Beer and Health

Welcome to the 6th Beer and Health Symposium: From myths to science

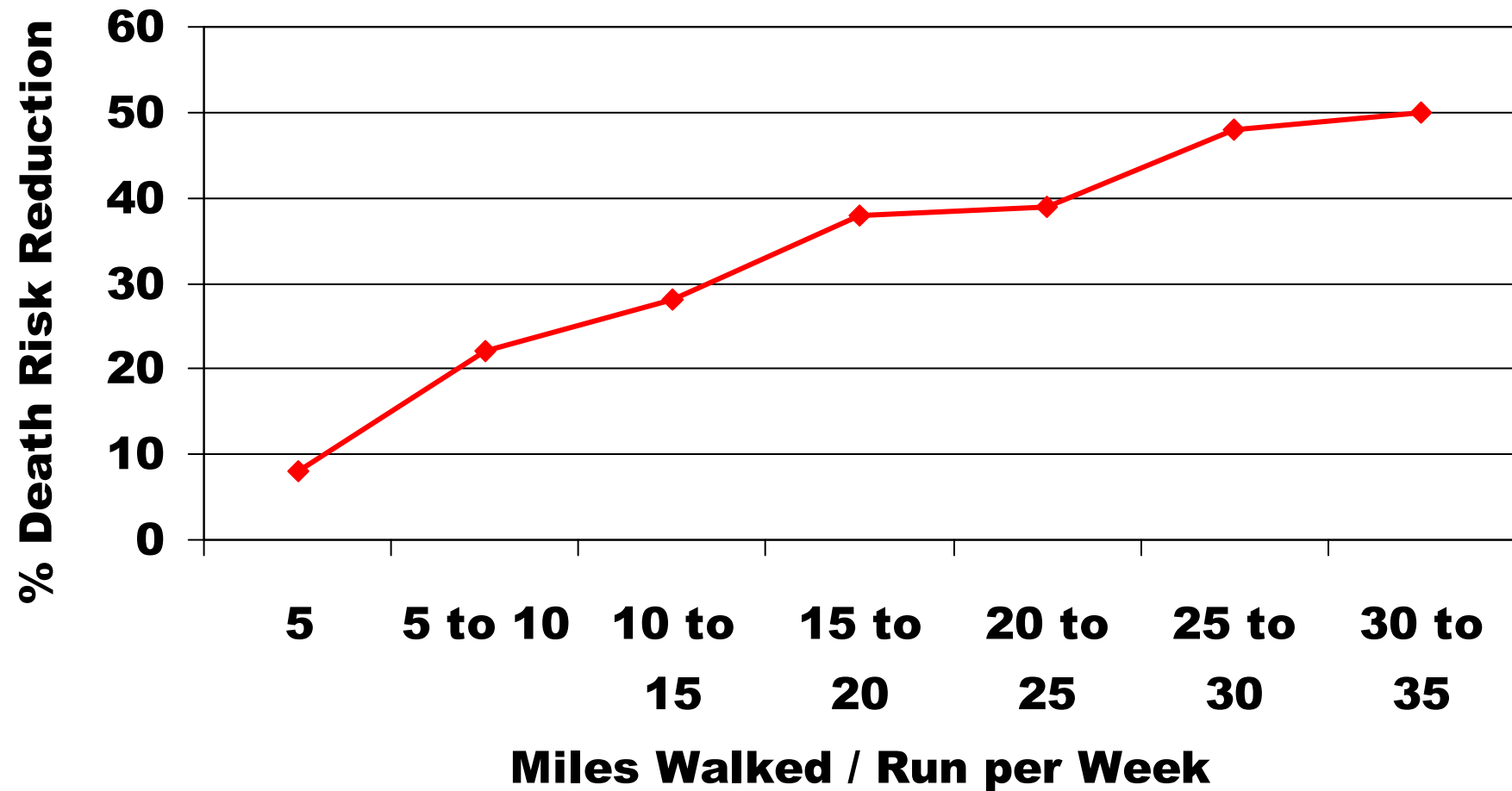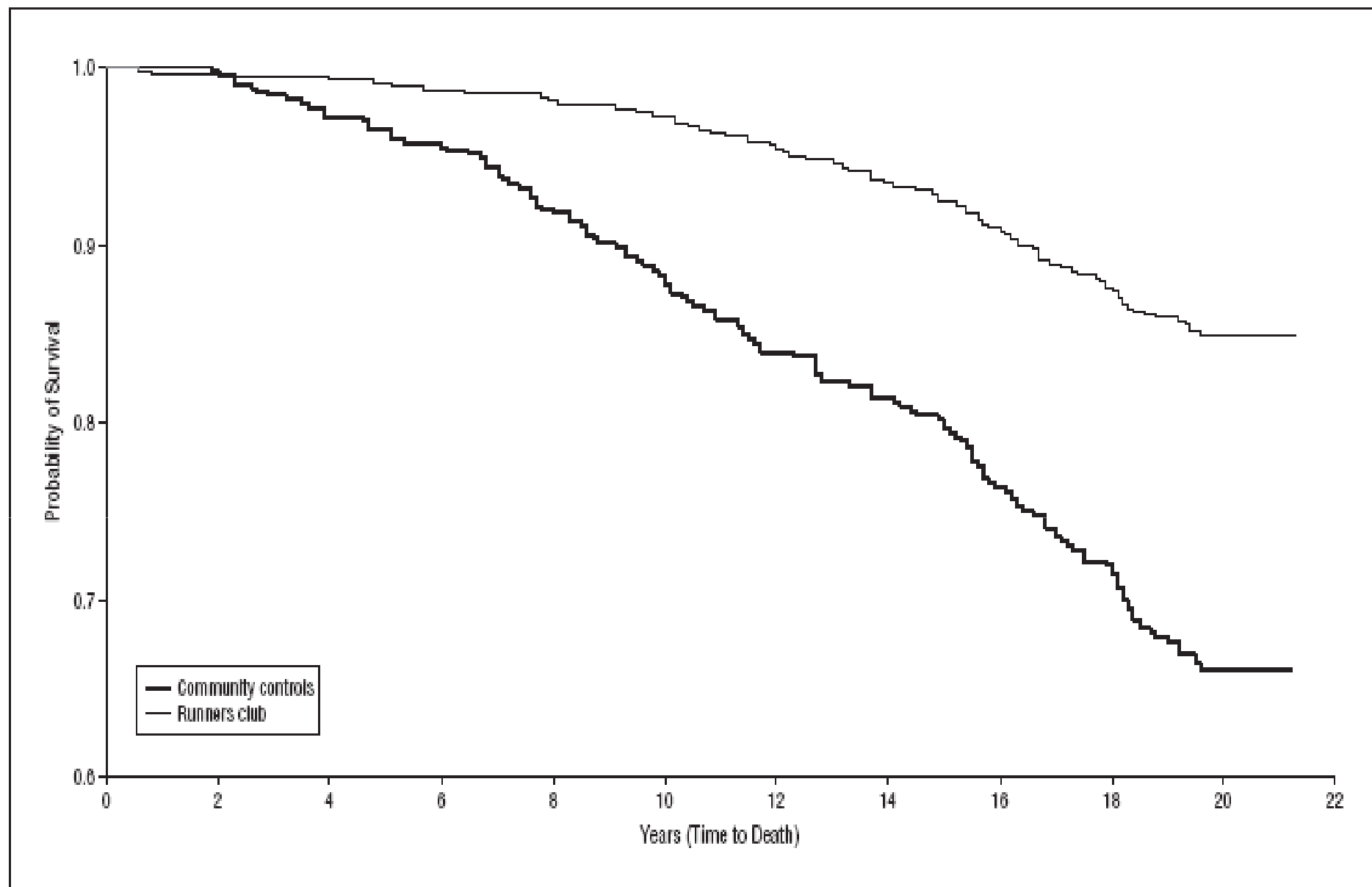# BEER AFTER EXERCISE: Yes or No?

Manuel J Castillo
School of Medicine
University of Granada

Harvard Alumni Study

Figure 4. Kaplan-Meier unadjusted survival curves for all cause mortality in runners club members and community controls from study onset through 19 years of follow-up. All 941 subjects at study inception are included. The difference between groups remained significant (P<.001 by log rank test).

INTERNATIONAL JOURNAL OF BEHAVIORAL
NUTRITION AND PHYSICAL ACTIVITY

RESEARCH   **Open Access**

Pleasant for some and unpleasant for others: a protocol analysis of the cognitive factors that influence affective responses to exercise

Elaine A Rose[1]*, Gaynor Parfitt[2]

Background

The Hedonic principle suggests that individuals choose to participate in behaviours which are pleasant (lead to positive affective responses) and avoid those that are unpleasant [1]. The role of affective responses in influencing future behavioural decisions extends to exercise. Williams et al. [2] have shown that affective responses to a moderate intensity exercise stimulus predicted exercise behaviour 6 and 12 months later. One of the key

The neurobiology of pleasure, reward processes, addiction and their health implications

Neuroendocrinology Letters No.4 August Vol.25, 2004

Feelings of Pleasure & Well-being as predictors of Health Status 21 Years Later

THE ROYAL SOCIETY

Positive health: connecting well-being with biology

Carol D. Ryff[1*], Burton H. Singer[2] and Gayle Dienberg Love[1]

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[2]Office of Population Research, Princeton University, Wallace Hall, Princeton, NJ 08544, USA

…(until now) inquiry has been overwhelmingly focused on the negative, probing how adversity (e.g. poor diet, stress, toxic habits, lack of exercise, loneliness, neuroticism, depression…) elevates biological risk

The key hypothesis of positive health is that well-being will be accompanied by optimal functioning of multiple physiological systems.

