

# Nutritional Challenges for High Performance Athletics



*Peter W.R. Lemon*

*The University of Western Ontario*

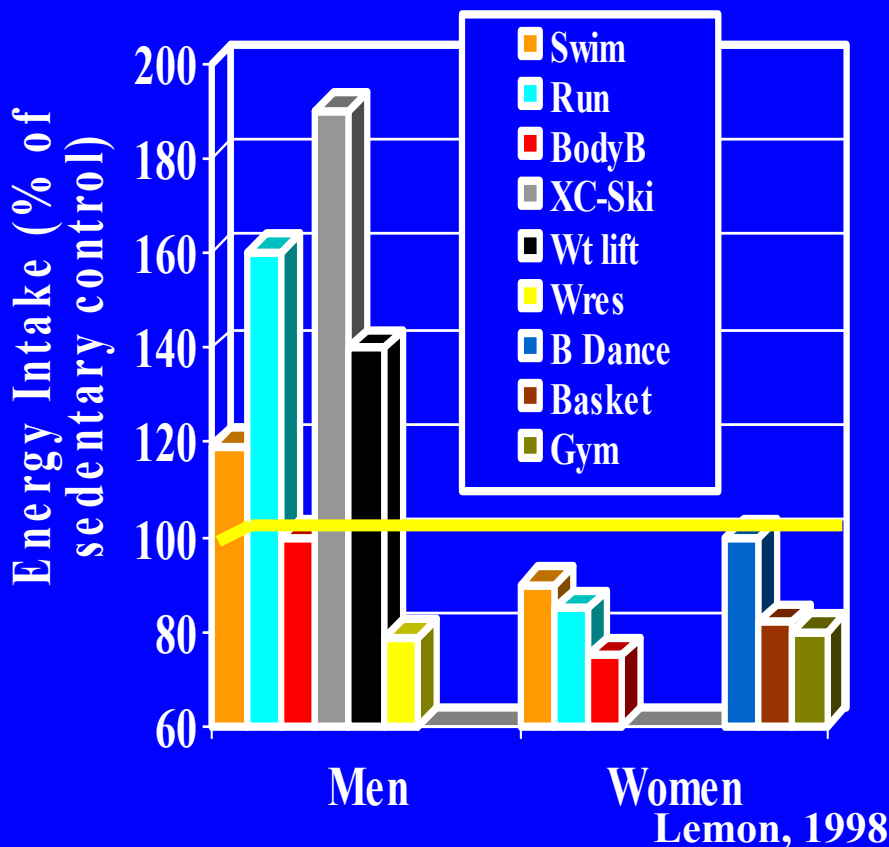
# **Factors Affecting Dietary Needs**

- **exercise type/intensity/duration**
- **continuous vs intermittent**
- **rest/recovery time between sessions**
- **degree of adaptation (training)**
- **environment**
- **age**
- **gender**

