

XII

CONGRESO DE LA SOCIEDAD  
Castellano Manchega  
DE GERIATRIA Y GERONTOLOGIA  
"FRAGILIDAD Y SARCOPENIA"



Albacete 2 y 3 de Marzo de 2012.  
Hotel Beatriz.

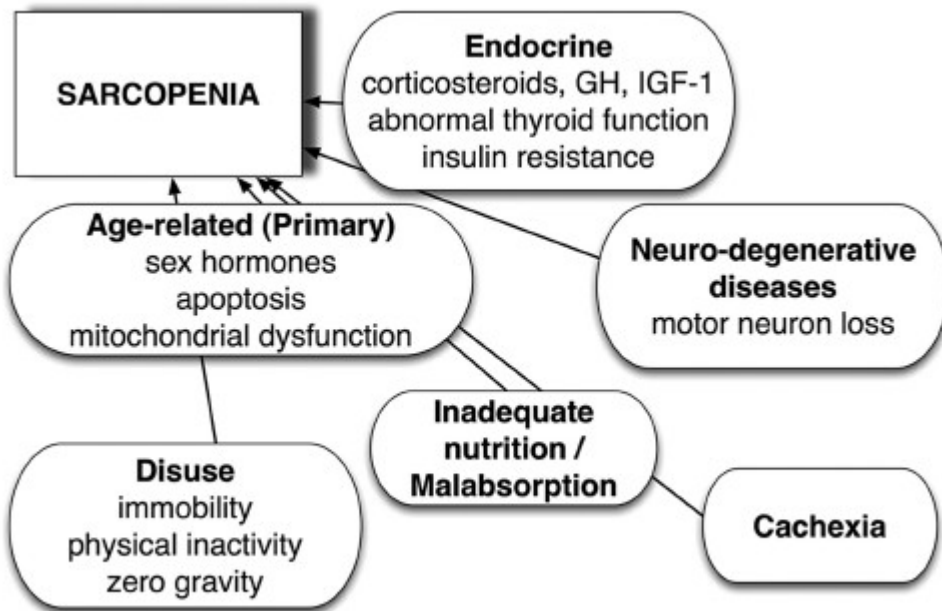


Fotografía: Belén Suro



# INTERVENCIÓN NUTRICIONAL EN SARCOPENIA

**Federico Cuesta Triana**  
**FEA Geriatria. Hospital Clínico San Carlos. UCM. Madrid**



ACTIVIDAD FÍSICA

ENFERMEDAD

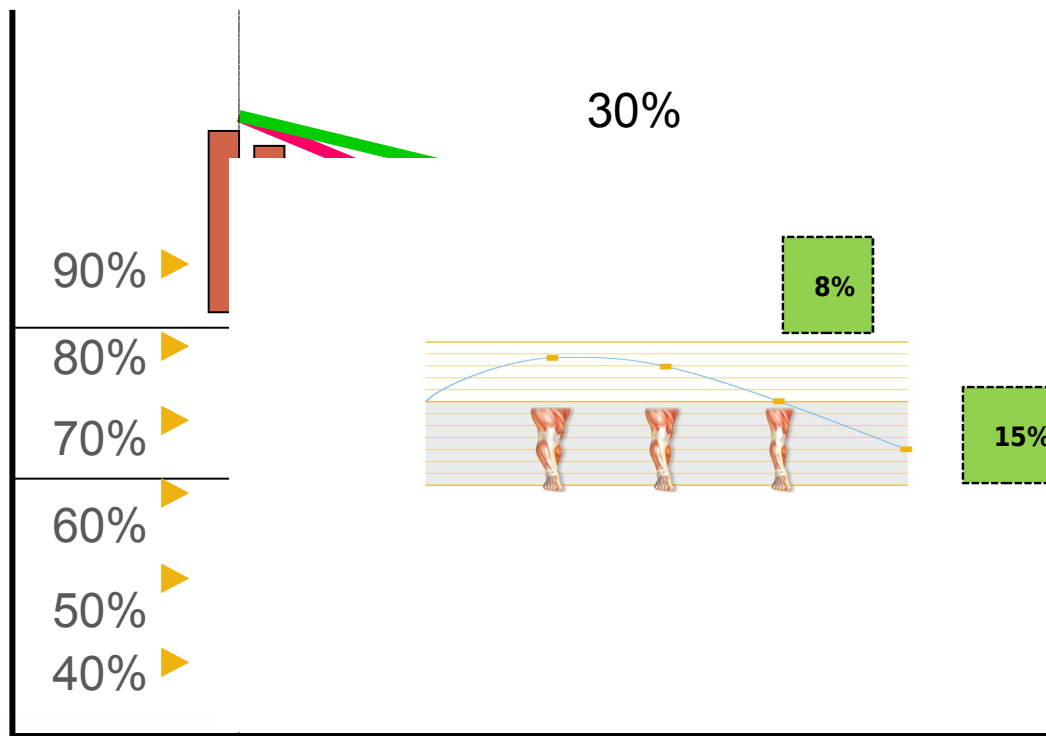
NUTRICIÓN

**IdISSC**

INSTITUTO de  
INVESTIGACIÓN SANITARIA  
Hospital Clínico San Carlos

# Ingesta alimentaria “anorexia of aging”

Ingesta energética



- Come más lento
- Saciedad precoz
- Porciones pequeñas
- Menos aperitivos
- Dieta menos variada

Morley 1997

□ 629 cal/d (mujeres)

□ 1321 cal/d (varones)

peso corporal (lean tissue)

20

40

70

80

AGE

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Hospital Clínico San Carlos

NHANES III

# Compartimentos corporales



**Masa libre de grasa (FFM)**

**Masa celular corporal (BCM)**

Agua corporal total (TBW)

Proteínas viscerales

Agua intracelular (44 %) -ICW

Agua extracelular (29 %) ECW

Tejido óseo (7 %)

Masa grasa (FM)

*Lean Body Mass*

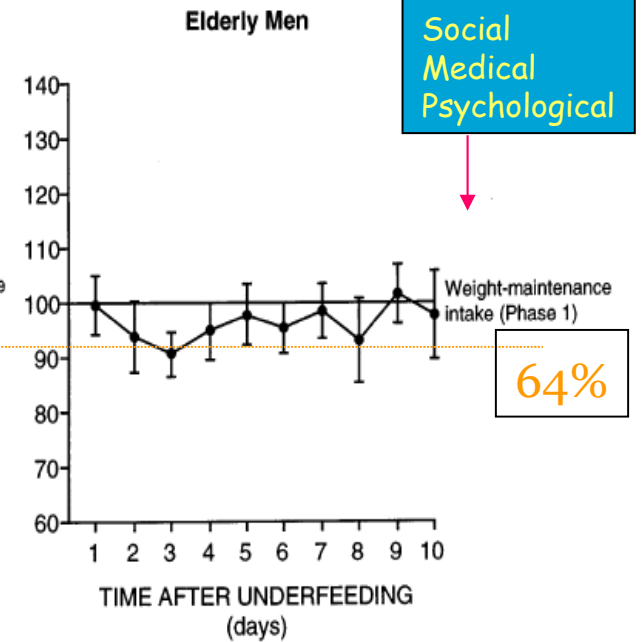
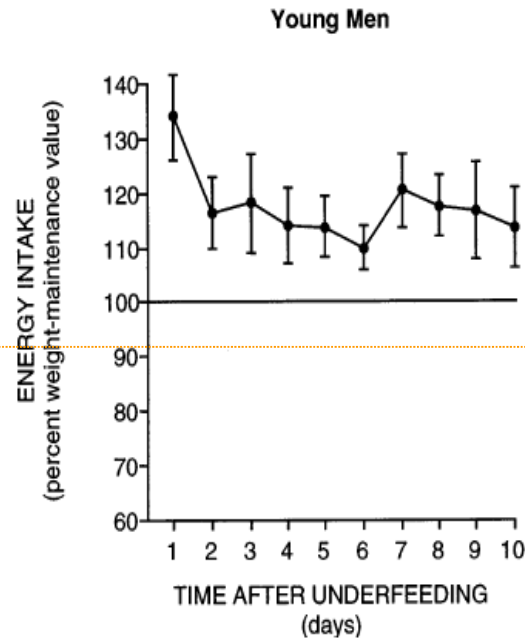


**CAQUEXIA**

# UNDERFEEDING

□ 792 Kcal / d

21 días



Olfato  
Gusto

Olfacción retronasal  
(estado dental)