… the protective effects of high levels of well-being should be reflected in longer active life expectancy and disability-free life years.

Is important to BE HAPPY !

Beer and Health

PROGRAMME · PRESS ROOM · LOCATION AND ACCOMODATION · CONTACTS · SPEAKERS · REGI

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- ➢ Happy people live up to 7 years longer, which is a larger positive effect than obesity, smoking and lack of physical exercise are negative.

- ➢ Risk of cardiovascular disease is 50% higher for the generally unhappy.

- ➢ Happier people absorb more health information.
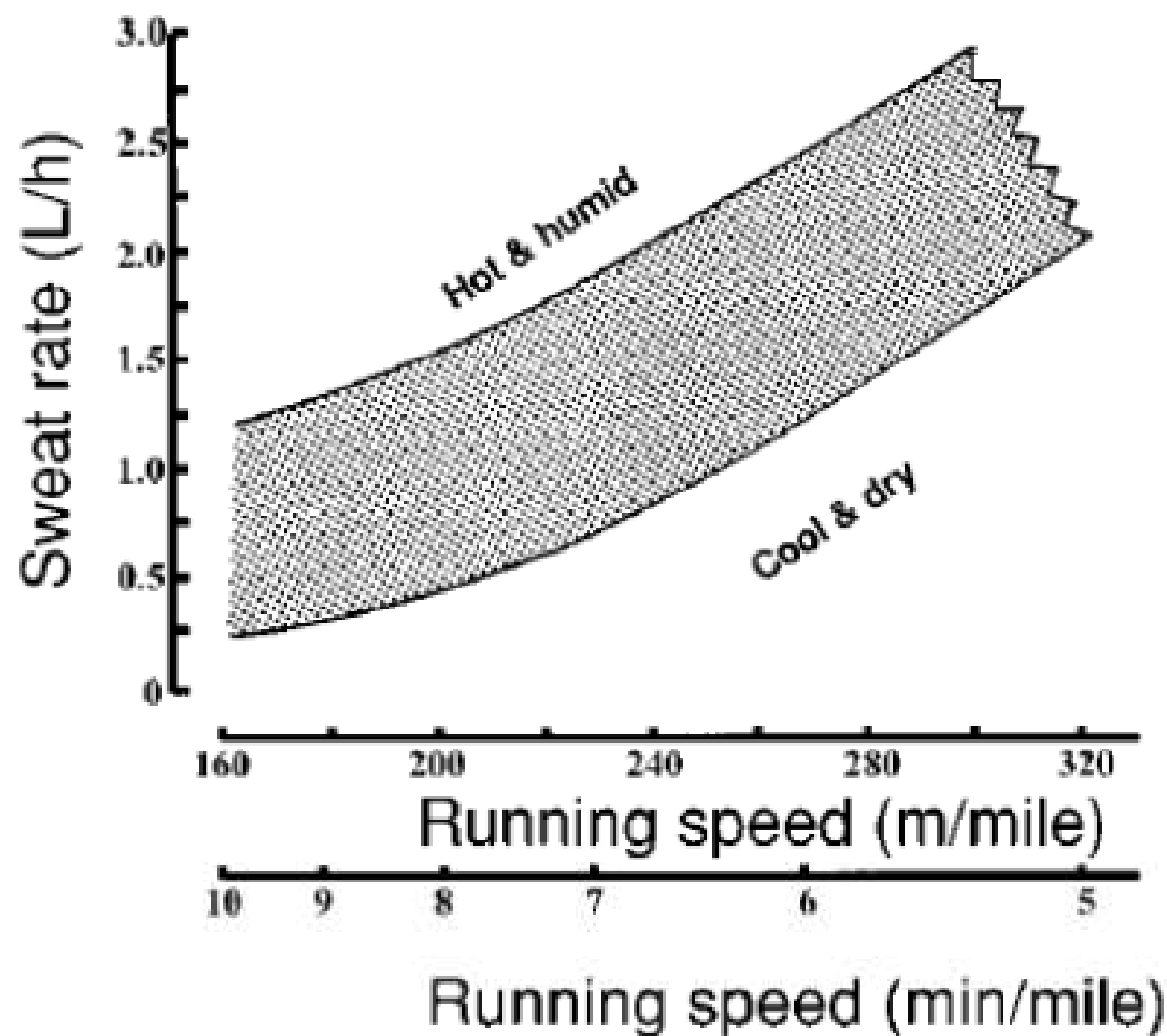
FIGURE 1. An approximation of hourly sweating rates as a function of climate and running speed (7).

Activity (Summer time)	Perspiration Rate (Liters per hour)	Drinking Rate (Liters per hour)
Running	1,5	0,5
Tennis	1,6	1,1
Squash	2,4	1,0
Football	1,5	0,6
Basket-ball	1,4	0,8
Rowing	2,0	1,0
Swimming	0,4	0,4

American College of Sports Medicine.
Position Stand on Exercise and Fluid Replacement
Med. Sci. Sports Exerc. Feb, 1, 2007.

The composition of the consumed fluids can be important. The Institute of Medicine provided general guidance for composition of "sports beverages" for persons performing prolonged physical activity in hot weather (73). They recommend that these types of fluid replacement beverages might contain ~20–30 $meq \cdot L^{-1}$ sodium (chloride as the anion), ~2–5 $meq \cdot L^{-1}$ potassium and ~5–10% carbohydrate (73). The need for these different components (carbohydrate and electrolytes) will depend on the specific exercise task (e.g., intensity and duration) and weather conditions. The sodium and potassium are to help replace sweat electrolyte losses, while sodium also helps to stimulate thirst, and carbohydrate provides energy. These components also can be consumed by nonfluid sources such as gels, energy bars, and other foods.

Beer	Sport Drink
2	13
7	3.6
3.9	6.8

	WATER	BEER	SPORT DRINK				Units
			Brand 1	Light	Generic	Brand 2	
Calories	0.0	43.0	32.0	11.0	27.0	26.0	kcal
From carbohydrates	0.0	14.2	31.6	11.0	26.2	26.0	kcal
From proteins	0.0	1.8	0.0	0.0	0.0	0.0	kcal
From alcohol	0.0	27.0	0.0	0.0	0.0	0.0	kcal
Carbohydrates	0.0	3.9	7.8	3.0	6.8	6.4	G
Glucose & Sucrose	0.0	0.0	6.1	0.0	5.5	5.2	g
Dextrins & trioses	0.0	3.6	0.0	0.0	0.0	0.0	g
Soluble Fibre	0.0	0.3*	0.0	0.0	0.0	0.0	g
Calcium	10.0	4.0	2.0	0.0	1.0	1.0	mg
Magnesium	2.0	6.0 / 9.8*	5.0	1.0	2.0	2.0	mg
Phosphate	0.0	14 / 32*	2.0	9.0	7.0	10.0	mg
Potassium	0.0	27 / 52 *	13.0	10.0	14.0	15.0	mg
Sodium	2.0	4.0	22.0	35.0	30.0	39.0	mg
Selenium	0.0	0.6	0.0	0.1	0.3	0.3	mcg
Fluor	~	44.2	62.0	~	42.4	34.0	mcg
Alcohol	0.0	3.9	0.0	0.0	0.0	0.0	g
Water	100.0	92.0	91.9	96.8	92.9	93.4	g

Table 5. Nutritional content of rehydrating drinks per 100 gr of liquid.

From www.nutritiondata.com. * Values from Sendra & Carbonell, 1999.