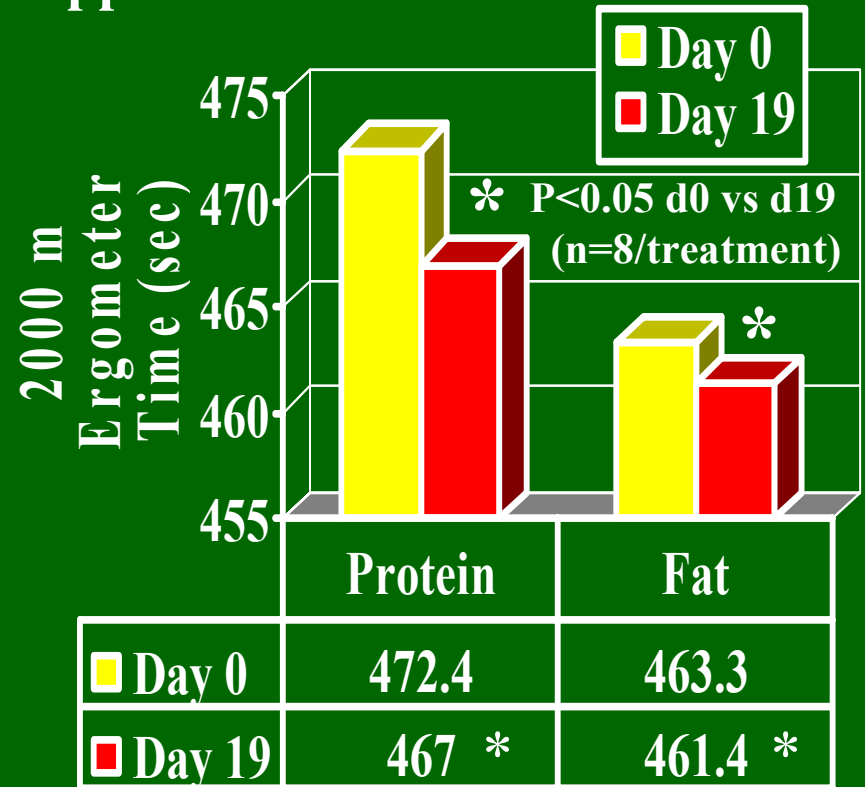
# Nutrients Known to be Important

- energy intake

## Activity & Energy Intake



## Performance with/without 940kJ/d Supplement in Elite Female Rowers

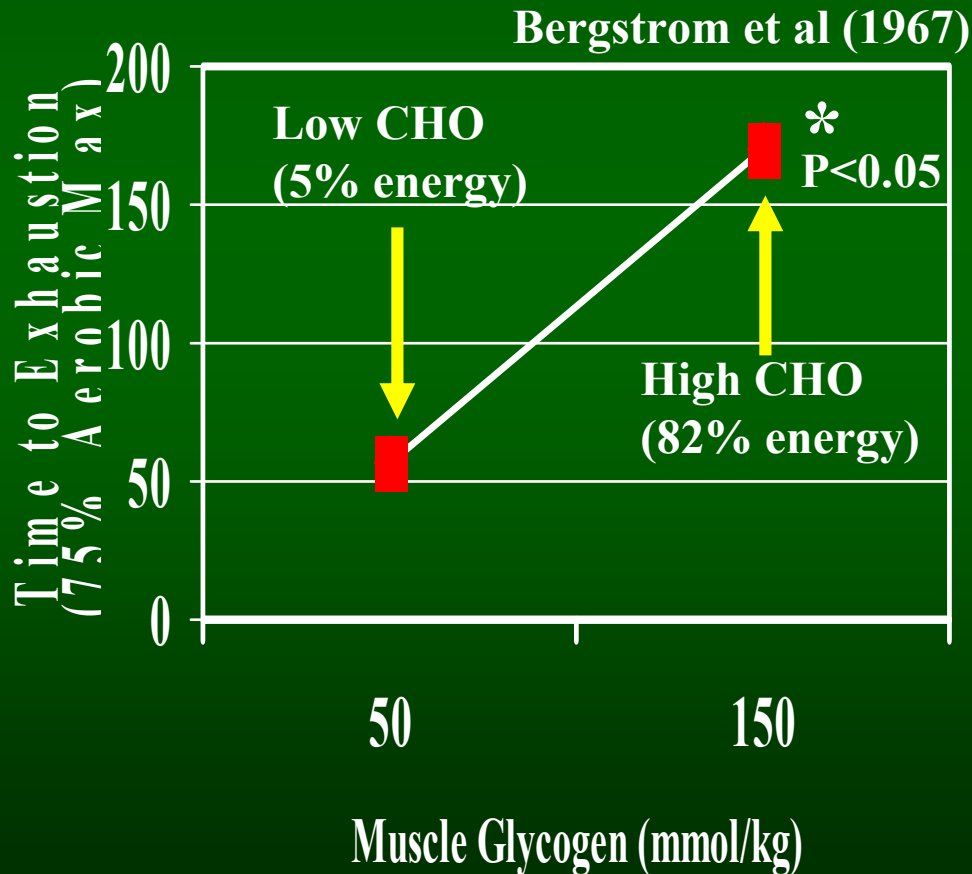


Bachman, Talyor, Lemon, 2000

