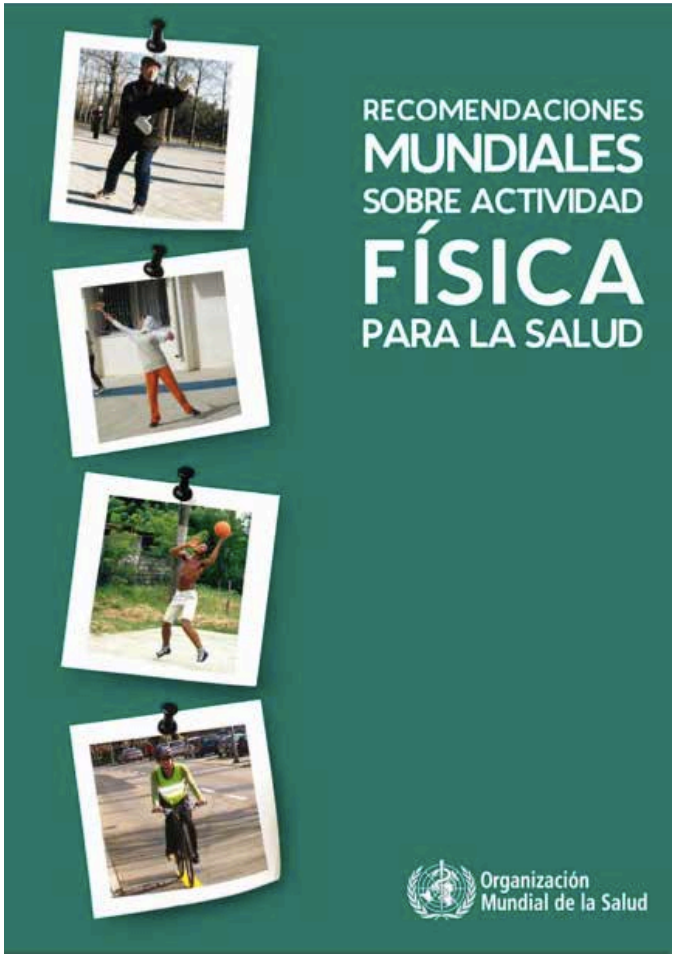
Movimiento y salud: ¿Existe la persona sana sedentaria?

Congreso de la Societat Catalano-Balear de Fisioteràpia

21-11-15

Todo el mundo sabe que hay que moverse:



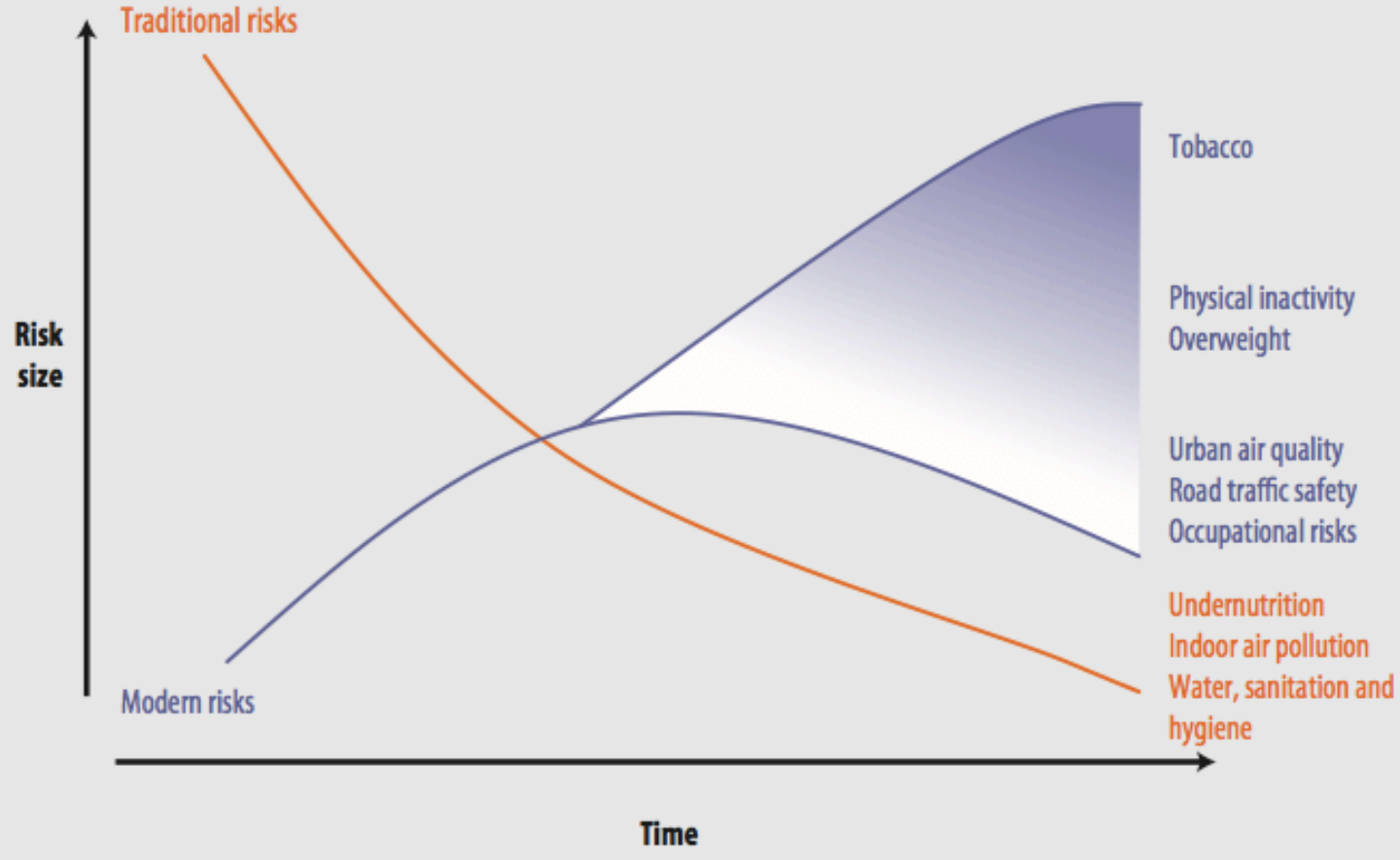
Todo el mundo sabe que hay que moverse:

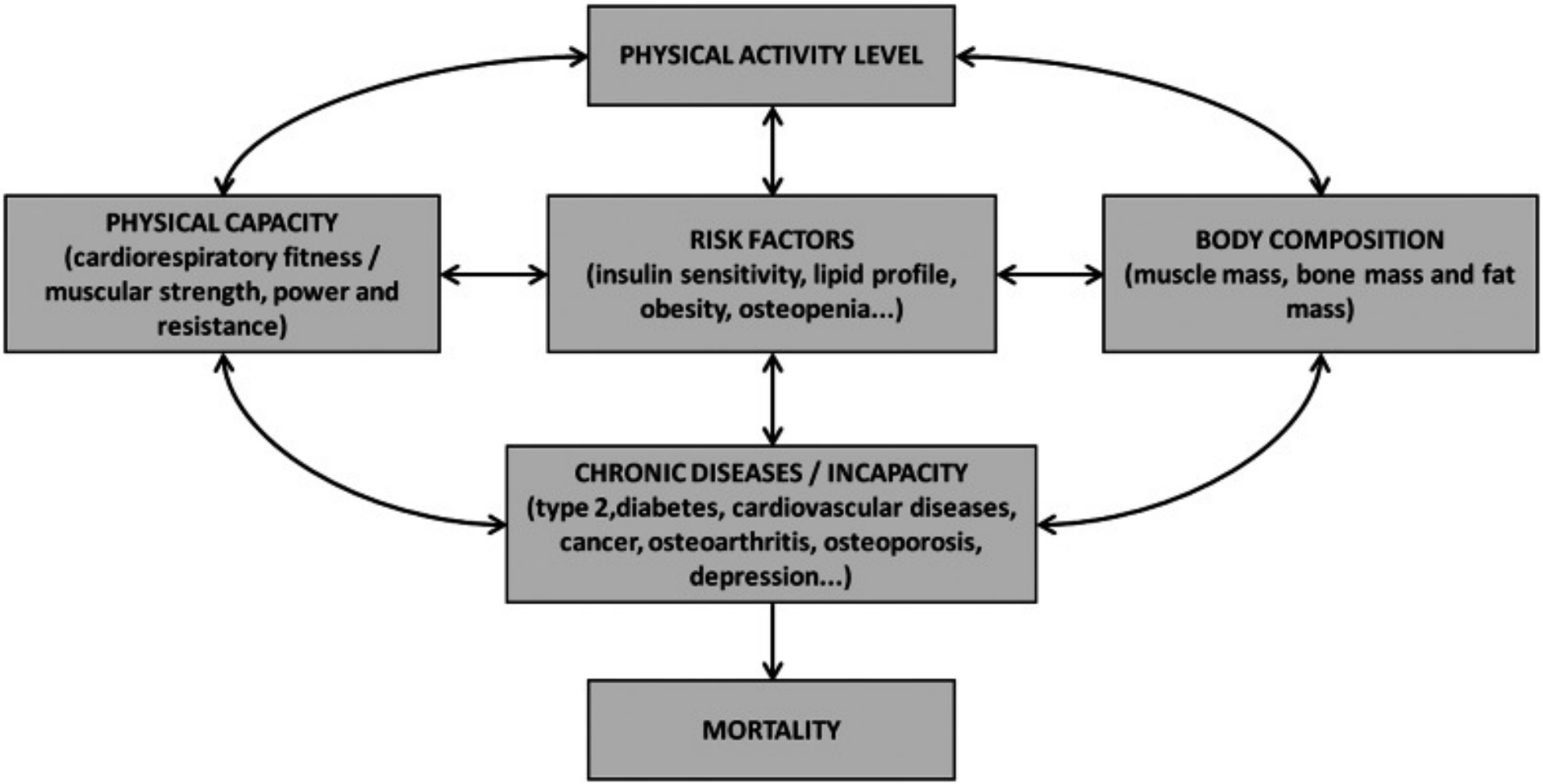
¿Sabemos hasta que punto nos impacta?

	Risk factor	Deaths (millions)	Percentage of total		Risk factor	Deaths (millions)	Percentage of total
	World				***Low-income countries[a]***		
1	High blood pressure	7.5	12.8	1	Childhood underweight	2.0	7.8
2	Tobacco use	5.1	8.7	2	High blood pressure	2.0	7.5
3	High blood glucose	3.4	5.8	3	Unsafe sex	1.7	6.6
4	Physical inactivity	3.2	5.5	4	Unsafe water, sanitation, hygiene	1.6	6.1
5	Overweight and obesity	2.8	4.8	5	High blood glucose	1.3	4.9
6	High cholesterol	2.6	4.5	6	Indoor smoke from solid fuels	1.3	4.8
7	Unsafe sex	2.4	4.0	7	Tobacco use	1.0	3.9
8	Alcohol use	2.3	3.8	8	Physical inactivity	1.0	3.8
9	Childhood underweight	2.2	3.8	9	Suboptimal breastfeeding	1.0	3.7
10	Indoor smoke from solid fuels	2.0	3.3	10	High cholesterol	0.9	3.4
	Middle-income countries[a]				***High-income countries[a]***		
1	High blood pressure	4.2	17.2	1	Tobacco use	1.5	17.9
2	Tobacco use	2.6	10.8	2	High blood pressure	1.4	16.8
3	Overweight and obesity	1.6	6.7	3	Overweight and obesity	0.7	8.4
4	Physical inactivity	1.6	6.6	4	Physical inactivity	0.6	7.7
5	Alcohol use	1.6	6.4	5	High blood glucose	0.6	7.0
6	High blood glucose	1.5	6.3	6	High cholesterol	0.5	5.8
7	High cholesterol	1.3	5.2	7	Low fruit and vegetable intake	0.2	2.5
8	Low fruit and vegetable intake	0.9	3.9	8	Urban outdoor air pollution	0.2	2.5
9	Indoor smoke from solid fuels	0.7	2.8	9	Alcohol use	0.1	1.6
10	Urban outdoor air pollution	0.7	2.8	10	Occupational risks	0.1	1.1

[a] Countries grouped by gross national income per capita – low income (US$ 825 or less), high income (US$ 10 066 or more).