	Sodium	Potassium	Chloride	Magnesium	Calcium
Sweat	20-80	5-25	10-70	1-4	3-4
Plasma	135-145	3.5-5	100-110	1.5-2	4.4-5.2
Cell Mass	10	148	2	30-40	0.2

Table 3. Mineral composition of human sweat, plasma and intracellular medium (cell mass) expressed in mmol/l

RESEARCH PROJECT

Suitability of beer as a rehydrating drink after sport practice

Performed by:

1. School of Medicine. University of Granada.
Research Group EFFECTS 262
M.J. Castillo, D. Jimenez Pavón, M. Cervantes Borunda

2. CSIC (National Research Council). Madrid.
Inmunonutrition Group. CSIC.
A. Marcos, J. Romeo, J. Wärnberg, L.E. Díaz

Subjects

- **16 young healthy men**
  - 20 - 30 years old
  - Physically active
  - Non abstemious
  - On mixed diet
  - No toxic habits
  - Without family or personal history of alcohol-related problems

Experimental Design

- Cross-over. Intra-subject
  - (each subject being his own control)

- Previous assessment of:
  - Inclusion/exclusion criteria
  - Aerobic Capacity (Leger-Boucher Test)
  - Instructions for the study

- Each subject performs 2 exercise (dehydrating) tests in random order, two weeks apart:
  - In one occasion receives for rehydration water "ad libitum"
  - In another occasion receives for rehydration 660 ml of beer (common lager, 4.5% alcohol) followed by water "ad libitum"

Pre-Exercise Tests

Exercise

Post-Exercise Tests

REHYDRATION

Post-Rehydration Tests

+

or

Questionnaires	5 min warming-up at 40% MAC	Questionnaires	Quantification of volumes: beer + water ingested and urine produced	Questionnaires
Clinical assessment	60 min Running at 60% MAC	Clinical assessment		Clinical assessment
Body Composition Anthropometry, DEXA, Bioimpedance,	5 min cool-down 30% MAC	Body Composition Anthropometry, DEXA, Bioimpedance,		Body Composition Anthropometry, DEXA, Bioimpedance,
Blood Saliva Urine	Heart Rate & RPE every 10 min	Blood Saliva Urine		Blood Saliva Urine
Psycho-Kinetic Assessment Vienna Test System	**35º C** **60% RH**	Psycho-Kinetic Assessment Vienna Test System		Psycho-Kinetic Assessment Vienna Test System

16/05/2006
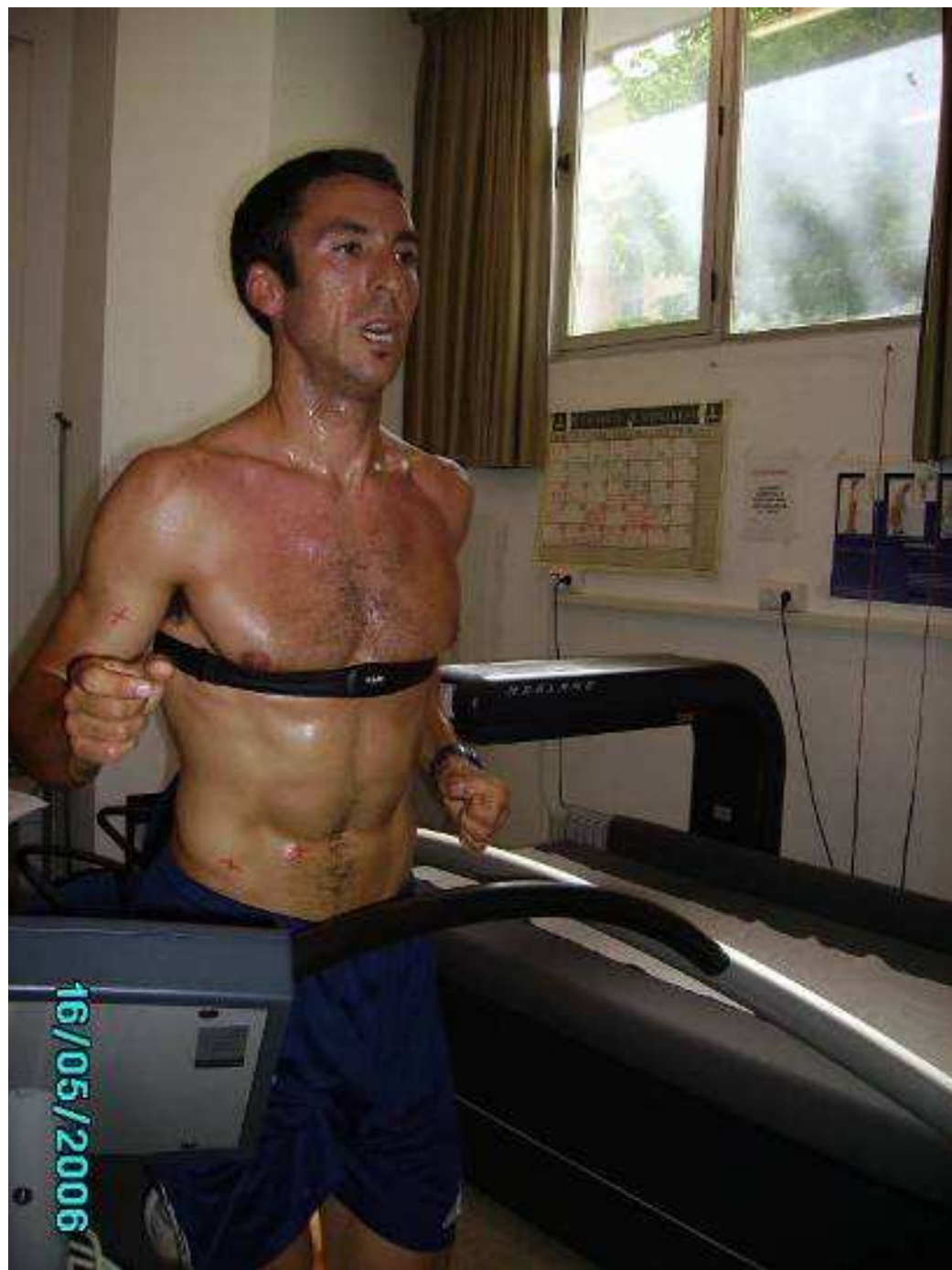
Heart Rate and Rate of Perceived Exertion (RPE) along the Exercise Test

Running Time (min)

Cool-down
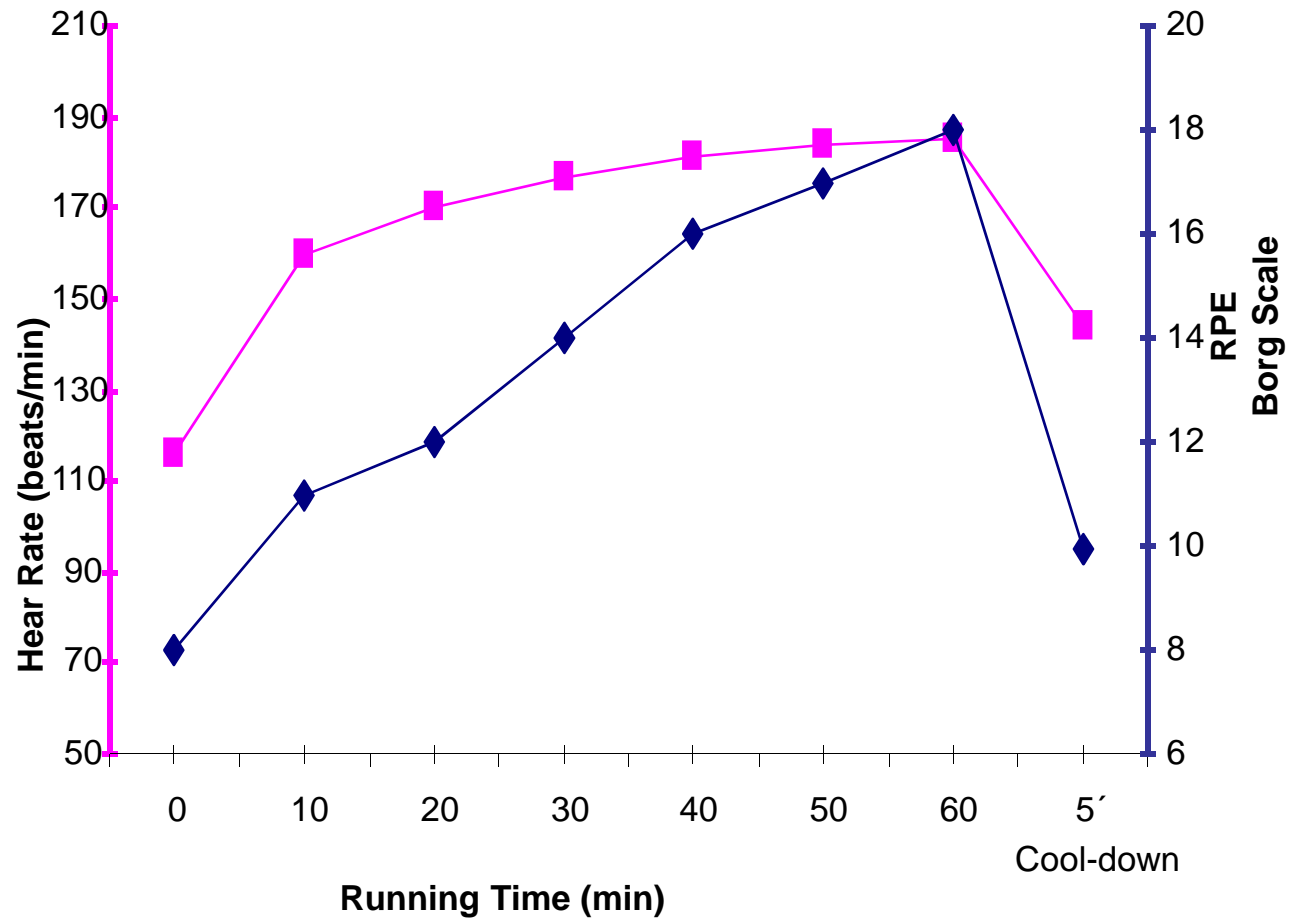
Data are mean of both exercise tests before re-hydration

Body Weight

(kg)