# Nutrients Known to be Important

- CHO intake

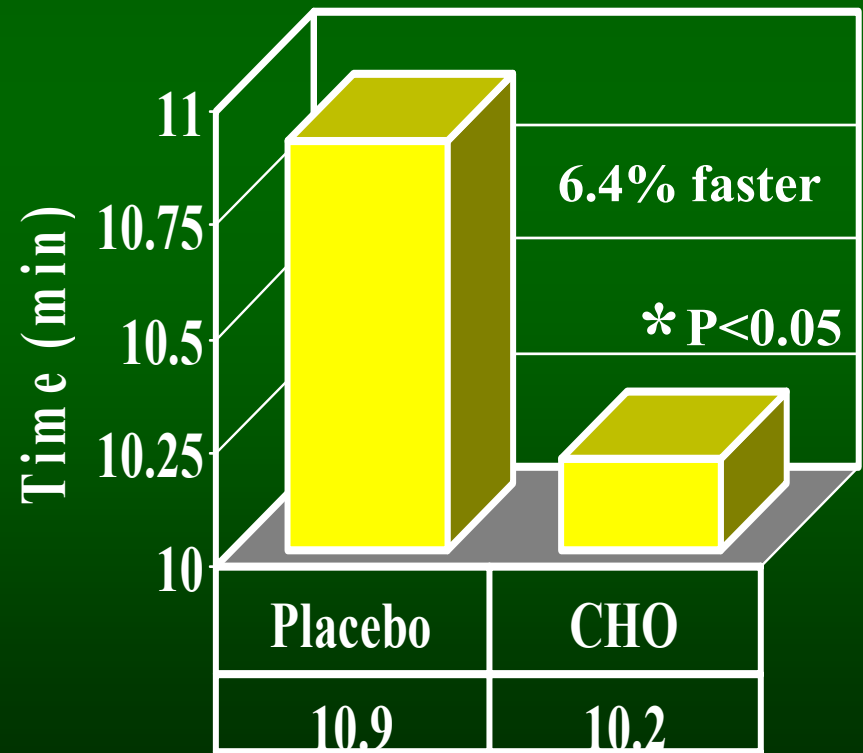
## Chronic CHO Intake & Performance



## Time Trial Following 50 min

@ 80% Aerobic max, n=8

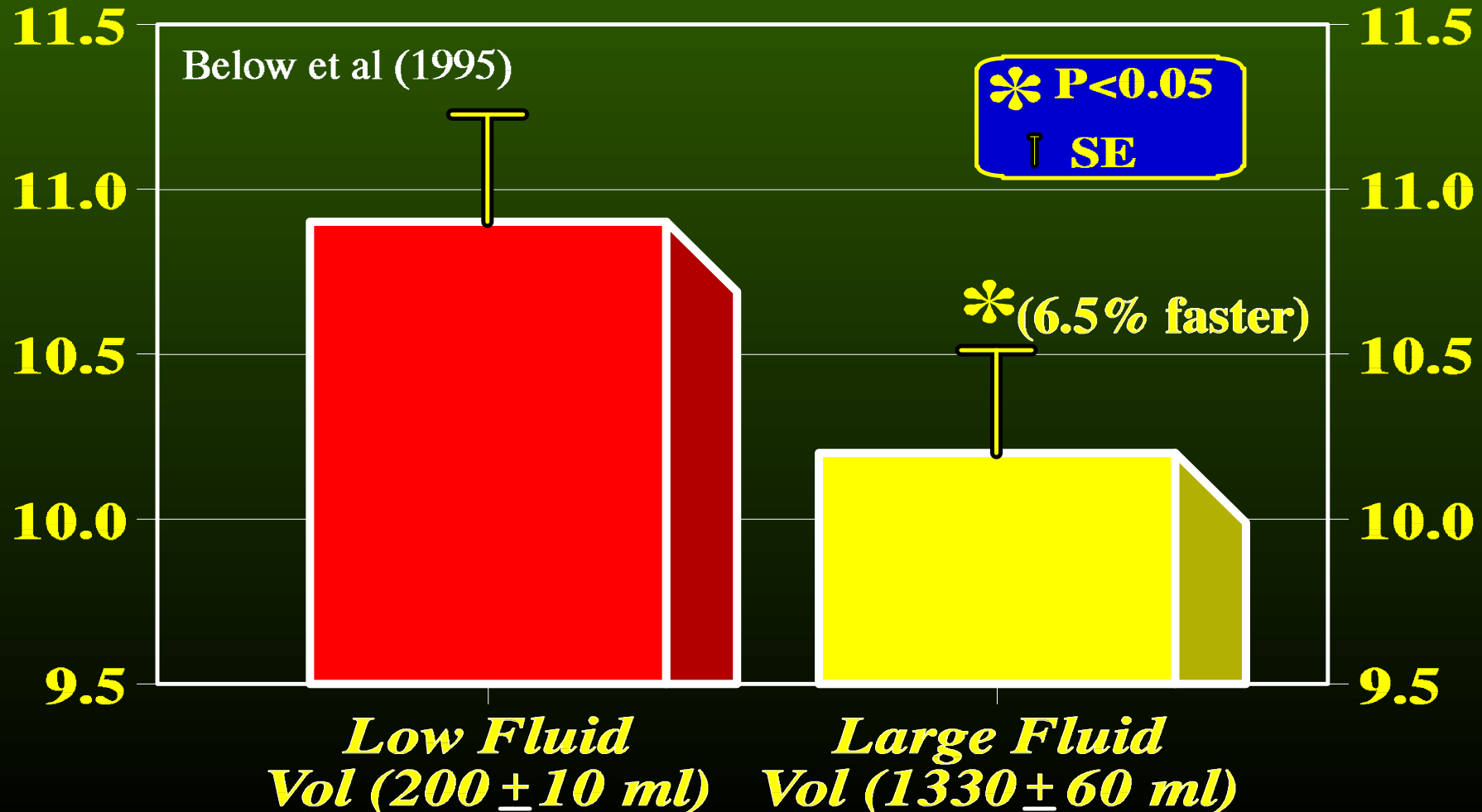
Below et al (1995)



