12º ENDO SUL SBEM SC

SUPLEMENTAÇÃO PROTEICA NO ATLETA NÃO COMPETITIVO

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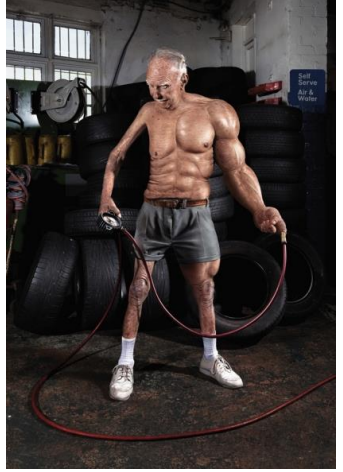
ENDOCRINOLOGIA DO EXERCÍCIO - UNIFESP

PROTEÍNAS:

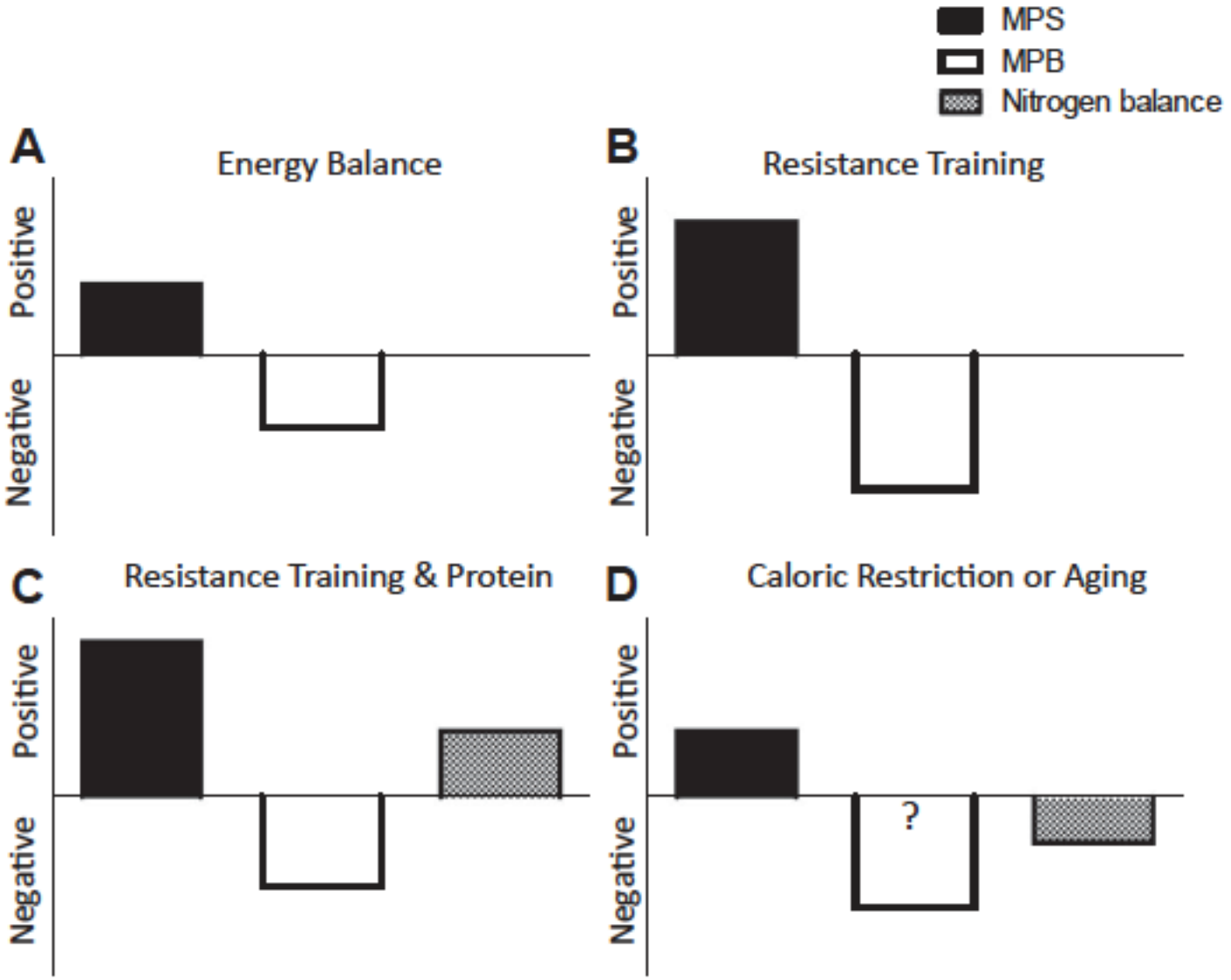


(1) ganho de massa muscular, especialmente quando associado com treinamento de resistência;

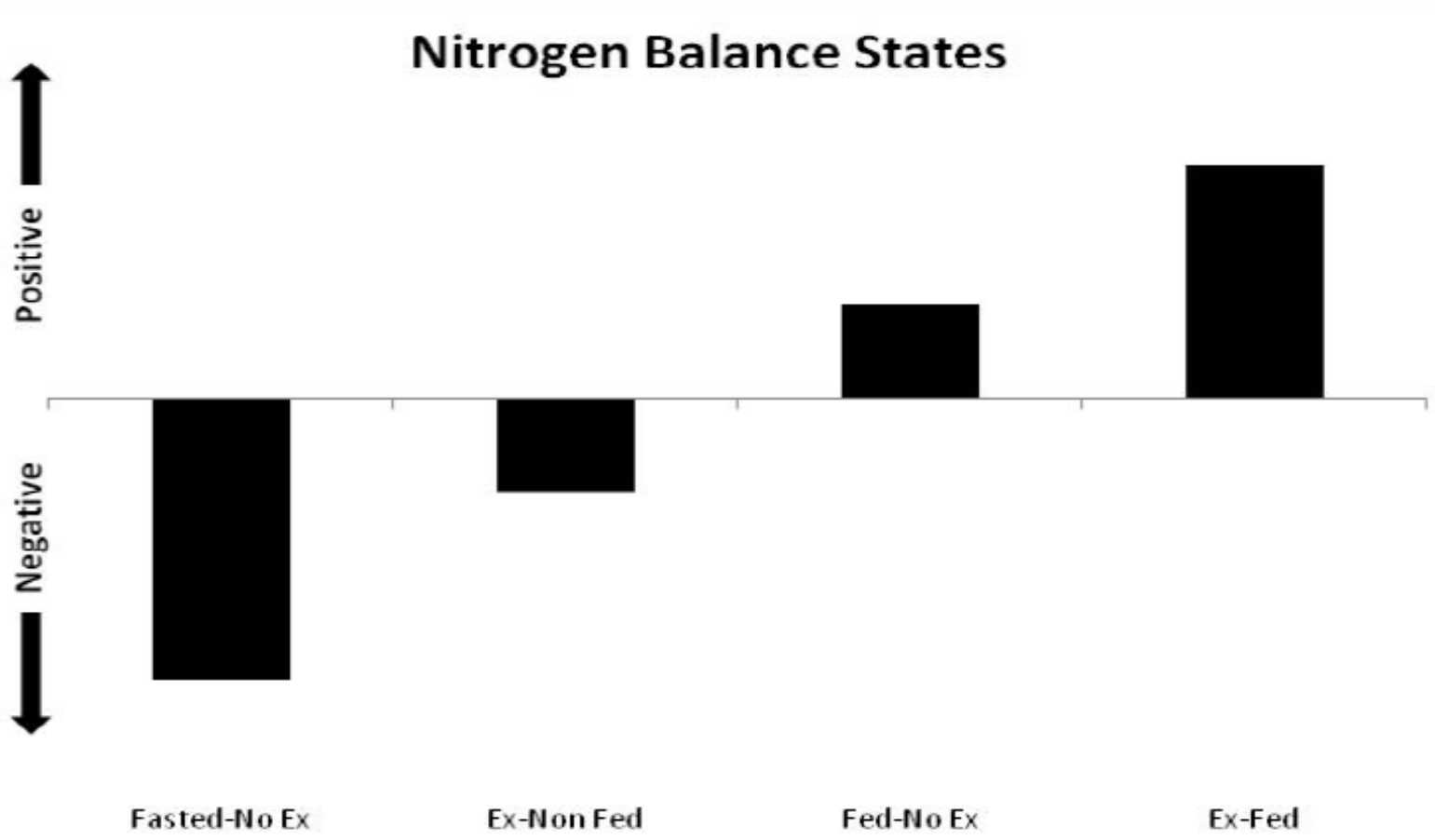
(2) menor perda de massa muscular na restrição/inadequação nutricional;

(3) multiplos benefícios metabólicos.