74.5
74.0
73.5
73.0
72.5
72.0
71.5
71.0

Water   Beer

p = 0.23

◆◆◆ ΔΔΔ   ◆◆◆ ΔΔΔ

*** ***

Pre-Exercise   Post-Exercise   Post-Rehydration
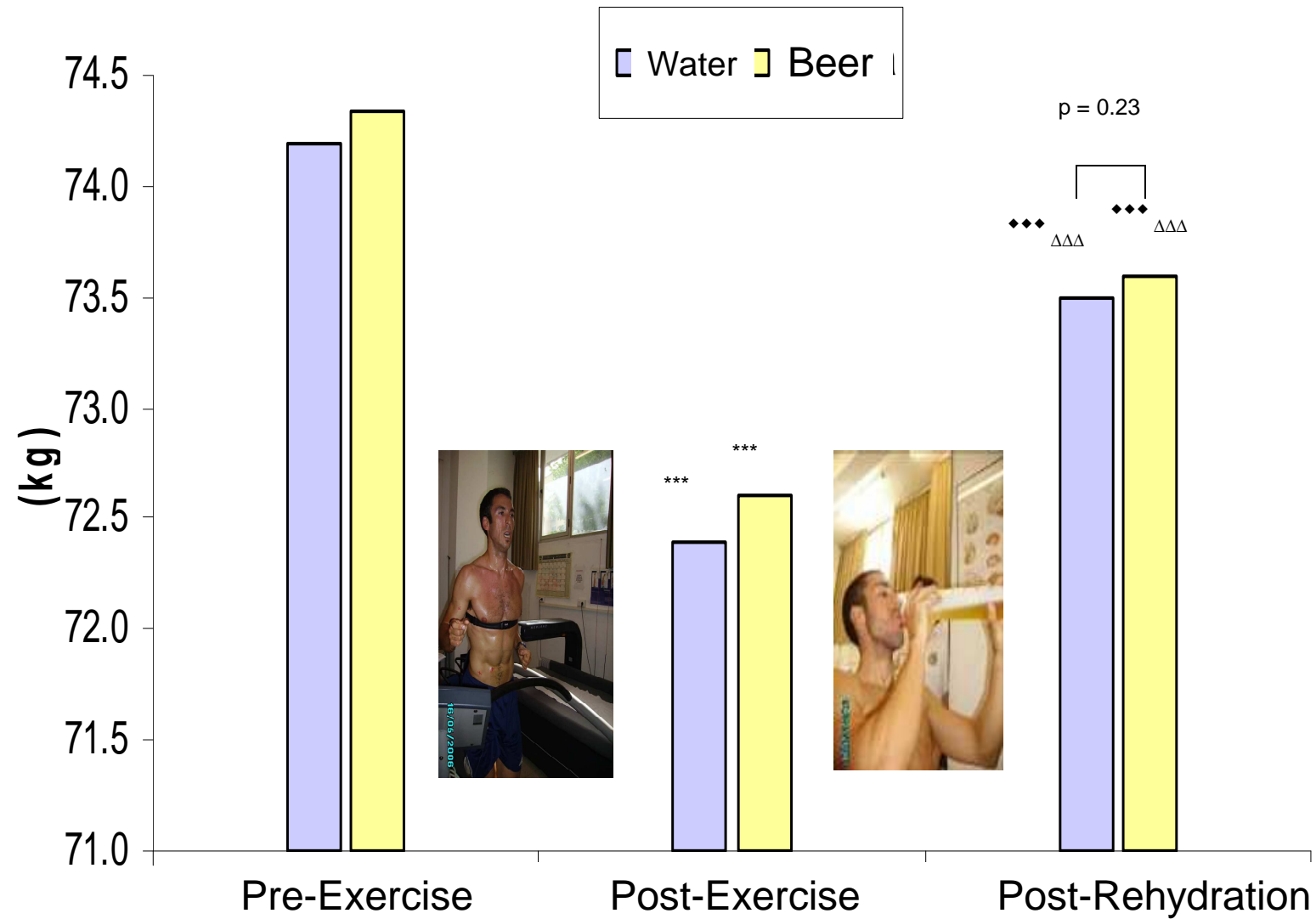
Body Weight (kg)
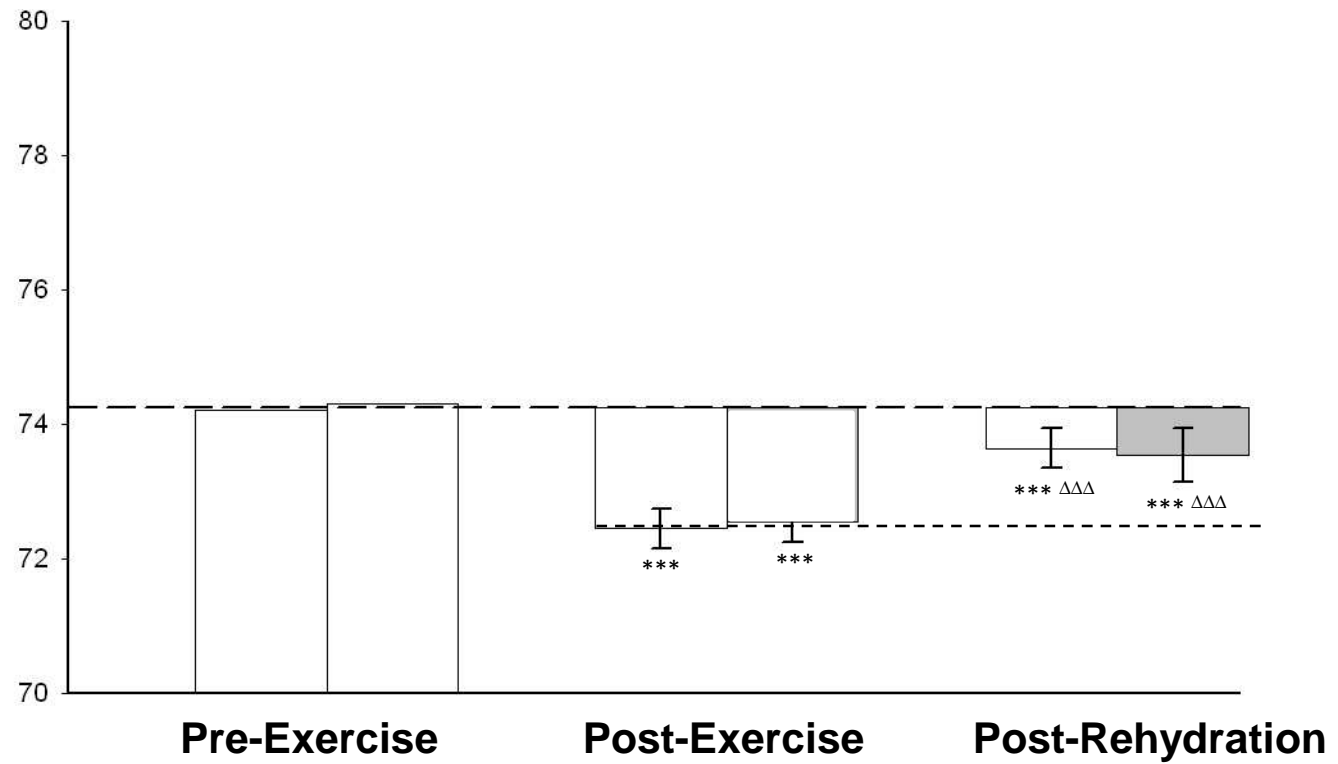
