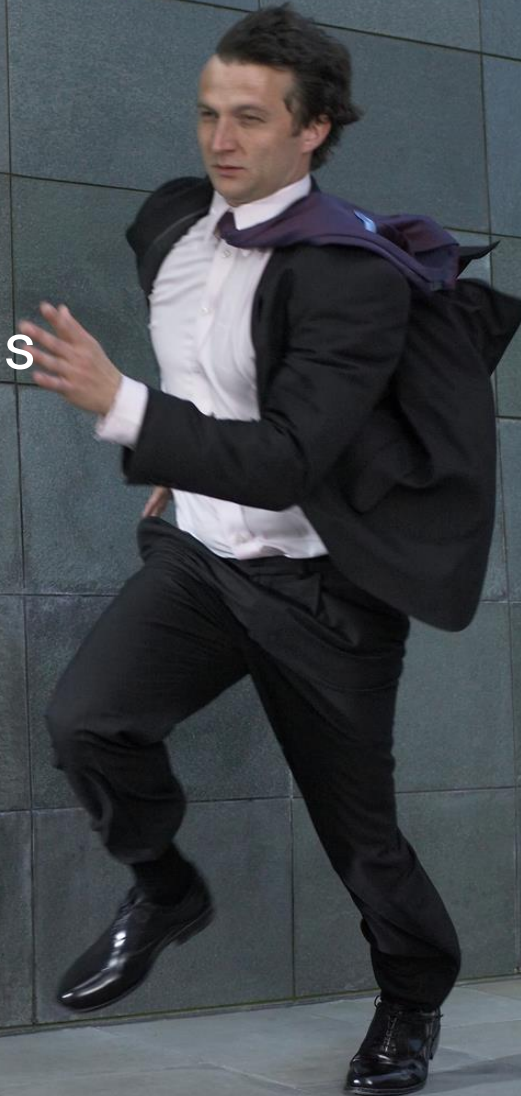
# DYSFUNCTIONAL MECHANISMS UNDERLYING MOST CHRONIC DISEASE

1. Mitochondrial dysfunction
2. Dysfunctional digestion/immune function
3. Oxidative stress
4. Persistent low-grade inflammation
5. Imbalanced neurotransmitter biochemistry



# PRIORITY SYSTEMS

- Energy and digestion
- Structural: musculo/skeletal
- Inflammatory/oxidative stress
- Digestive/immunity
- Stress-handling/resilience