# Nutrients Known to be Important

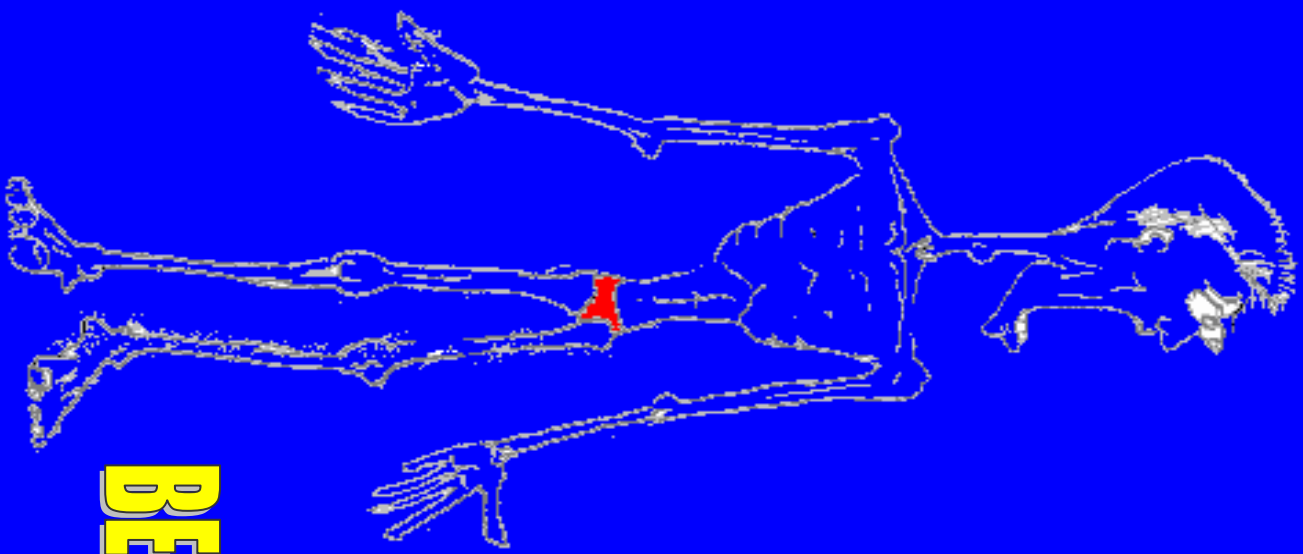
- fluid intake

*Performance time (min)*



# Controversial topics

- **protein**
- **fat**
- **vitamins/minerals**
- **creatine**
- **variety of others, ie., glutamine, ribose, HMB, prohormones, ephedrine, caffeine, CLA, etc**
- **other questions, ie., timing of nutrient relative to training sessions, etc**