FAT FREE MASS (DEXA)
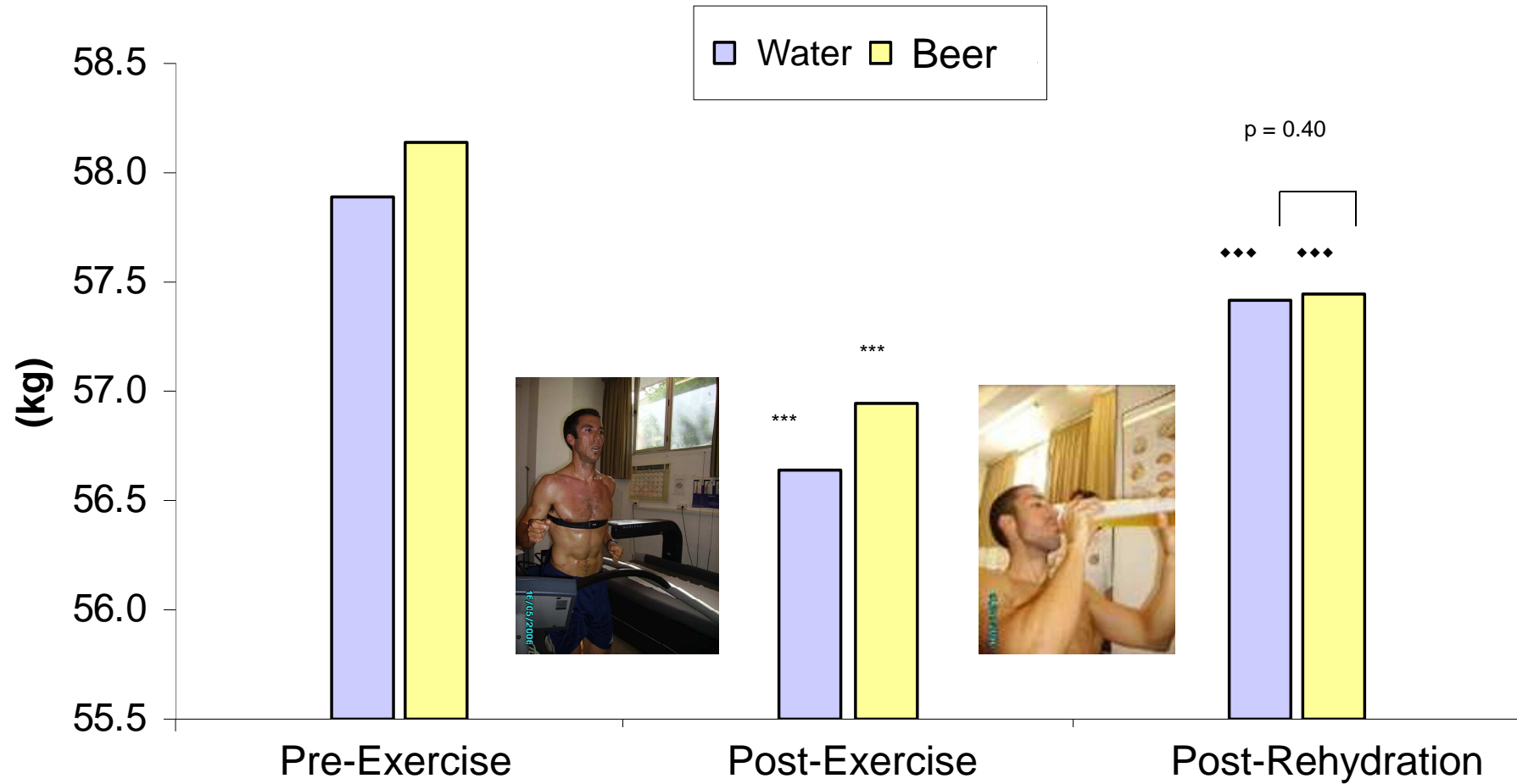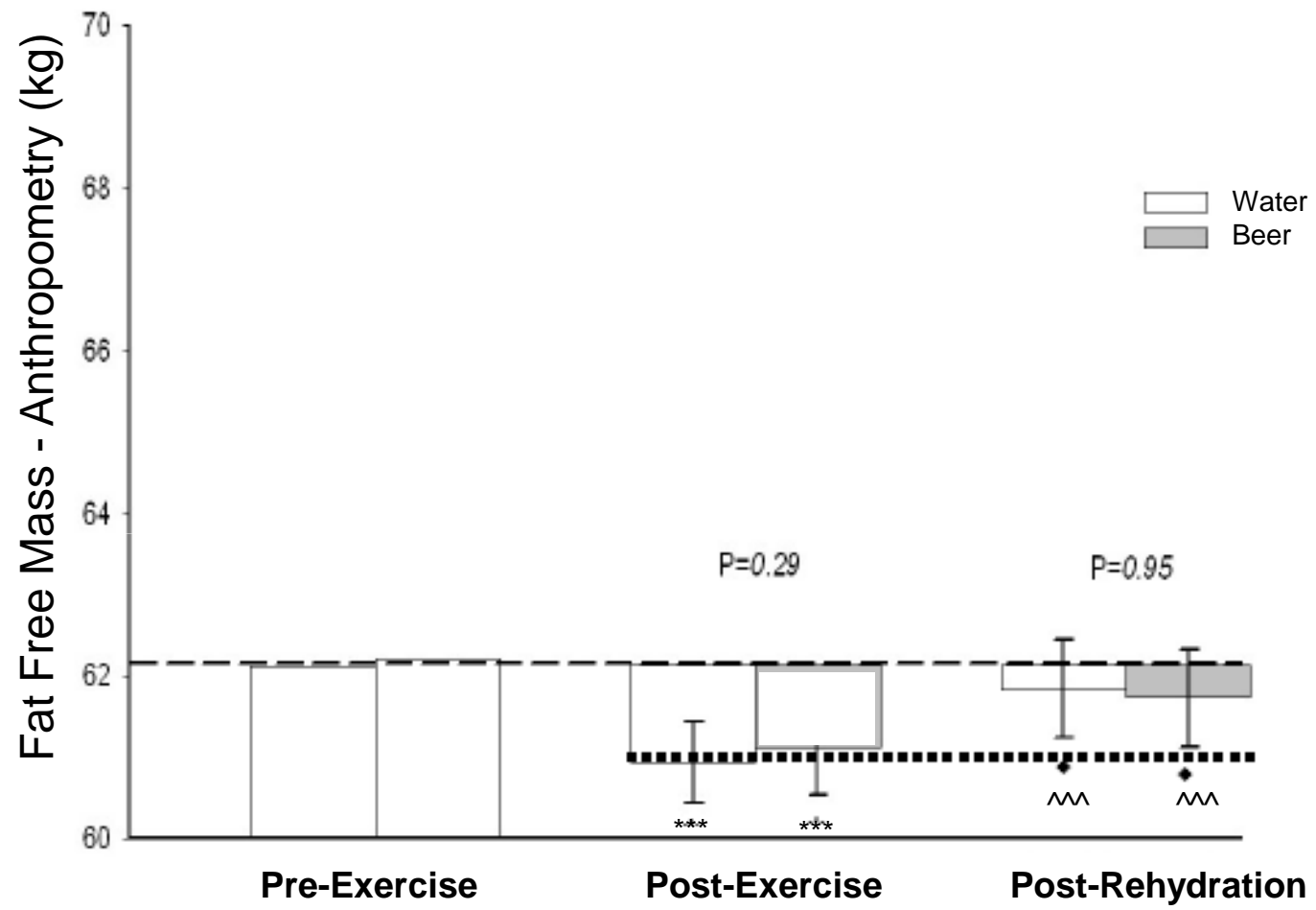
Fluid Balance during Rehydration
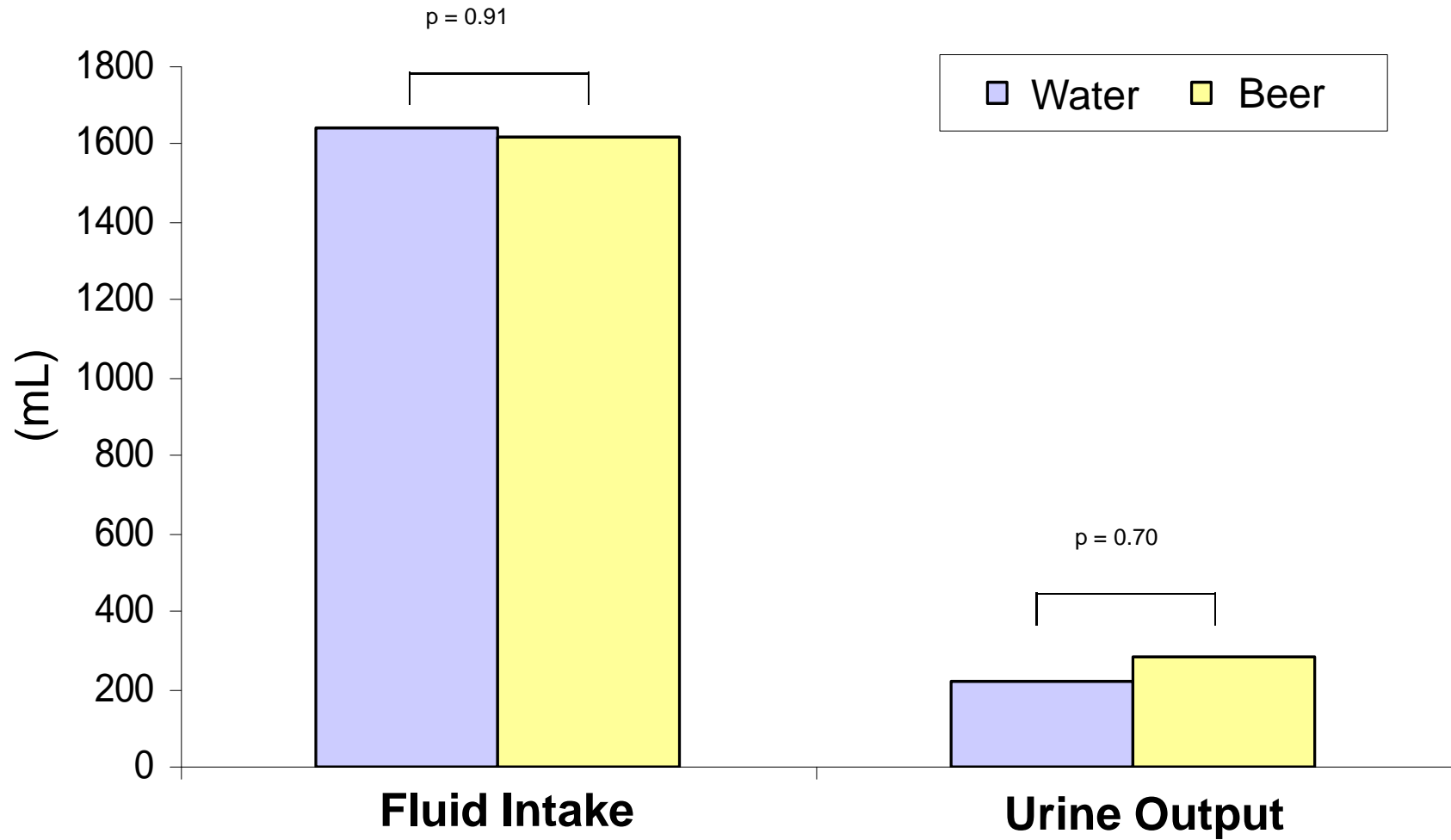
Absolute values of Urinary Excretion (mean ± SD)