ENERGY SYSTEM



MUSCULO-SKELETAL SYSTEM

INFLAMMATORY/  
OXIDATIVE STRESS





# IMMUNE SYSTEM





STRESS-HANDLING/RESILIENC

# STEP BY STEP



1. Food first

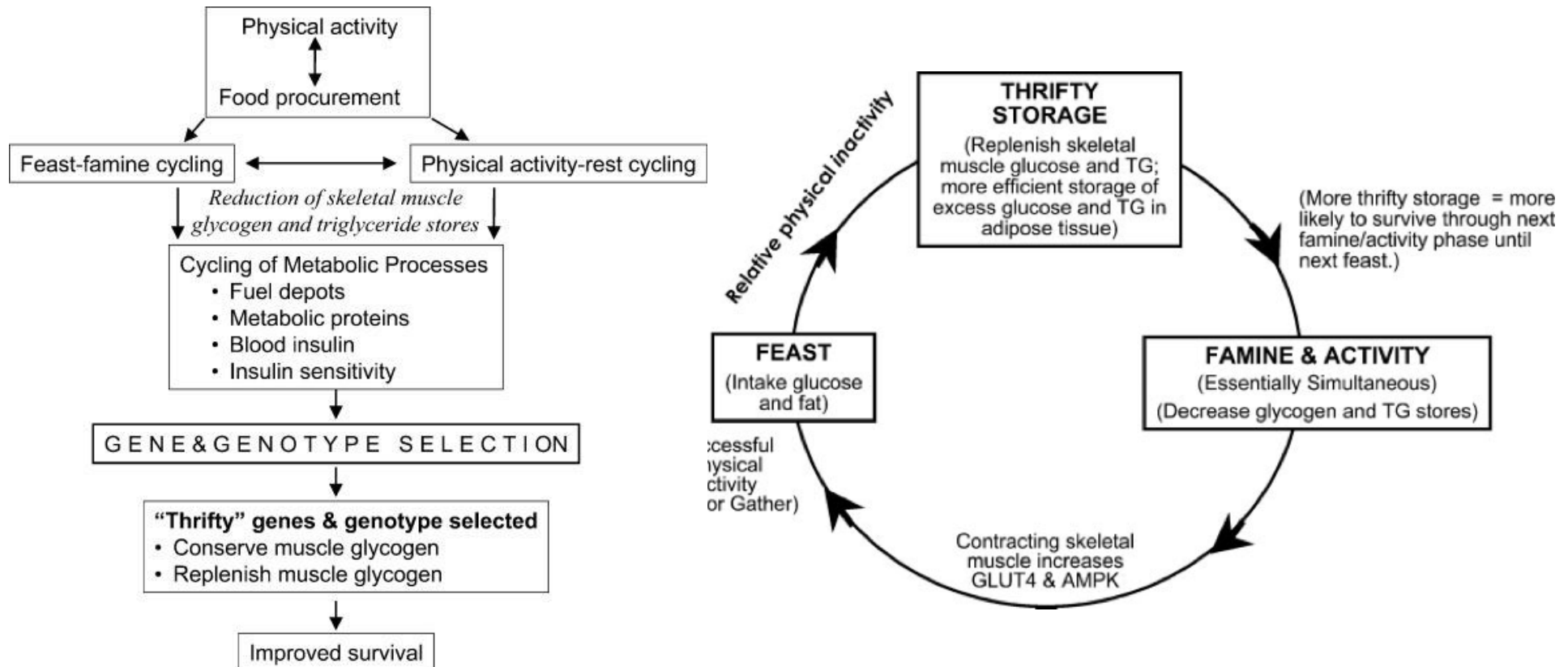
2. Physical activity second

3. Rest third

# OUR EVOLUTIONARY HERITAGE



# OUR EVOLUTIONARY HERITAGE



Manu V. Chakravarthy and Frank W. Booth. Eating, exercise, and “thrifty” genotypes: connecting the dots toward an evolutionary understanding of modern chronic diseases. *J Appl Physiol.* 2004; 96: 3–10.

# FOOD4HEALTH GUIDELINES

FOR ADULTS AND CHILDREN OVER 6

## 6 FOOD GROUPS EVERY DAY

Percentages refer to amounts by weight (not energy contribution)

1 40% VEGETABLES (UNPROCESSED)

2 10% FRUITS (UNPROCESSED)

FIND OUT MORE AT:  
<http://anh-europe.org/news/.....>

3 10% GRAINS (GLUTEN-FREE WHOLE GRAINS)

4 10% HIGH 'HEALTHY FAT' FOODS

5 25% PROTEIN-RICH FOODS

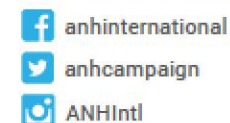
6 5% CONCENTRATED NUTRIENTS (E.G. NON-IRRADIATED HERBS AND SPICES, FOOD SUPPLEMENTS)



