

# Mountain Dog Training and Nutrition by John Meadows CSCS, IFFB Pro

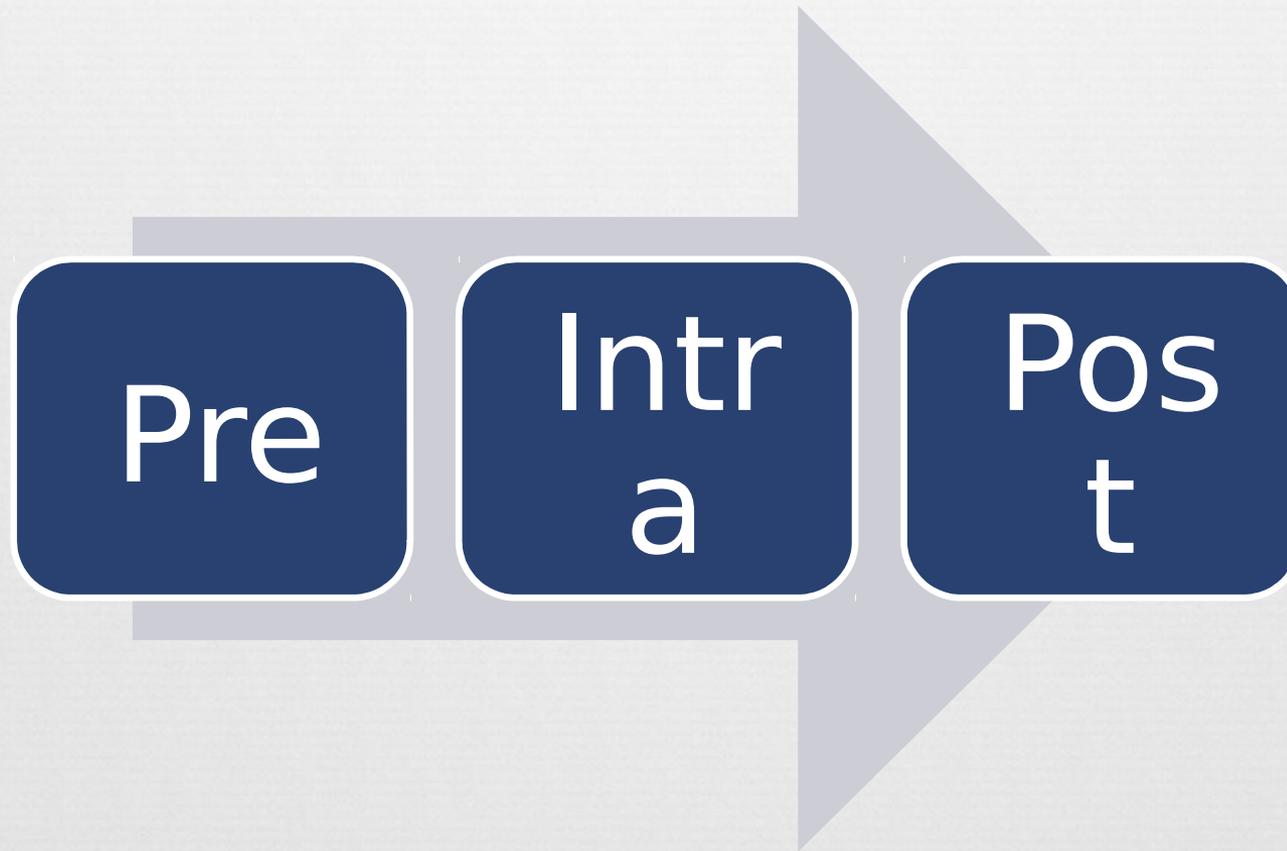


# **Mountain Dog Diet: Nutritional Program Design**

# What matters most?



# Nutrient Timing



# Nutrient Timing

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## ORIGINAL ARTICLE

Stephen P. Bird · Kyle M. Tarpinning  
Frank E. Marino

## Independent and combined effects of liquid carbohydrate/essential amino acid ingestion on hormonal and muscular adaptations following resistance training in untrained men

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**Abstract** This investigation examined chronic alteration of the acute hormonal response associated with liquid carbohydrate (CHO) and/or essential amino acid (EAA) ingestion on hormonal and muscular adaptations following resistance training. Thirty-two untrained young men performed 12 weeks of resistance training twice a week, consuming ~675 ml of either, a 6% CHO solution, 6 g EAA mixture, combined CHO + EAA sup-

**Keywords** Resistance training · Supplementation · Cortisol · Insulin · Hypertrophy

### Introduction

Resistance exercise stimulates acute changes in the rate of muscle protein turnover, resulting in an increase in

# Nutrient Timing

*Making the case for intra-workout nutrition.*

Very well constructed study.