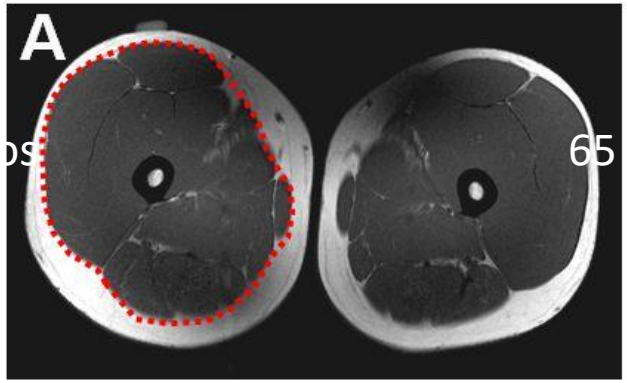
J Food Sci. 2015;80 Suppl 1:A8-A15

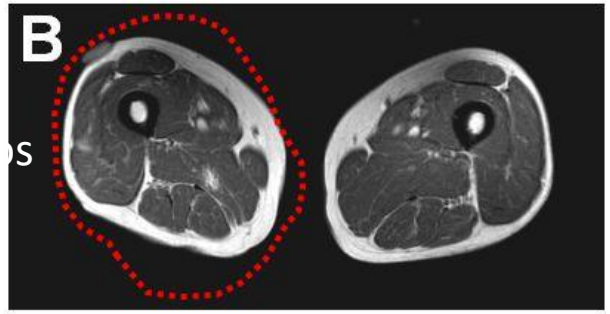


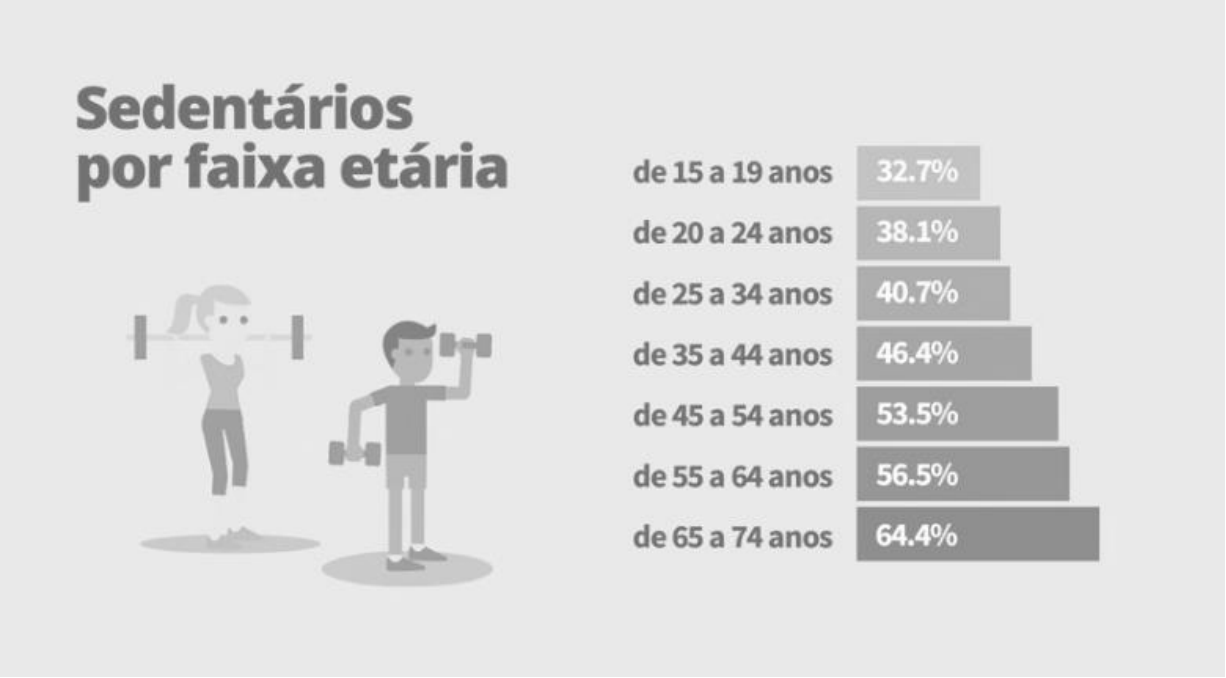
J Food Sci. 2015 Mar;80 Suppl 1:A8-A15



Journal of Sports Science and Medicine 2010: 9, 354-363





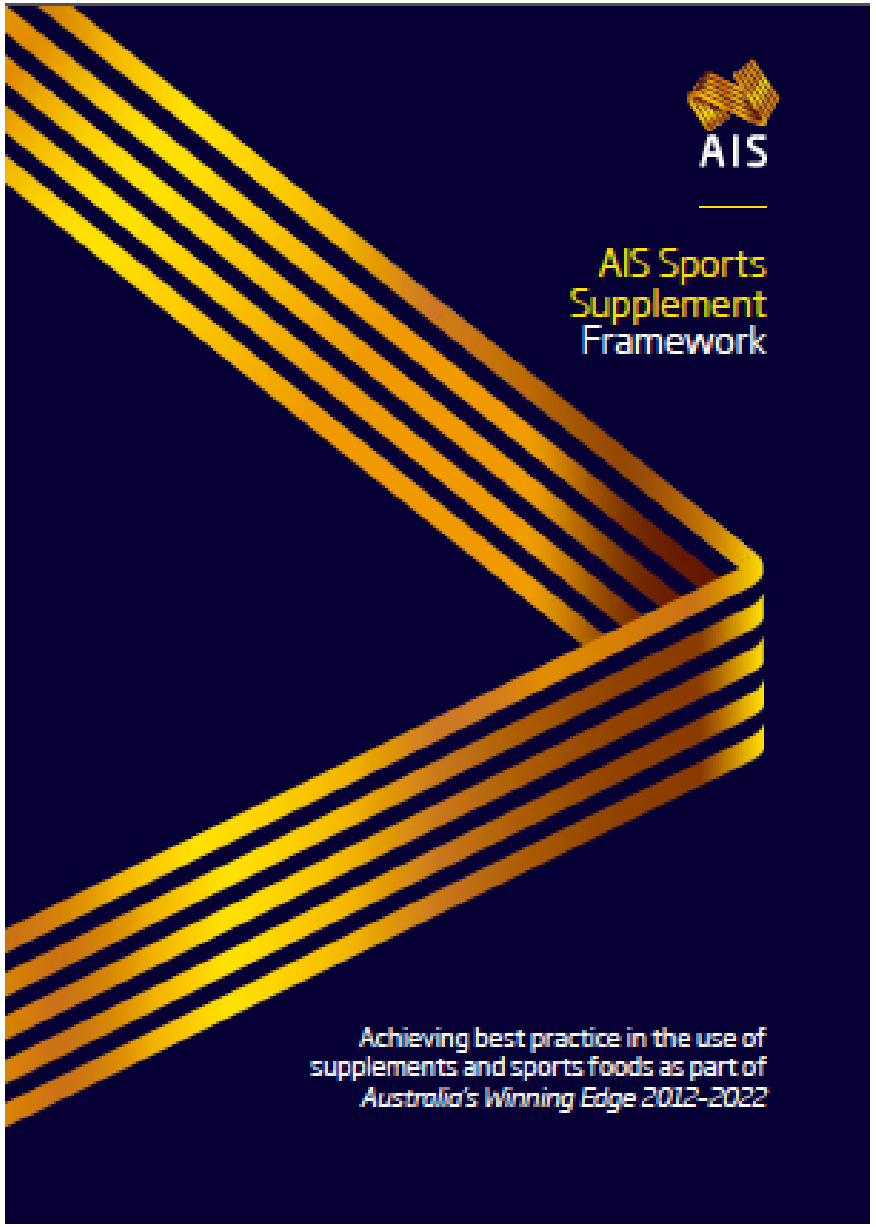


A SARCOPENIA inicia aos 40 anos, numa velocidade de redução média de 0,8% da massa muscular ao ano

Diagnóstico Nacional do Esporte (Diesporte) 2015
J Food Sci. 2015;80 Suppl 1:A8-A15

“food first” approach!!!

GL Close, L Hamilton, A Philp, L Burke and JP Morton, New Strategies in Sport Nutrition to Increase Exercise Performance, Free Radical Biology and Medicine, http://dx.doi.org/10.1016/j.freeradbiomed.2016.01.016



http://www.ausport.gov.au/ais/nutrition/supplements

AIS Sports Supplement Framework

The ABCD Classification system

Designed by @YLMSportScience

A

Supported for use in specific situations in sport using evidence-based protocols

Sports drink, gels & bar
Whey protein
Iron & Calcium supplement
Multivitamin/mineral
Vitamin D
Probiotics (gut/immune)
Caffeine
B-alanine
Bicarbonate
Beetroot juice
Creatine

B

Deserving of further research and could be considered for provision to athletes under a research protocol or case-managed monitoring situation

Quercetin
Tart cherry juice
Exotic berries (acai, goji etc.)
Curcumin
Anti-oxidants C and E
Carnitine
HMB
Glutamine
Fish oils
Glucosamine

C

Have little meaningful proof of beneficial effects

Category A and B products used outside approved protocols

The rest – if you can't find an ingredient or product in Groups A, B or D, it probably deserves to be here!