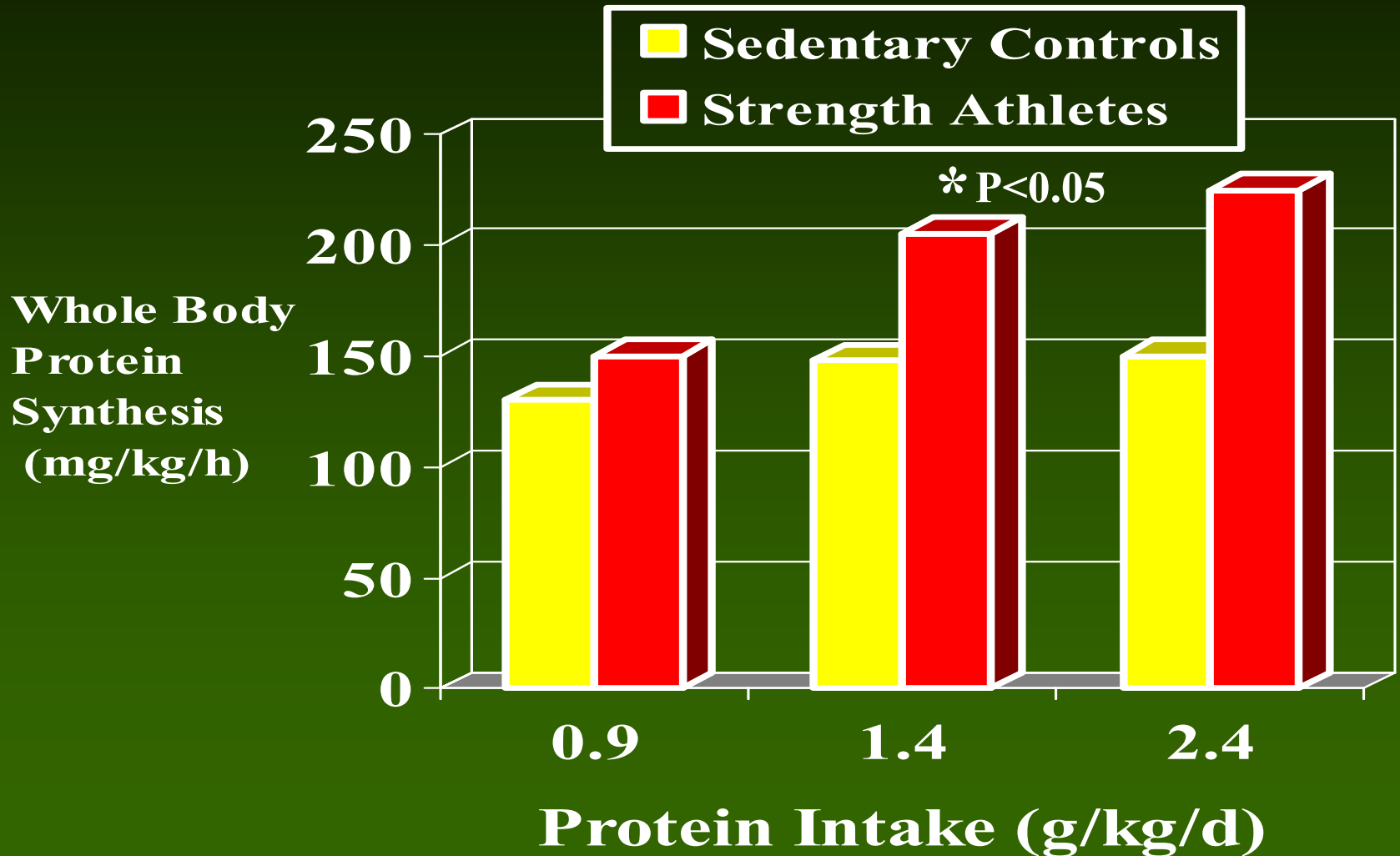
**BEFORE**



**AFTER**

# Protein?

## Protein Intake & Protein Synthesis

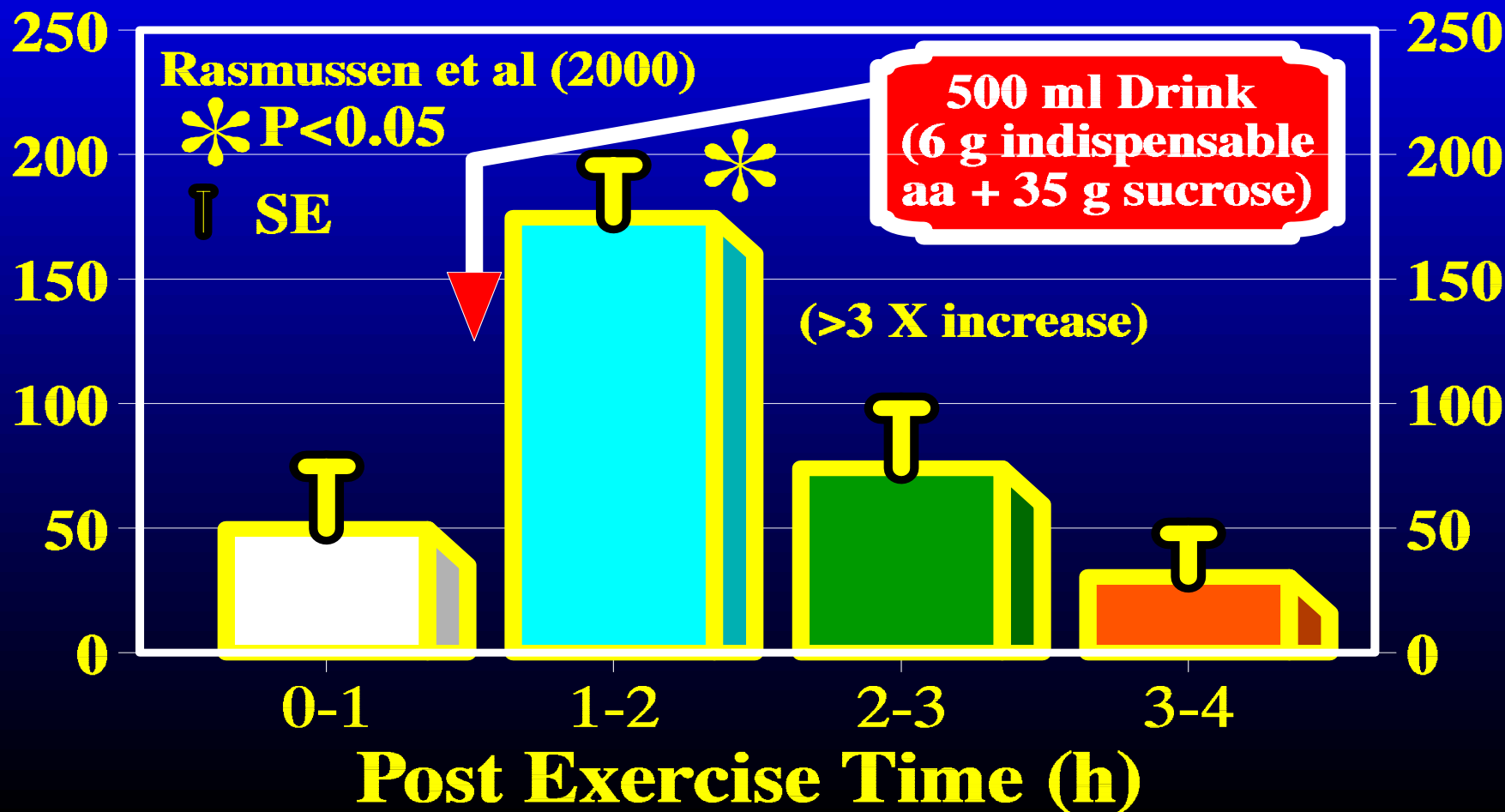




# *Post-ex Amino Acids Ingestion increases protein synthesis!