*J Gerontol 2000; 55: M366-371*

Potenciadores de sabor  
Monosodium glutamate

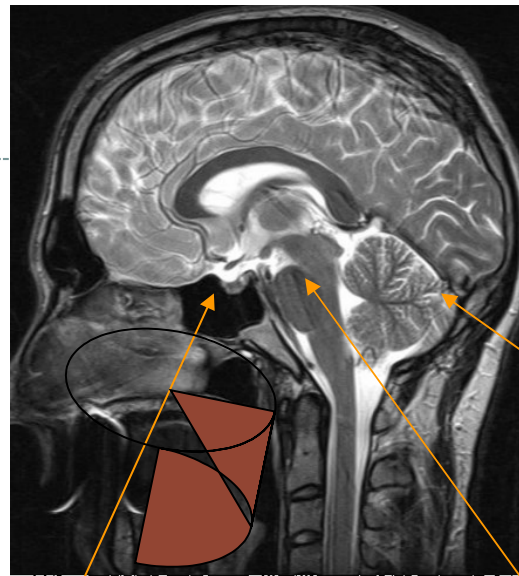
*Prev Med 2001, 32: 416-23*

NPY  
NO

leptina

grasa  sensibilidad

Testosterona   
(SARCOPENIA)



FACTORES SOCIALES

↓ Palatabilidad  
↓ Saciedad sensorio específica  
↓ Variedad dieta

Ghrelina

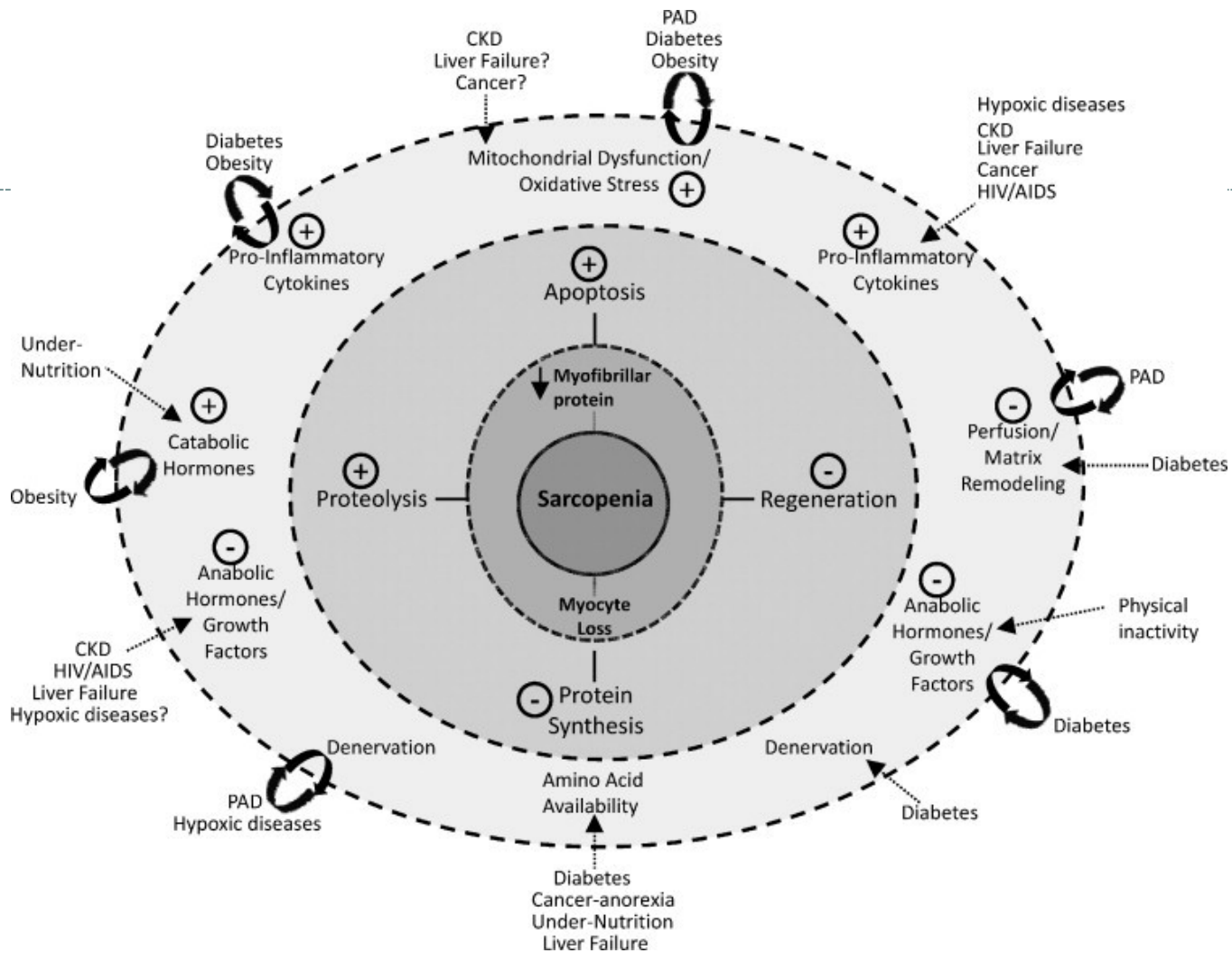
CCK

↓ Oxido Nítrico  
↓ Distensibilidad del fundus  
 Llenado antral

distensión antral  
Saciedad precoz

↓ **Apetito**  
Vaciamiento gástrico lento

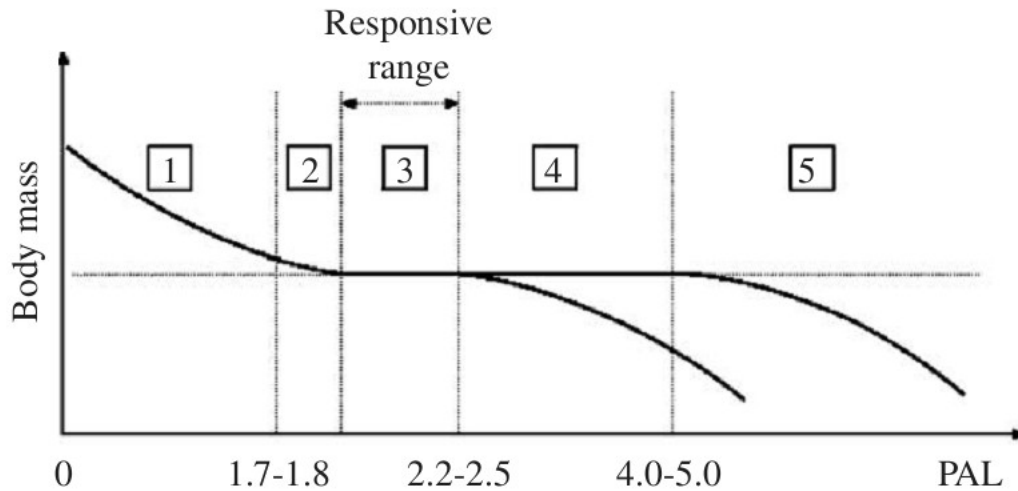
INGESTA DE  
ENERGÍA





# Effects of physical activity on food intake

Katarina Melzer<sup>a</sup>, Bengt Kayser<sup>b</sup>, Wim H.M. Saris<sup>c</sup>, Claude Pichard<sup>a,\*</sup>