D

Banned or at high risk of contamination with substances that could lead to a positive drug test

Ephedrine, Strychnine
Sibutramine
Methylhexanamine (DMAA)
Other herbal stimulants
DHEA, Androstenedione
19-norandrostenione/ol
Other prohormones
Tribulus terrestris and other testosterone boosters
Maca root powder
Glycerol, Colostrum

http://www.ausport.gov.au/ais/nutrition/supplements

Overview of category	Sub-categories	Examples
Evidence level: Supported for use in specific situations in sport using evidence-based protocols. **Use within supplement programs:** Provided or permitted for use by some athletes according to best practice protocols.	**Sports foods** – specialised products used to provide a practical source of nutrients when it is impractical to consume everyday foods.	Sports drink
		Sports gel
		Sports confectionery
		Liquid meal
		Whey protein
		Sports bar
		Electrolyte replacement
	Medical supplements – used to treat clinical issues, including diagnosed nutrient deficiencies. Requires individual dispensing and supervision by appropriate sports medicine/science practitioner	Iron supplement
		Calcium supplement
		Multivitamin/mineral
		Vitamin D
		Probiotics (gut/immune)
	Performance supplements – used to directly contribute to optimal performance. Should be used in individualised protocols under the direction of an appropriate sports medicine/science practitioner. While there may be a general evidence base for these products, additional research may often be required to fine-tune protocols for individualised and event-specific use.	Caffeine
		B-alanine
		Bicarbonate
		Beetroot juice
		Creatine

http://www.ausport.gov.au/ais/nutrition/supplements

necessidades proteicas

- Ingestão diária recomentada de proteína: **0,8 a 1,0 g** de proteína/kg/d para crianças, adolescentes e adultos

- Atletas: **1,4 a 2,0g/kg/d** - caso contrário, poderão ter um equilíbrio protéico/nitrogênio negativo, com catabolismo muscular e recuperação lenta, perda de massa muscular e diminuição da performance nos treinamentos/competições

obesity reviews 2013;14, 324–343

Paediatr Child Health 2013;18(4):200-2

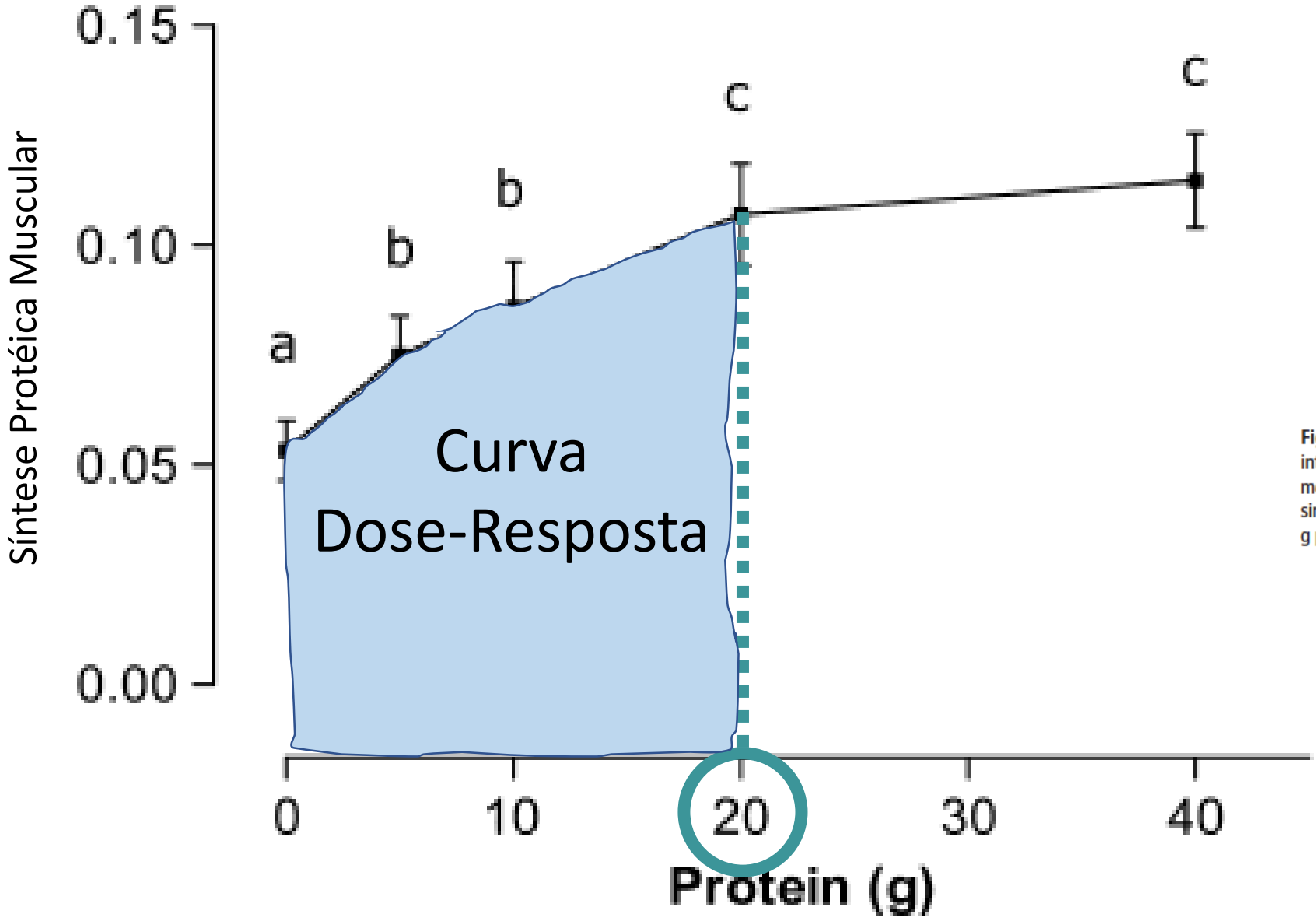
Jäger *et al. Journal of the International Society of Sports Nutrition* (2017) 14:20
DOI 10.1186/s12970-017-0177-8

Journal of the International Society of Sports Nutrition

REVIEW Open Access

International Society of Sports Nutrition Position Stand: protein and exercise

There is novel evidence that suggests higher protein intakes (**>3.0 g/kg/d**) may have positive effects on body composition in resistance-trained individuals.



Proc Nut Soc 2011;70(1): 100-3

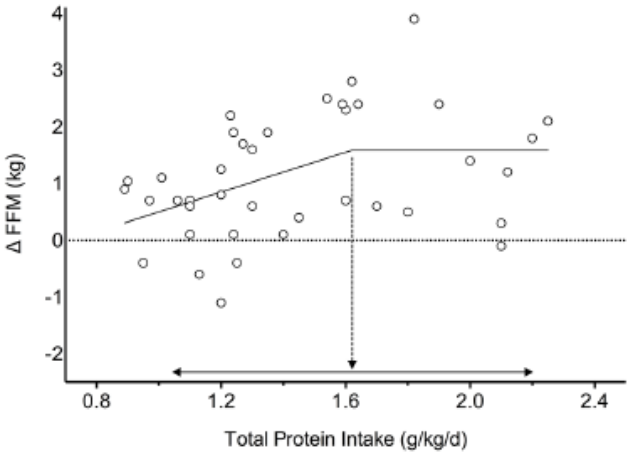
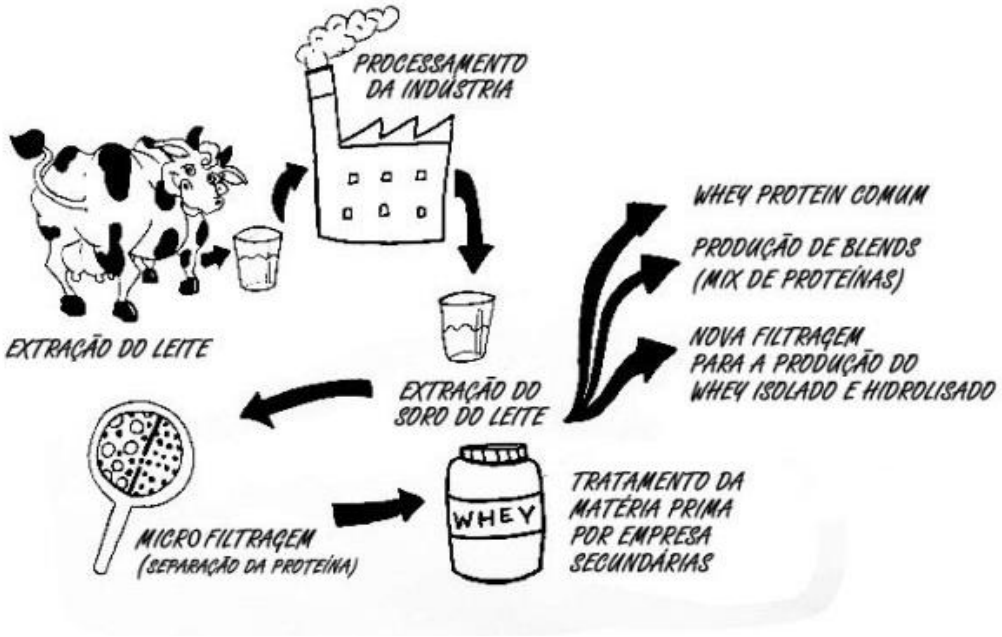


Figure 5 Segmental linear regression between relative total protein intake (g/kg body mass/day) and the change in fat-free mass (ΔFFM) measured by dual energy X-ray absorptiometry. Each circle represents a single group from a study. Dashed arrow indicates the break point=1.62 g protein/kg/day, p=0.079. Solid arrow indicates 95% CI, (1.03 to 2.20).