*

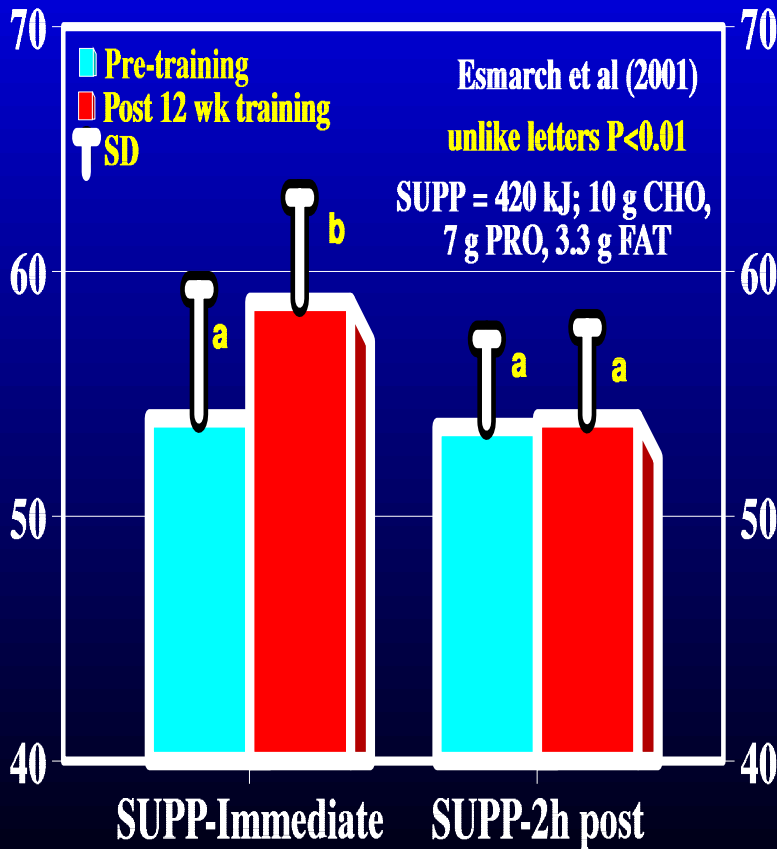
## *Muscle Protein Synthesis*

*(nmol·min<sup>-1</sup>·100 ml leg volume<sup>-1</sup>)*

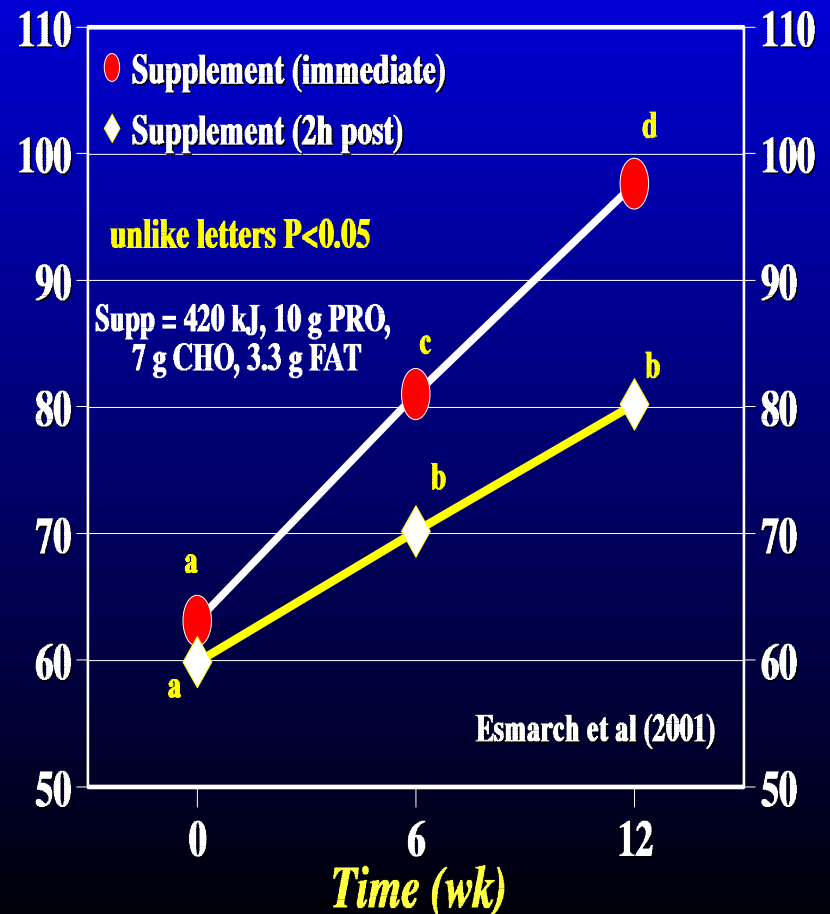


# Effects on Strength & Size? - yes

## Leg