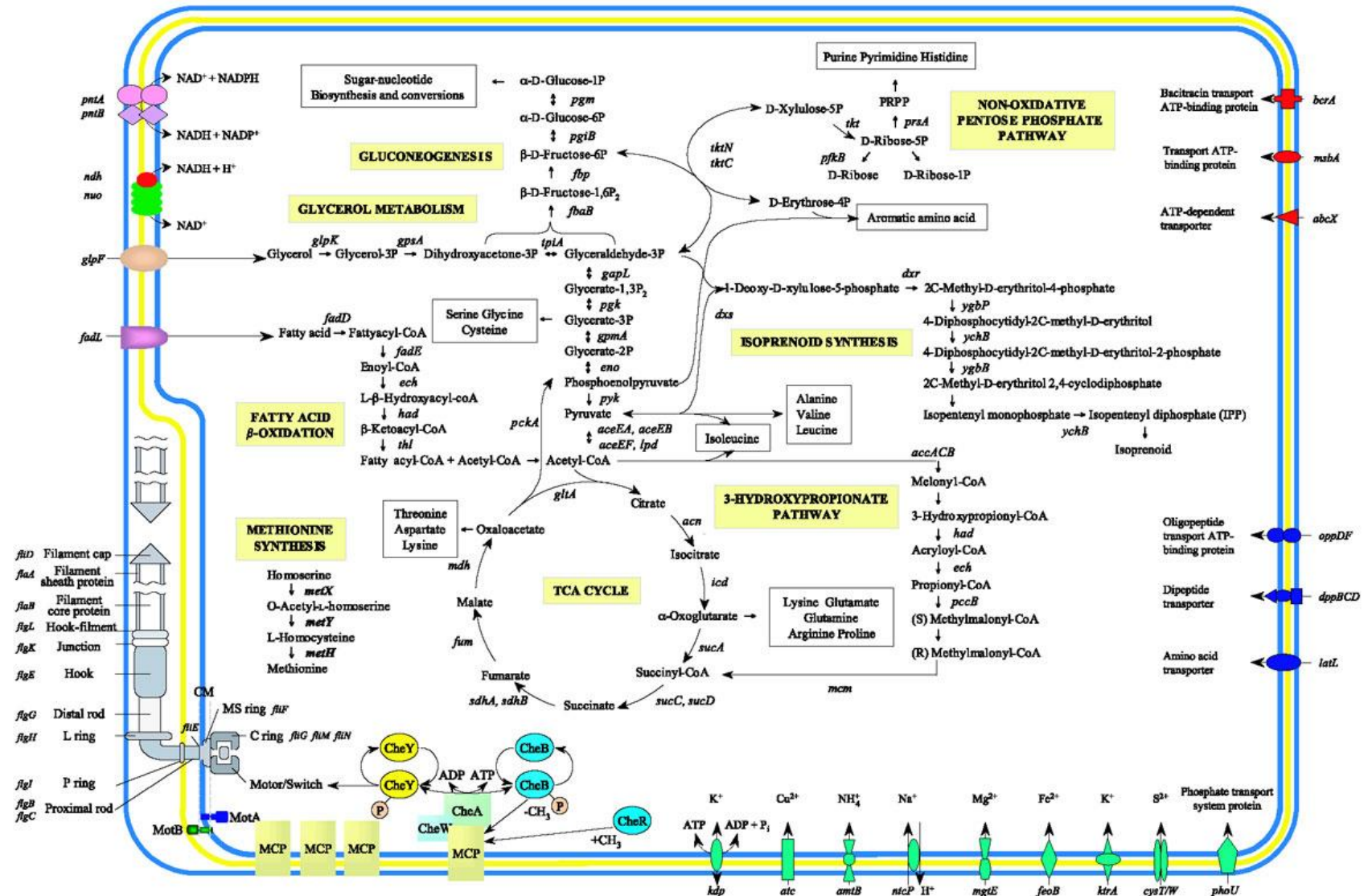
## 10 KEY POINTERS

- 1 Macronutrient composition by energy contribution (kcal or kJ) should be approximately 20% protein (4 kcal/g), 30% carbohydrates (4 kcal/g) and 50% fats (9 kcal/g)
- 2 Minimise consumption of highly processed food
- 3 Consume plenty of fresh, raw foods
- 4 Avoid high-temperature cooking methods (frying, grilling), unless brief. Minimise heat-damage to proteins, fats, vegetables, starches and other carbs by using slow cooking methods
- 5 Healthy fats for cooking include extra virgin coconut oil, unfiltered extra virgin olive oil and butter (the latter assuming no lactose intolerance)
- 6 Consume plenty of fresh herbs and non-irradiated, preferably organic, spices
- 7 Avoid snacking and try to maintain 5 or more hours between meals
- 8 Consume at least 1.5 litres of spring or filtered water daily (more if exercising intensively), between meals
- 9 Avoid all foods which trigger intolerance or allergy (concentrated sources of nutrients)
- 10 Seek advice from a qualified and experienced health professional on the most appropriate supplements (concentrated sources of nutrients)

