NUTRITION FOUNDATION
OF ITALY

12.00 *Il miele e lo sport*
Michelangelo Giampietro
Scuola dello Sport, CONI di Roma

Seminario

IL MIELE: TRA NUTRIZIONE E SALUTE

Milano, Mercoledì 9 novembre 2016

Il miele è un alimento e "integratore" adatto e utile per tutti gli sportivi

Componenti Alimentari	Valore
Contenuti in 100 g / unità	
COMPONENTI PRINCIPALI	
Parte edibile, %	**100**
Energia, ricalcolata, kJ	**1295**
Energia, Ric con fibra, kJ	**1295**
Energia, ricalcolata, kcal	**304**
Energia, Ric con fibra, kcal	**304**
Proteine totali, g	**0,6**
Proteine animali, g	**0,0**
Proteine vegetali, g	**0,6**
Lipidi totali, g	**0,0**
Lipidi animali, g	**0,0**
Lipidi vegetali, g	**0,0**
Colesterolo, mg	**0**
Carboidrati disponibili (MSE), g	**80,3**
Amido (MSE), g	**0,0**
Carboidrati solubili (MSE), g	**80,3**
Fibra alimentare totale, g	**0,0**
Alcol, g	**0,0**
Acqua, g	**18,0**
MINERALI ed ELEMENTI IN TRACCIA	
Ferro, mg	**0,5**
Calcio, mg	**5**
Sodio, mg	**11**
Potassio, mg	**51**
Fosforo, mg	**6**
Zinco, mg	**0,90**

BDA
BANCA DATI DI COMPOSIZIONE DEGLI ALIMENTI PER STUDI EPIDEMIOLOGICI IN ITALIA

VITAMINE IDROSOLUBILI	
Vitamina B1, Tiamina, mg	**tr**
Vitamina B2, Riboflavina, mg	**0,04**
Vitamina C, mg	**1**
Niacina, mg	**0,30**
Vitamina B6, mg	**0,02**
Folati totali, µg	**2**
VITAMINE LIPOSOLUBILI	
Retinolo equivalente	
Retinolo eq. (RE), µg	**0**
Retinolo, µg	**0**
ß-carotene eq., µg	**0**
Vitamina E (ATE), mg	**0,00**
Vitamina D, µg	**0,00**
ACIDI GRASSI	
Acidi grassi saturi totali, g	**0,00**
Acidi grassi monoinsaturi totali, g	**0,00**
Acido oleico, g	**0,00**
Acidi grassi polinsaturi totali, g	**0,00**
Acido linoleico, g	**0,00**
Acido linolenico, g	**0,00**
Altri acidi grassi polinsaturi, g	**0,00**

AMERICAN COLLEGE of SPORTS MEDICINE

Dietitians of Canada
Les diététistes du Canada

eat right. American Dietetic Association

AMERICAN COLLEGE OF SPORTS MEDICINE · FOUNDED 1954 ·

Nutrition and Athletic Performance

JOINT POSITION STATEMENT

The fundamental differences between an athlete's diet and that of the general population are that athletes require **additional fluid** to cover sweat losses and **additional energy to fuel physical activity**. As discussed earlier, it is appropriate for much of the **additional energy to be supplied as carbohydrate**. The proportional increase in energy requirements seems to exceed the proportional increase in needs for most other nutrients.

Med Sci Sports Exerc. **2009 Mar**; 41(3):709-31
JADA **2009 Mar**; 109 (3): 509-527.

AMERICAN COLLEGE of SPORTS MEDICINE

eat right® Academy of Nutrition and Dietetics

Dietitians of Canada
Les diététistes du Canada

AMERICAN COLLEGE of SPORTS MEDICINE

ACADEMY OF NUTRITION AND DIETETICS
DIETITIANS OF CANADA

JOINT POSITION STATEMENT

Nutrition and Athletic Performance

POSITION STATEMENT

It is the position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine that the performance of, and recovery from, sporting activities are enhanced by well-chosen nutrition strategies. These organizations provide guidelines for the appropriate type, amount and timing of intake of food, fluids and dietary supplements to promote optimal health and sport performance across different scenarios of training and competitive sport.