Br J Sports Med 2018;52:376–384



- W**hey protein -** proteína completa, contendo:
  - aminoácidos essenciais (**EAA**)
  - uma elevada proporção de AA de cadeia ramificada – **BCAA**
  - Leucina - AA chave na estimulação da síntese de proteína muscular e função mitocondrial

J Food Sci. 2015 Mar;80 Suppl 1:A8-A15

Ingestion of whey hydrolysate, casein, or soy protein isolate: effects on muscle protein synthesis at rest and following resistance exercise in young men

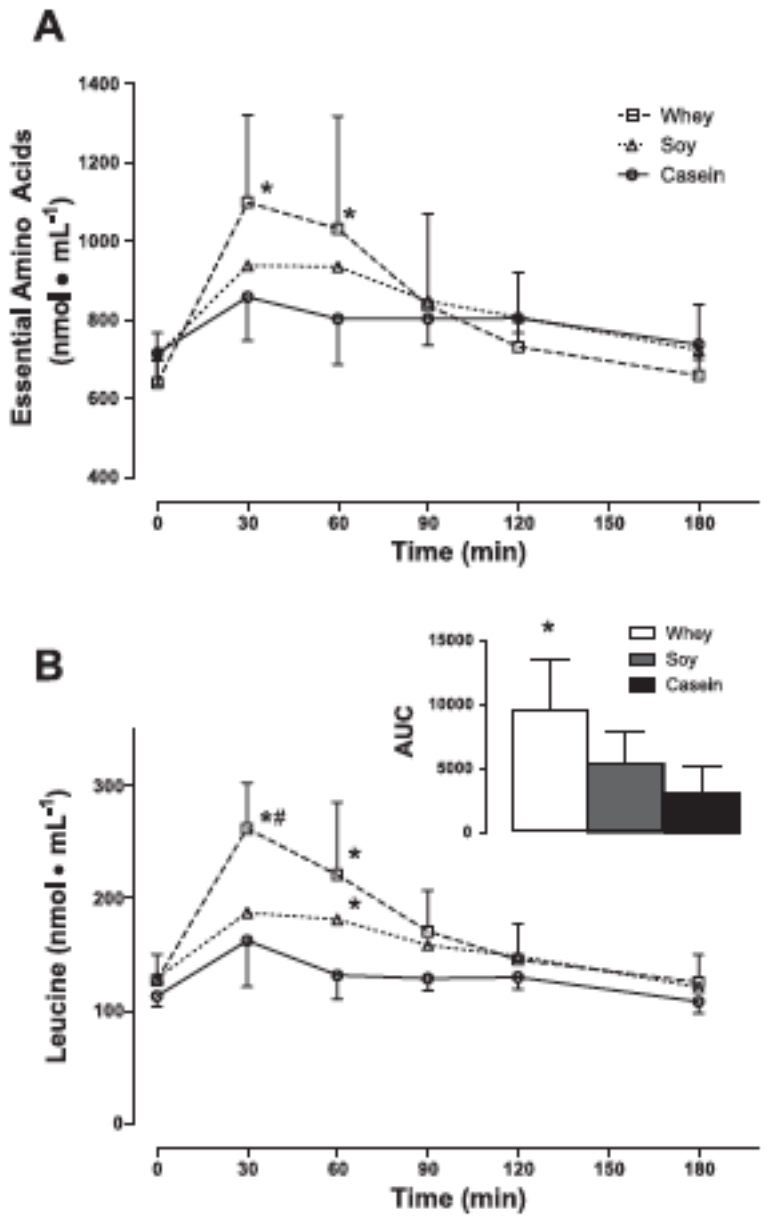


Fig. 3. Blood concentration of essential amino acids (*A*) and leucine (*B*) after ingestion of whey hydrolysate, casein, or soy protein. *Inset*: leucine area under the curve (AUC). *Significantly different from casein ($P < 0.05$). # Significantly different from soy ($P < 0.05$). All values are means ± SD; $n = 6$ per group. Some error bars have been omitted for clarity.

J Appl Physiol 107: 987–992, 2009.
doi:10.1152/japplphysiol.00076.2009.

Ingestion of whey hydrolysate, casein, or soy protein isolate: effects on mixed muscle protein synthesis at rest and following resistance exercise in young men

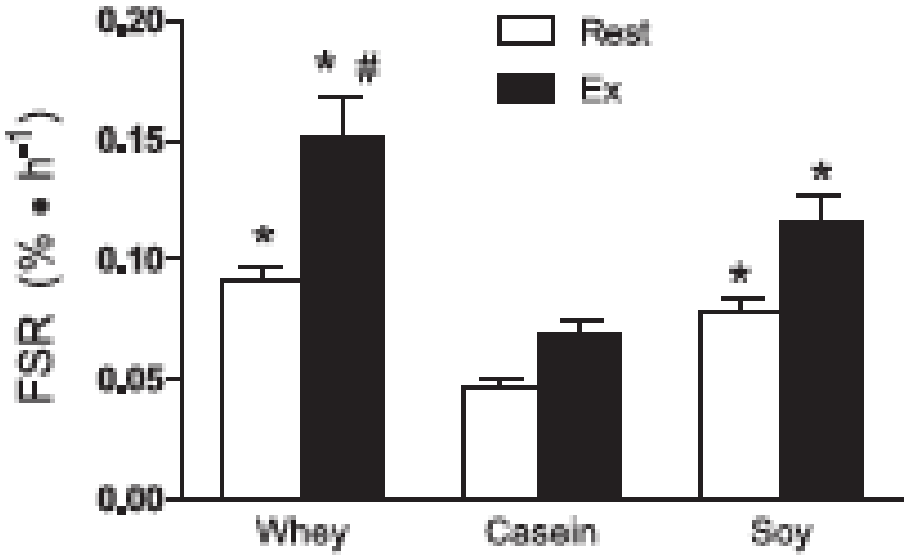
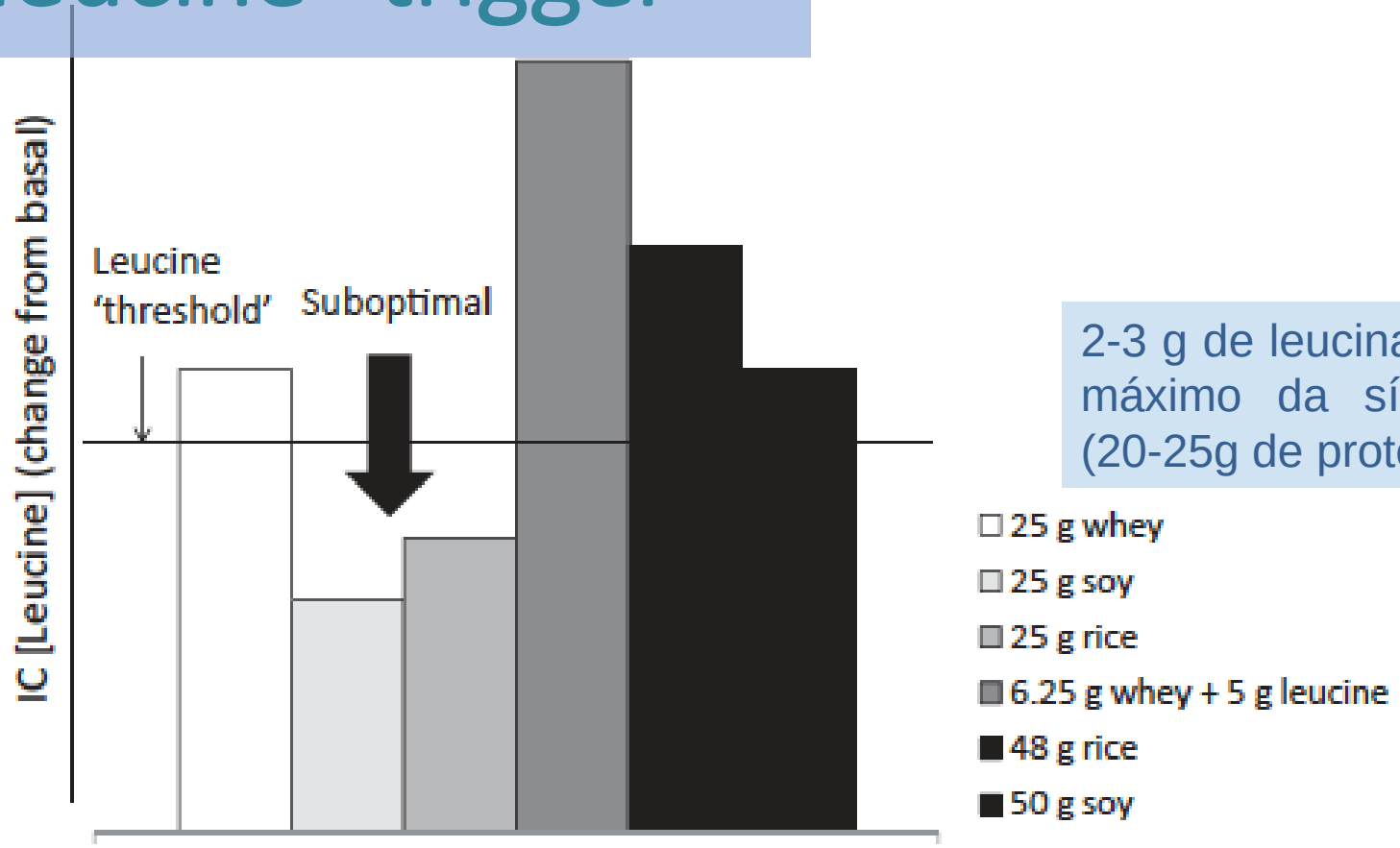


Fig. 5. Mixed muscle protein fractional synthetic rate (FSR) after ingestion of whey hydrolysate, casein, or soy protein at rest and after resistance exercise. *Significantly different from casein for same condition ($P < 0.01$). # Significantly different from soy for same condition ($P < 0.05$). All values are means ± SD; $n = 6$ per group.