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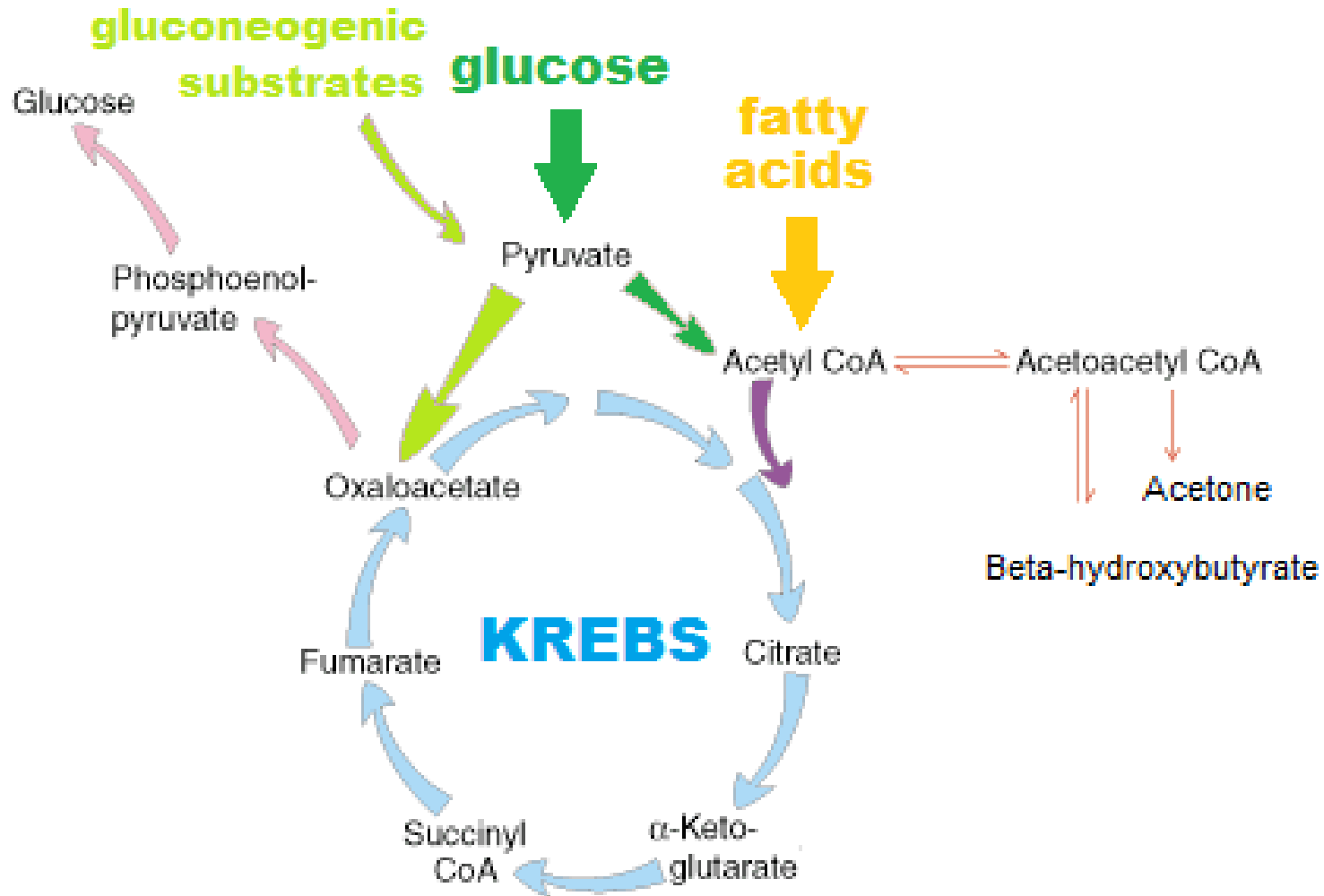