Med Sci Sports Exerc. **2016 Mar**; 48(3):543-68

Apporto giornaliero di carboidrati in relazione alle ore settimanali di allenamento.

Med Sci Sports Exerc. **2016 Mar**; 48(3):543-68

CARICO di ALLENAMENTO (ore/settimana)	**APPORTO GLUCIDICO GIORNALIERO (g/kg p.c.d./die)**
Attività fisica minima	2-3
Attività fisica leggera, di bassa intensità (3-5 ore/settimana)	3-5
Programma di intensità moderata (5-7 ore/settimana ≈ 1 ora al giorno)	5-7
Programmi di "endurance" di moderata/alta intensità (7-21 ore/sett = 1-3 ore al giorno)	**6-10**
Impegno estremo (>4-5 ore/gg, di moderata/alta intensità)	8-12
Preparazione maratona (36-48 h prima)	10-12

A Step Towards Personalized Sports Nutrition: Carbohydrate Intake During Exercise

Asker Jeukendrup

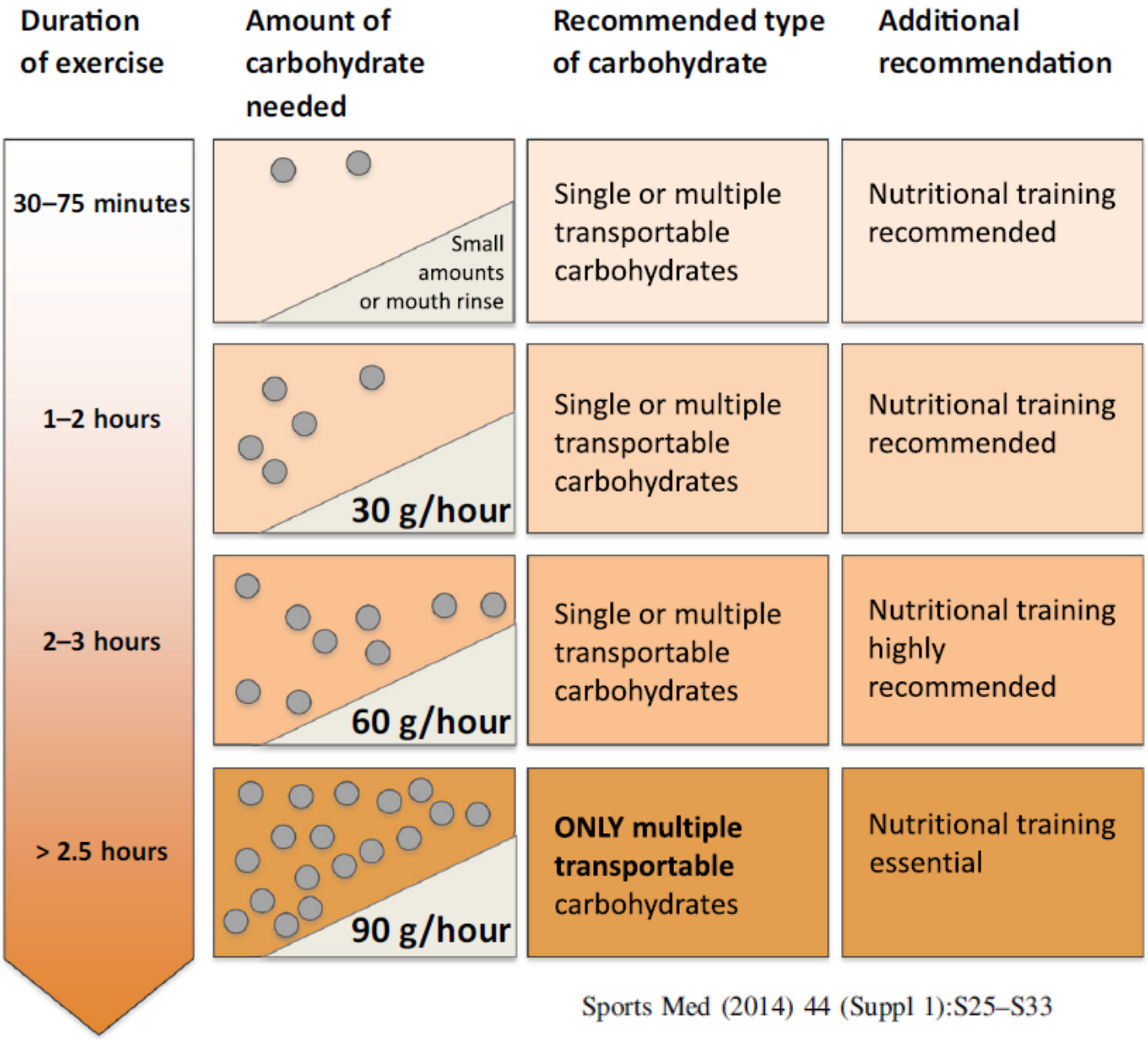


Fig. 1 The new carbohydrate intake guidelines. Carbohydrate intake recommendations during exercise depend on the duration of exercise. In general, carbohydrate intake recommendations increase with increasing duration. The type of carbohydrate may also vary as well as recommendations for nutritional training. These recommendations are for well trained athletes. Aspiring athletes may need to adjust these recommendations downwards

Sports Med (2014) 44 (Suppl 1):S25–S33

Fueling During Exercise

This fueling opportunity is the well-planned "pit stop." The fuel should be simple, easily digestible carbohydrates that the body needs to maintain energy and prevent fatigue.

Fuel every 45-60 minutes during a long workout. ACSM guidelines recommend 30-60 grams of carbohydrate (120-240 calories) per hour. Remember that for optimal performance, we also need to provide the body with fluids and electrolytes. If the workout is less than 90 minutes, but at a high intensity, you may want to drink an energy drink instead of water or bring an energy gel with you.