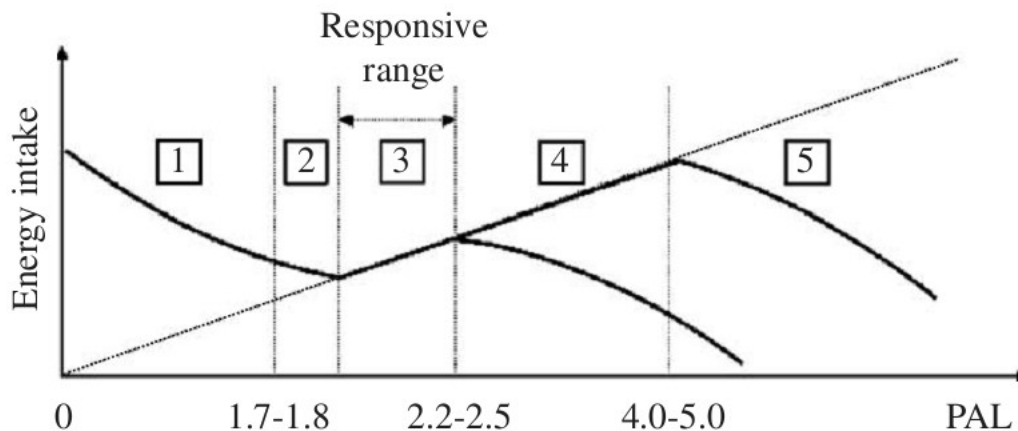
1 sedentarismo

2 actividad corta e intensa

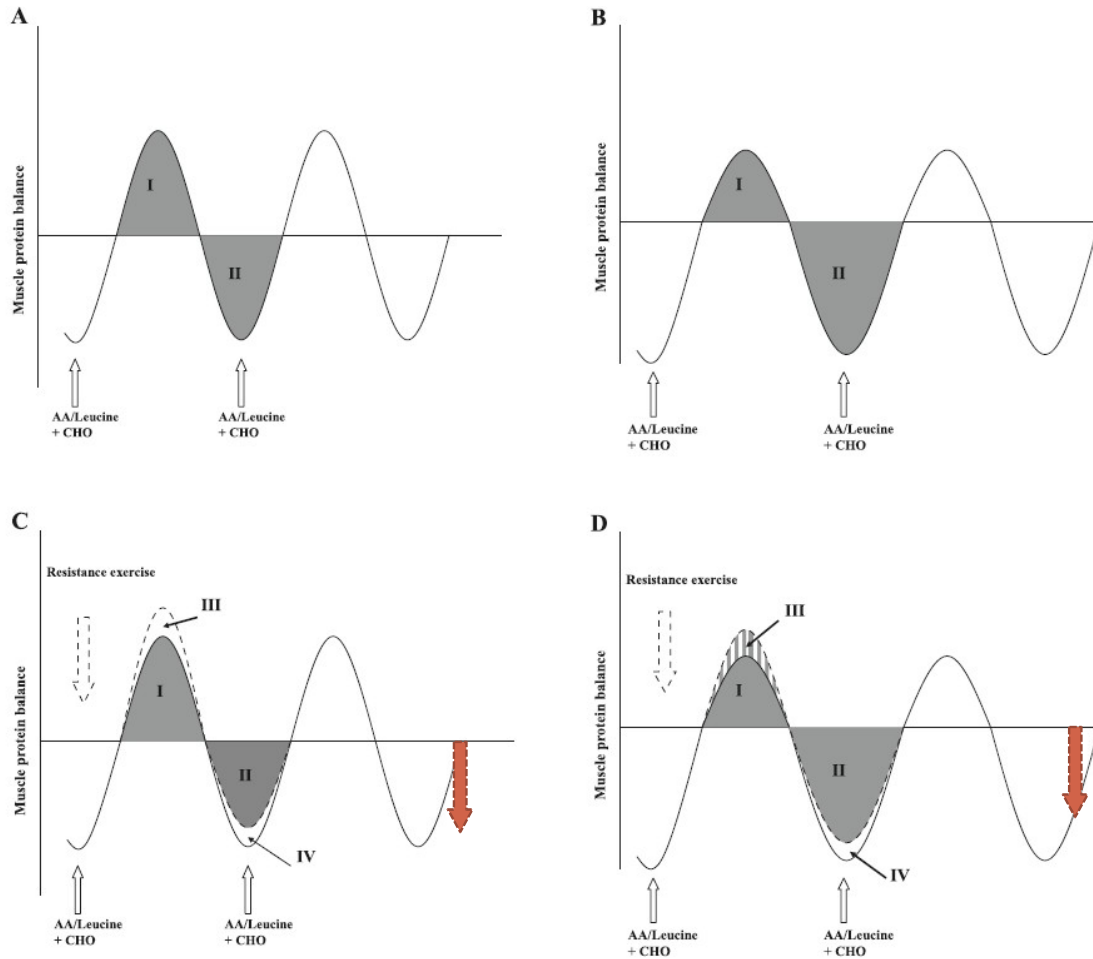
3 actividad moderada-intensa mantenida

4 límite normal

5 límite en entrenados



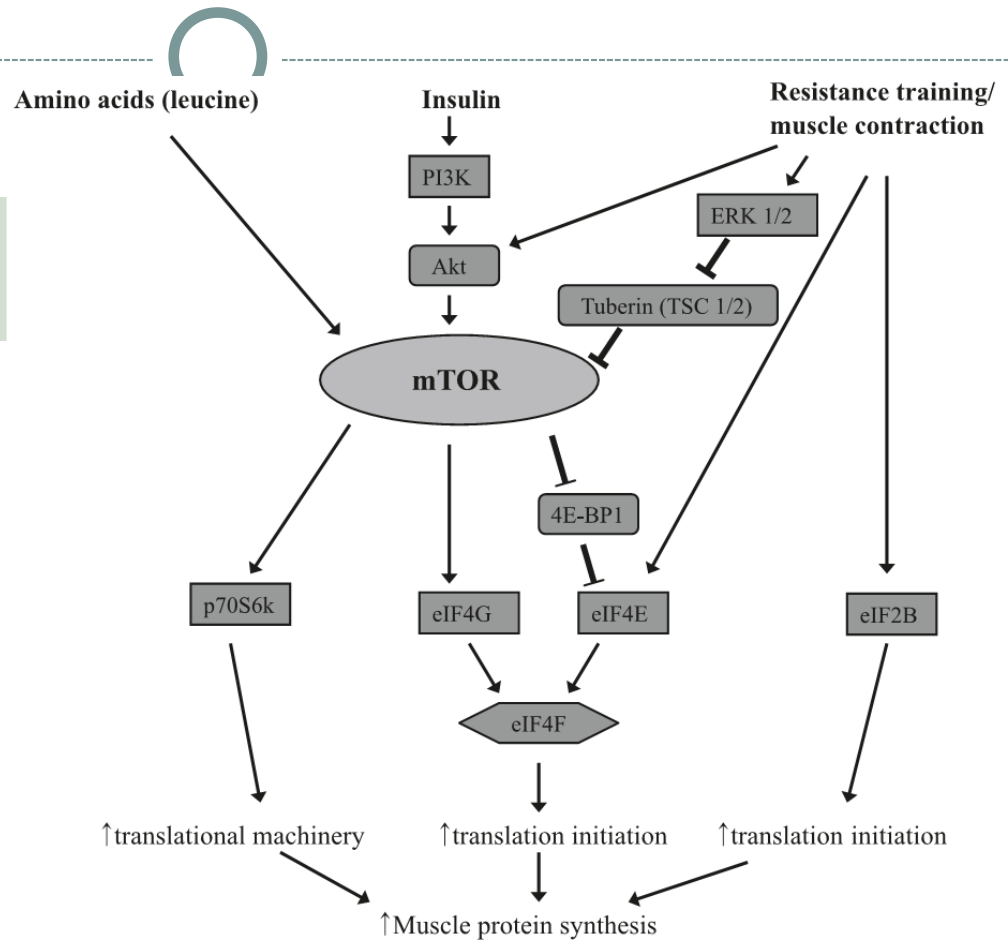
# Nutrición y ejercicio



# Dietary implications on mechanisms of sarcopenia: roles of protein, amino acids and antioxidants

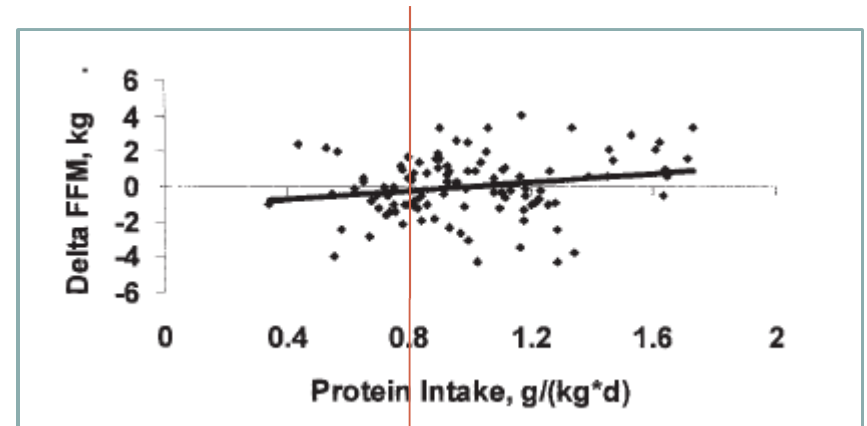
Jeong-Su Kim\*, Jacob M. Wilson, Sang-Rok Lee

Ingesta proteica inadecuada  
Resistencia a síntesis proteica



# Dietary Protein and Resistance Training Effects on Muscle and Body Composition in Older Persons

Increasing Dietary Protein Requirements in Elderly People for Optimal Muscle and Bone Health