# ENERGY SYSTEMS

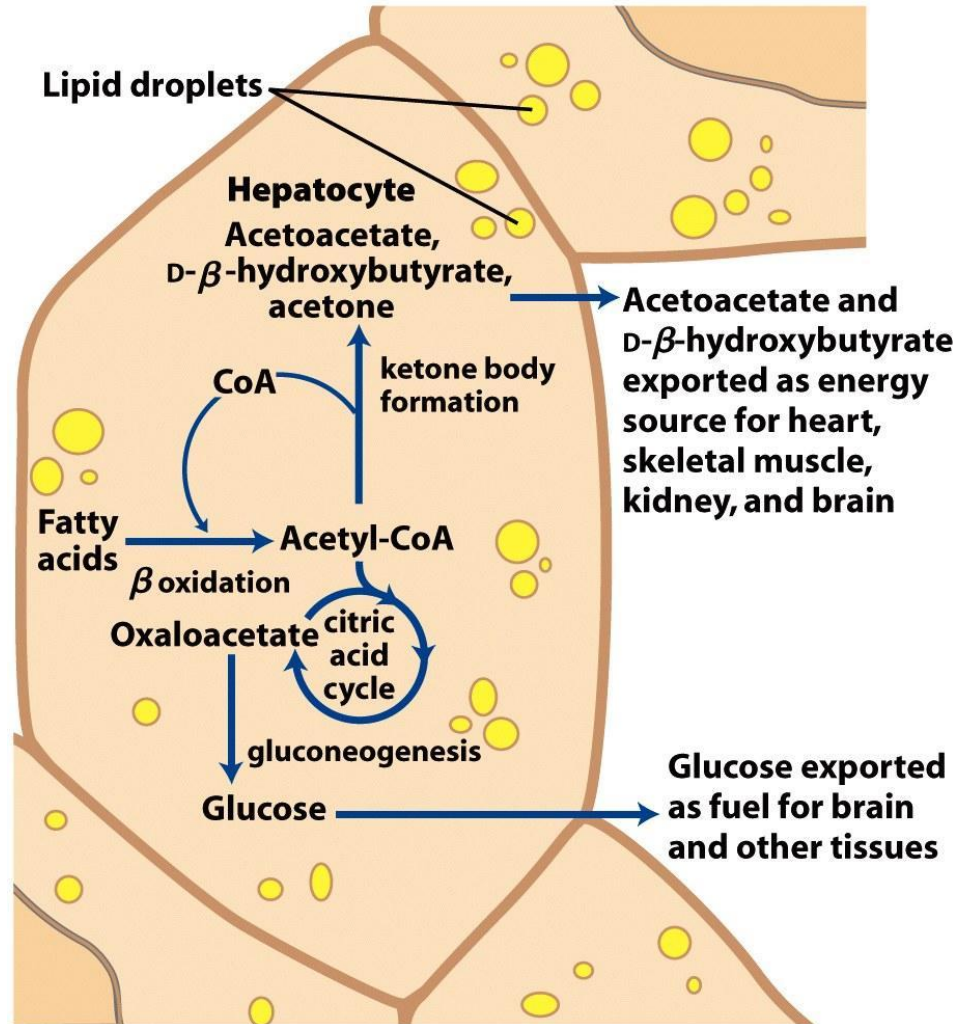


Ren *et al.* Unique physiological and pathogenic features of *Leptospira interrogans* revealed by whole-genome sequencing. *Nature* 2013; 422: 888-893