J Appl Physiol 107: 987–992, 2009.
doi:10.1152/japplphysiol.00076.2009.

leucine “trigger”



2-3 g de leucina para estímulo máximo da síntese proteica (20-25g de proteína HBV)

- para que ocorra síntese de proteína muscular após o consumo proteico, a concentração de leucina intracelular muscular precisa atingir um nível - o limiar de leucina.
- este limiar pode diminuído com o treinamento de resistência e aumentado pelo envelhecimento e inatividade física

J Food Sci. 2015 Mar;80 Suppl 1:A8-A15

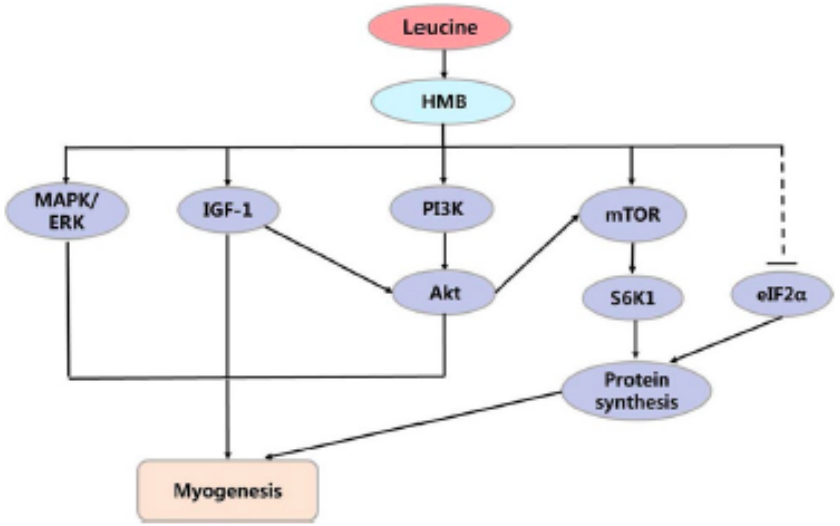


Fig. 2 Possible mechanisms for HMB to stimulate protein synthesis in skeletal muscle. HMB increases protein synthesis in the muscle through MAPK/ERK signaling, IGF-1 axis, PI3K/Akt pathway, mTOR/S6K1 signaling

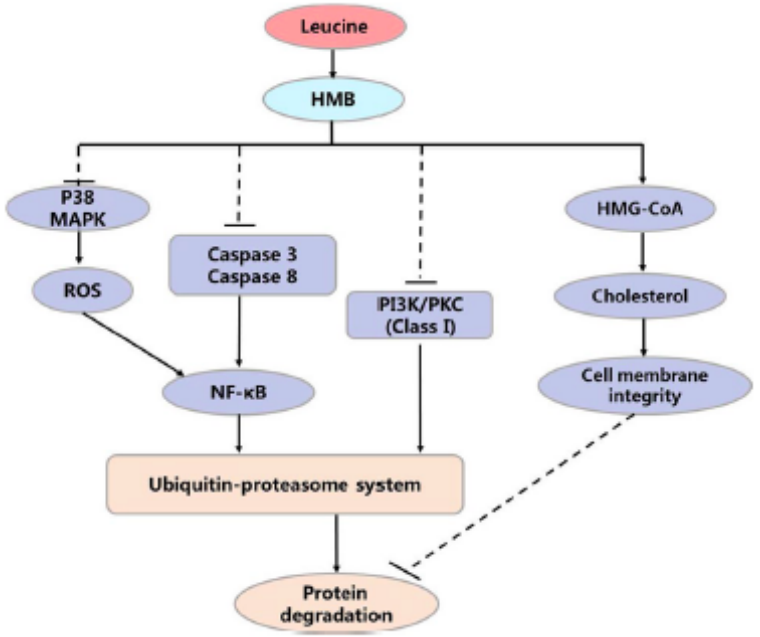


Fig. 3 Possible mechanisms for HMB to inhibit protein degradation in skeletal muscle. HMB inhibits protein degradation through multiple mechanisms, including suppressing ubiquitin–proteasome system and enhancing cell membrane integrity

Amino Acids. 2016;48(1):41-51.
doi: 10.1007/s00726-015-2067-1.

Leucina:

- Oxidação de gorduras
- Aumento da massa mitocondrial em miócitos, adipócitos e hepatócitos
- Ativação de genes alvo como o peroxisome-proliferator activated receptor gamma coactivator-1α (PGC-1α) e mammalian target of cellular rapamycin (mTOR):
    - biogênese mitocondrial – ativação dos sistemas termogênicos

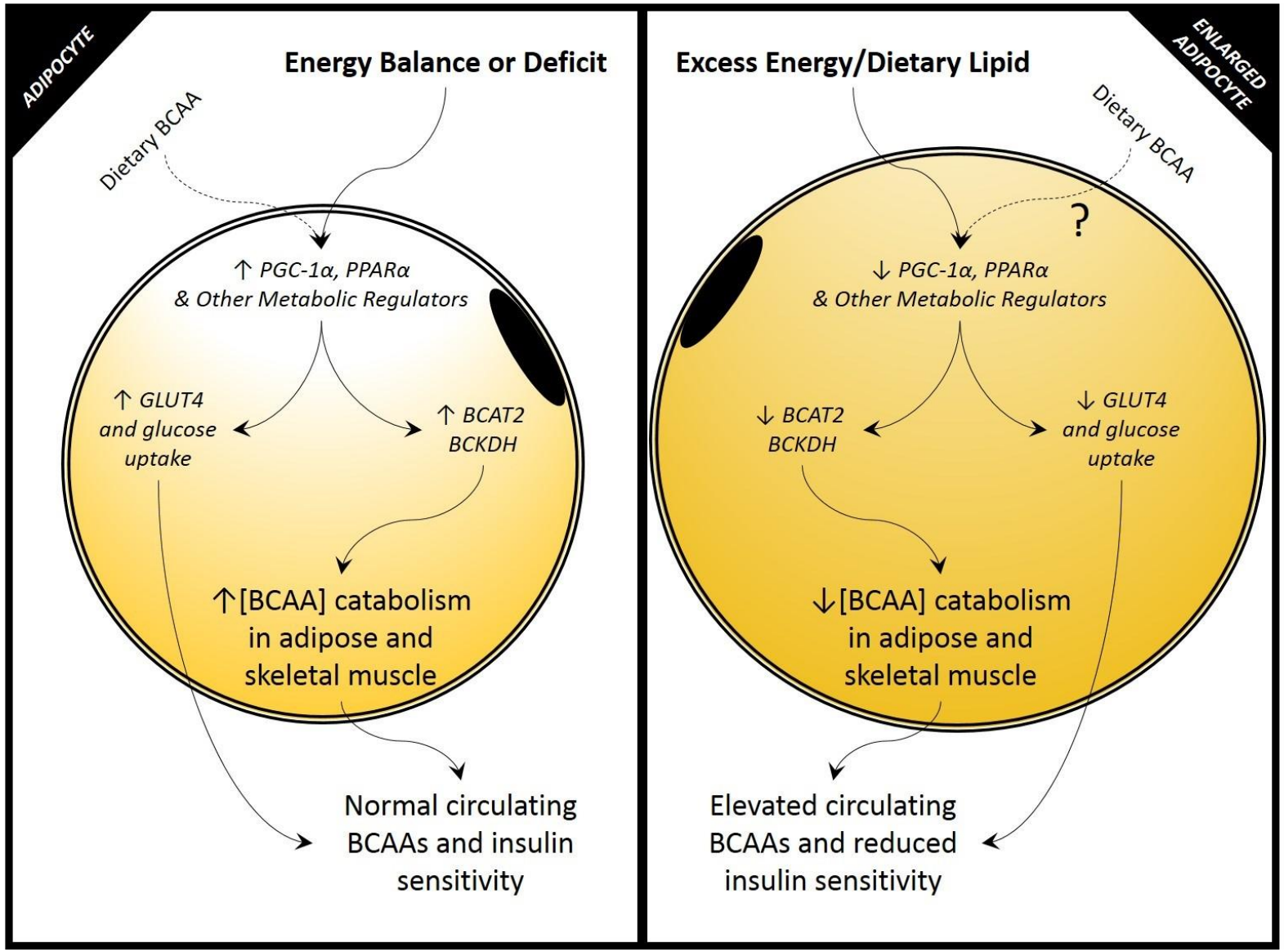
Metabolism. 2014 May ; 63(5): 618–627

quantidade de proteína consumida para atingir o limiar de leucina x aumento calórico