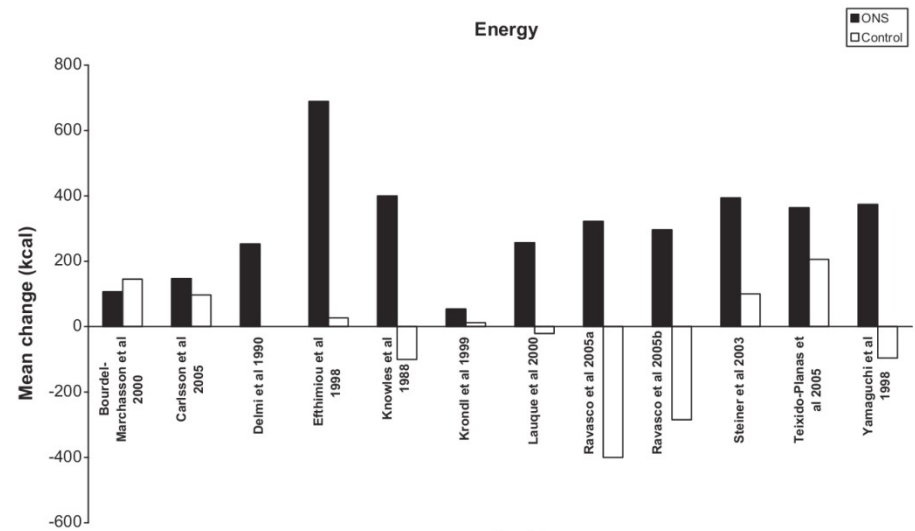
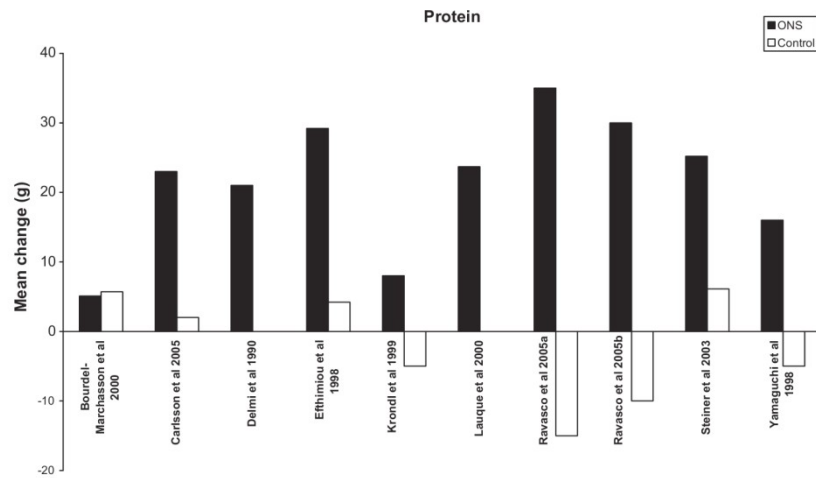
RDA



LOS REQUERIMIENTOS PROTEICOS SON SUPERIORES EN LA POBLACIÓN ANCIANA

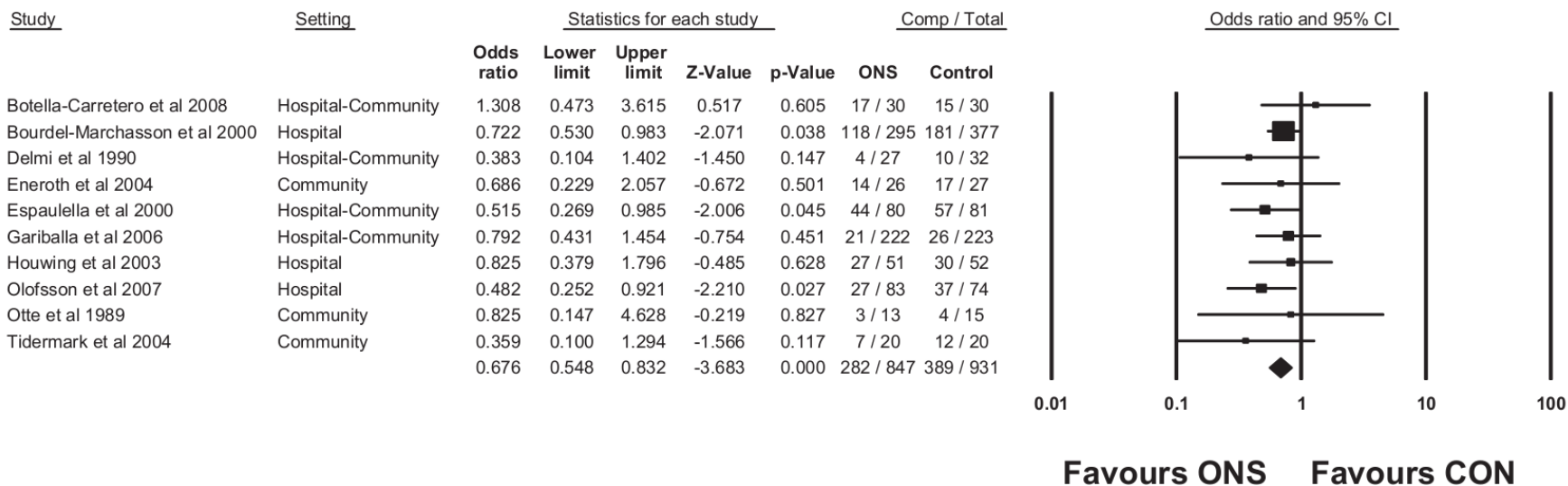
## Review

# Systematic review and meta-analysis of the effects of high protein oral nutritional supplements



Review

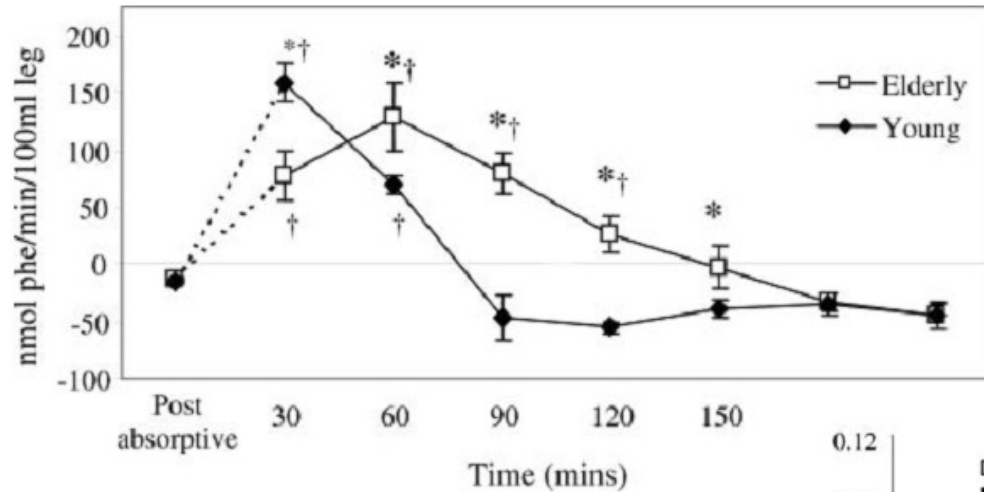
# Systematic review and meta-analysis of the effects of high protein oral nutritional supplements



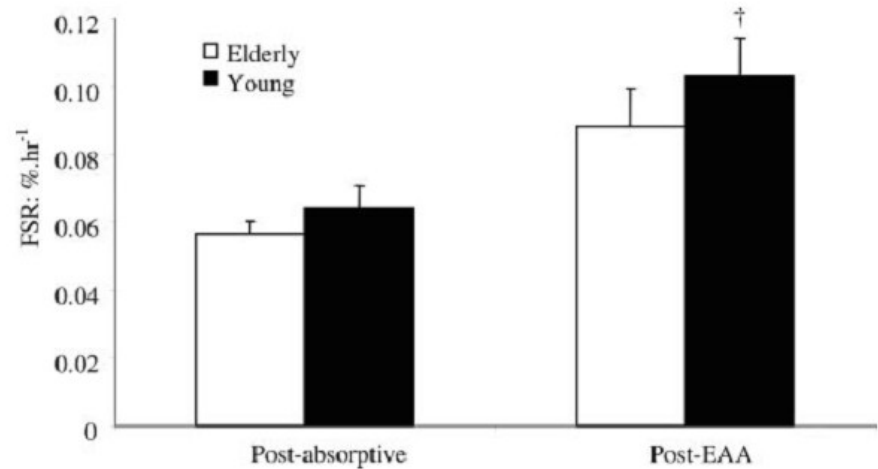
complicaciones

# Amino acid ingestion improves muscle protein synthesis in the young and elderly

Douglas Paddon-Jones,<sup>1,2</sup> Melinda Sheffield-Moore,<sup>1,2</sup> Xiao-Jun Zhang,<sup>1,2</sup> Elena Volpi<sup>1,2</sup>  
Steven E. Wolf,<sup>1,2</sup> Asle Aarland,<sup>1-3</sup> Army A. Ferrando,<sup>1,2</sup> and Robert R. Wolfe<sup>1-3</sup>



15 gramos de AAE

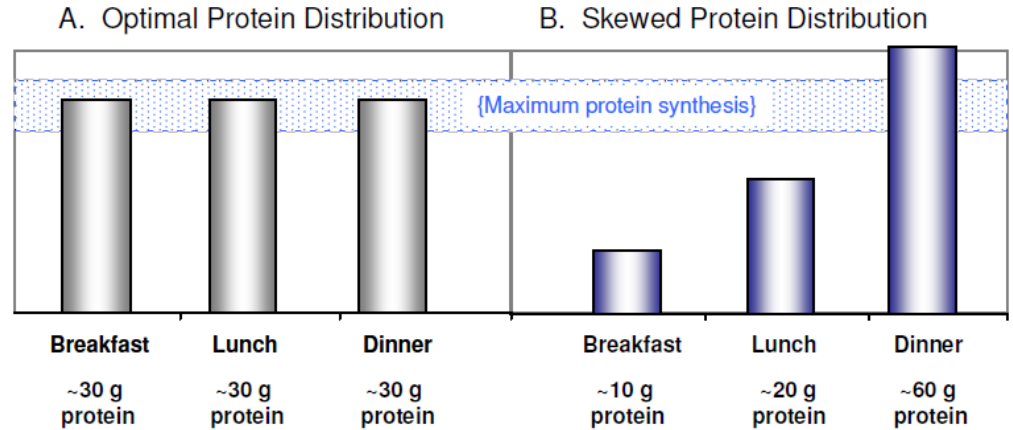


*Am J Physiol Endocrinol Metab* 286: E321–E328, 2004.