# ENERGY SYSTEMS



# ENERGY SYSTEMS

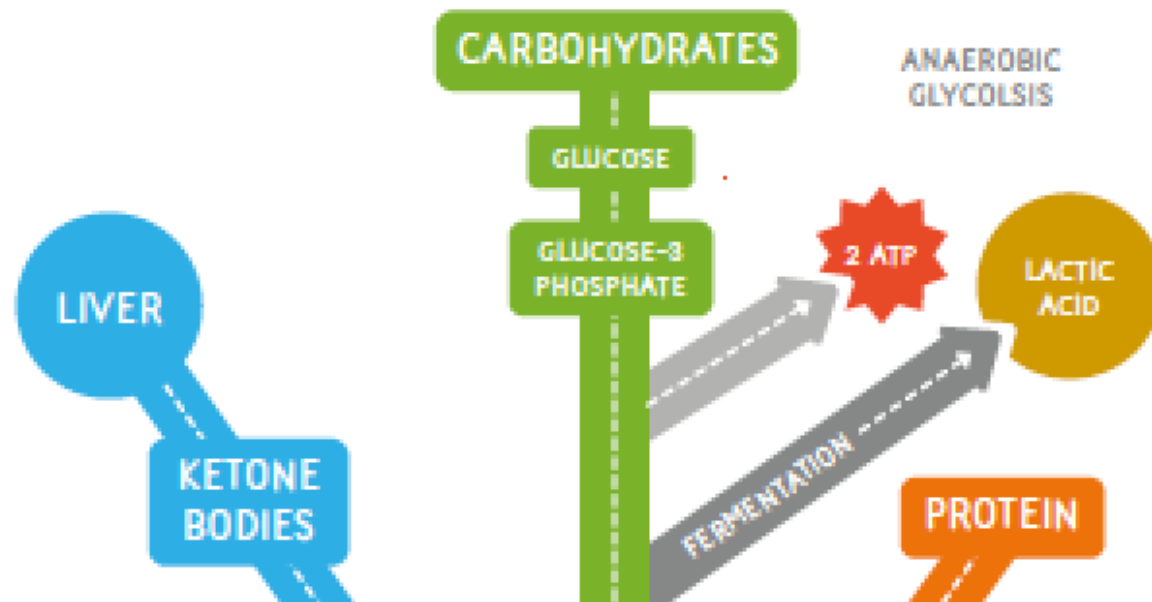


**Figure 17-20**  
*Lehninger Principles of Biochemistry, Fifth Edition*  
© 2008 W. H. Freeman and Company



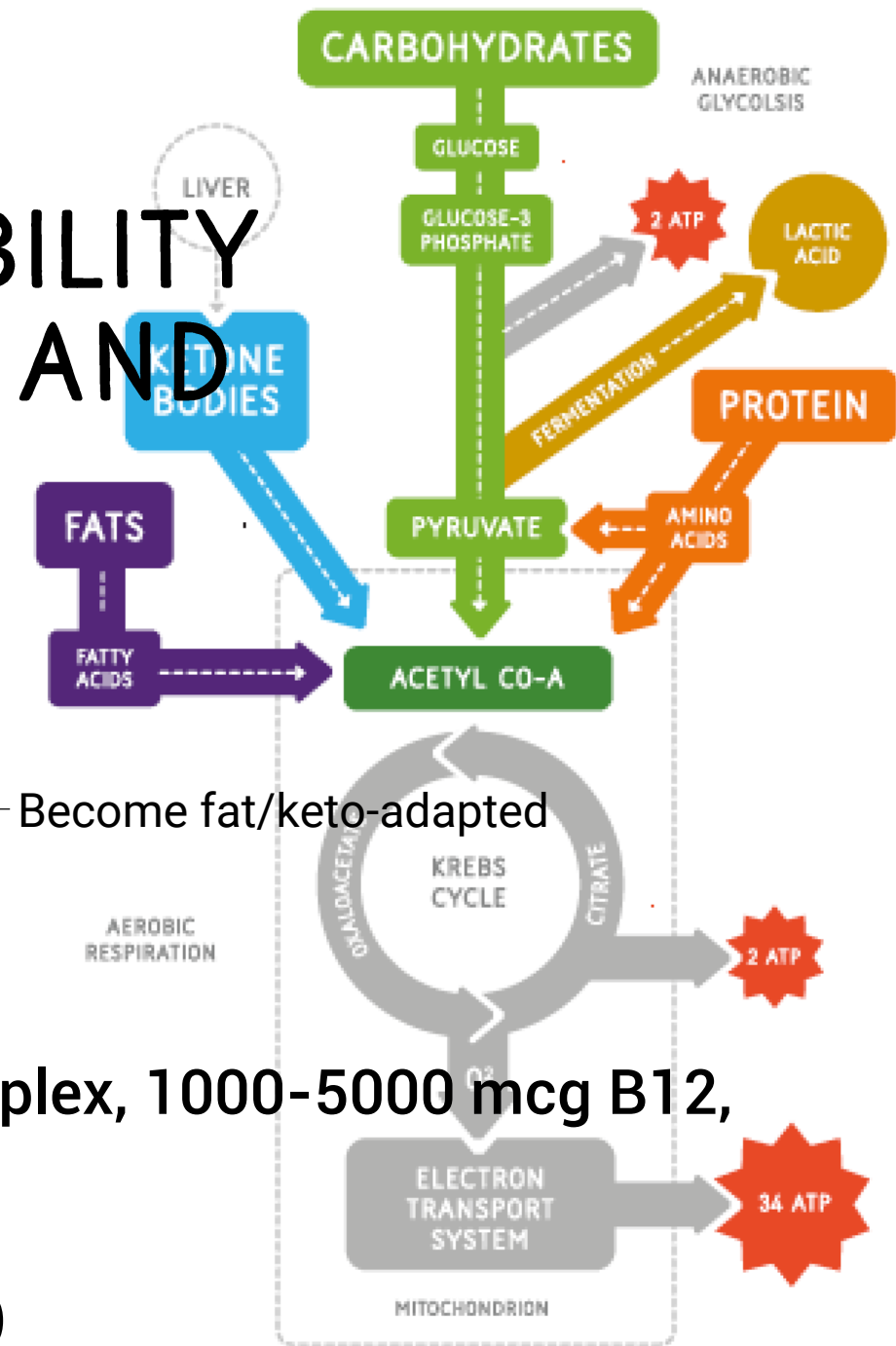
# CARB JUNKIE VS METABOLICALLY FLEXIBLE, FAT-ADAPTED AND RESILIENT HUMAN

The key to resolving today's obesity and chronic disease crisis involves helping people to develop metabolic flexibility and resilience. There's good reason why evolution gifted us with 4 different metabolic systems for energy production