|	Urea (g)	Creatinine (g)	Uric Acid (mg)	Potassium (mEq)	Sodium (mEq)	Calcium (mg)	Phosphate (mg)	Chloride (mEq)	Magnesium (mg)
Water	3.4 ± 2.7	0.30 ± 0.16	40 ± 42	9.80 ± 3.70	12 ± 8	20 ± 16	69 ± 82	153 ± 98	8 ± 4
Beer	2.5 ± 1.1	0.25 ± 0.15	39 ± 43	8.33 ± 3.45	13 ± 7	20 ± 10	45 ± 26	154 ± 78	10 ± 5
Water vs Beer	} $p = 0.17$	} $p = 0.14$	} $p = 0.88$	} $p = 0.15$	} $p = 0.67$	} $p = 0.63$	} $p = 0.27$	} $p = 0.84$	} $p = 0.50$

20/04/2006

Changes in Plasma Volume
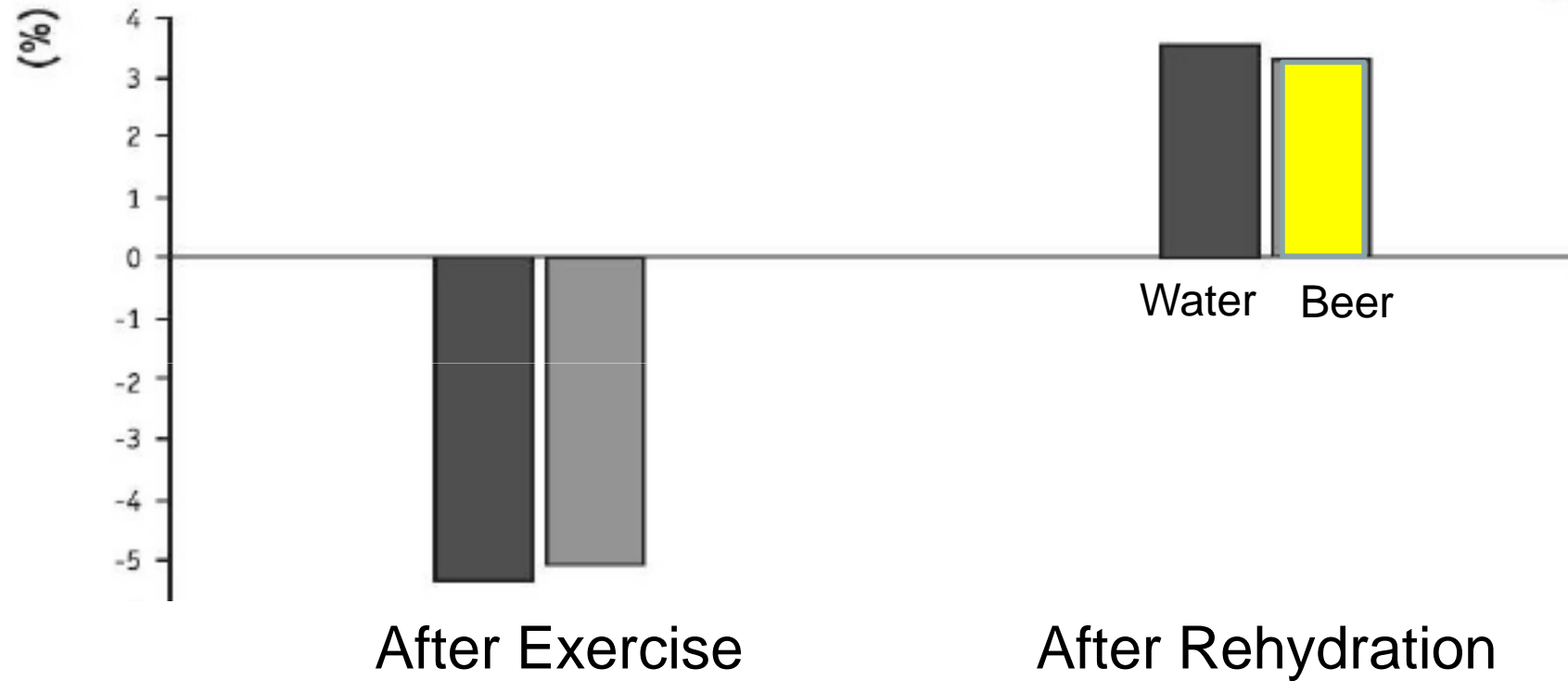
Plasma levels		Pre-Exercise	Post-Exercise	Rehydration	Water vs Beer after Rehydration
Sodium (mEq/l)	Water	138 ± 2	138 ± 2	137 ± 3	} $p = 0.95$
	Beer	138 ± 2	139 ± 3	137 ± 2	
Potassium (mEq/l)	Water	4.6 ± 0.4	4.7 ± 0.4	4.2 ± 0.4^{▯▯}$_{\Delta\Delta\Delta}$	} $p = 0.28$
	Beer	4.7 ± 0.4	4.7 ± 0.3	4.3 ± 0.3^{▯▯}$_{\Delta}$	
Urea (mg/dl)	Water	40 ± 6	47 ± 6***	44 ± 4[▯]$_{\Delta\Delta\Delta}$	} $p = 0.09$
	Beer	39 ± 8	45 ± 7 ***	40 ± 8^{▯▯}	
Creatinine (mg/dl)	Water	1.2 ± 0.1	1.3 ± 0.1 ***	1.2 ± 0.1^{▯▯}$_{\Delta\Delta}$	} $p = 0.25$
	Beer	1.2 ± 0.1	1.3 ± 0.1 ***	1.2 ± 0.1[▯]	
Albumin (g/dl)	Water	4.7 ± 0.3	5.0 ± 0.2 ***	4.9 ± 0.2 $_{\Delta}$	} $p = 0.19$
	Beer	4.6 ± 0.3	4.9 ± 0.3 ***	4.9 ± 0.2 $_{\Delta}$	