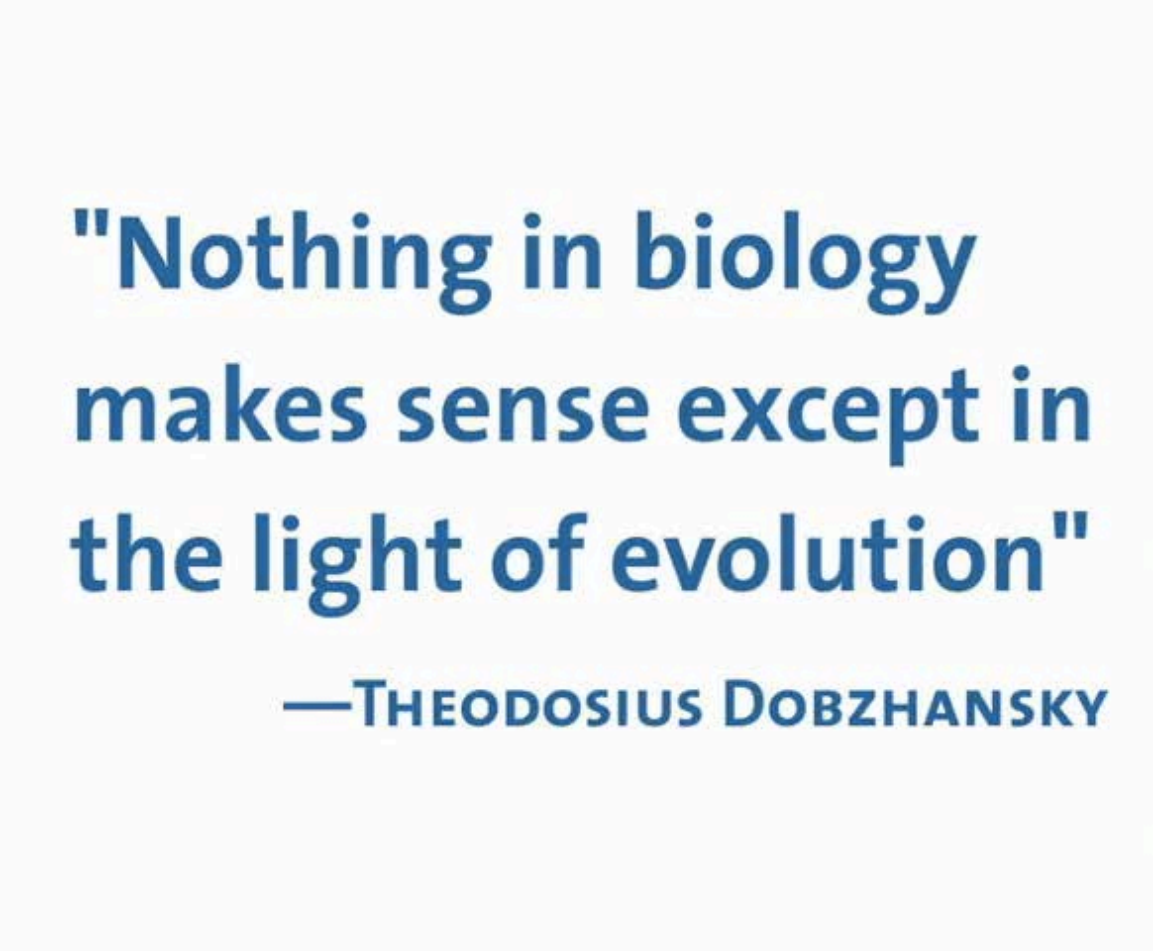
Figure 2: The risk transition. Over time, major risks to health shift from traditional risks (e.g. inadequate nutrition or unsafe water and sanitation) to modern risks (e.g. overweight and obesity). Modern risks may take different trajectories in different countries, depending on the risk and the context.





Ciolac EG. Exercise Training and Aging. CLINICS 2013;68(5):710-717

Qué está pasando: Empecemos desde el principio

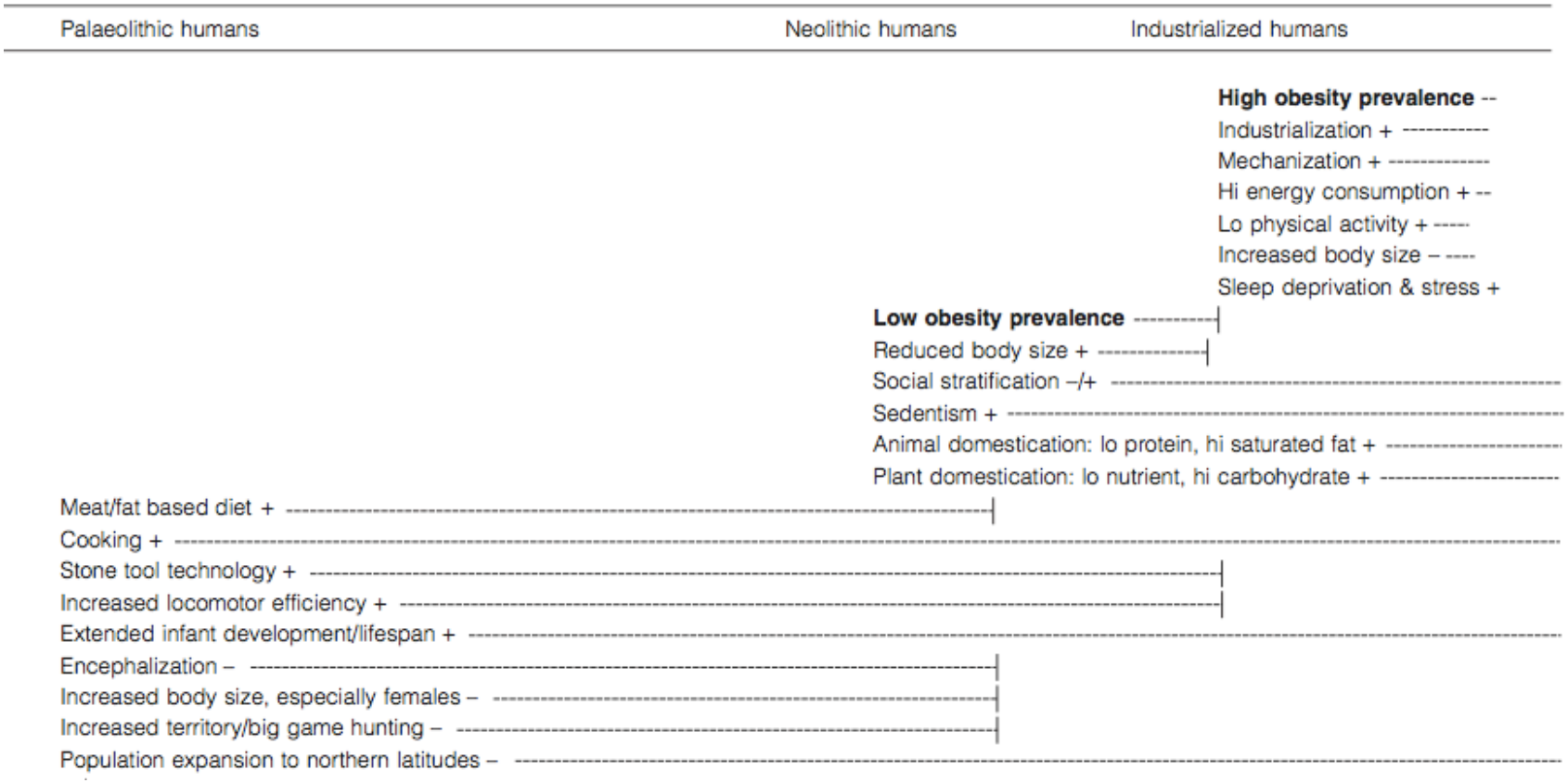


Número de generaciones

Table I Historical milestones in human generations[14,63–65]

Historical milestones	Generations	% total
Homo habilis	76,667	100.0
Homo erectus	60,000	78.2
Modern *Homo sapiens*	6666	8.7
Neolithic Revolution	366	0.48
Industrial Revolution	7	0.009
Food industry (junk food) and physical inactivity (Modern Age)	4	0.005

Carrera-Bastos, P; Fontes-villalba M O'Keefe, ; J H ; Lindeberg, S; Cordain L. Research Reports in Clinical Cardiology 2011:2

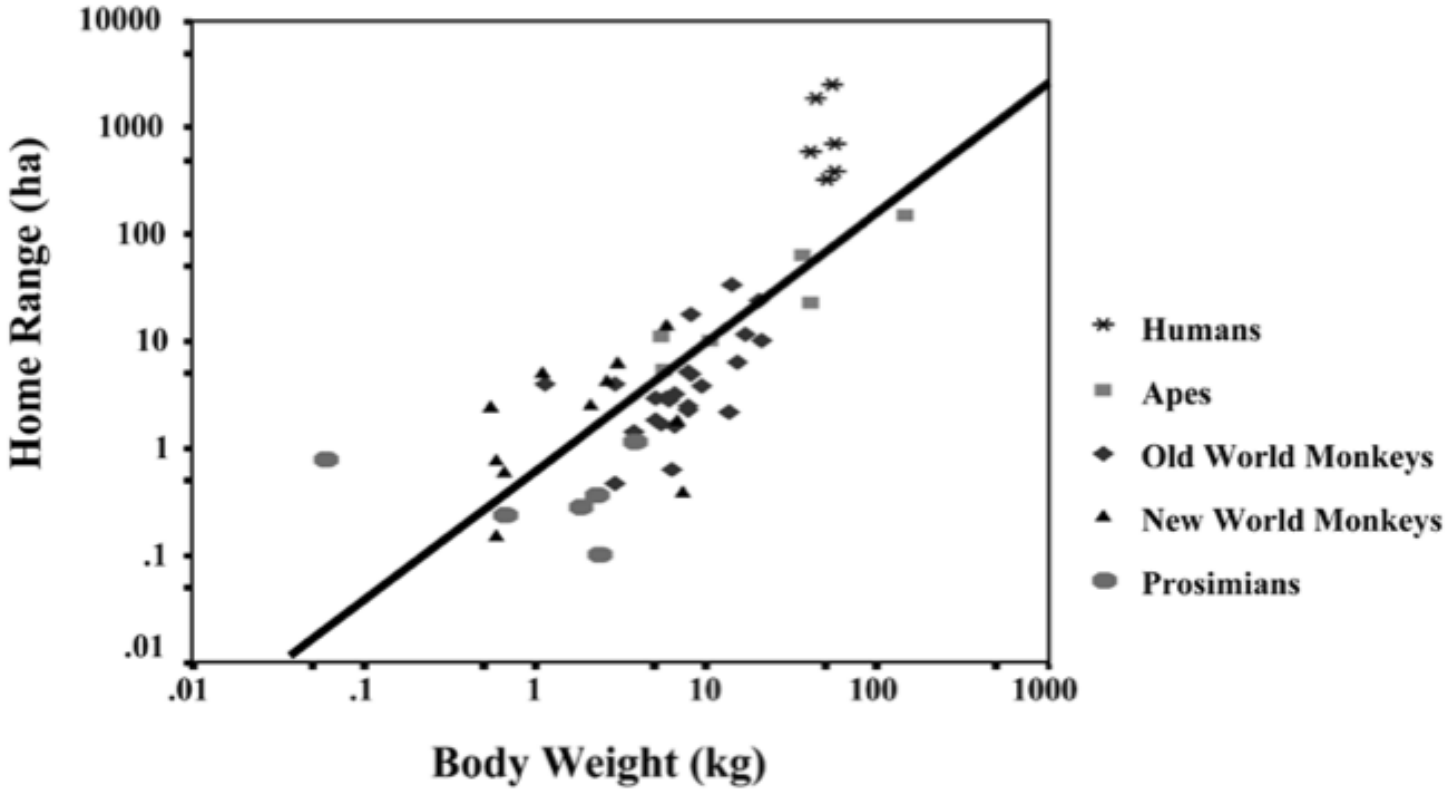


Bellisari , A. **Obesity** reviews (2008) **9**, 165–180

Impulsores de las necesidades energéticas y nutricionales humanas

1. Necesidad de una dieta de alta calidad (energética y nutritivamente)
2. Desarrollo de regímenes de forrajeo que requerían movimiento en áreas extensas para obtener dichas dietas nutricionalmente densas.

13km us 2km

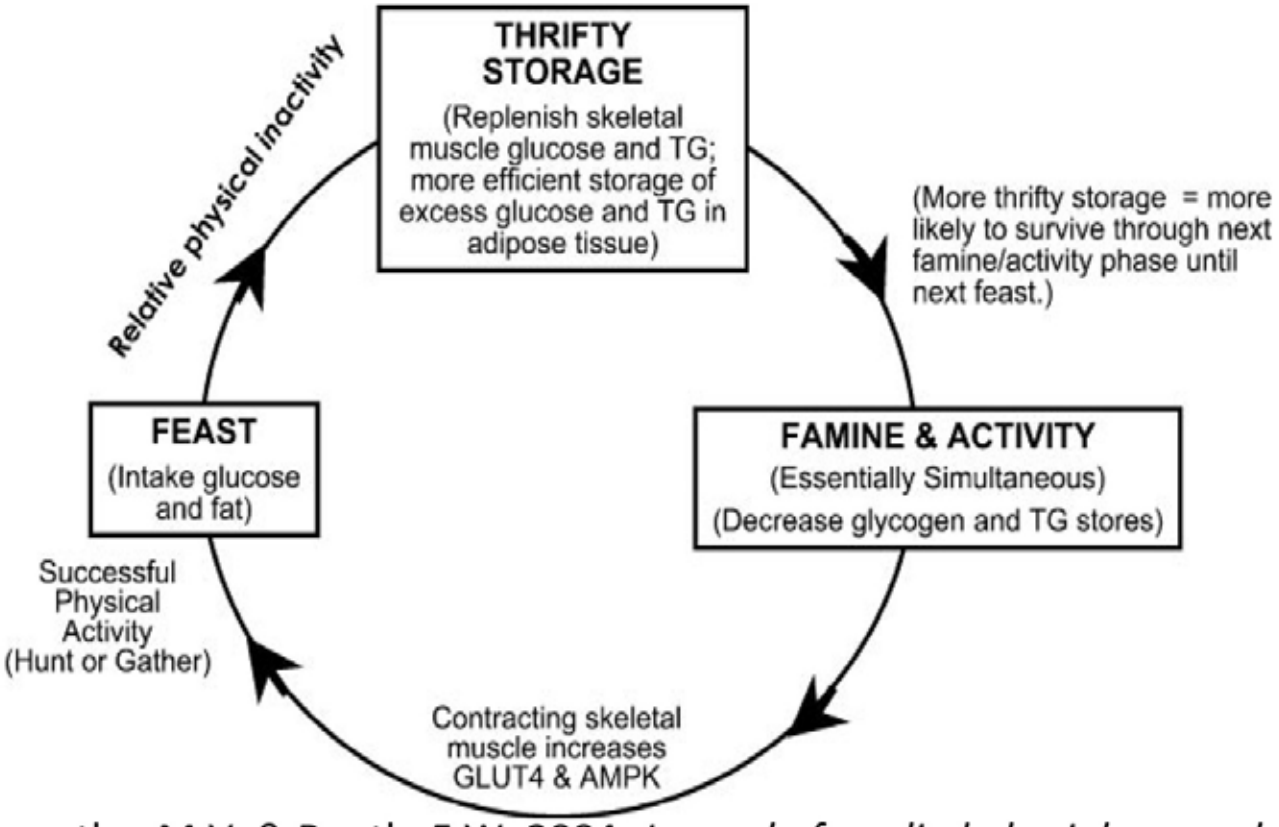


Leonard WR, Human nutritional evolution. In: Stinson S, Bogin B, Huss-Ashmore R, O'Rourke D (eds). *Human Biology: An Evolutionary and Biocultural Perspective*, Wiley-Liss: New York, 2000, pp. 295–344.