# OPTIMISING METABOLIC FLEXIBILITY (FUEL EFFICIENCY AND USE/STORAGE)

1. Food/nutrients
2. Intermittent fasting
3. Caloric restriction
4. Physical activity
5. Recovery
6. B vitamins (25-100 mg B complex, 1000-5000 mcg B12, 1500 mcg 5MTHF)
7. CoQ10 (100 mg)
8. MCTs (~5-20g, divided doses)



# DO YOU NEED CARB ENERGY GELS?

*European Journal of Sport Science*, 2015

Vol. 15, No. 1, 13–20, <http://dx.doi.org/10.1080/17461391.2014.959564>



## ORIGINAL ARTICLE

### Rethinking fat as a fuel for endurance exercise

JEFF S. VOLEK<sup>1</sup>, TIMOTHY NOAKES<sup>2</sup>, & STEPHEN D. PHINNEY<sup>3</sup>

<sup>1</sup>Kinesiology Program, Department of Human Sciences, The Ohio State University, Columbus, OH, USA, <sup>2</sup>Discovery Health Professor of Exercise and Sports Science, Department of Human Biology, University of Cape Town and Sports Science Institute of South Africa, Newlands, South Africa, <sup>3</sup>School of Medicine (Emeritus), University of California Davis, Davis, CA, USA

#### Abstract

A key element contributing to deteriorating exercise capacity during physically demanding sport appears to be reduced carbohydrate availability coupled with an inability to effectively utilize alternative lipid fuel sources. Paradoxically, cognitive and physical decline associated with glycogen depletion occurs in the presence of an over-abundance of fuel stored as body fat that the athlete is apparently unable to access effectively. Current fuelling tactics that emphasize high-carbohydrate intakes before and during exercise inhibit fat utilization. The most efficient approach to accelerate the body's ability to oxidize fat is to lower dietary carbohydrate intake to a level that results in nutritional ketosis (i.e., circulating ketone levels >0.5 mmol/L) while increasing fat intake for a period of several weeks. The coordinated set of metabolic adaptations that ensures proper interorgan fuel supply in the face of low-carbohydrate availability is referred to as keto-adaptation. Beyond simply providing a stable source of fuel for the brain, the major circulating ketone body, beta-hydroxybutyrate, has recently been shown to act as a signalling molecule capable of altering gene expression, eliciting complementary effects of keto-adaptation that could extend human physical and mental performance beyond current expectation. In this paper, we review these new findings and propose that the shift to fatty acids and ketones as primary fuels when dietary carbohydrate is restricted could be of benefit for some athletes.

**Keywords:** *Metabolism, nutrition, performance*

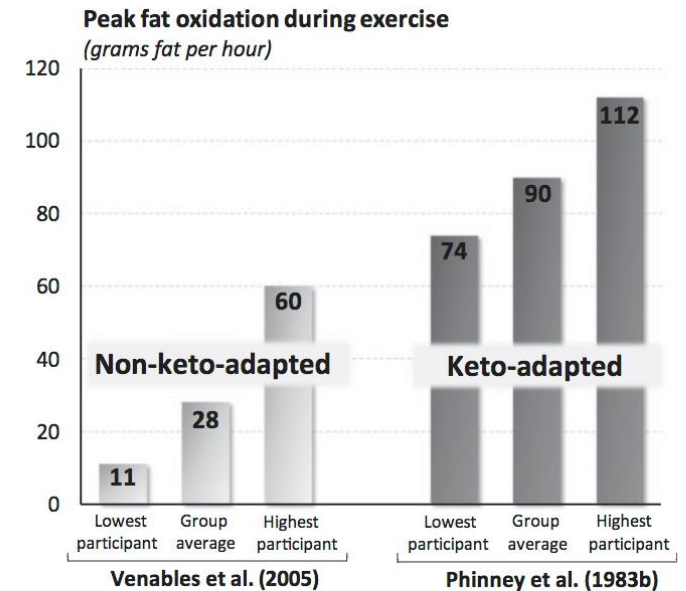


Figure 1. The rate of fat use during exercise at 64%  $\text{VO}_2\text{max}$  in trained cyclist (Phinney et al., 1983) compared to peak fat oxidation rates recorded in 300 people that included highly trained individuals (Venables et al., 2005).