GLUCOSE / INSULIN RATIO
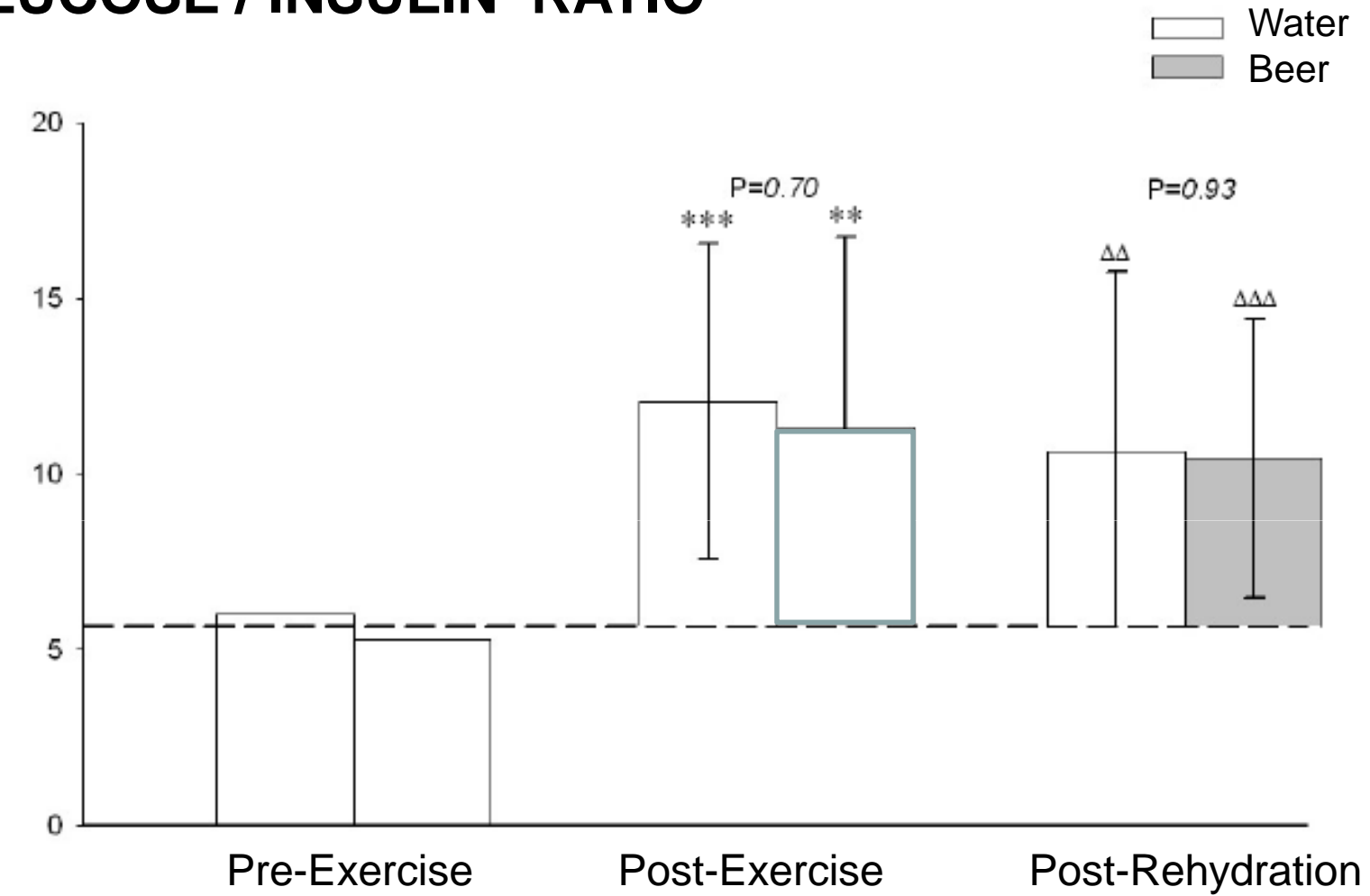
**p≤0,01 y ***p≤0,001 vs pre-exercise
ΔΔp≤0,01 y ΔΔΔp≤0,001
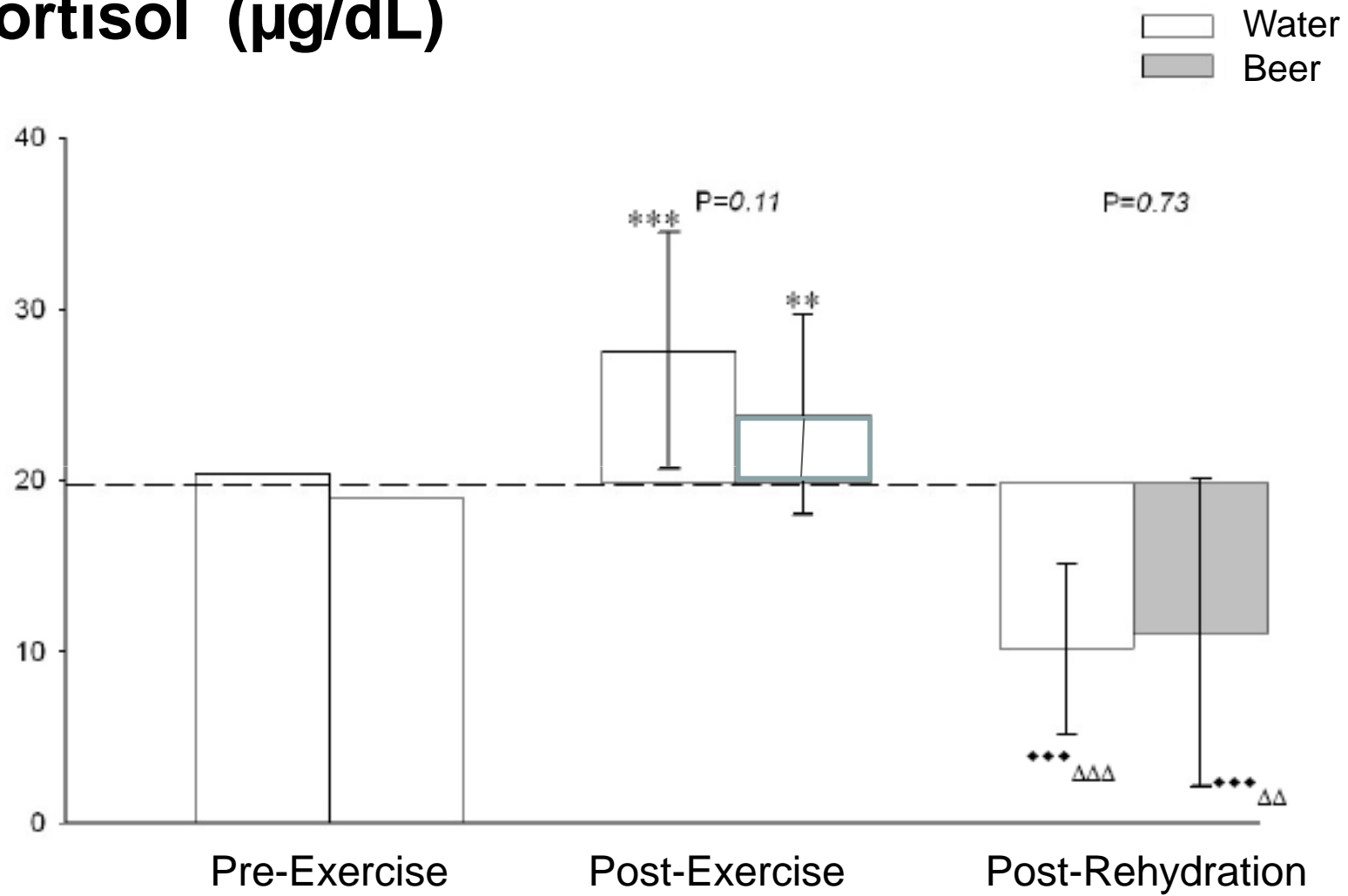
Growth Hormone (ng/mL)
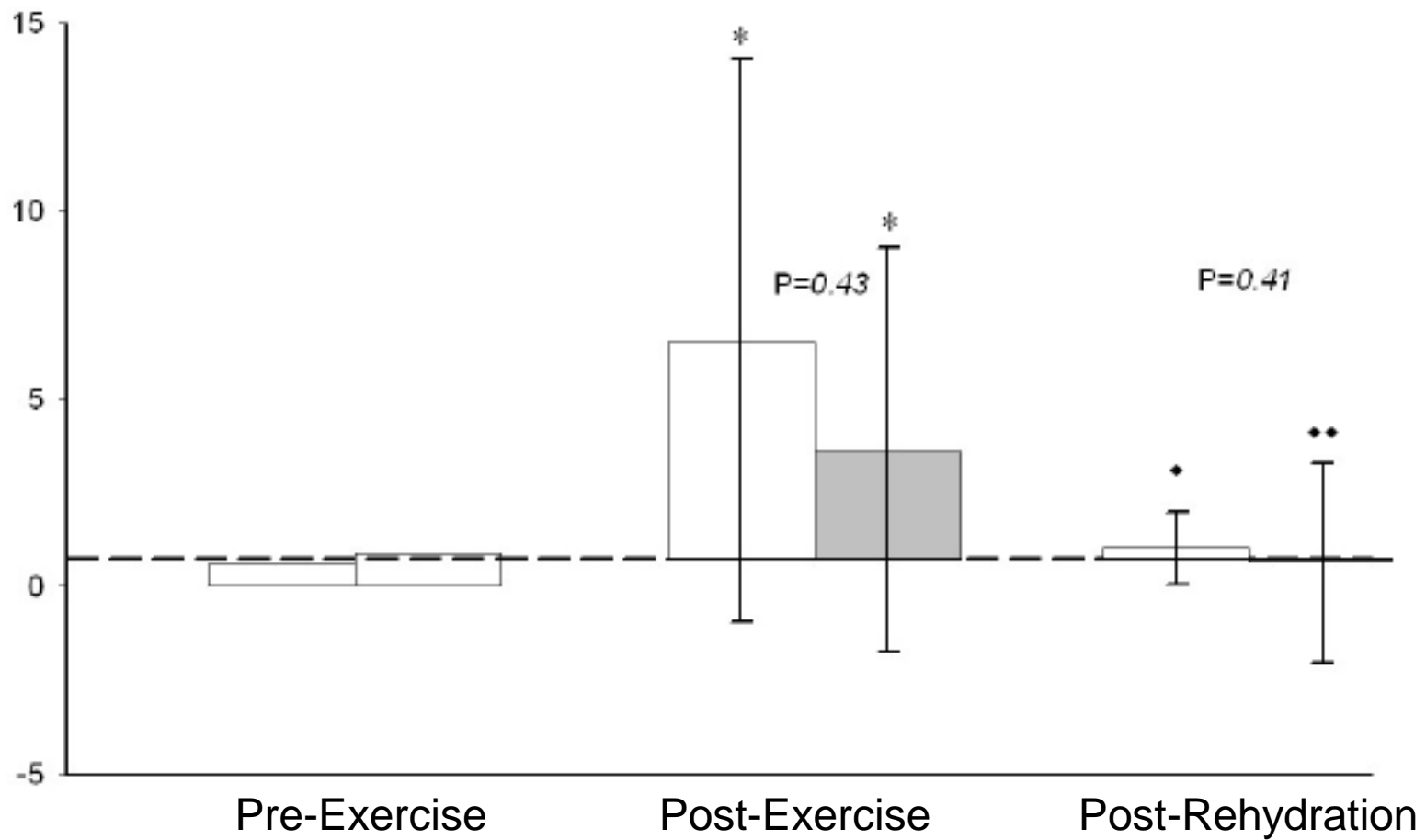
*p≤0,05, **p≤0,01 y ***p≤0,001 vs pre-exercise