- 32 men age 18-29
- Untrained – yes I like this!
- 4 groups – PLA, CHO, EAA, CHO and EAA
- 3 x 10 at 75% of max on 8 exercises
- Subject consumed 6 grams of EAA and 40 grams of carbs intra. Divided volume equally and consumed between sets.
- Measures taken at 0, 4, 8, and 12 weeks!
- Diets controlled closely

# Nutrient Timing

*Making the case for intra-workout nutrition.*

1: Intra-workout nutrition suppresses cortisol levels

Bird et al, 2006

Placebo group: cortisol increased 105% immediately after training, and remained 54% higher 30 min post-workout.

In contrast, carb and carb + EAA groups had no significant increases in cortisol during exercise and had 27% and 23% lower cortisol levels 30 min post-workout.

# Nutrient Timing

2. Intra workout carbs + protein suppresses muscle protein breakdown - Bird et al, 2006b

Metabolism Clinical and Experimental 55 (2006) 570-577

In the double-blind, placebo-controlled study, the authors found that consuming carbs + EAAs intra-workout resulted in 27% less muscle protein breakdown 48 hrs post-training.

Do measured reductions in cortisol levels or muscle protein breakdown don't translate to real-world gainz?

# Nutrient Timing

3. Intra-workout protein + carbs increases muscle fiber cross-sectional area, a measure of muscle growth. Bird et al, 2006(c)

In this double-blinded, placebo-controlled study, carbs + EAAs increased muscle fiber cross-sectional area to a greater extent than a placebo after a 12-week training program.

# Nutrient Timing – Glucose and

574

S.P. Bird et al. / *Metabolism Clinical and Experimental* 55 (2006) 570–577

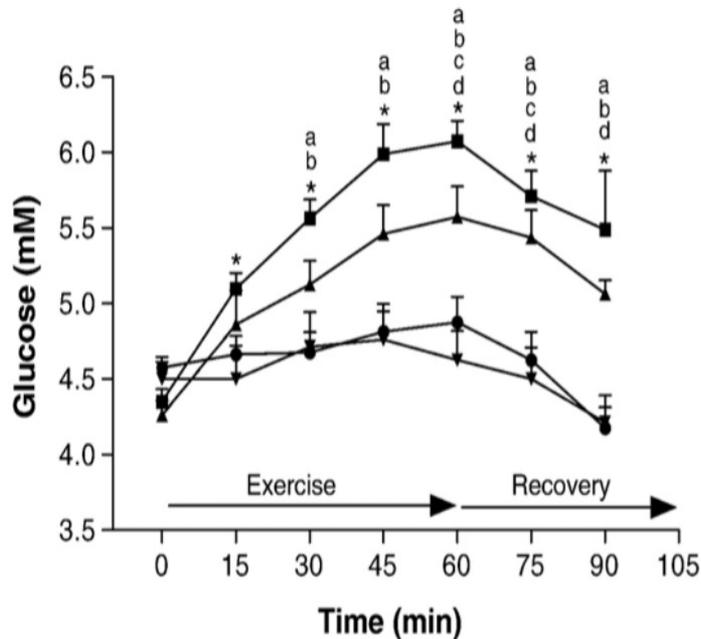


Fig. 1. Serum glucose concentrations for PLA (●), CHO (▲), EAA (▼), and CHO + EAA (■). Significantly different from preexercise value ( $*P < .05$ ): CHO vs 30, 45, 60, 75, and 90 minutes; CHO + EAA vs 30, 45, 60, 75, and 90 minutes. Significant difference between treatments ( $P < .05$ ): <sup>a</sup>CHO from PLA; <sup>b</sup>CHO + EAA from PLA; <sup>c</sup>CHO from EAA; <sup>d</sup>CHO +