- 100 kcal para 25 g de isolado de proteína de soro de leite
- 200 kcal para 50 g de proteína de soja
- 240 kcal para 48 g de proteína de arroz

Problema para quem quer fazer **restrição calórica** e para os **idosos que tem menor apetite**

J Food Sci. 2015 Mar;80 Suppl 1:A8-A15



Mol Nutr Food Res 2018;62(6):e1700756

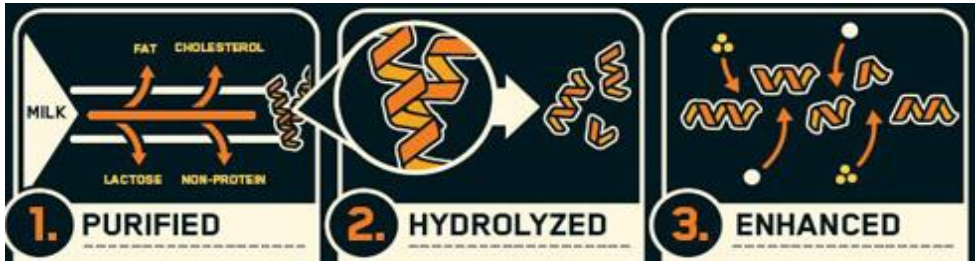
Leite de vaca - 3,5 g de proteína/100 mL (20% whey e 80% caseína)

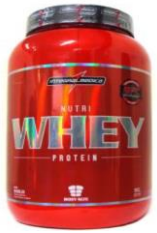
Whey	Casein
β-Lactoglobulin (35%)	α(s1)-caseir
α-Lactalbumin (12%)	α(s2)-caseir
Glycomacropeptide (12%)	β-casein
Proteose peptone 3 (12%)	κ-casein
Immunoglobulin (8%)	
Bovine serum albumin (5%)	
Lactoferrin (1%)	
Lactoperoxidase (0.5%)	
Branched chain amino acid	
Other components (lactose)	
Vitamins and minerals (Ca, Fe, K, P, Mg, Zn)	
Traces of milk fat	

Whey contains a greater proportion of proteins that are thought to participate in biological activities that are beneficial to health (31,32).
Values are % by energy.
Ca, calcium; Fe, iron; K, potassium; Mg, magnesium; P, phosphorus; Zn, zinc.

obesity reviews 2013;14, 324–343

Formas de whey protein





Whey Protein concentrado –35-80% proteína, com pequenas quantidades de lactose e gordura. Mais barata

Whey Protein isolado – usualmente 85%-90% de proteína, < 1% de lactose

Whey Protein hidrolisado – peptídeos curtos/cadeias de aminoácidos que sofreram hidrólise por enzimas proteolíticas, digestão facilitada, absorção mais rápida

World J Diabetes 2015 October 25; 6(14): 1274-1284

https://www.sportsdietitians.com.au/factsheets/supplements/protein-supplementation/

World Journal of Diabetes

REVIEW

Whey protein: The "whey" forward for treatment of type 2 diabetes?

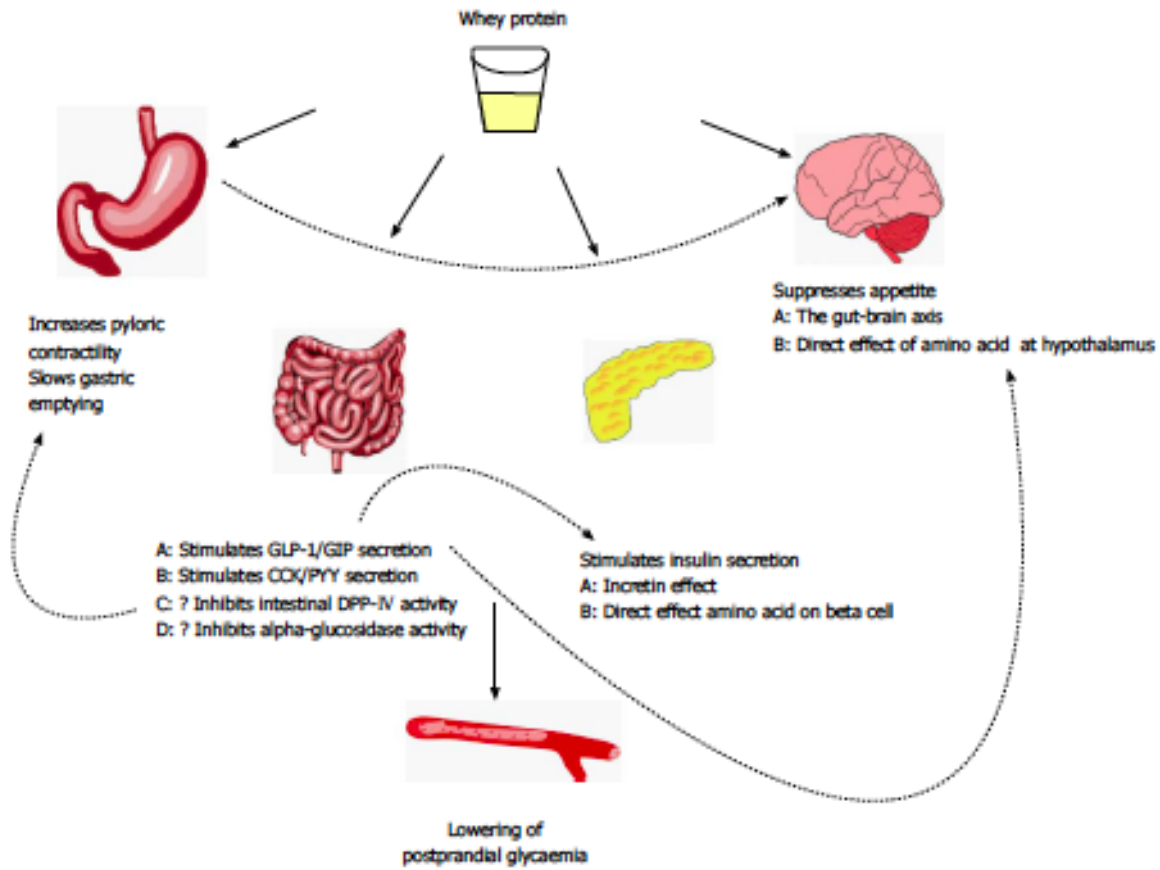


Figure 1 Mechanisms by which whey protein can reduce postprandial glycaemia. GLP-1: Glucagon-like-peptide-1; GIP: Glucose-dependent insulinotropic polypeptide; CCK: Cholecystokinin; PYY: Peptide YY; DPP-IV: Dipeptidyl peptidase-IV.

World J Diabetes 2015 October 25; 6(14): 1274-1284

MECANISMOS POTENCIAIS MÚLTIPLOS DE BENEFÍCIO DO WP NO DM

- Diminui o esvaziamento gástrico
- Estimula a liberação de peptídeos intestinais, incluindo as incretinas
- Inibe a DPP4???
- Inibe a alfa-glicosidase???
- Estimula a secreção de insulina
- Suprime o apetite por efeitos hipotalâmicos