⁺p≤0,05, ⁺⁺p≤0,01 y ⁺⁺⁺p≤0,001 vs post-exercise
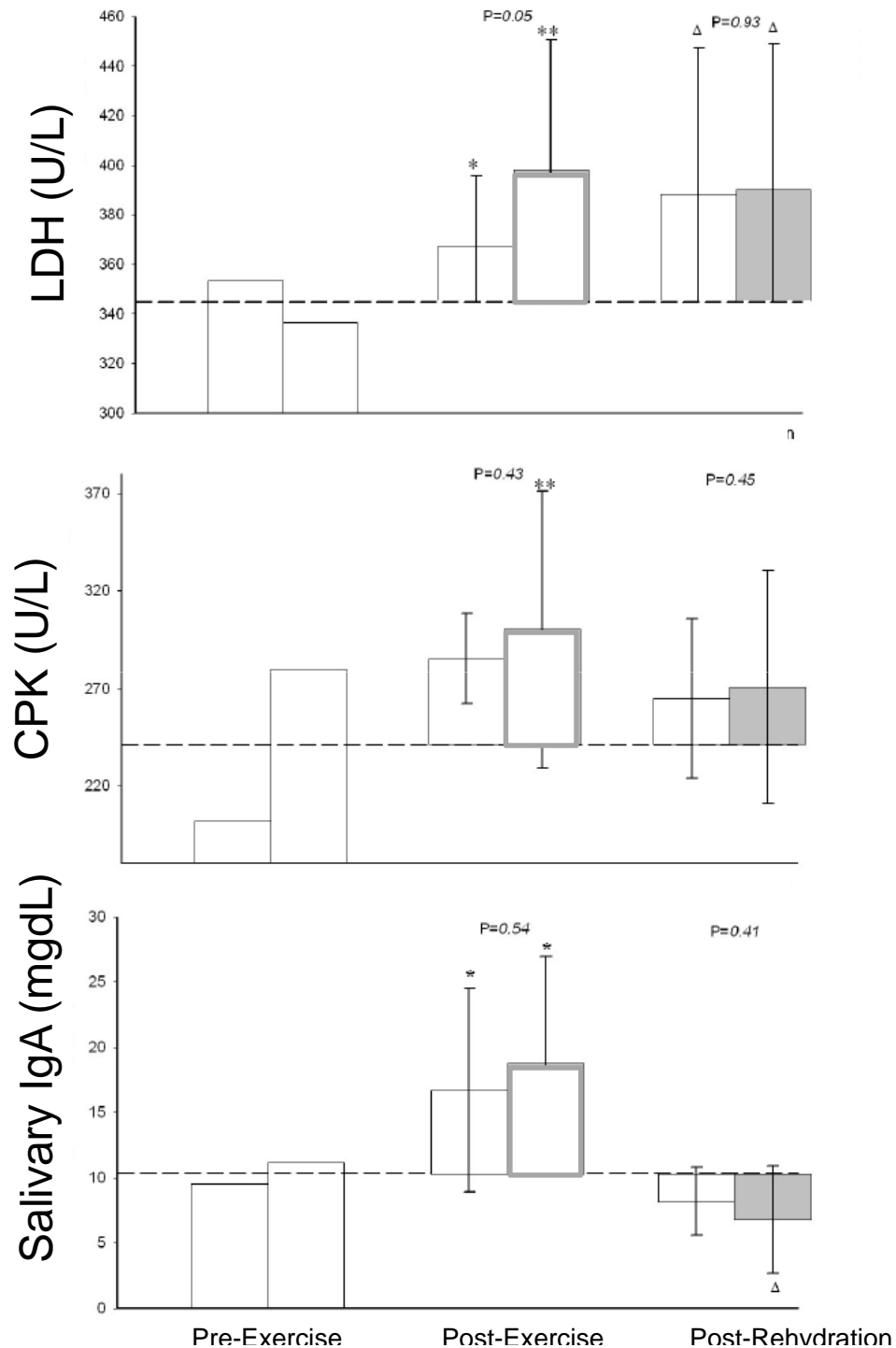
Same for:

- Extended blood cell count

- Extended blood chemistries

- Hydration status tests

- Inflamation and tissue damage

- Hormonal and metabolic tests

- Cytokines

…

More than 100 biological parameters susceptible to be affected by beer consumption

18/04/2006

		Pre-Exercise	Post-Exercise	Rehydration	Water vs Beer after Rehydration
Perception Reaction Time (ms)	W	252 ± 34	251 ± 33	263 ± 38	} *p = 0.49*
	B	268 ± 51	269 ± 53	268 ± 54	
Choice Reaction Time (ms)	W	383 ± 71	358 ± 61	378 ± 73	} *p = 0.24*
	B	389 ± 83	371 ± 73	380 ± 87	
Multiple Stimuli Test Duration (Min)	W	15.2 ± 1.1	14.4 ± 0.8**	14.2 ± 0.9 $_\Delta$	} *p = 0.95*
	B	14.9 ± 0.7	14.6 ± 0.8*	13.9 ± 0.6 $^{▯}{}_{\Delta\Delta\Delta}$	
Multiple Stimuli Test Reaction Time (ms)	W	654 ± 60	619 ± 60 ***	605 ± 51 $^{▯}{}_{\Delta\Delta\Delta}$	} *p = 0.13*
	B	652 ± 47	627 ± 51 **	612 ± 44 $^{▯}{}_{\Delta\Delta\Delta}$	
Multiple Stimuli Test Total answers (over 540)	W	548 ± 10	550 ± 10	547 ± 6	} *p = 0.74*
	B	544 ± 12	551 ± 26	548 ± 8	
Multiple Stimuli Test Wrong answers	W	16 ± 11	17 ± 8	13 ± 7	} *p = 0.96*
	B	14 ± 16	13 ± 5	11 ± 8	
Multiple Stimuli Test Answers within Time	W	524 ± 14	525 ± 10	531 ± 7	} *p = 0.49*
	B	522 ± 18	525 ± 11	531 ± 7	
Multiple Stimuli Test Correct answers	W	533 ± 6	532 ± 7	535 ± 5	} *p = 0.24*
	B	529 ± 5	531 ± 7	535 ± 4	

Peripheral Perception Test		Pre-Exercise	Post-Exercise	Rehydration	Water vs Beer after Rehydration
Duration (min)	W	7.9± 1.1	6.9 ± 0.9 **	7.1 ± 2.2	} p = 0.29
	B	7.5 ± 0.8	6.9 ± 0.7 *	7.9 ± 4.4	
Visual Field (Degrees)	W	175 ± 9	171 ± 7	172 ± 6	} p = 0.60
	B	178 ± 7	174 ± 6	172 ± 5	
Left Visual Angle (º)	W	93 ± 6	92 ± 4	91 ± 4	} p = 0.11
	B	94 ± 5	92 ± 4	91 ± 4	
Right Visual Angle (º)	W	82 ± 5	79 ± 5	80 ± 4	} p = 0.83
	B	83 ± 4	82 ± 4	81 ± 3	
Missed Peripheral Stimuli	W	8 ± 5	8 ± 6	7 ± 6	} p = 0.98
	B	7 ± 5	6 ± 6	5 ± 6	
Reaction Time (ms)	W	656 ± 75	609 ± 60	617 ± 67	} p = 0.50
	B	636 ± 65	597 ± 52	619 ± 50	

de
INVESTIGACIÓN / RESEARCH   from GRANADA

a

PRÁCTICA / PRACTICE   PHILADELPHIA

EFFECTS 262   Fishtown Beer Runners

http://www.ugr.es/~cts262/   http://fishtownbeerrunners.blogspot.com/   FBR

Salón de Grados
Facultad Ciencias Actividad Física y Deporte
26 Mayo 2011

9:30-11:00

Lectura y Defensa de la Tesis Doctoral:
LA CERVEZA COMO BEBIDA REHIDRATANTE DESPUÉS DEL EJERCICIO
Efectividad y seguridad para el consumidor
PhD Dissertation:
REHYDRATION WITH BEER AFTER EXERCISE
Effectiveness and safety for consumers
Mónica Cervantes. Universidad de Granada y Universidad de Chihuahua, Mexico

11:30-12:30

Del deporte a la investigación. De la investigación a la práctica
Manuel J Castillo. Facultad de Medicina. Granada
Del baloncesto a la salud. De la salud al bienestar
Juan Antonio Corbalán. Deportista y Médico. Madrid
Responsible running and drinking in the interest of health
David April. Fishtown Beer Runners. Philadelphia

12:30 -13:30

Poniendo en práctica la investigación:
Carrera saludable desde FCCAyD al Mirador de San Nicolás
Recuperación con cerveza en Restaurante Huerto de Juan Ranas. Albaycín

Contact: mmcuenca@ugr.es Phone: +34 649440850 Tlfno: 627 704922

RUN !
ENJOY !
BE HAPPY !!!