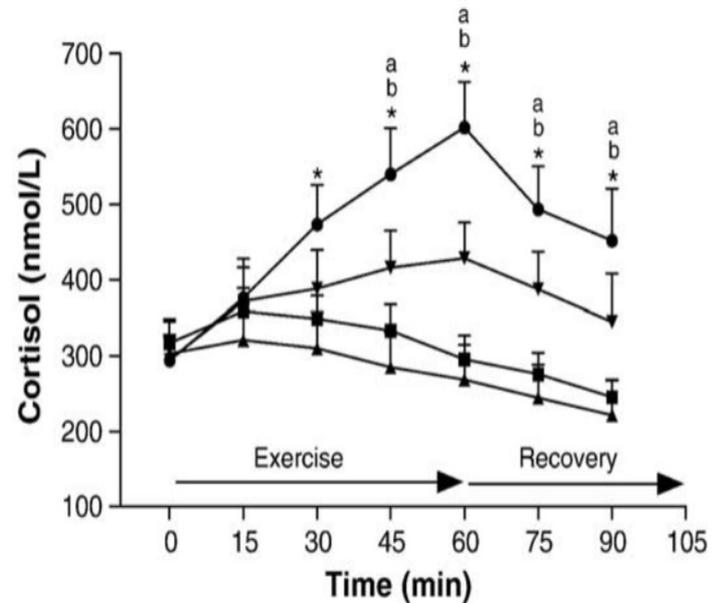


Fig. 3. Serum cortisol concentrations for PLA (●), CHO (▲), EAA (▼), and CHO + EAA (■). Significantly different from preexercise value ( $*P < .05$ ): PLA vs 30, 45, 60, 75, and 90 minutes; CHO vs 90 minutes; CHO + EAA vs 90 minutes. Significant difference between treatments ( $P < .05$ ): <sup>a</sup>CHO from PLA; <sup>b</sup>CHO + EAA from PLA.

# Nutrient Timing – Insulin and 3-MHS

## 3.3. Insulin

The PLA group showed no significant change in serum insulin concentration to the exercise bout from baseline. Essential amino acid ingestion resulted in significant increases at 75 and 90 minutes. Both CHO and CHO +

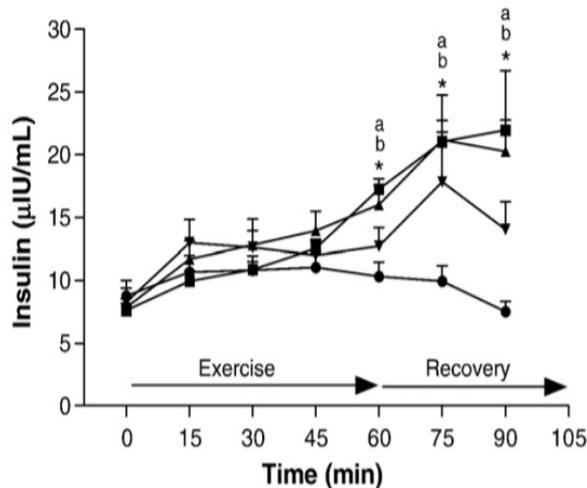


Fig. 2. Serum insulin concentrations for PLA (●), CHO (▲), EAA (▼), and CHO + EAA (■). Significantly different from preexercise value ( $*P < .05$ ): CHO vs 60, 75, and 90 minutes; EAA vs 75 and 90 minutes; CHO + EAA vs 60, 75, and 90 minutes. Significant difference between treatments ( $P < .05$ ): <sup>a</sup>CHO from PLA; <sup>b</sup>CHO + EAA from PLA.

baseline. However, consequent to the CHO and CHO + EAA treatments, the exercise-induced cortisol response was blunted, resulting in a significant decrease pre- to post-exercise. This blunted response was associated with significantly lower cortisol levels than PLA at 45, 60, 75, and 90 minutes (Fig. 3).