During endurance exercise, drink 6-12 oz. of sports drink or water every hour.

Mid-exercise foods can include:

- Gels
- Energy beans
- Energy beverages
- **HONEY**
- Bananas
- Oranges

Fall 2008

AMERICAN COLLEGE OF SPORTS MEDICINE

ACSM FIT SOCIETY® PAGE

THE ATHLETE'S KITCHEN

Nutrition News from ACSM

By Nancy Clark, R.D., FACSM

- Natural sports snacks, like a granola bar or banana, offer a variety of sugars, but engineered foods might offer just one type of sugar. Because different sugars use different transporters to get into muscle cells, eating a variety of sugars enhances energy availability. In a 62-mile (100 km) time trial, cyclists who consumed two sugars (glucose + fructose) completed the course in 204 minutes; those who had just glucose took 16 additional minutes. The bottom line: eat a variety of foods with a variety of sugars during endurance exercise, such as sports drinks, tea with honey, gummi bears…
- milks, more so than water, sports drinks or watery chocolate drinks. Chocolate milk is familiar, readily available, and tastes good!
- How long do elite soccer players need to recover from a game? In one study, they needed five days for sprinting ability to return to pre-game level. That's four days longer than most athletes allow…
- How many calories does a triathlete burn during the Hawaii Ironman competition?
- vitamins via healthy foods.
- The "freshman 15" gained in the first year of college may be an exaggeration. Among a group of 40 female college freshman, half gained and half lost weight (~4 to 5 pounds) Excess calories from specialty coffees and soda contributed to the weight gain. Watch out for liquid calories!
- If kids are going to play video games, they might as well play active ones, such as Wii