Homo sapiens is selected to move

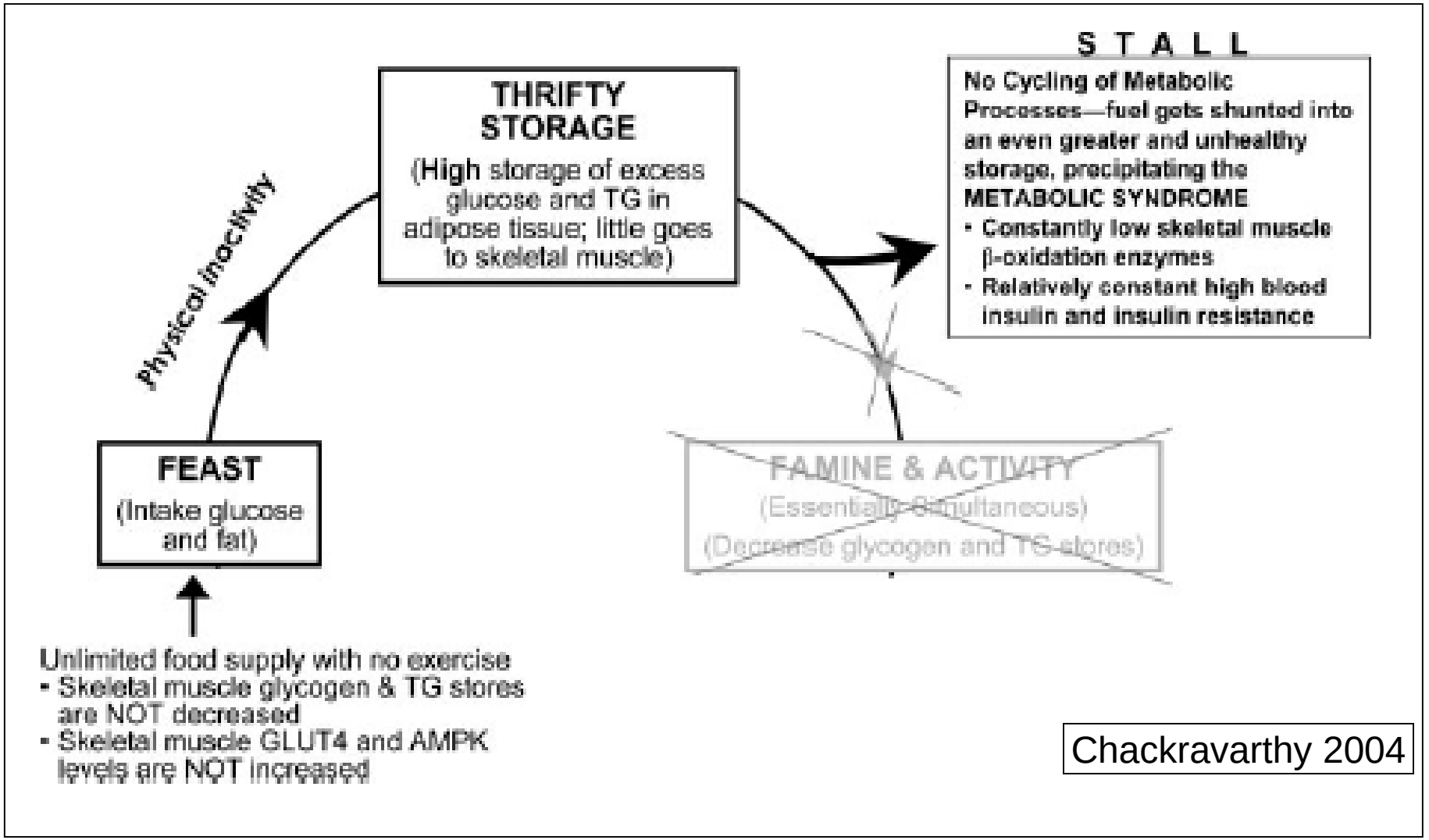
- Termorregulación
- Dedos cortos que reducen el coste energético en carrera
- Gluconeogénesis
- Gran flexibilidad metabólica de los órganos energéticamente caros.

Fisiología



Chakravarthy, M.V. & Booth, F.W. 2004. *Journal of applied physiology , vol. 96, no. 1, pp. 3-10*

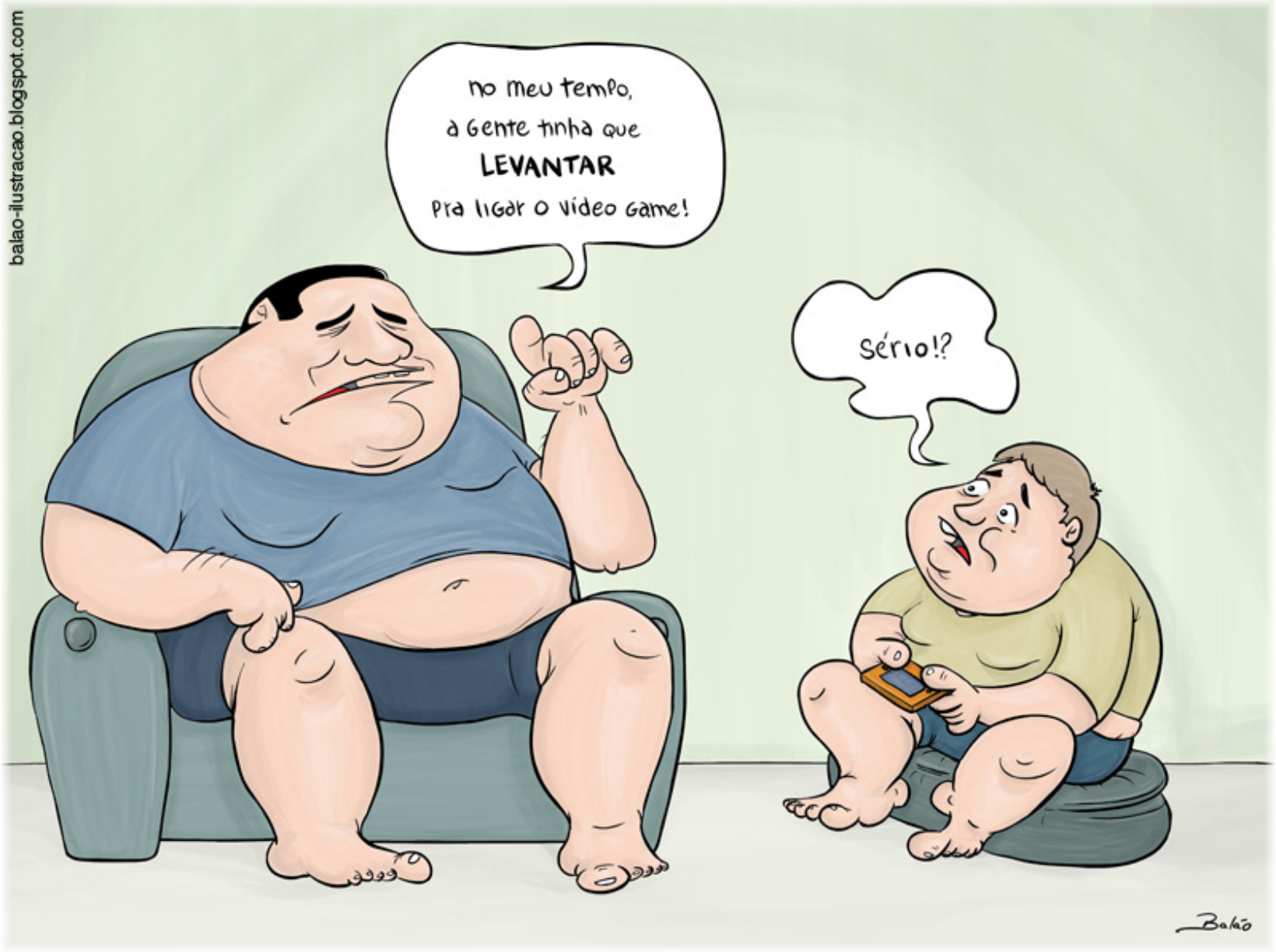
Modern life situation



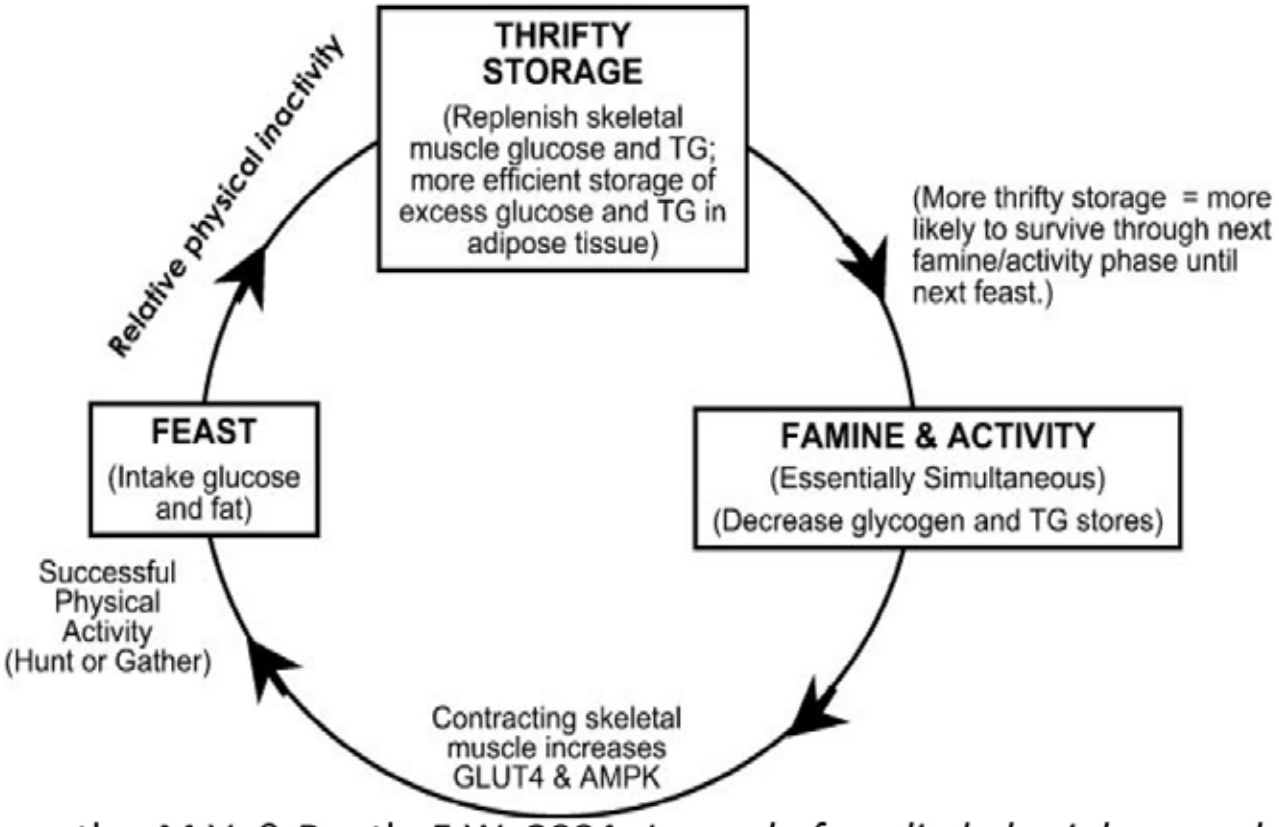
Chackravarthy 2004

La necesidad activa genes de movimiento espontáneo

La necesidad	La actualidad
• Hambre	Nevera a cinco metro
• Sed	Botella al lado
• Miedo	A fantasmas
• Frio	Con la calefacción?
• Calor	Con aire condicionado
• Libido	Bueno, podría ser
• Curiosidad	El ordenador esta en casa


balao-ilustracao.blogspot.com
no meu tempo,
a gente tinha que
LEVANTAR
pra ligar o video game!
Sério!?
Balão

Fisiología



Chakravarthy, M.V. & Booth, F.W. 2004. *Journal of applied physiology , vol. 96, no. 1, pp. 3-10*

Evolution turns the inevitable into a necessity

Anything that was always there must continue to be there

Since it becomes part of adaptation

Oxygen is an example, commensal bacteria might be another

Rook, Clin Exp Immunol 2010

J Physiol Biochem (2011) 67:87–94
DOI 10.1007/s13105-010-0052-4

ORIGINAL ARTICLE

A single session of intense exercise improves the inflammatory response in healthy sedentary women

Juan José García · Elena Bote · Maria D. Hinchado · Eduardo Ortega

Received: 5 May 2010 / Accepted: 28 September 2010 / Published online: 9 October 2010

J Musculoskelet Neuronal Interact 2013; 13(2):195-205

Original Article

pQCT-assessed relationships between diaphyseal design and cortical bone mass and density in the tibiae of healthy sedentary and trained men and women

R.F. Capozza[1], J. Rittweger[2], P.S. Reina[1], P. Mortarino[1], L.M. Nocciolino[1], S. Feldman[3], J.L. Ferretti[1], G.R. Cointry[1]

[1]Center of P-Ca Metabolism Studies (CEMPeC), and [3]LABOATEM, Faculty of Medicine, National University of Rosario, Argentina; [2]German Space Agency (DLR), Cologne, Germany

Eur J Appl Physiol (2013) 113:2737–2747
DOI 10.1007/s00421-013-2711-y

ORIGINAL ARTICLE

Meal induced gut hormone secretion is altered in aerobically trained compared to sedentary young healthy males

Michael Taulo Lund · Lærke Taudorf · Bolette Hartmann · Jørn Wulff Helge · Jens Juel Holst · Flemming Dela

Am J Med Sci. 2012 Aug;344(2):90-5. doi: 10.1097/MAJ.0b013e3182394942.

Prevention of low back pain in sedentary healthy workers: a pilot study.

Moore C, Holland J, Shaib F, Ceridan E, Schonard C, Marasa M.