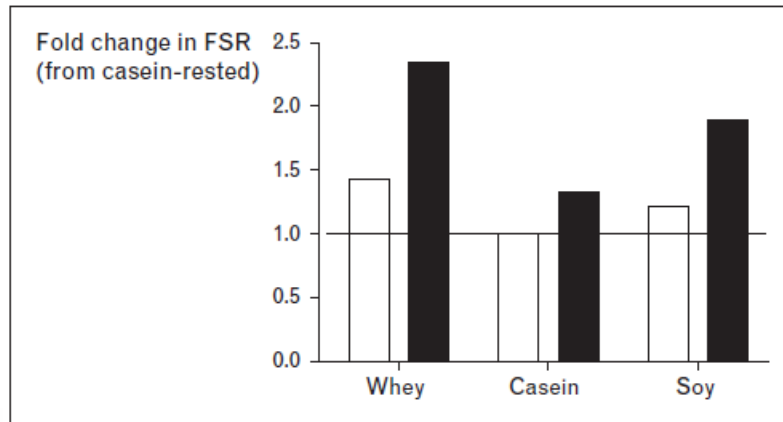
# Dietary Guidelines should reflect new understandings about adult protein needs

Donald K Layman



# Maximizing muscle protein anabolism: the role of protein quality

Jason E. Tang and Stuart M. Phillips

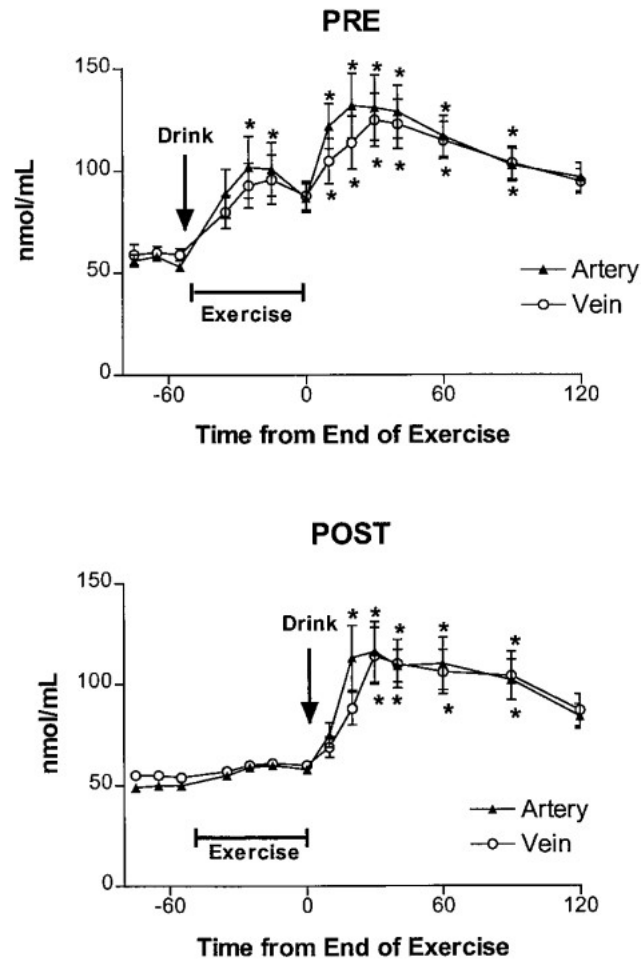


Data are shown as fold changes from the lowest value (casein-rest) obtained (J.E. Tang *et al.*, unpublished observation). □, rest; ■, exercise.

Current Opinion in Clinical Nutrition and Metabolic Care 2009, 12:66–71

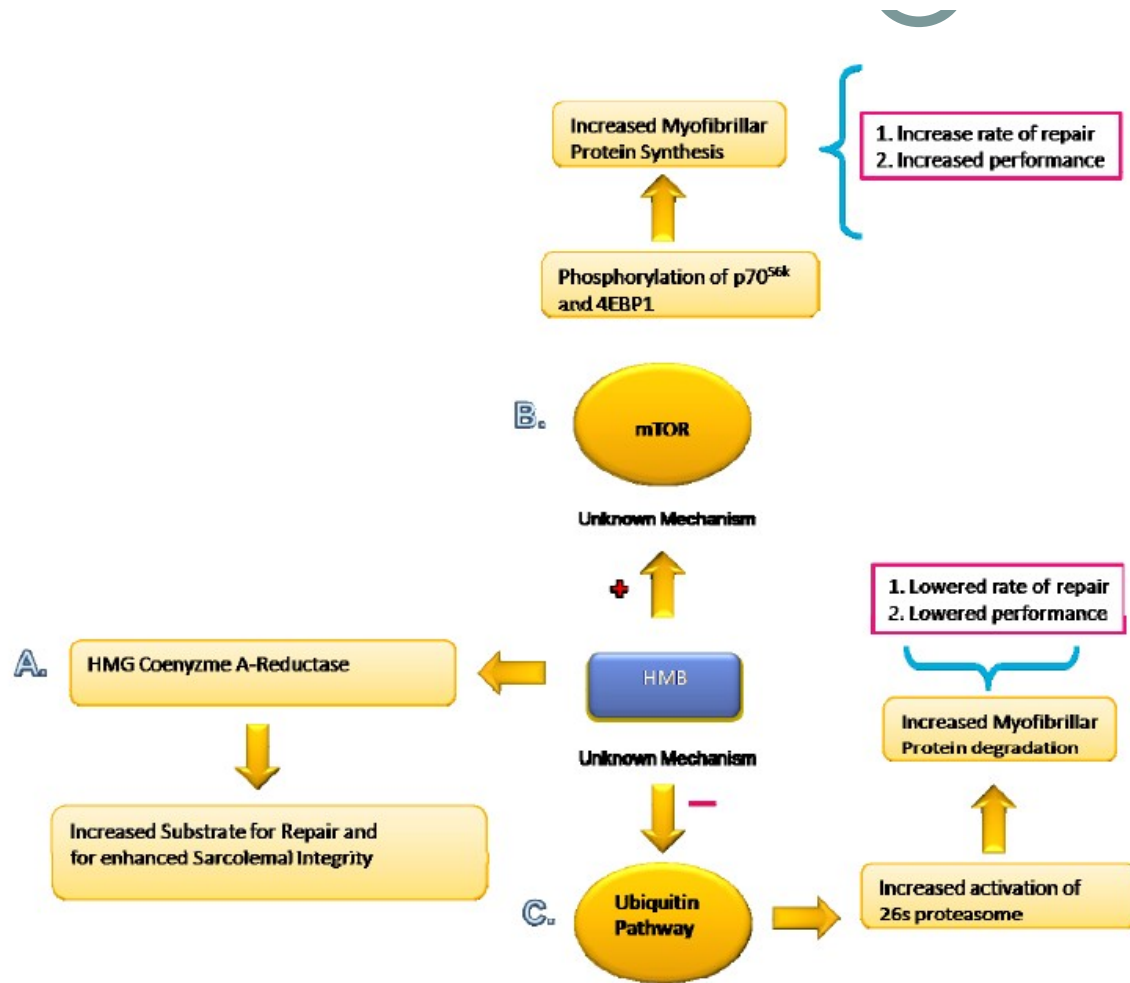


# Timing of amino acid-carbohydrate ingestion alters anabolic response of muscle to resistance exercise



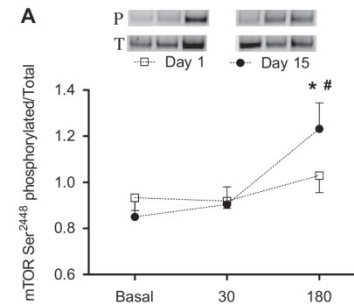
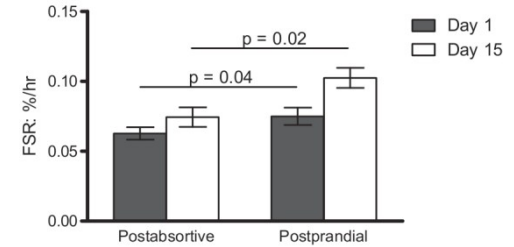
# Effects of beta-hydroxy-beta-methylbutyrate (HMB) on exercise performance and body composition across varying levels of age, sex, and training experience: A review