Cross-sectional Area (cm<sup>2</sup>)

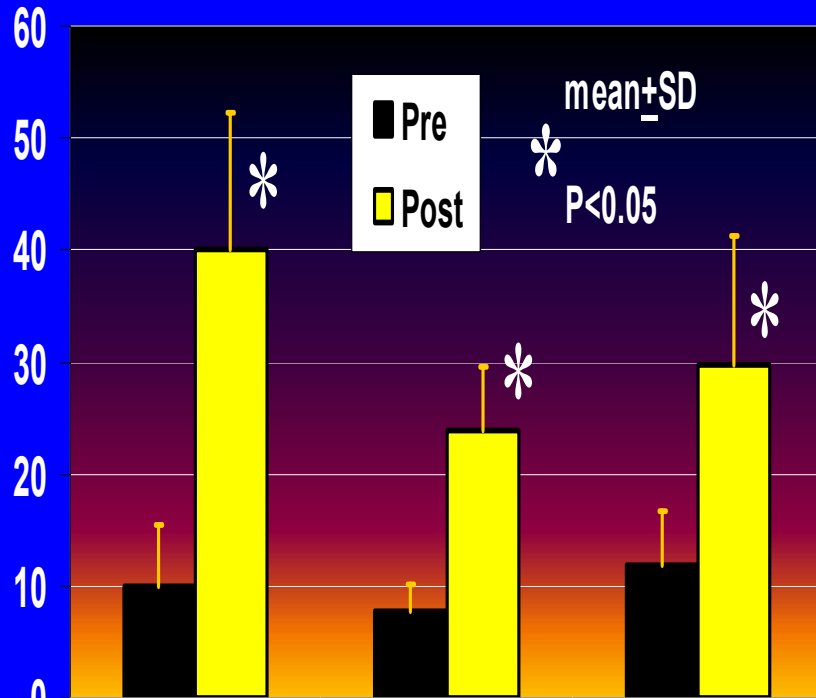


## 5-repetition max (kg)



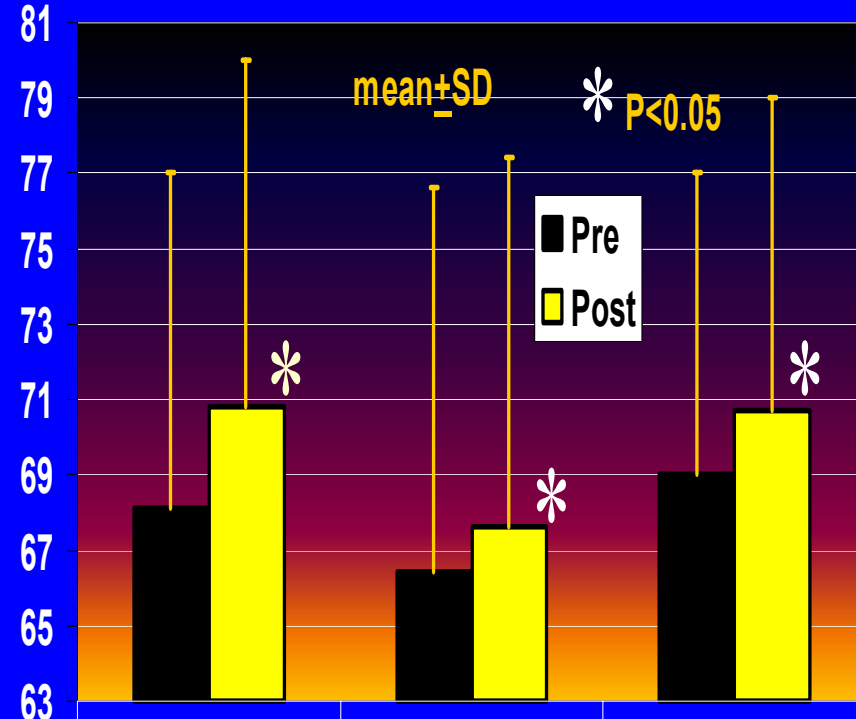
# *Creatine and protein may enhance muscle strength/size gains with training!*