University of Louisville School of Medicine, Kentucky, USA. drmoore1@yahoo.com

Abstract

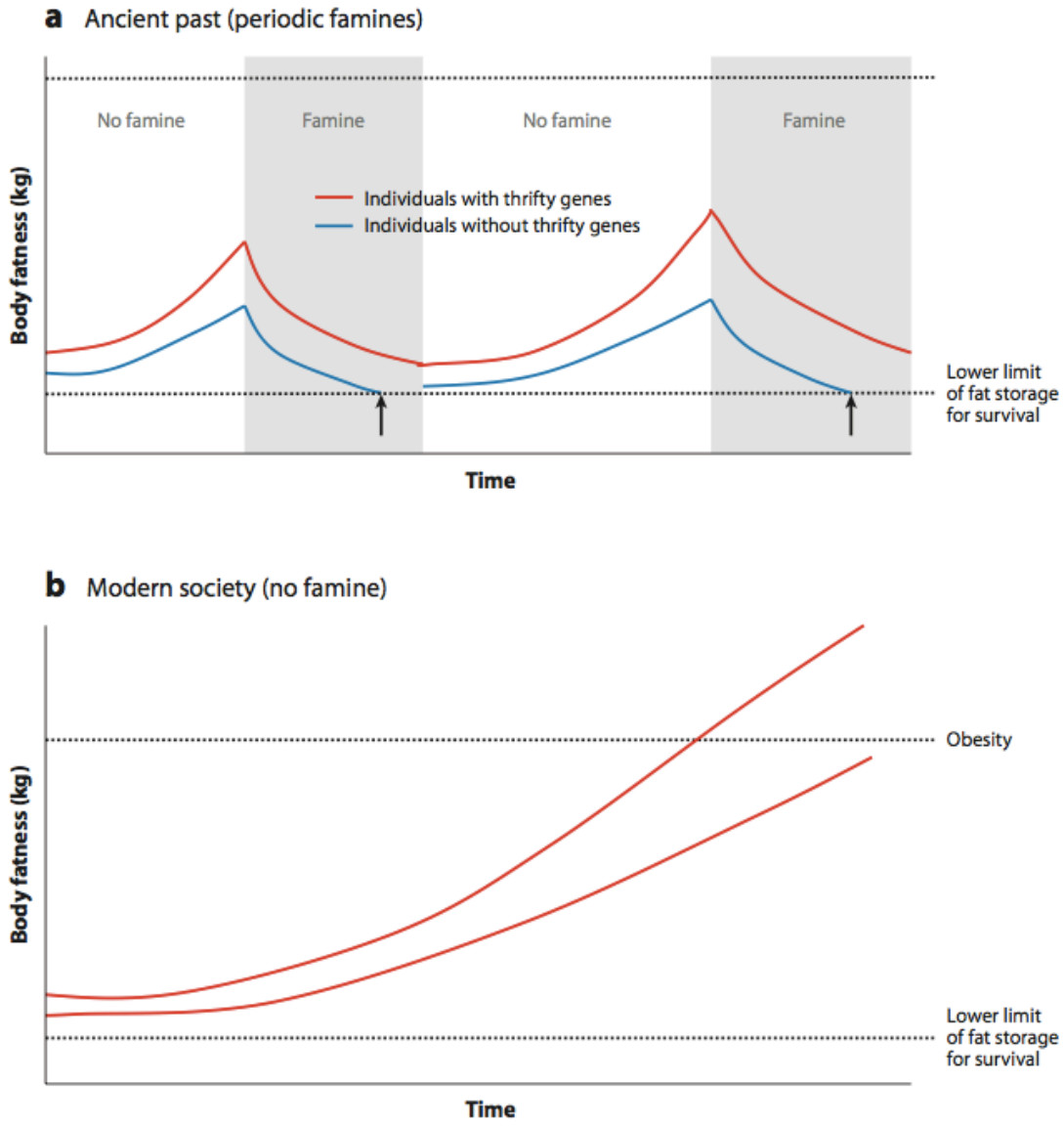
Diabetes Metab. 2012 Feb;38(1):40-5. doi: 10.1016/j.diabet.2011.07.004. Epub 2011 Sep 25.

Crossover and maximal fat-oxidation points in sedentary healthy subjects: methodological issues.

Gmada N, Marzouki H, Haboubi M, Tabka Z, Shephard RJ, Bouhlel E.

Research Unit "Sportive practices in School and University and performance", Higher Institute of Sport and Physical Education of Kef, University of Jendouba, Jendouba, Tunisia.

Abstract



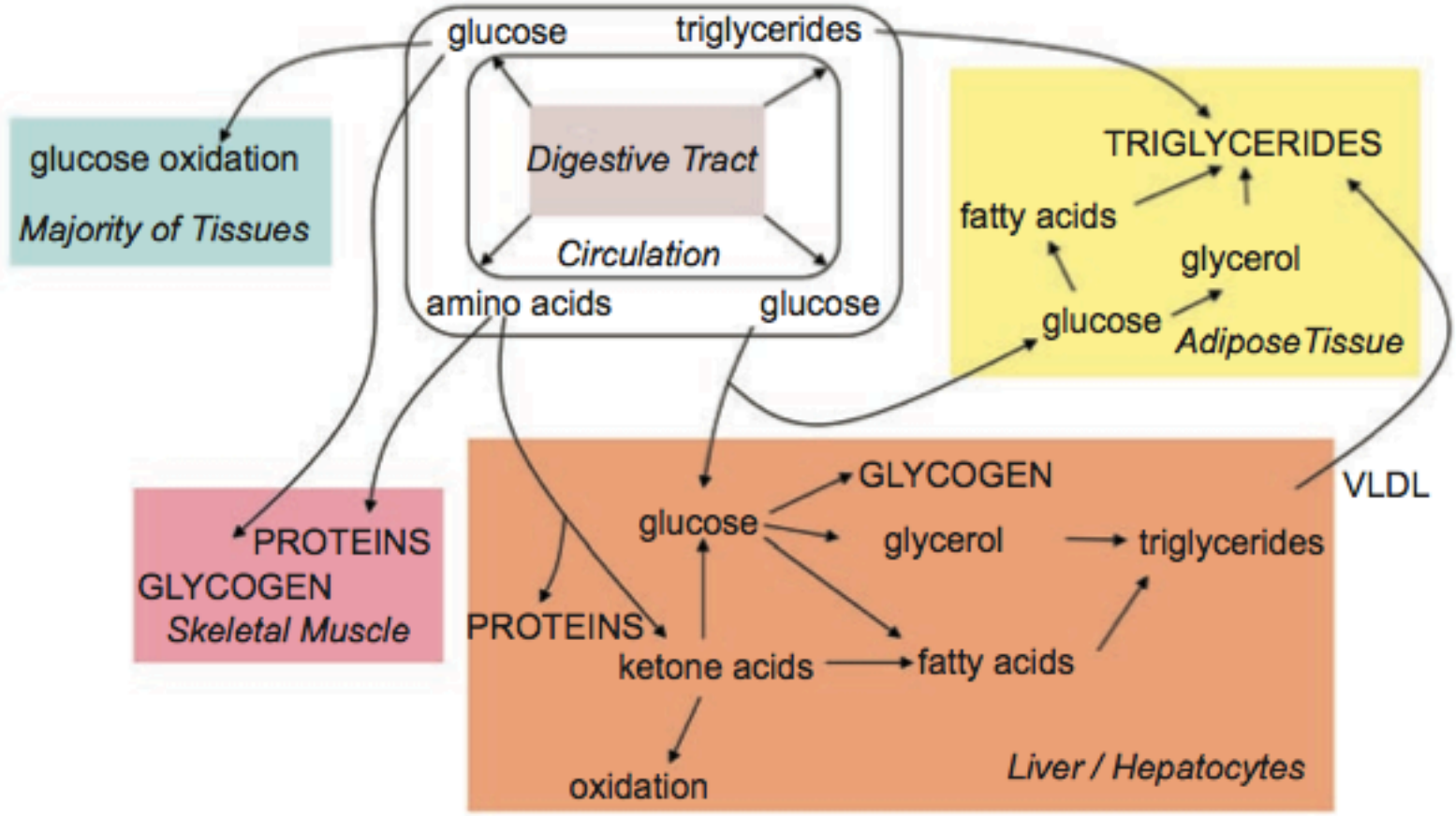
Speakman, JR. Evolutionary Perspectives on the Obesity Epidemic: Adaptive, Maladaptive, and Neutral Viewpoints. Annu. Rev. Nutr. 2013. 33:289–317

Effects of Brain Evolution on Human Nutrition and Metabolism

William R. Leonard,[1] J. Josh Snodgrass,[2] and Marcia L. Robertson[1]

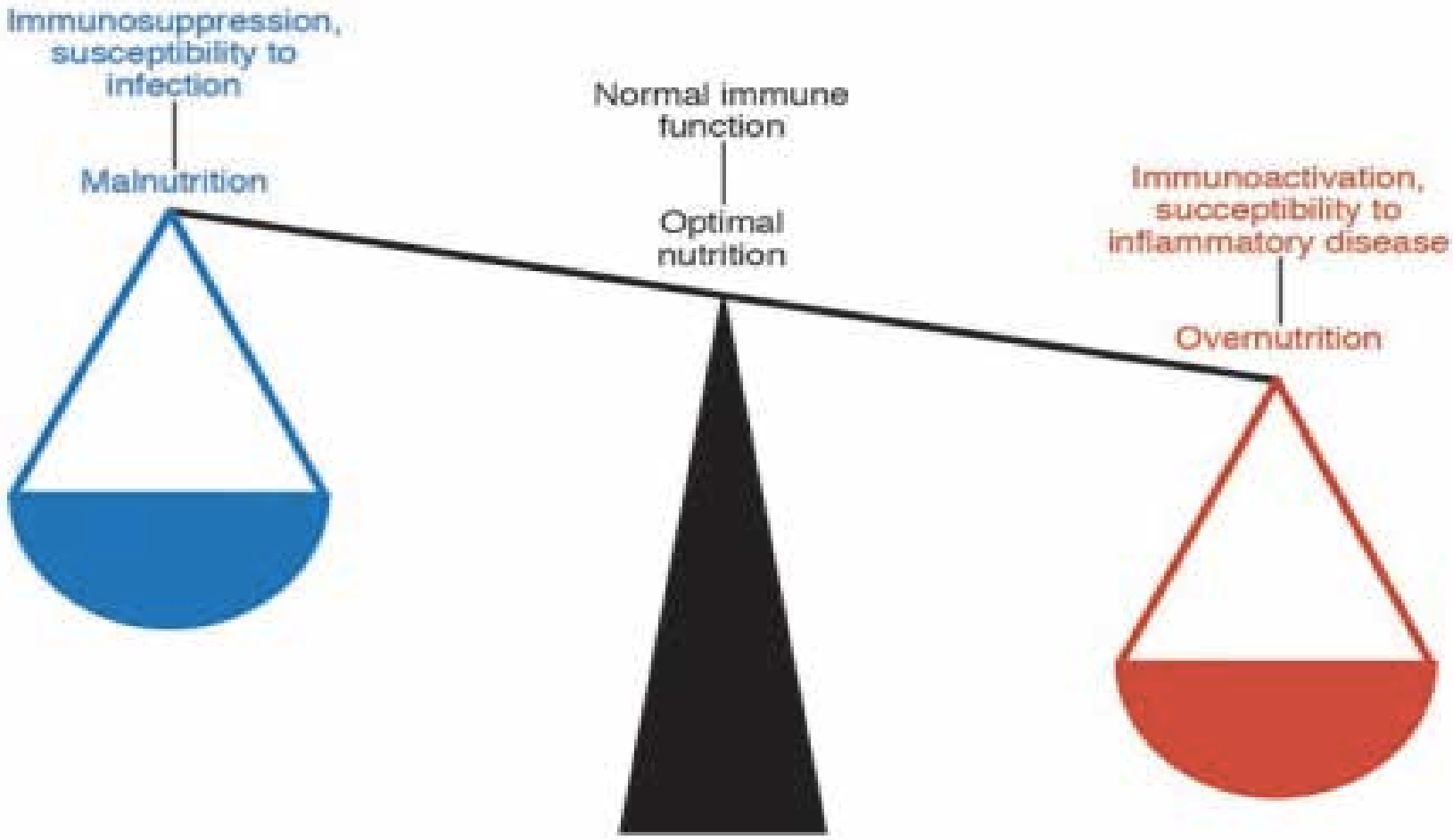
[1]Department of Anthropology, Northwestern University, Evanston, Illinois 60208,
[2]Department of Anthropology, University of Oregon, Eugene, Oregon 97403;
email: w-leonard1@northwestern.edu

4. Humans have relatively lower levels of muscularity and higher levels of adiposity than do other primates of similar size. High levels of adiposity in humans are particularly notable in infancy. Greater body fatness and lower muscle mass allow human infants to accommodate the growth of their large brains by having a ready supply of stored energy, reducing the total energy costs of the rest of the body.



Average energy stores in man	During starvation provides energy for
Fat : 10 000 to 15 000 g	35 days
Muscle glycogen : 350 g	15 hours
Liver glycogen : 80 g	3.5 hours
Extracellular glucose (blood) : 20 g	40 minutes
Body protein : 6 000-7 000 g	15 days

Anghel, S; Wahli, W **Fat poetry: a kingdom for PPAR**g. Cell Research (2007) 17:486-511.



J.

Anghel, S; Wahli, W**Fat poetry: a kingdom for PPAR**g. Cell Research (2007) 17:486-511.