Gabriel J Wilson\*<sup>1</sup>, Jacob M Wilson<sup>2</sup> and Anssi H Manninen<sup>3</sup>



# Leucine supplementation chronically improves muscle protein synthesis in older adults consuming the RDA for protein

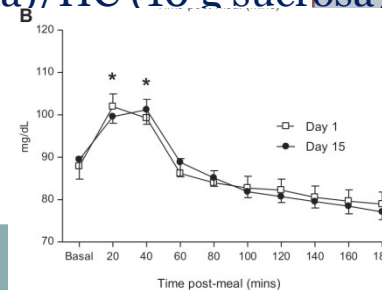
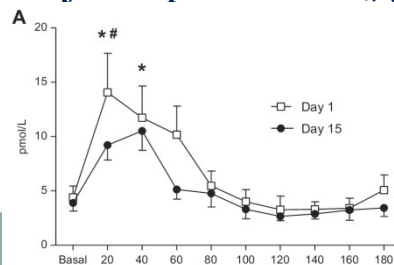
Clinical Nutrition (2012), doi:10.1016/j.clnu.2012.01.005



2

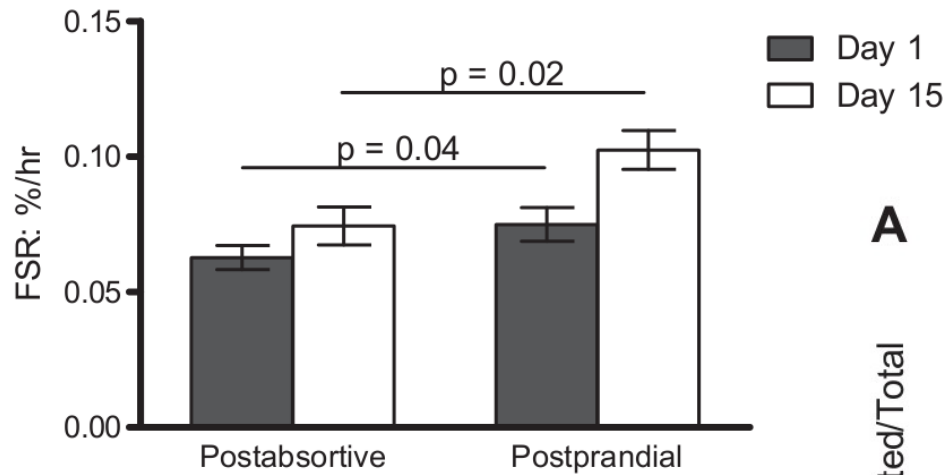
Suplemento leucina 4 g en tres comidas  
Comida baja en proteínas (7g aa)/HC (10 g sucrosa)

14

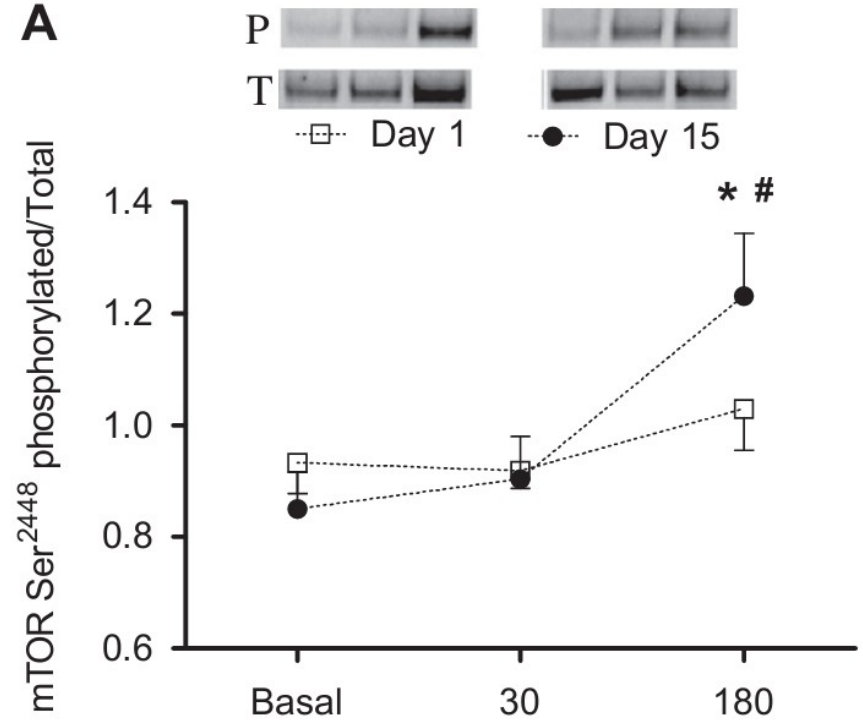


# Leucine supplementation chronically improves muscle protein synthesis in older adults consuming the RDA for protein

Clinical Nutrition (2012), doi:10.1016/j.clnu.2012.01.005



**A**



Saciedad, palatabilidad, costes, cumplimiento

# Protein Intake and Muscle Strength in Older Persons: Does Inflammation Matter?

DOI: 10.1111/j.1532-5415.2011.03833.x



	Beta (SE)	P-Value*
Protein Intake, g/day <sup>†</sup>	-0.004 (0.013)	.78
Protein by Log(CRP) <sup>‡</sup>	0.020 (0.007)	.003
Protein by Log(IL-6) <sup>§</sup>	0.016 (0.008)	.05
Protein by Log(TNF- $\alpha$ ) <sup>  </sup>	0.016 (0.007)	.02
Protein by Log(CRP) by sex	-0.002 (0.004)	.53
Protein by Log(IL-6) by sex	-0.003 (0.005)	.51
Protein by Log(TNF- $\alpha$ ) by sex	-0.001 (0.003)	.89
Protein by Log(CRP) by chronic conditions	-0.002 (0.002)	.20
Protein by Log(IL-6) by chronic conditions	-0.002 (0.002)	.23
Protein by Log(TNF- $\alpha$ ) by chronic conditions	-0.001 (0.002)	.37

2000

Cuestionario de  
frecuencia

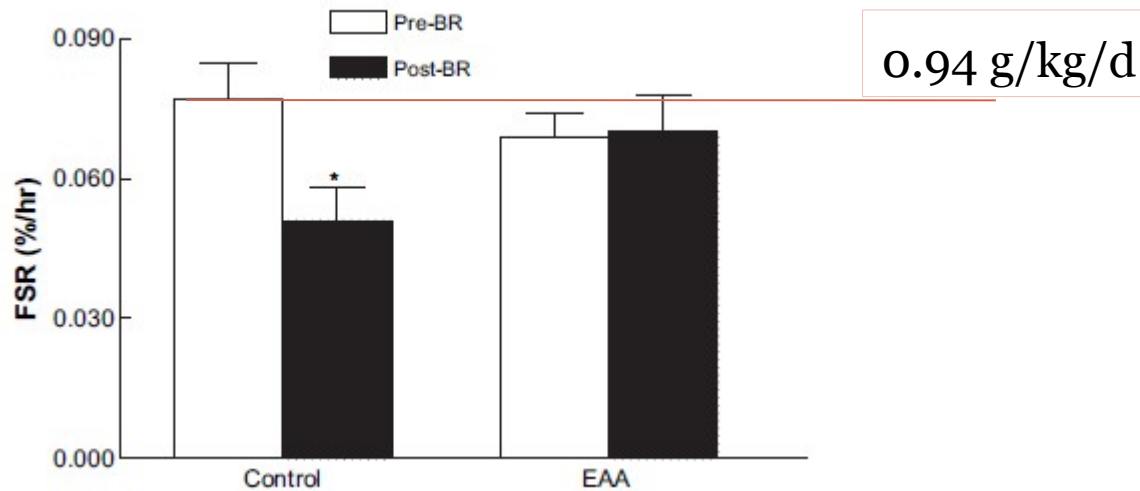
IL-6, TNF  $\alpha$ ,  
PCR

2003

# EAA supplementation to increase nitrogen intake improves muscle function during bed rest in the elderly<sup>☆</sup>

Arny A. Ferrando<sup>a,\*,e</sup>, Doug Paddon-Jones<sup>b,e</sup>, Nicholas P. Hays<sup>a</sup>, Patrick Kortebein<sup>a</sup>, Ola Ronsen<sup>c</sup>, Rick H. Williams<sup>a</sup>, Ashley McComb<sup>a</sup>, T. Brock Symons<sup>d</sup>, Robert R. Wolfe<sup>a</sup>, William Evans<sup>a</sup>