Leg Press Endurance- Reps at 80% of 1-RM



	Protein+CR	Protein	CR
■ Pre	10.0	7.7	11.9
■ Post	40.0	23.9	29.8

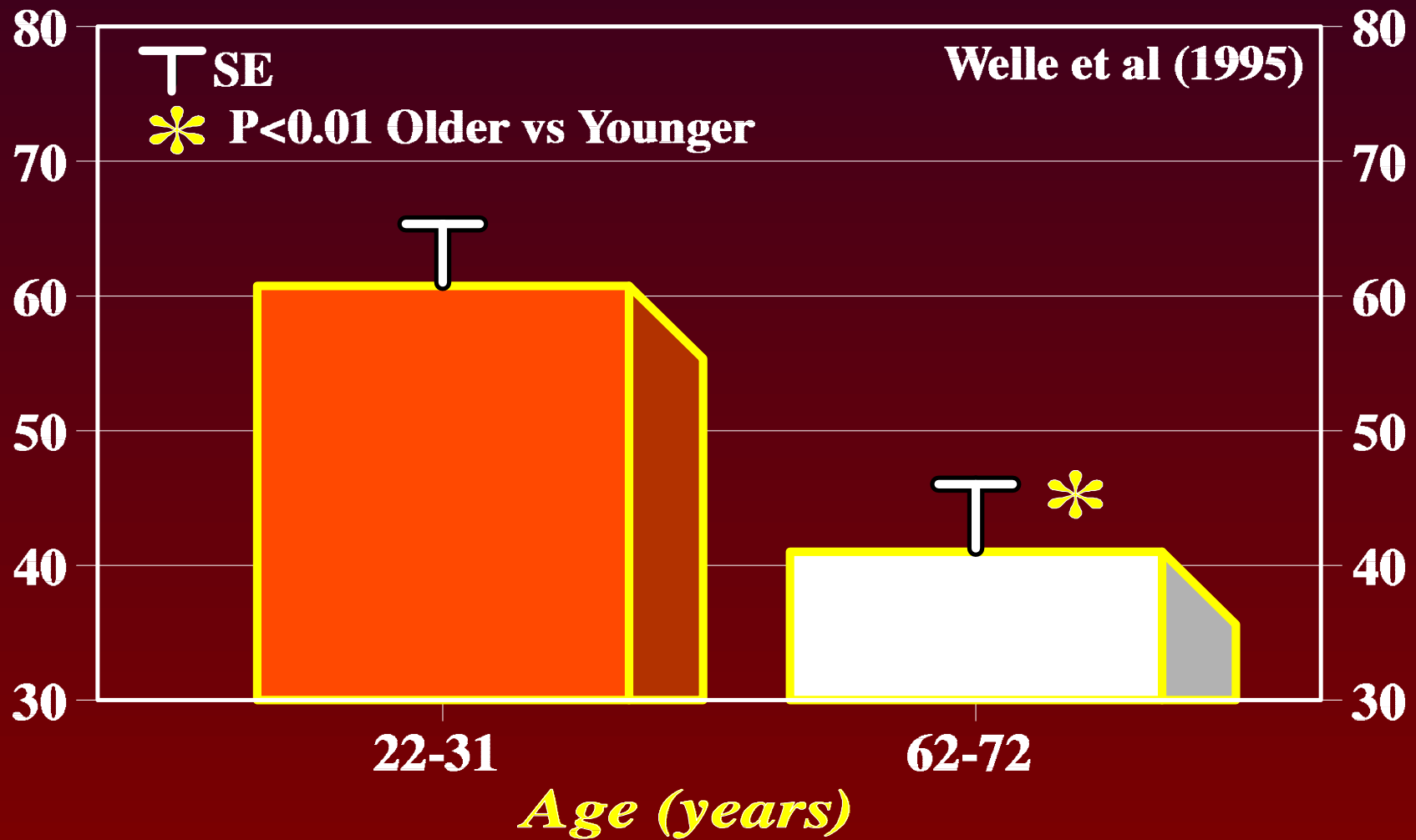
Whole Body Lean Mass (kg)



	Protein+CR	Protein	CR
■ Pre	68.1	66.4	69.0
■ Post	70.8	67.6	70.7

# *Beneficial for aged, muscle disease, etc?*

*Fractional Myofibrillar Protein Synthesis  
(% /h X 1000) following 3 months of training*



# Challenge(s)?

- **several**
  - **athletes: what product(s) to take?**
  - **scientists: provide the objective data to clarify picture**
    - **but traditional funding inadequate!**
  - **industry: credibility**
  - **regulators: quality control, safety**
- **solutions ?????**
  - **partnership - science and industry (% of sales)**
  - **benefits ????**
    - **equip more laboratories**
    - **unbiased data collection; more speculative research**
    - **answers, new product ideas, and enhance credibility/  
marketability of products by verifying applicability of  
theory**