Key points

- Myokines are cytokines or other peptides that are produced, expressed and released by muscle fibres
- Myokines may exert autocrine, paracrine or endocrine effects
- Myokines may balance and counteract the effects of adipokines
- The muscle–cell secretome consists of several hundred secreted products
- Identified myokines include myostatin, LIF, IL-6, IL-7, BDNF, IGF-1, FGF-2, FSTL-1 and irisin
- Myokines may mediate protective effects of muscular exercise, with regard to diseases associated with a physically inactive lifestyle

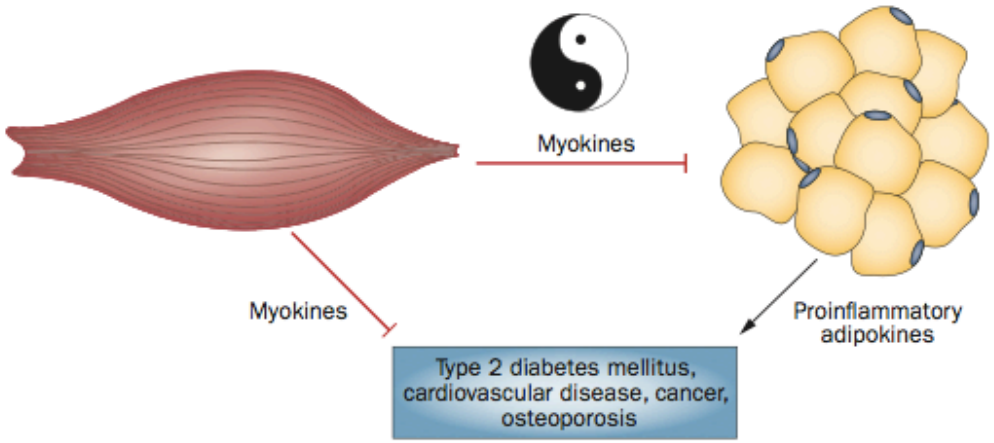
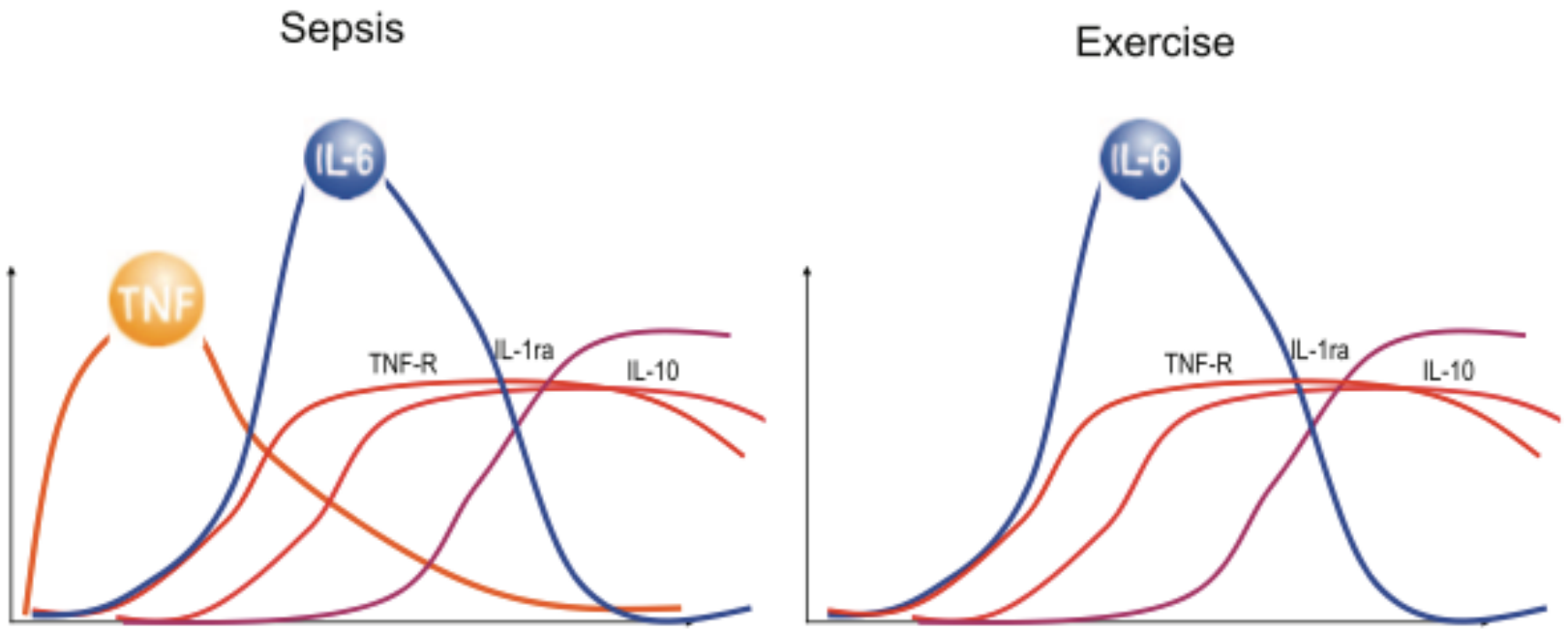
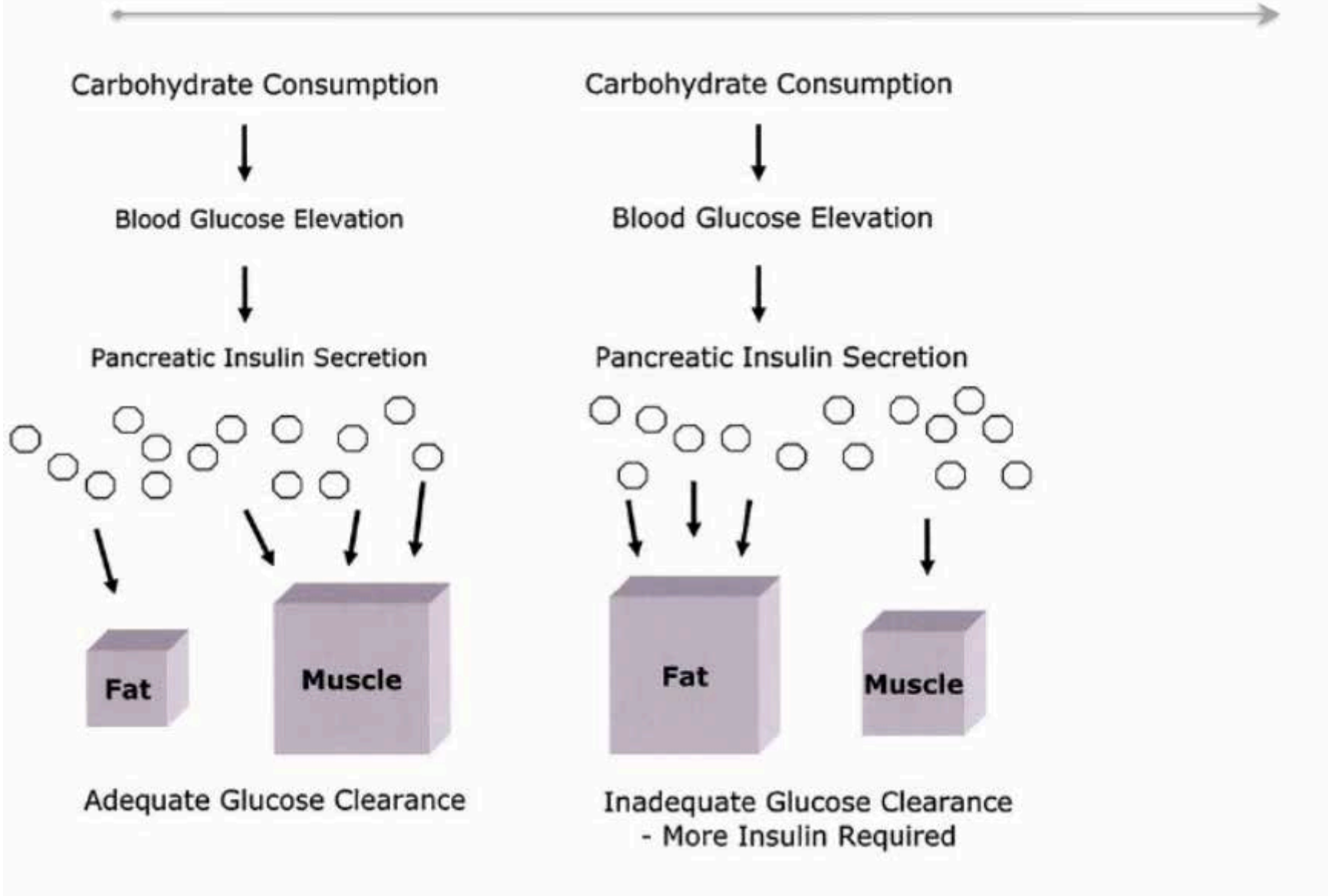


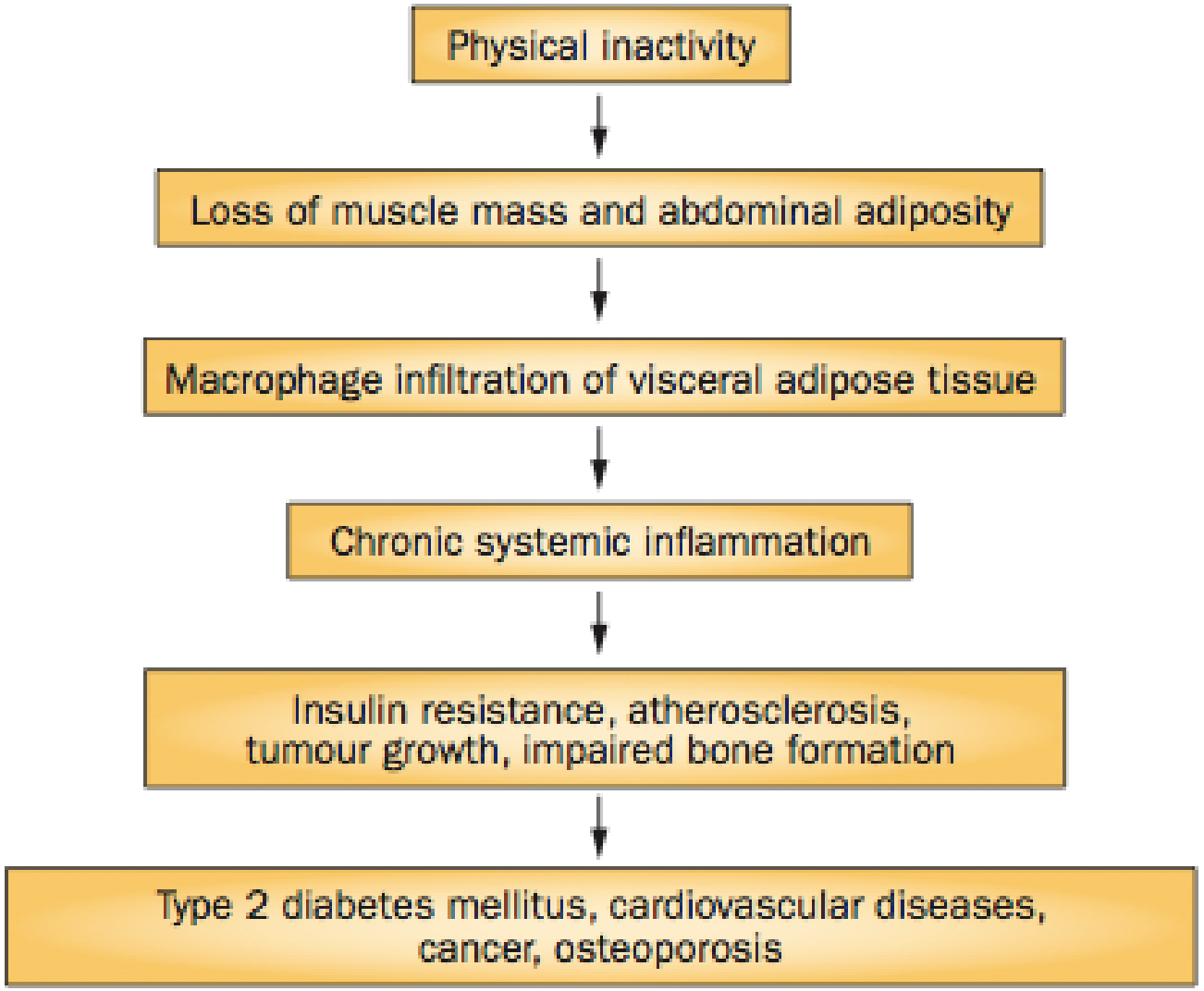
Figure 1 | Interplay between adipokines and myokines represent a yin–yang balance. Especially under conditions of obesity, adipose tissue secretes adipokines, which contribute to establish a chronic inflammatory environment that promotes pathological processes such as atherosclerosis and insulin resistance. Skeletal muscles are capable of producing myokines that confer some of the health benefits of exercise. Such myokines might counteract the harmful effects of proinflammatory adipokines.