Clinical Nutrition 29 (2010) 18–23

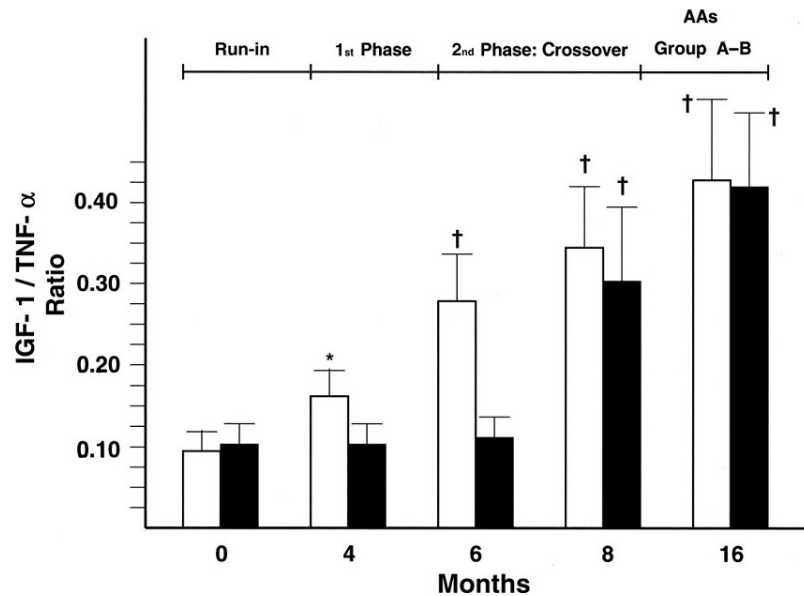
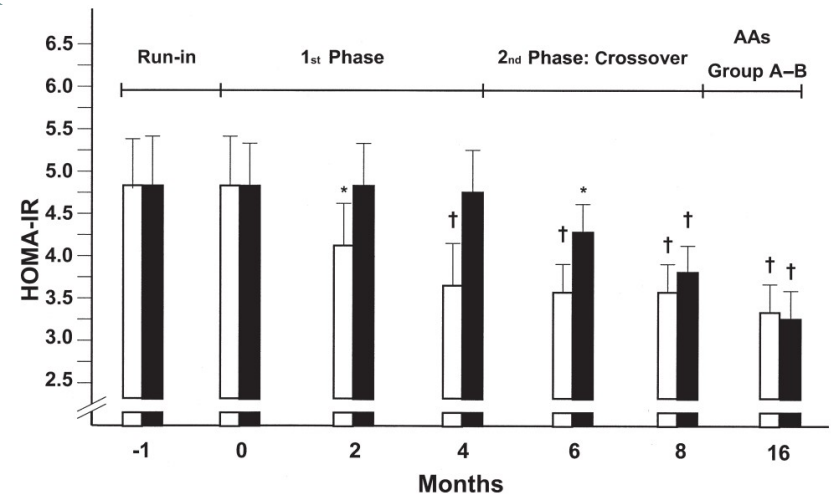
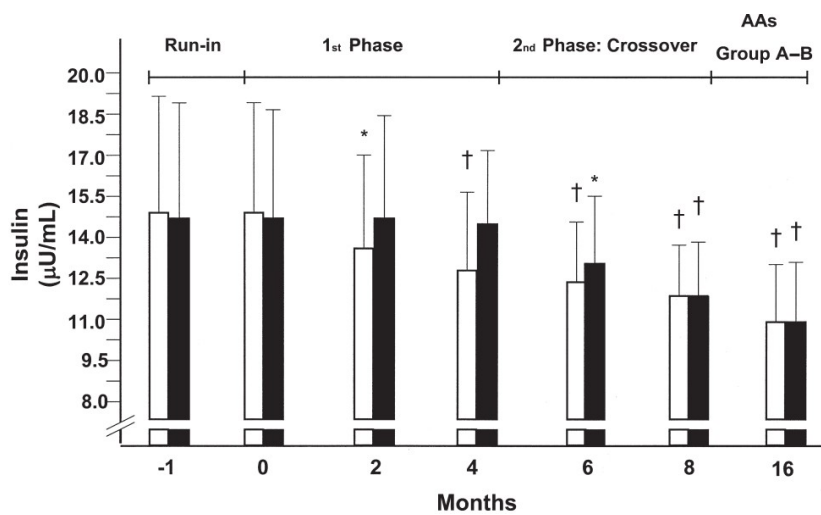


Composition of essential amino acid (EAA) drink.

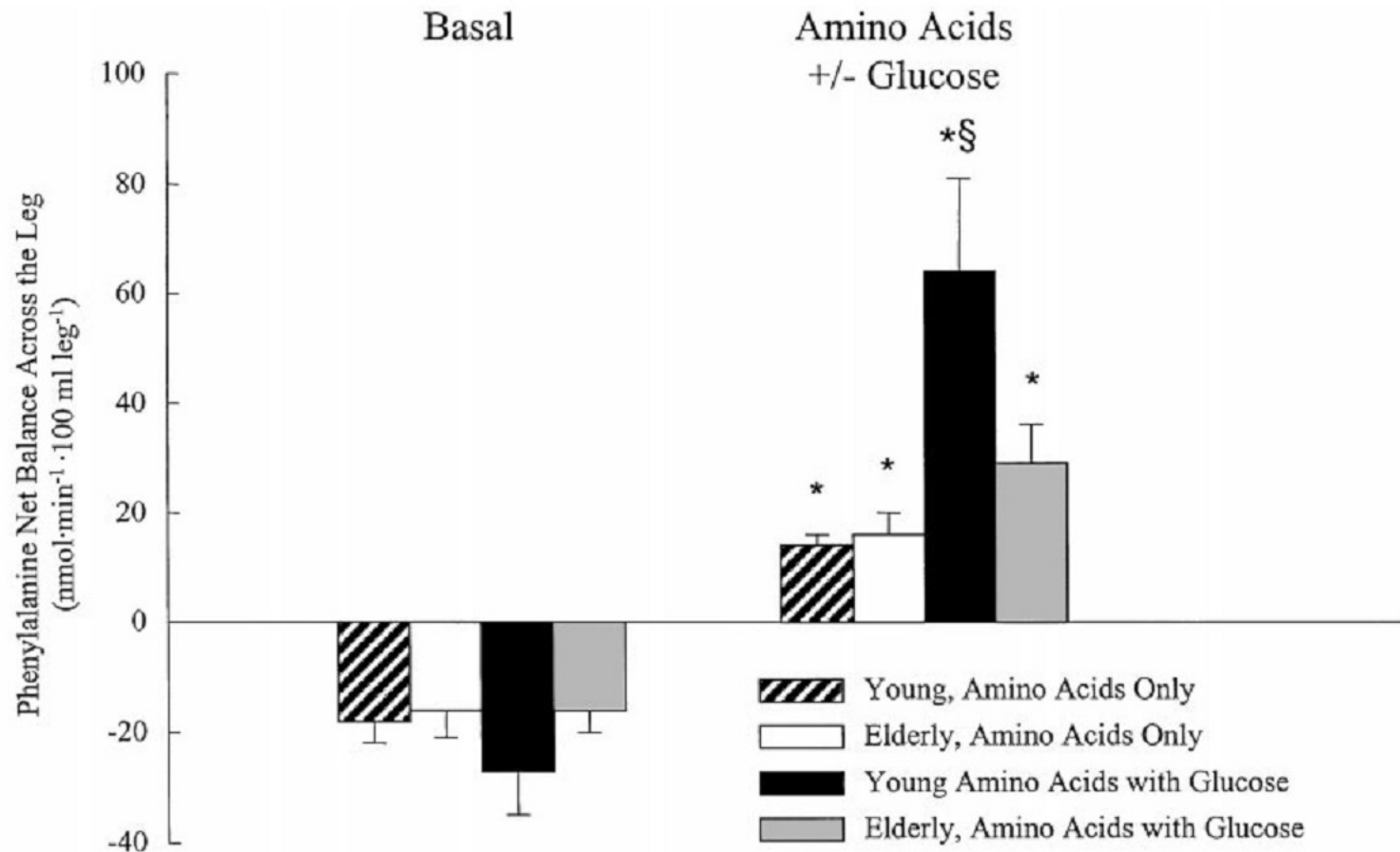
Amino Acid	Amount (g)	Proportion of total (%)
Histidine	0.488	3.26
Isoleucine	1.286	8.57
Leucine	5.382	35.88
Lysine (HCl)	2.561	17.08
Methionine	0.538	3.59
Phenylalanine	0.698	4.65
Threonine	1.435	9.57
Valine	1.116	7.44
Arginine	1.495	9.97
Total	15.000	100.00

# Nutritional Supplements with Oral Amino Acid Mixtures Increases Whole-Body Lean Mass and Insulin Sensitivity in Elderly Subjects with Sarcopenia

□ aa  
 ■ placebo



# The Response of Muscle Protein Anabolism to Combined Hyperaminoacidemia and Glucose-Induced Hyperinsulinemia Is Impaired in the Elderly\*