World J Diabetes 2015 October 25; 6(14): 1274-1284

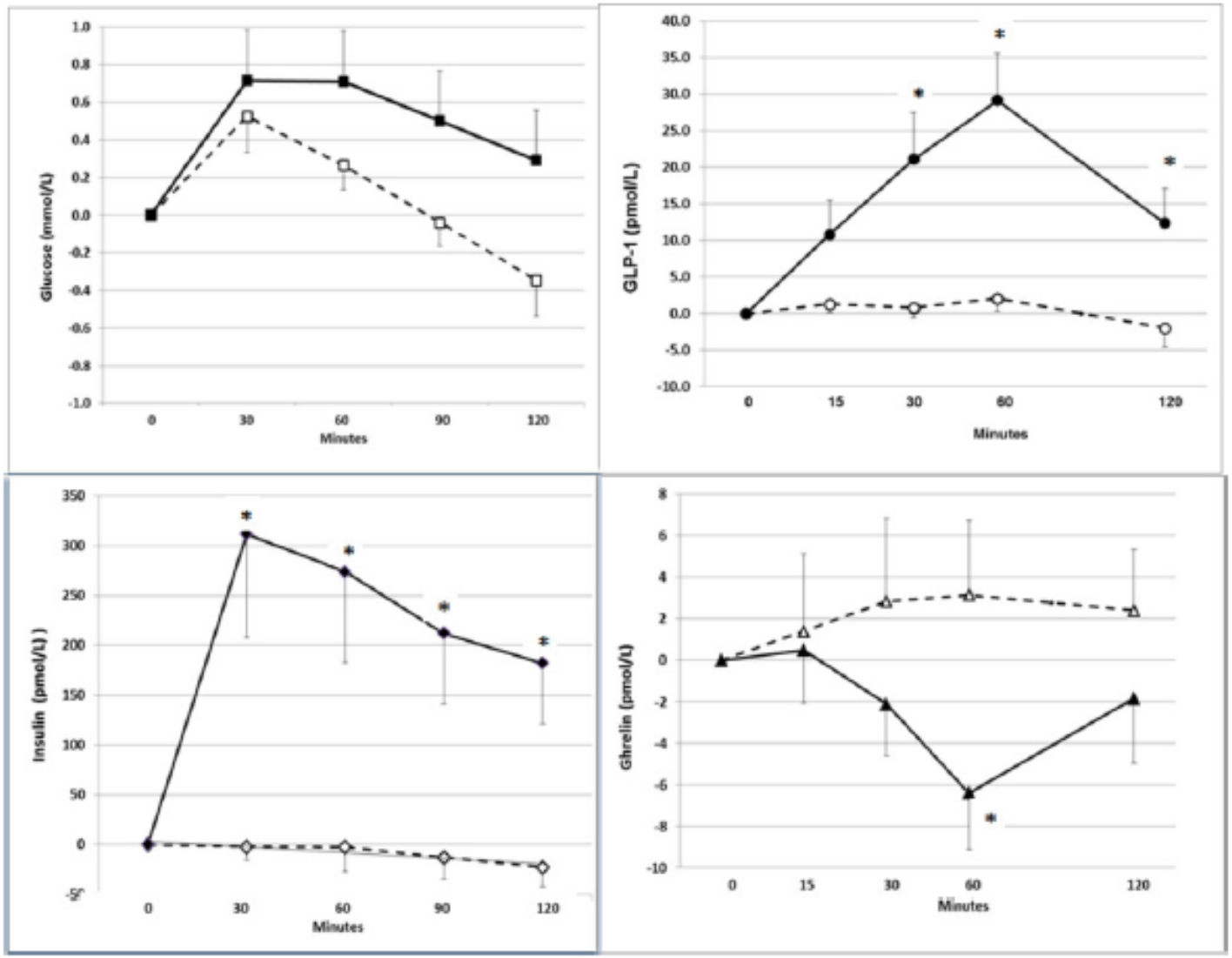
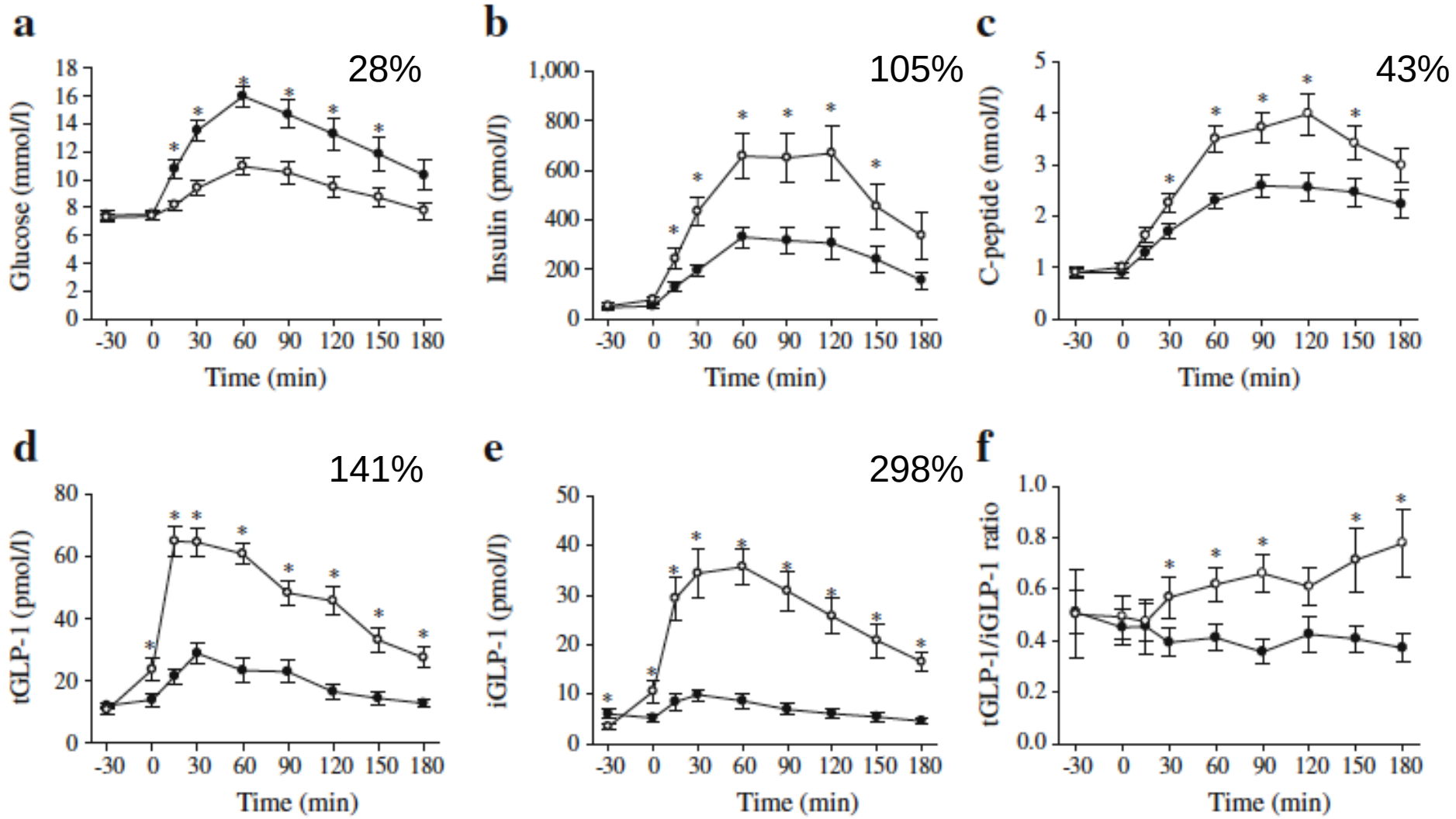


Figure 1 Changes (mean +SEM) in glucose, insulin, glucagon-like peptide (GLP)-1 and ghrelin from the baseline values after administration of placebo (broken lines and open markings) or whey protein (solid lines and filled markings) during acute challenge tests.



Diabetologia 2014, 57:1807–1811

Whey Protein x fatores de risco cardiometabólicos

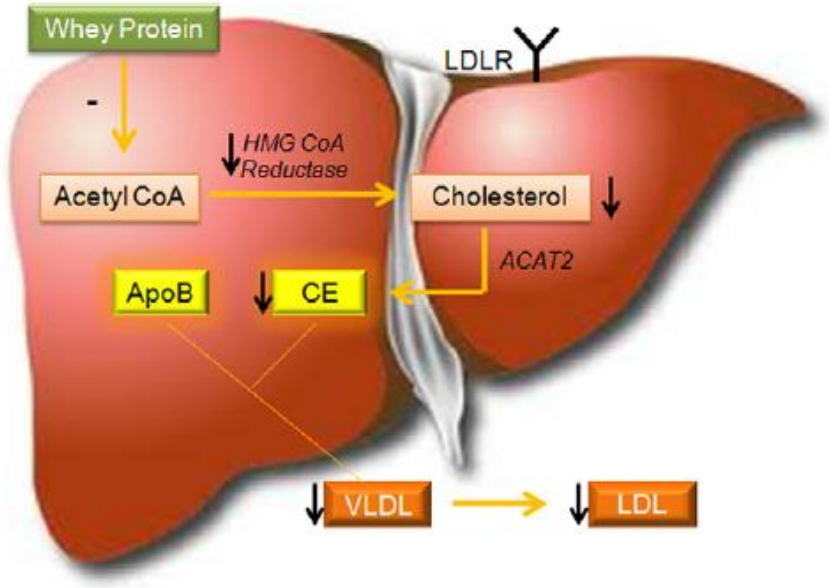


Figure 1 Possible pathway affected by whey protein on cholesterol synthesis in the liver. HMG-CoA reductase activity is thought to be inhibited by whey protein leading to a reduction in cholesterol synthesis in the cell. This lowers the availability of CE as a substrate for apoB100 production, consequently resulting in decreased secretion of VLDL into the circulation. ACAT2, acyl-CoA cholesterol acyltransferase 2; ApoB, apoliproprotein B; CE, cholesterol ester; LDL, low-density protein; LDL-R, LDL receptor; VLDL, very low-density protein.