Pedersen, B. K. & Febbraio, M. A. *Nat. Rev. Endocrinol.* 3 April 2012



PEDERSEN, BK; FEBBRAIO M. Muscle as an Endocrine Organ: Focus on Muscle-Derived Interleukin-6. *Physiol Rev* . VOL 88 . OCTOBER 2008


Carbohydrate Consumption
Blood Glucose Elevation
Pancreatic Insulin Secretion
Fat
Muscle
Adequate Glucose Clearance
Carbohydrate Consumption
Blood Glucose Elevation
Pancreatic Insulin Secretion
Fat
Muscle
Inadequate Glucose Clearance
- More Insulin Required



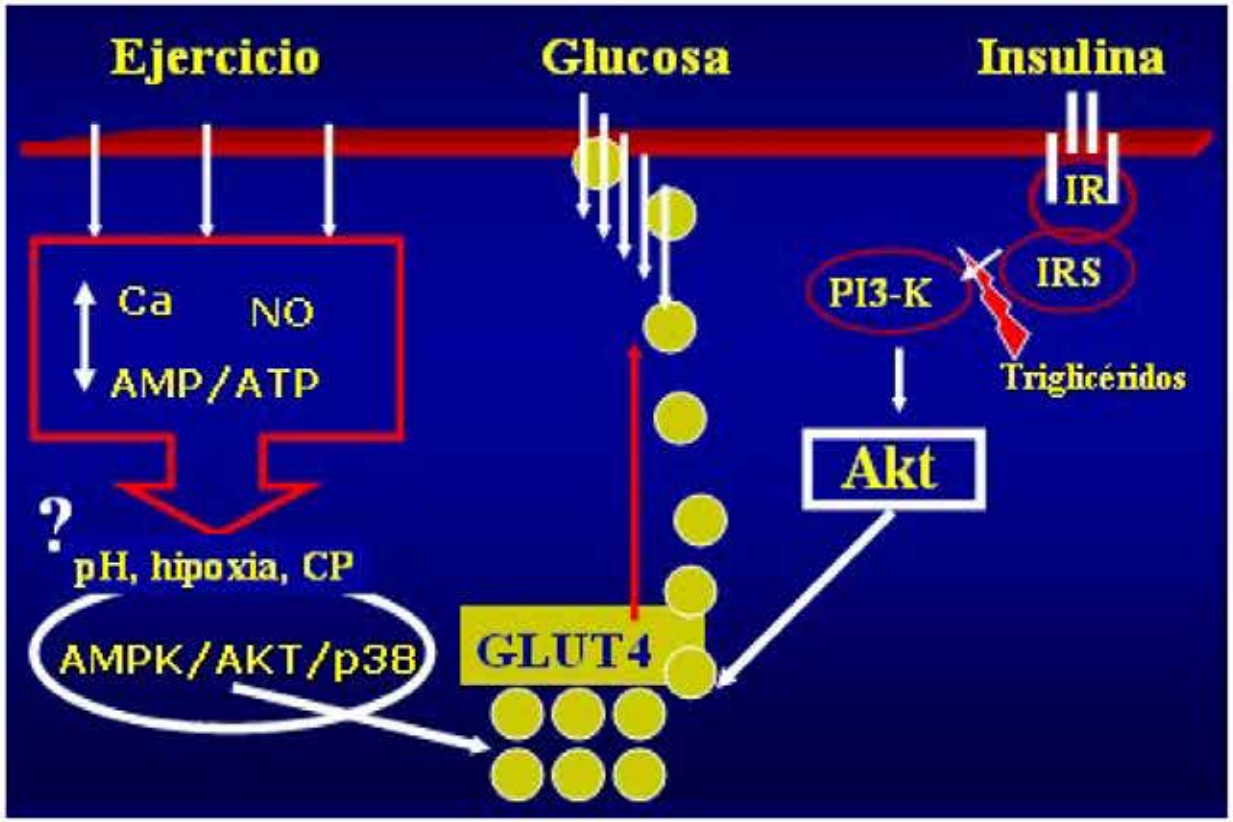
Pedersen, B. K. & Febbraio, M. A. *Nat. Rev. Endocrinol.* 3 April 2012

Concepto de desmusculación.

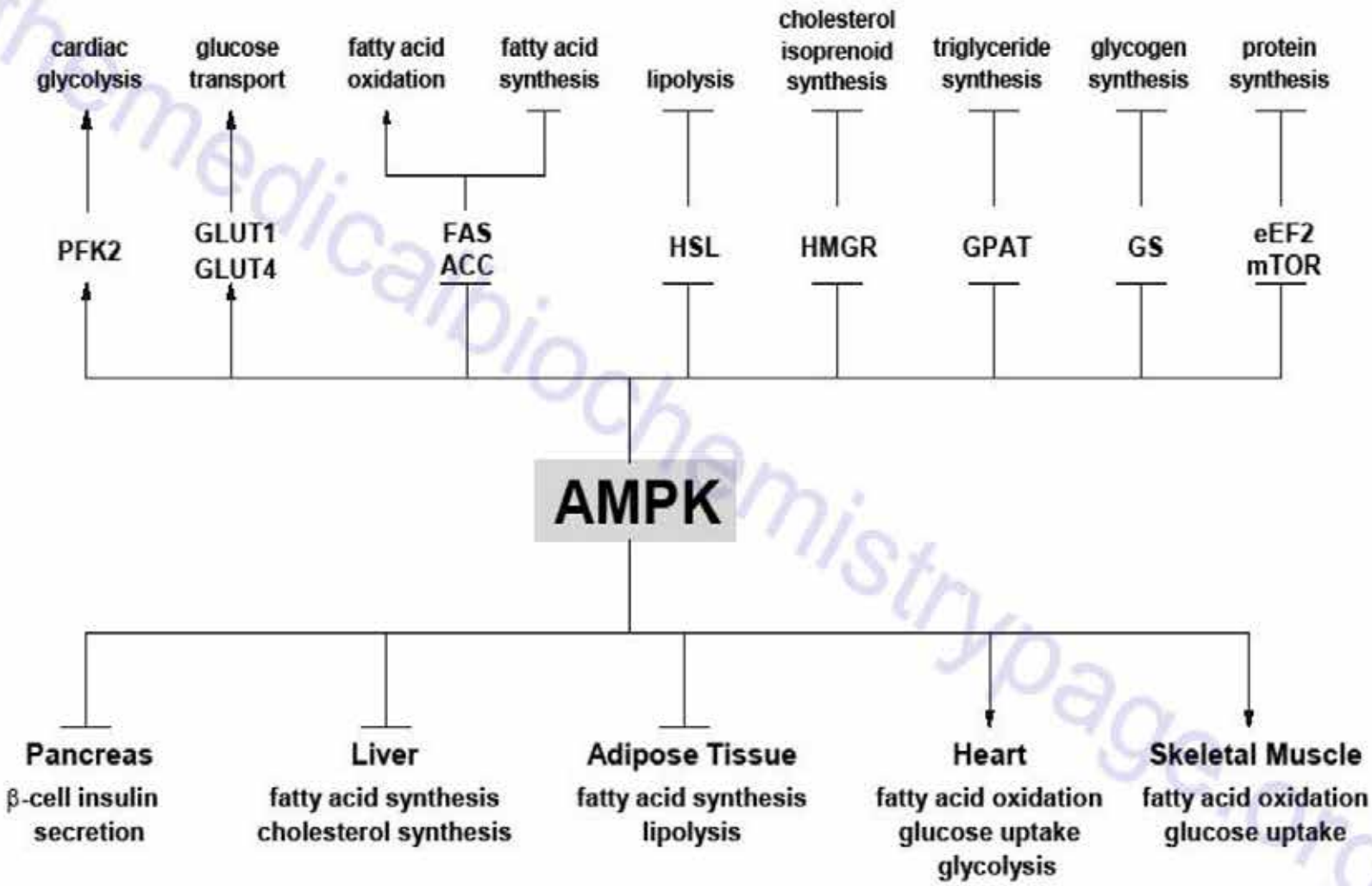
- Paleoanthropologists conclude that the physiques of average preagricultural adults resembled those of contemporary superior athletes (Ruff, 2000a,b).
- Highly trained males ratio of skeletal muscle to adipose tissue approximates 5:1 (~50% body weight as muscle, ~10% as fat) (Proctor and Joyner, 1997; Janssen et al., 2000).
- For current female athletes, the ratio can be as high as 3:1 (~45% muscle, ~15% fat) (Proctor and Joyner, 1997; Janssen et al. 2000)
- Women athletes often experience ovulatory dysfunction—which would have been selected against—the retrojected tissue proportions for Stone Age women are 35%–40% muscle and 20%–25% fat.

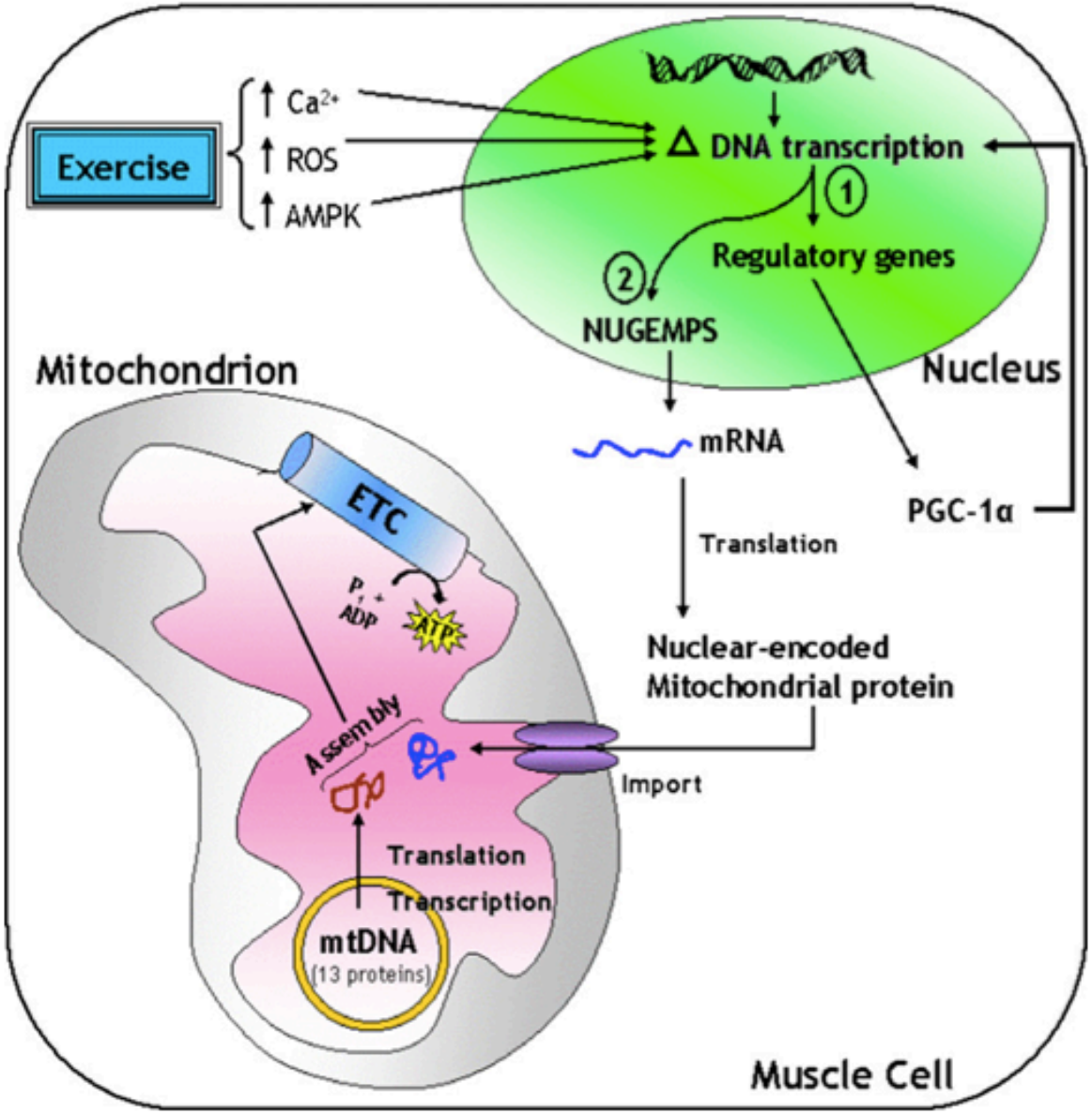
Y por si fuera poco…

Receptores glut 4

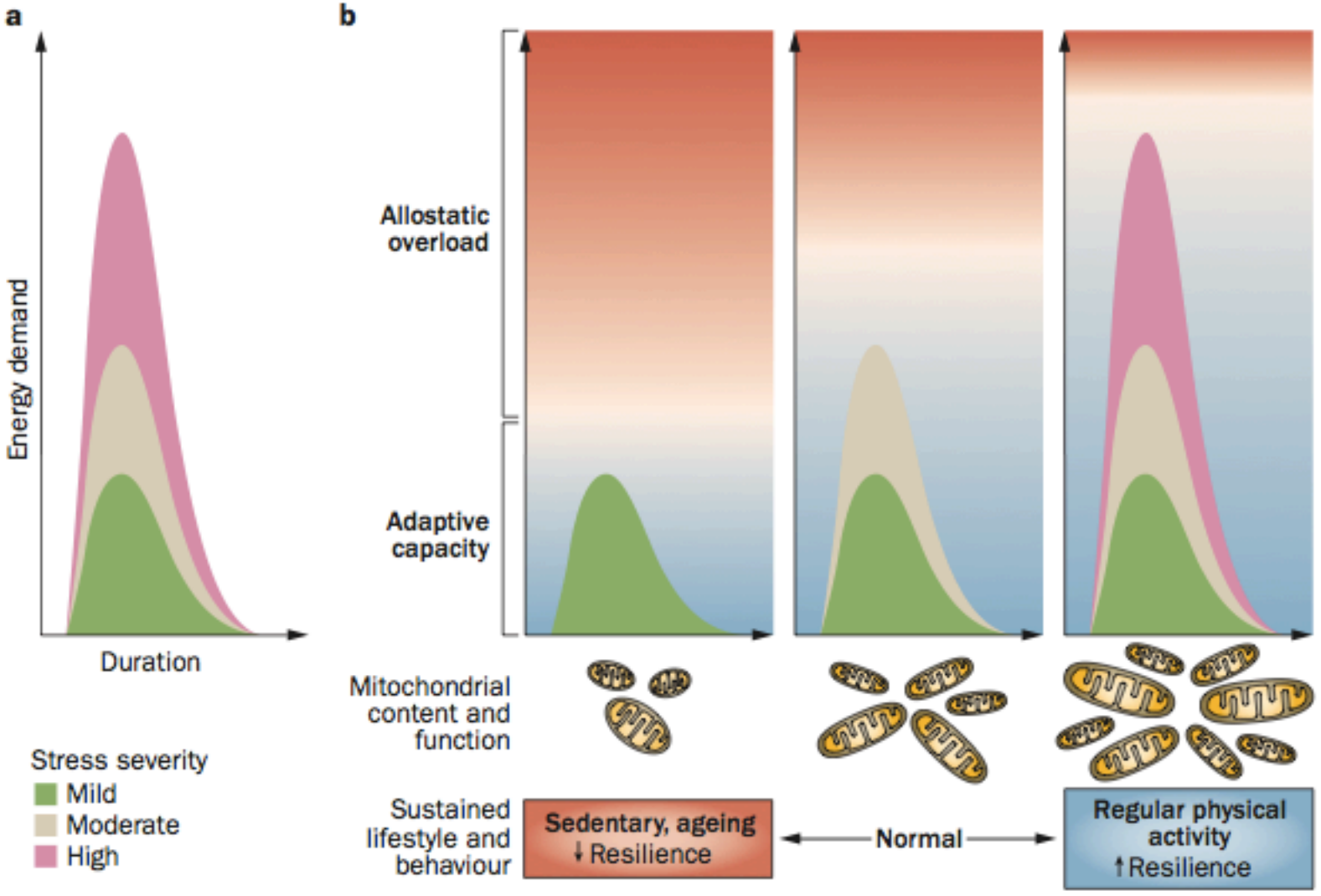


GOODYEAR, 2003





Nutrition, Metabolism & Cardiovascular Diseases (2007) 17, 332-337



Picard, M. *et al.* Mitochondrial allostatic load puts the 'gluc' back in glucocorticoids *Nat. Rev. Endocrinol*. 10, 303–310 (2014

Y MÁS...