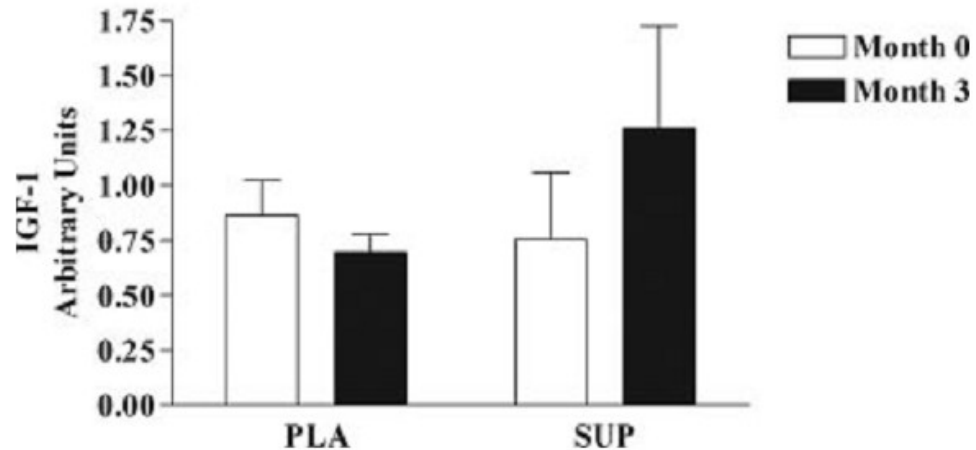
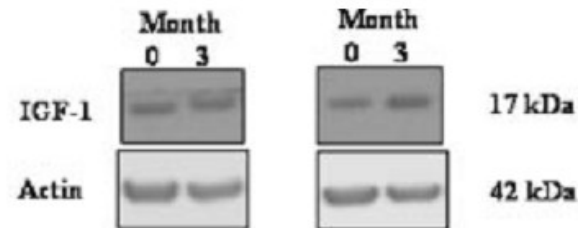




## Amino Acid Supplementation Increases Lean Body Mass, Basal Muscle Protein Synthesis, and Insulin-Like Growth Factor-I Expression in Older Women

	Placebo (n = 7)		SUP (n = 7)	
Age (yr)	69 ± 3		67 ± 1	
Height (cm)	163 ± 2		165 ± 3	
	Month 0	Month 3	Month 0	Month 3
Weight (kg)	71 ± 4	72 ± 5	73 ± 6	74 ± 6
LBM (kg)	40.7 ± 2.4	41.0 ± 2.8	43.5 ± 2.8	45.2 ± 3.0 <sup>a</sup>
Fat (%)	40 ± 1	40 ± 1	38 ± 2	38 ± 2
Serum creatinine (mg/dl)	0.81 ± 0.06	0.83 ± 0.04	0.76 ± 0.03	0.74 ± 0.04

15 gr AAE



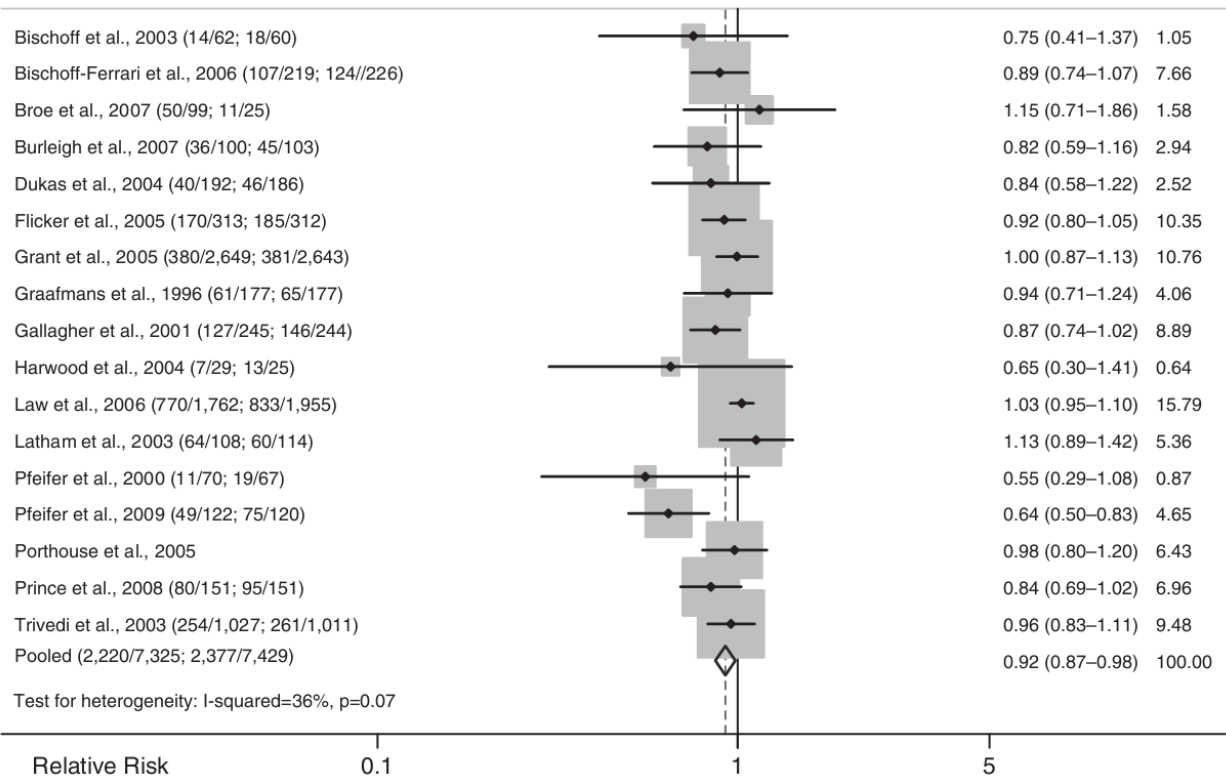
# Vitamin D Treatment for the Prevention of Falls in Older Adults: Systematic Review and Meta-Analysis



## Post Hoc Analysis

Source (Number fallers/total per arm for treatment; control)

RR (95%CI) %



# Effect of Vitamin D Supplementation on Muscle Strength, Gait and Balance in Older Adults: A Systematic Review and Meta-Analysis

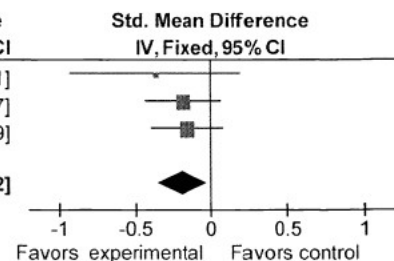


800-1000 UI

## Timed Up & Go Test

Study or Subgroup	Vitamin D supplementation			Control			Weight	Std. Mean Difference IV, Fixed, 95% CI
	Mean	SD	Total	Mean	SD	Total		
Bunout 2006	13.8	2.5	24	15.2	4.7	24	8.6%	-0.37 [-0.94, 0.21]
Pfeifer 2009	7.5	3.4	121	8.3	5.1	121	44.0%	-0.18 [-0.44, 0.07]
Zhu 2010	8.1	3.9	129	9	7	132	47.4%	-0.16 [-0.40, 0.09]
<b>Total (95% CI)</b>			<b>274</b>			<b>277</b>	<b>100.0%</b>	<b>-0.19 [-0.35, -0.02]</b>

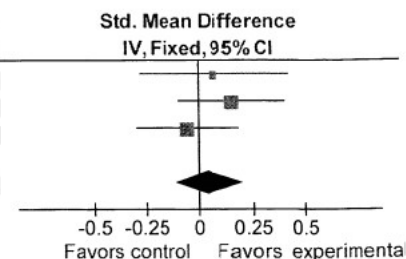
Heterogeneity:  $\text{Chi}^2 = 0.43$ ,  $\text{df} = 2$  ( $P = 0.81$ );  $I^2 = 0\%$   
 Test for overall effect:  $Z = 2.19$  ( $P = 0.03$ )



## Lower Extremity Strength

Study or Subgroup	Vitamin D supplementation			Control			Weight	Std. Mean Difference IV, Fixed, 95% CI
	Mean	SD	Total	Mean	SD	Total		
Dhesi 2004	204	92.4	62	198	79.7	61	19.7%	0.07 [-0.28, 0.42]
Pfeifer 2009	236	75	121	224	83	121	38.6%	0.15 [-0.10, 0.40]
Zhu 2010	176.5	49	129	179.5	54	132	41.7%	-0.06 [-0.30, 0.18]
<b>Total (95% CI)</b>			<b>312</b>			<b>314</b>	<b>100.0%</b>	<b>0.05 [-0.11, 0.20]</b>

Heterogeneity:  $\text{Chi}^2 = 1.39$ ,  $\text{df} = 2$  ( $P = 0.50$ );  $I^2 = 0\%$   
 Test for overall effect:  $Z = 0.60$  ( $P = 0.55$ )



# Systematic Literature Review of Randomized Control Trials Assessing the Effectiveness of Nutrition Interventions in Community-Dwelling Older Adults

Kristofer Bandayrel, BAsC; Sharon Wong, PhD, RD



EVIDENCIA



# Nutritional Recommendations for the Management of Sarcopenia