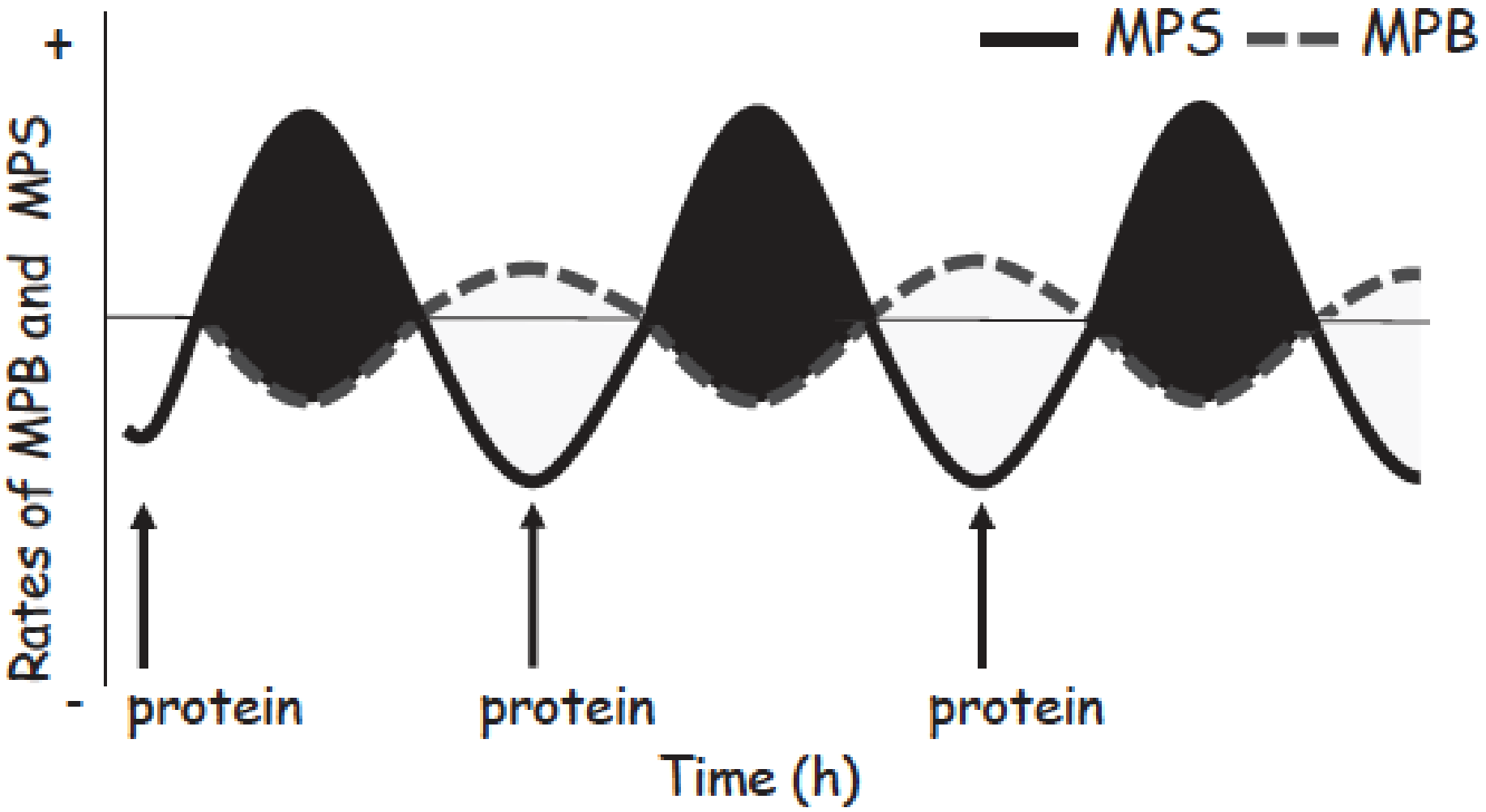
- aumento da termogênese
- manutenção da massa magra.
- melhorar dos níveis de glicose e resposta insulínica
- redução da pressão arterial e rigidez arterial
- melhora do perfil lipídico.

obesity reviews 2013;14, 324–343

"janela anabólica”

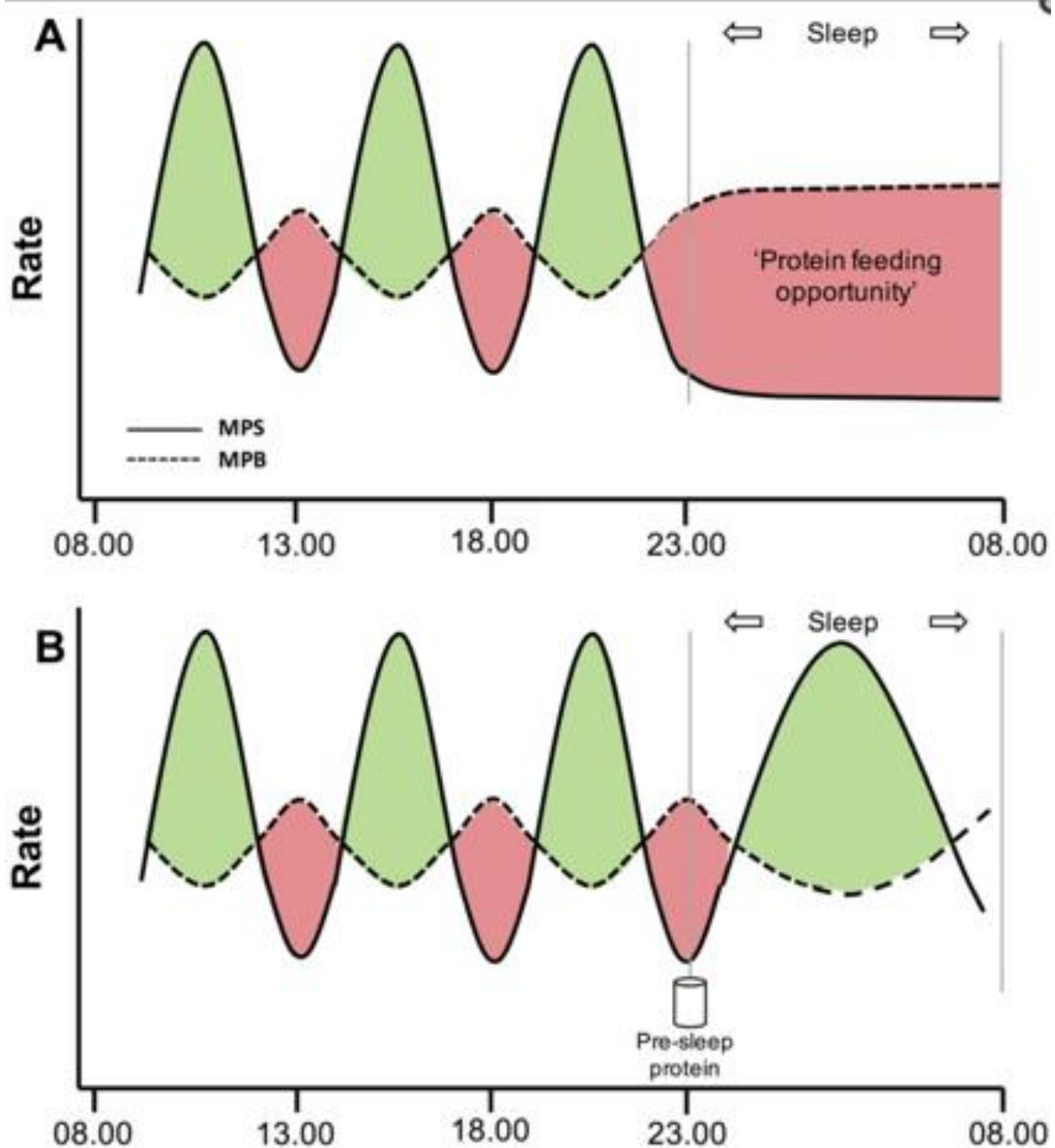
tempo ideal para promover hipertrofia muscular e ganho de força com treinamento de resistência

J Food Sci. 2015 Mar;80 Suppl 1:A8-A15



Nutrients. 2016; 23;8(4):181

J Food Sci. 2015;80 Suppl 1:A8-A15



Nutrients 2016, 8, 763

Schoenfeld *et al. Journal of the International Society of Sports Nutrition* 2013, **10**:53
http://www.jissn.com/content/10/1/53

jissn
journal of the international society of sports nutrition

REVIEW Open Access

The effect of protein timing on muscle strength and hypertrophy: a meta-analysis

Com relação à hipertrofia, a ingestão total de proteínas foi o maior preditor da magnitude da síntese proteica.

Esse resultado refuta a crença comum de que o tempo de ingestão de proteínas em torno do treinamento é crítico para as adaptações musculares e indica que consumir proteína adequada em combinação com exercício de resistência é o fator chave para maximizar o acúmulo de proteína muscular.

Aragon and Schoenfeld *Journal of the International Society of Sports Nutrition* 2013, **10**:5
http://www.jissn.com/content/10/1/5

jissn
journal of the international society of sports nutrition

REVIEW **Open Access**

Nutrient timing revisited: is there a post-exercise anabolic window?

dietary flexibility

12º ENDO SUL

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OBRIGADO!!!

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