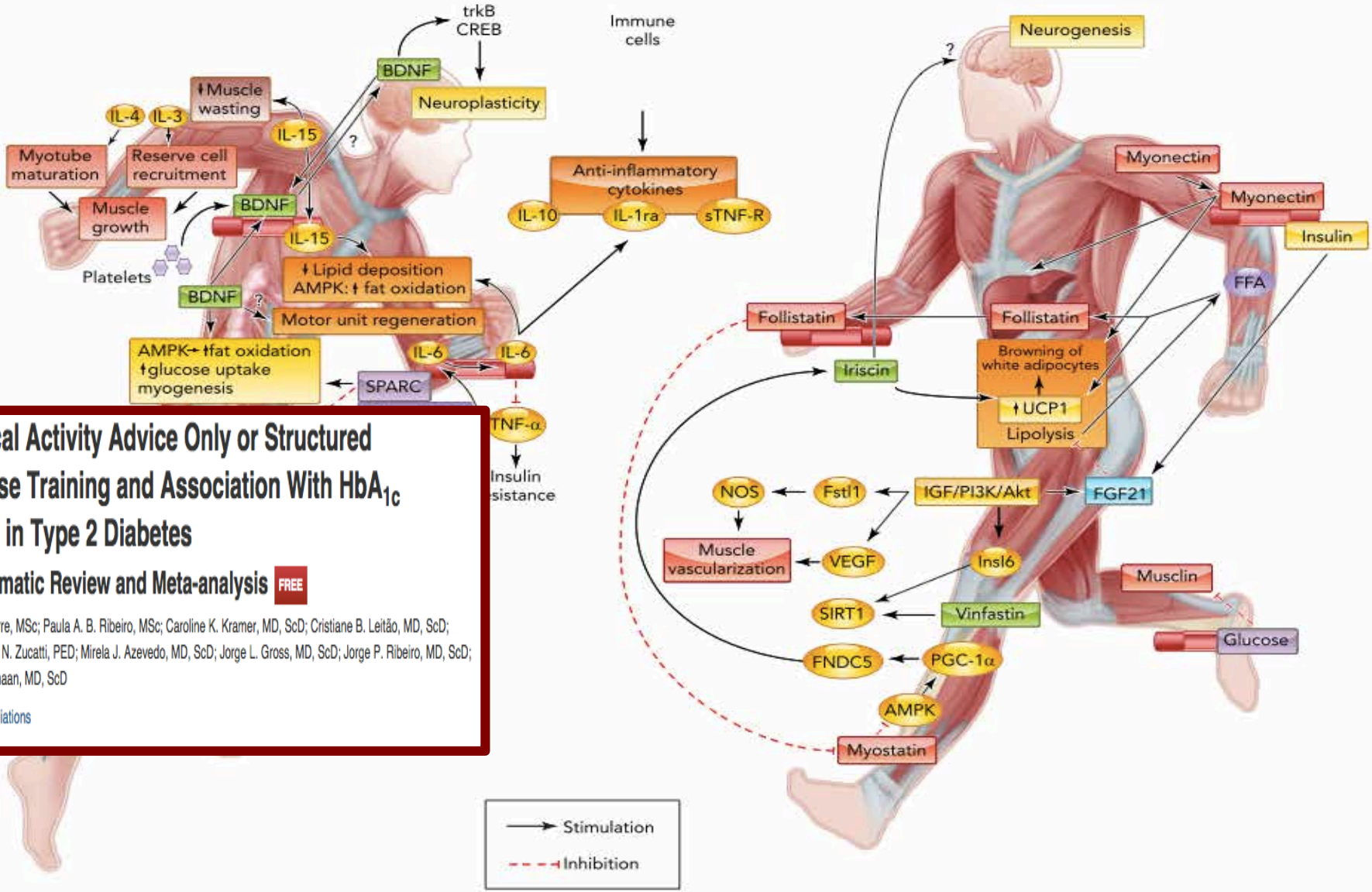
REVIEWS

PHYSIOLOGY 28: 330–358, 2013; doi:10.1152/physiol.00019.2013

Exercise is the Real Polypill

Carmen Fiuza-Luces,[1,2] Nuria Garatachea,[3] Nathan A. Berger,[4] and Alejandro Lucia[1,2]

The concept of a "polypill" is receiving growing attention to prevent cardio-



Physical Activity Advice Only or Structured Exercise Training and Association With HbA_{1c} Levels in Type 2 Diabetes

A Systematic Review and Meta-analysis FREE

Daniel Umpierre, MSc; Paula A. B. Ribeiro, MSc; Caroline K. Kramer, MD, ScD; Cristiane B. Leitão, MD, ScD; Alessandra T. N. Zucatti, PED; Mirela J. Azevedo, MD, ScD; Jorge L. Gross, MD, ScD; Jorge P. Ribeiro, MD, ScD; Beatriz D. Schaan, MD, ScD

[+] Author Affiliations

PHYSIOLOGY 28: 330–358, 2013; doi:10.1152/physiol.00019.2013

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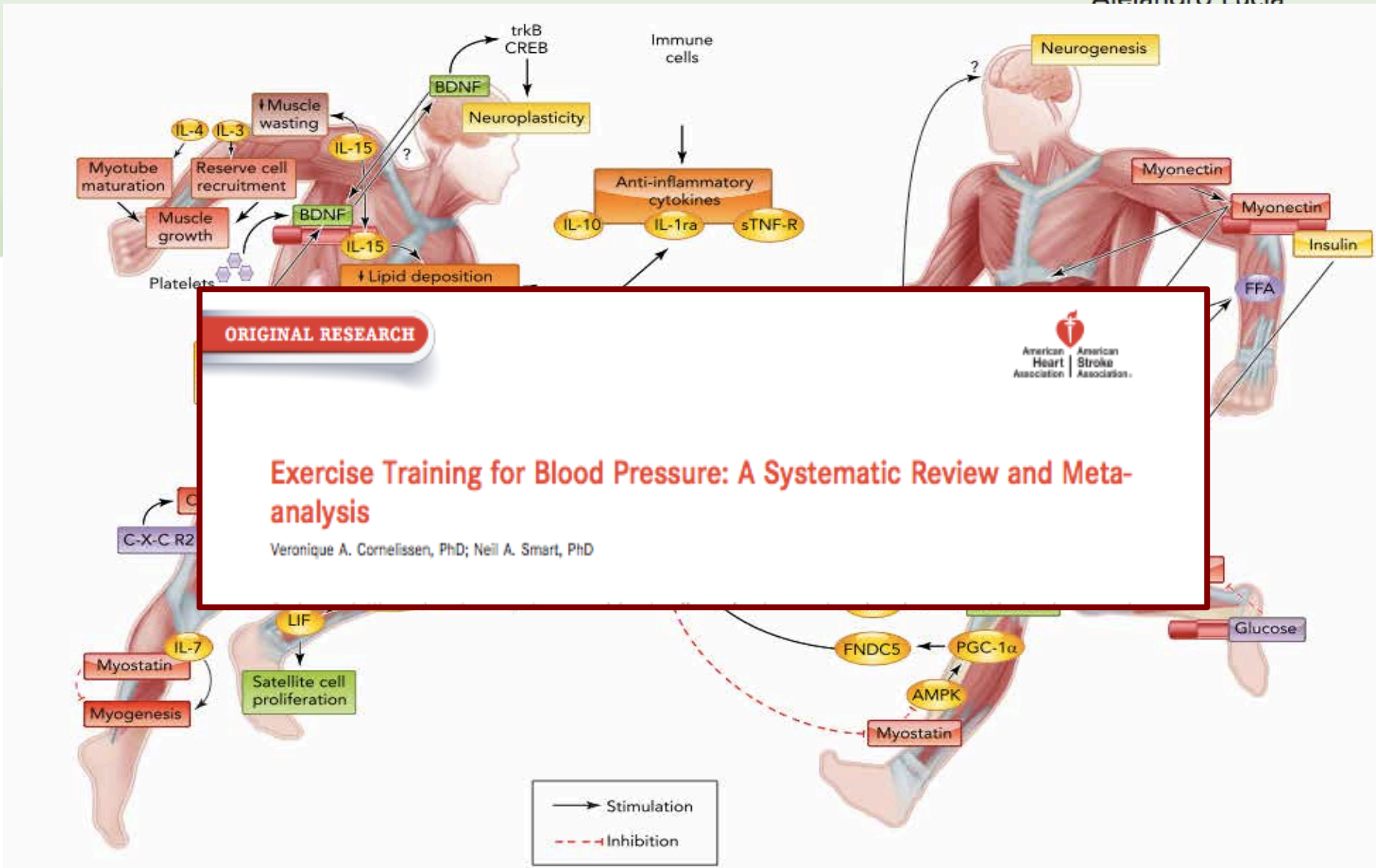

ORIGINAL RESEARCH

American Heart Association | American Stroke Association

Exercise Training for Blood Pressure: A Systematic Review and Meta-analysis

Veronique A. Cornelissen, PhD; Neil A. Smart, PhD

PHYSIOLOGY 28: 330–358, 2013; doi:10.1152/physiol.00019.2013

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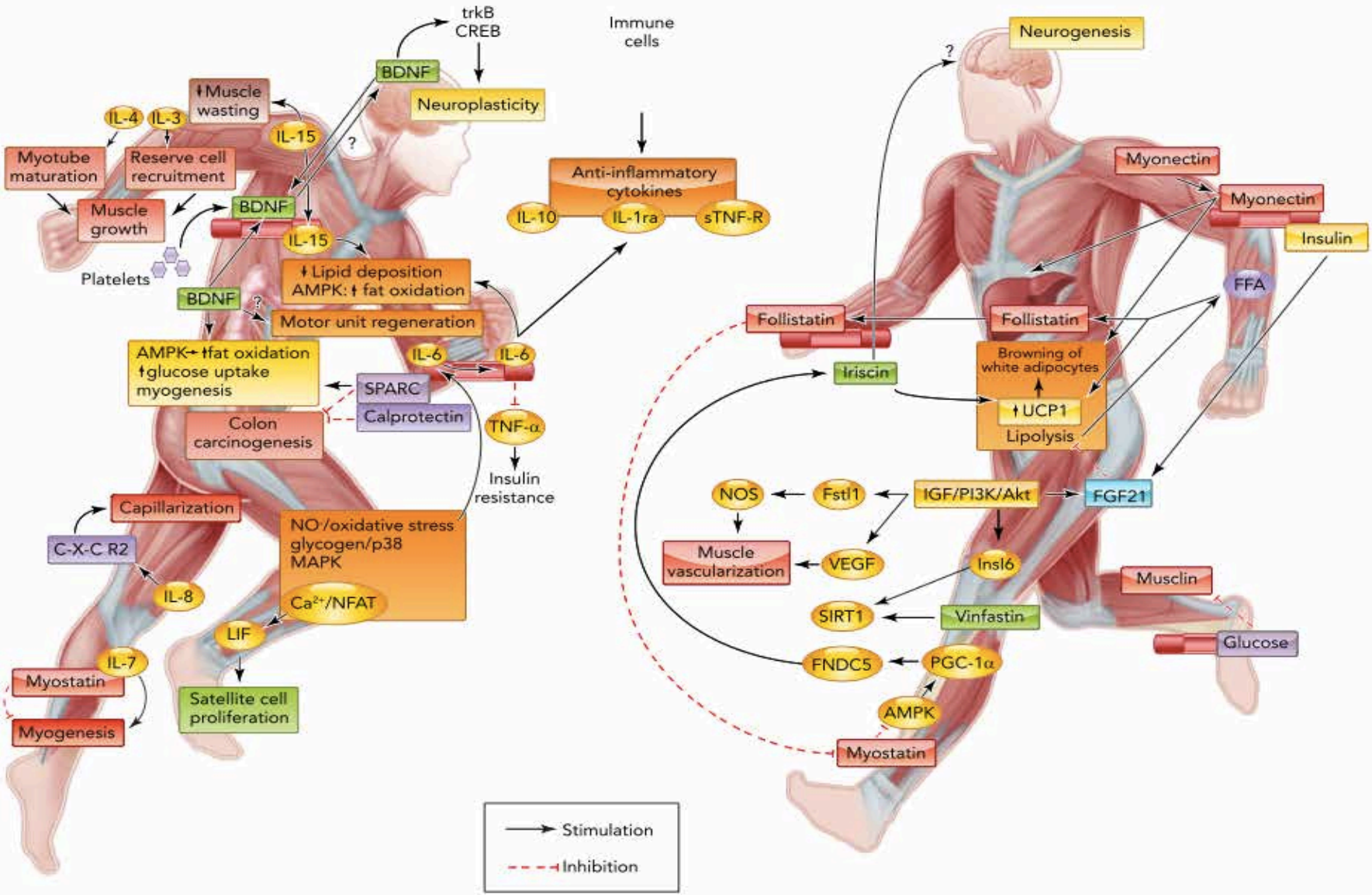