# MUSCULO-SKELETAL

## 1. Food/nutrients

- Protein + BCAAs (1-2g/kg bw)
- Vitamin K2 (150-1000 mcg/d)
- Magnesium (an calcium) (400-1200 mg/d, divided doses)
- Vitamin D (4000-8000 IU) - without sun
- Trace-ultra-trace elements

## 2. Physical activity – high intensity,/short duration, intervals (HIIT), low intensity/long duration

## 3. Recovery (and 'nutrient timing') – individualised; 20g protein post-workout



# IMMUNE SYSTEM



- Repair the gut + F4H guidelines
- Vitamin A (preformed) + Mixed carotenoids 800 mcg/d RE
- Vitamin C + bioflavonoids (2g/d, divided doses)
- Vitamin D: 100-200 mcg/d (4000-8000 IU) - without sun
- Vitamin B6: 25 mg/d Folate (5MTHF): 1500 mcg/d B12 (methylcobalamin): 1000-5000 mcg/d
- Vitamin E (mixed tocopherols/tocotrienols): 200-500 mg α-TE
- Zinc: 15-50 mg/d (high doses, short-term) - without phytates!
- Selenium 150-300 mcg/d
- Botanicals: turmeric, garlic, ginseng, Echinacea, elderberry, ashwagandha, maitake, reishi, 1-3, 1-6 beta-glucans

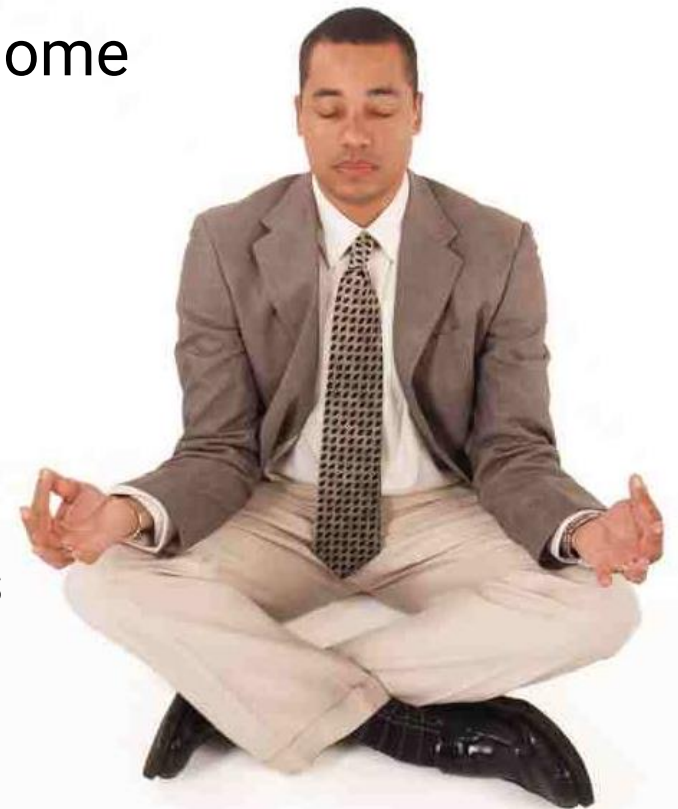
# INFLAMMATORY/ OXIDATIVE STRESS

- Anti-inflammatory diet: F4H guidelines
- Polyphenols in diet
- Polyphenols/anthocyanidins in supplements
- Omega-3:6 (1:1-1:3)
- Turmeric (wholistic: full spectrum incl essential oils) + fat
- Resveratrol
- Reduce physiological/emotional stress
- Adaptogens: ashwagandha, Panax ginseng, Rhodiola



# STRESS HANDLING/RESILIENCE

- Biochemical pathways in balance + adequate resources/information – F4H guidelines
- Healthy gut lumen, mucosa and microbiome
- Good mitochondrial reserve
- Response fast and slow-twitch muscle
- Well modulated immune system
- Health inflammatory response
- Healthy HPA(GG) axis
- Regular stress transformation practices



# LET'S MAKE IT HAPPEN!



Email: [rob@anhinternational.org](mailto:rob@anhinternational.org)

Tel: +44 (0)1306 646 600



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