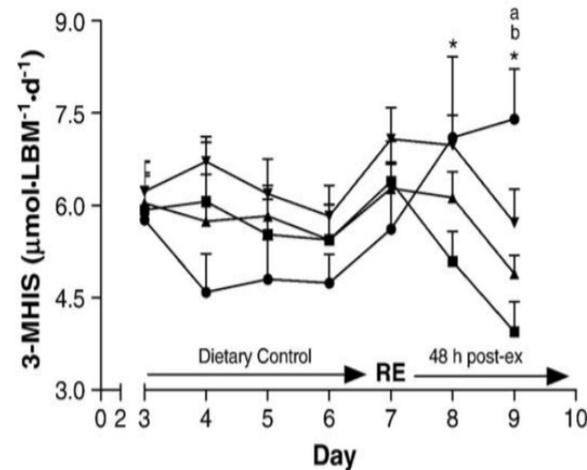
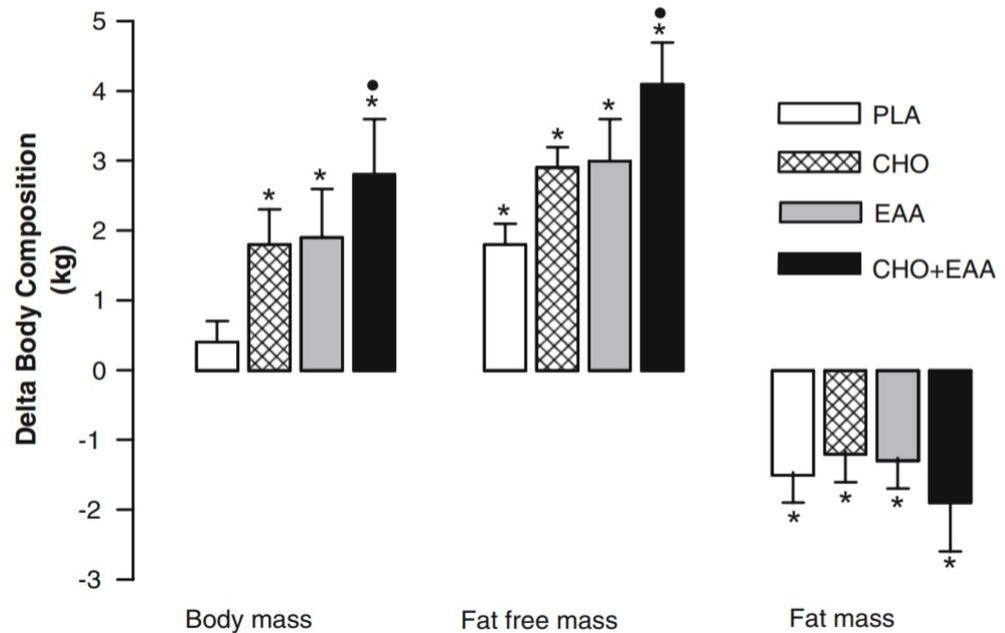


Fig. 4. Mean daily 24-hour urinary 3-MH excretion values for PLA (●), CHO (▲), EAA (▼), and CHO + EAA (■), expressed as micromoles per kilogram of lean body mass (LBM) per day. Significantly different from preexercise (day 6) value ( $*P < .05$ ): PLA vs days 8 and 9; CHO + EAA vs day 9. Significant difference between treatments ( $P < .05$ ): <sup>a</sup>CHO from PLA; <sup>b</sup>CHO + EAA from PLA.

# Nutrient Timing – Body Composition

230

**Fig. 2** Body composition changes following 12 weeks of resistance training. Significant difference ( $P < 0.05$ ) from baseline value, \*. Treatment group pre- to post-training change is significantly different ( $P < 0.05$ ) from PLA (filled circle)



fibre types. Following 12 weeks of progressive resistance training, a hypertrophic effect was observed for all three

strength were recorded across all groups ( $P < 0.05$ ), pre- to post-training. CHO + EAA ingestion resulted in

# Nutrient Timing – CSA - GAINZZZZ

## Muscular strength

There were no significant differences at baseline for 1-RM strength between groups. Consequent to 12 weeks of progressive resistance training increases in 1-RM

**Fig. 3** Muscle fibre CSA of type I, IIa, and IIb before (solid bars) and after (open bars) 12 weeks of resistance training. \*Post-training muscle fibre CSA is significantly different ( $P < 0.05$ ) from pre-training. Treatment group change in muscle fibre CSA is significantly different ( $P < 0.05$ ) from PLA (filled circle), CHO (up filled triangle), and EAA (down filled triangle)

## Biochemical responses

Biochemical responses during 12 weeks of resistance training are presented in Table 1. PLA and EAA displayed no significant change in GLU concentration,