REVIEWS
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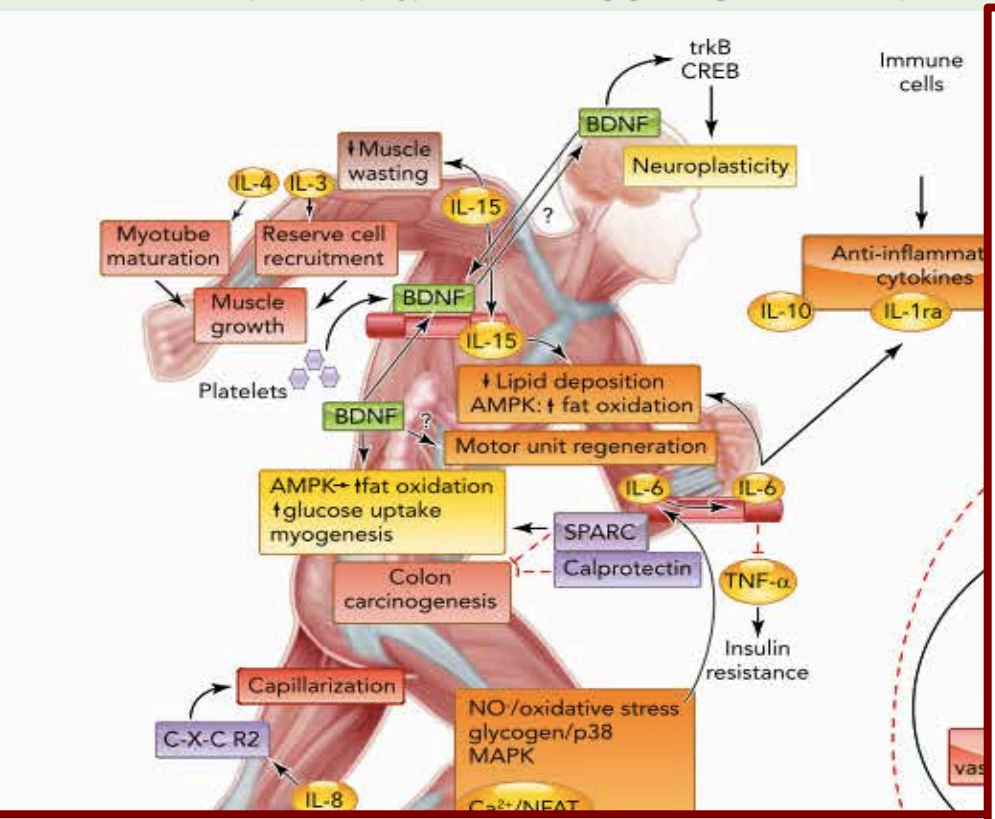
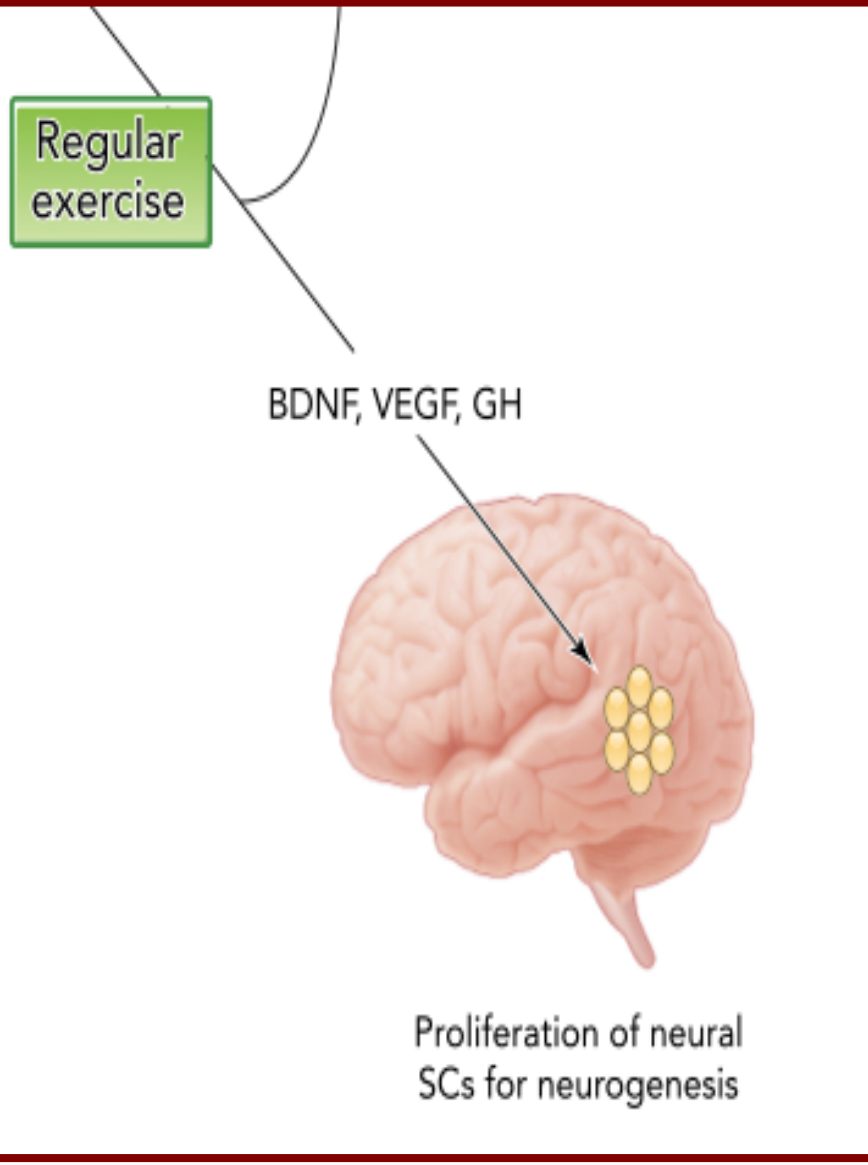


Neuroplasticity — Exercise-Induced Response of Peripheral Brain-Derived Neurotrophic Factor

A Systematic Review of Experimental Studies in Human Subjects



PHYSIOLOGY 28: 330–358, 2013; doi:10.1152/physiol.00019.2013

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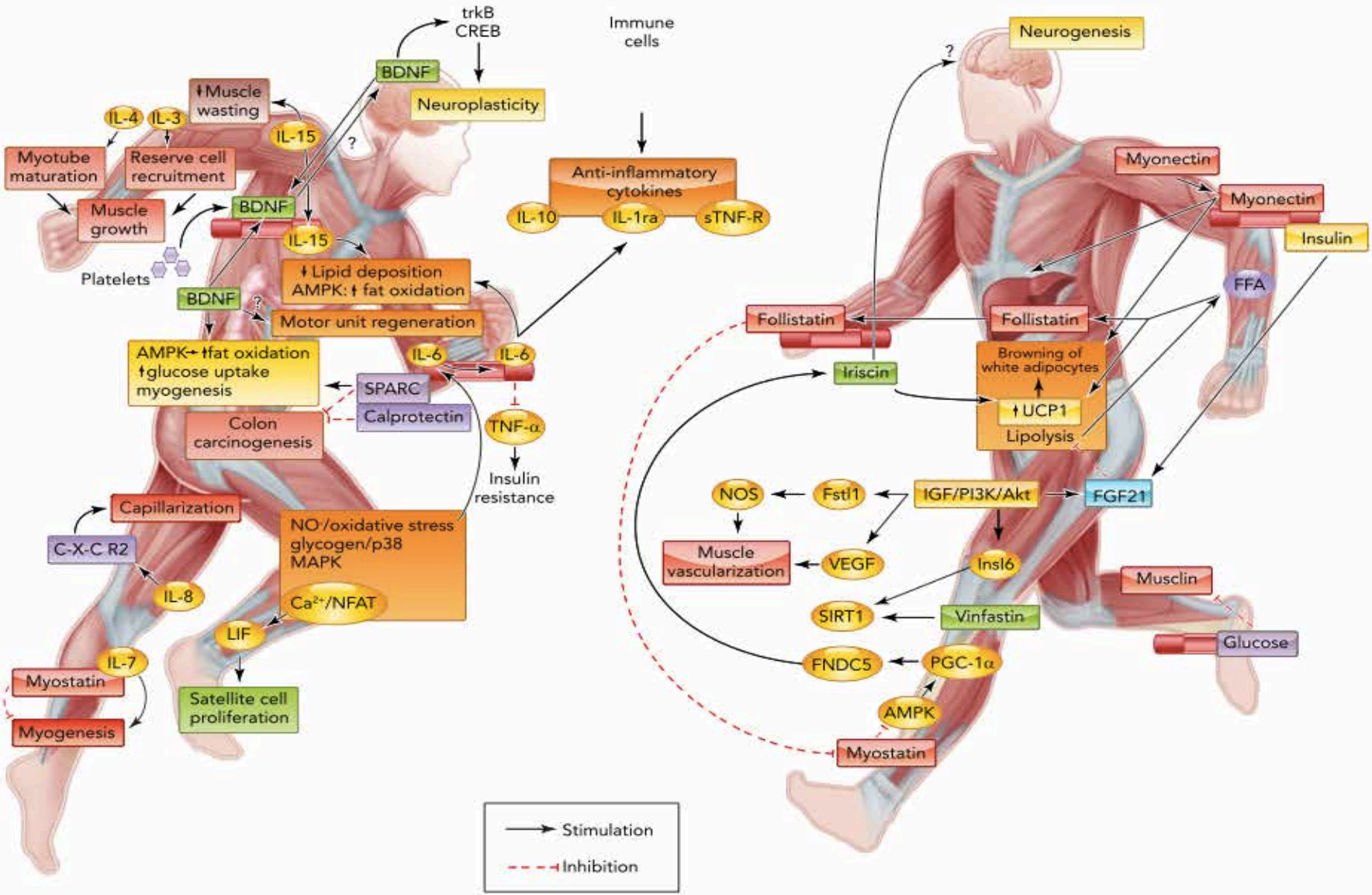

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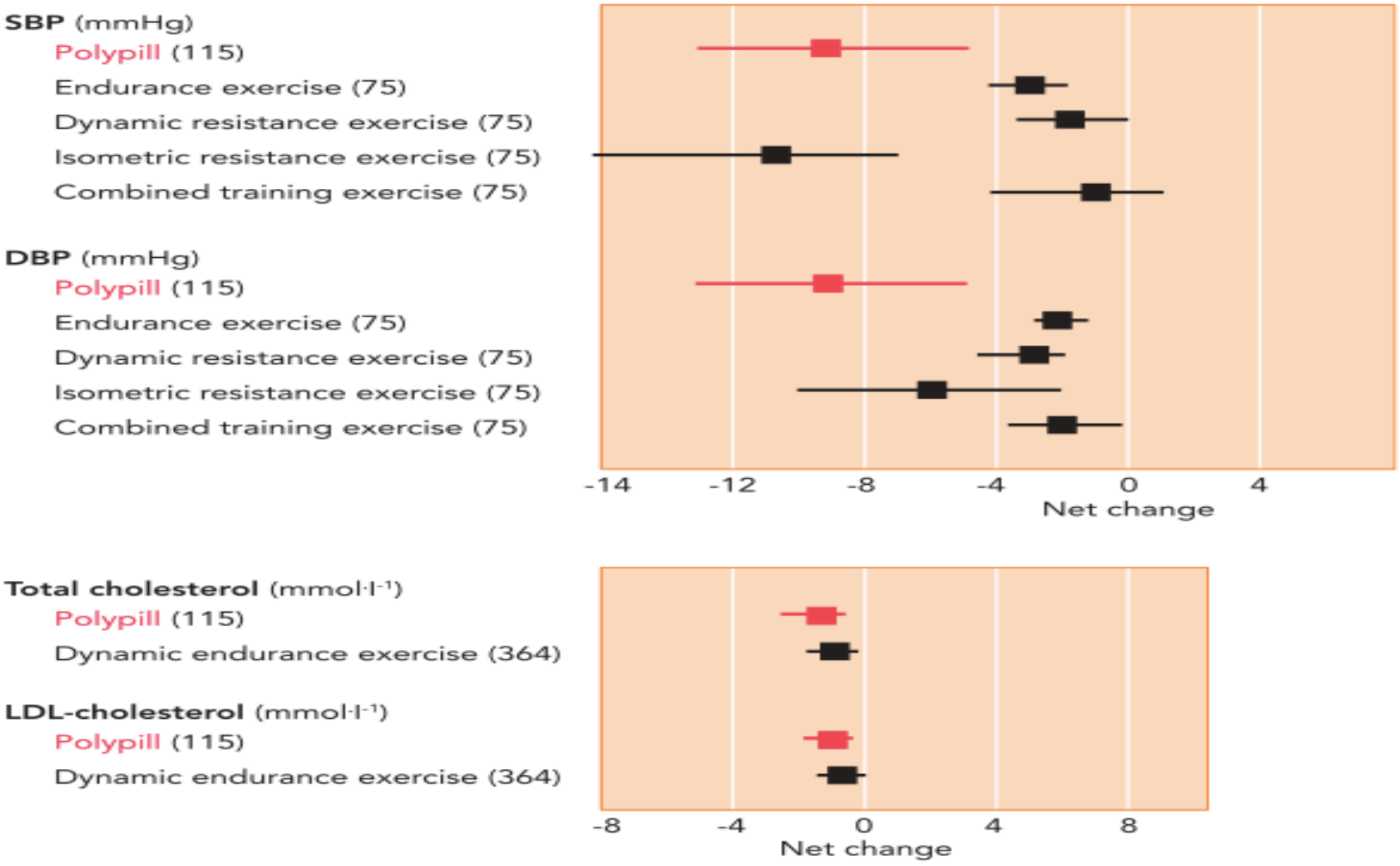
trkB



Parece ser…

"In the not too distant past pizzas were not delivered, there were no drive-through fast-food restaurants, and no automobiles. Quite the contrary, during our evolutionary history, there was selection for genes that 'posed the questions': Why sit when you can walk and why walk when you can run?"

Mattson, M.P., Evolutionary aspects of human exercise—Born to run purposefully. Ageing Res. Rev. (2012),

La intensa felicidad que sentimos por el avistamiento fugaz de un animal libre en la naturaleza , no es más que la nostalgia de cuando nosotros vivíamos en ella...