. . . eat a variety of food with a variety of sugars during endurance exercise, such as sports drinks,

tea with honey,

gummi bears

6 grammi di miele = 4,8 g CHO = 18,24 kcal

100 g di miele = 80,3 g CHO = 304 kcal

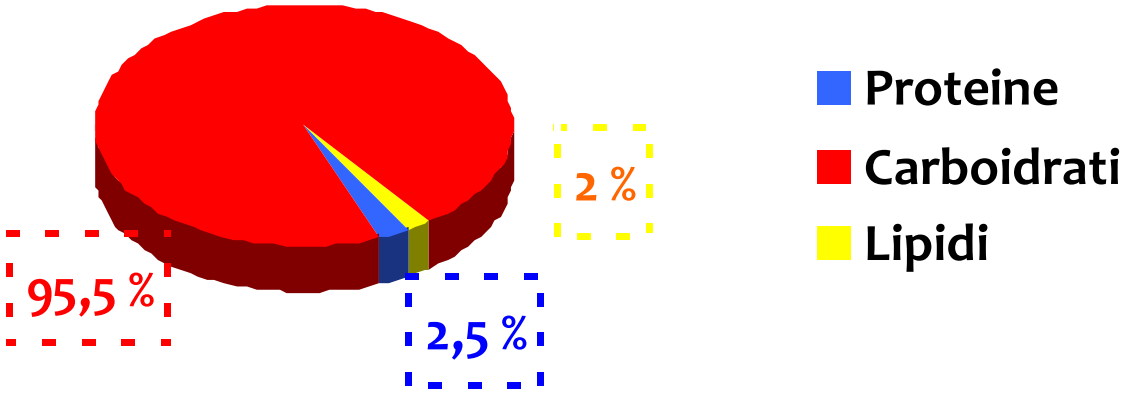
- 250 ml di succo di frutta (albicocca)

oppure 39 grammi di miele

- 750 ml di acqua

- 1 g (max 2 g) di sale

118 kcal per litro di bevanda



Asian J Sports Med. 2015 September; 6(3): e24044. DOI: 10.5812/asjsm.24044

Published online 2015 September 28. **Research Article**

Effects of Post-Exercise Honey Drink Ingestion on Blood Glucose and Subsequent Running Performance in the Heat

Nur Syamsina Ahmad,[1] Foong Kiew Ooi,[1,*] Mohammed Saat Ismail,[2] and Mahaneem Mohamed[3]

Background: Glycogen depletion and hypoglycemia have been associated with fatigue and decrement of performance during prolonged exercise

Objectives: This study investigated the effectiveness of Acacia honey drink as a post-exercise recovery aid on glucose metabolism and subsequent running performance in the heat.

Patients and Methods: Ten subjects participated in this randomized cross-over study. All subjects performed 2 trials. In each trial, all subjects went through a glycogen depletion phase (Run-1), 2-hour rehydration phase and time trial running phase (Run-2). In Run-1, subjects were required to run on a treadmill at 65% VO_{2max} in the heat (31°C, 70% relative humidity) for 60 min. During 2-hour rehydration phase, subjects drank either plain water (PW) or honey drink (HD) with amount equivalent to 150% of body weight loss in 3 boluses (60%, 50% and 40% subsequently) at 0, 30 and 60 min. In Run-2, the longest distance covered in 20 min was recorded for determining running performance. Two-way repeated measured ANOVA and paired t-test were used for analysis.

Results: Running distance in Run-2 covered by the subjects in the honey drink HD trial (3420 ± 350 m) was significantly ($P < 0.01$) longer compared to plain water PW trial (3120 ± 340 m). In general, plasma glucose, serum insulin and osmolality were significantly ($P < 0.05$) higher in HD compared to PW during the rehydration phase and Run-2.

Conclusions: These findings indicate that rehydration with honey drink improves running performance and glucose metabolism compared to plain water in the heat. Thus, honey drink can be recommended for rehydration purpose for athletes who compete in the heat.

10 soggetti: corsa 5’ al 50 % VO_2 max + 60’ al 65 % + 5’ al 50 %

Honey drink (6,8% CHO) compared to plain water in the heat (31°C e 70% umidità relativa) 2 ore riposo/reidratazione = 150% peso perso

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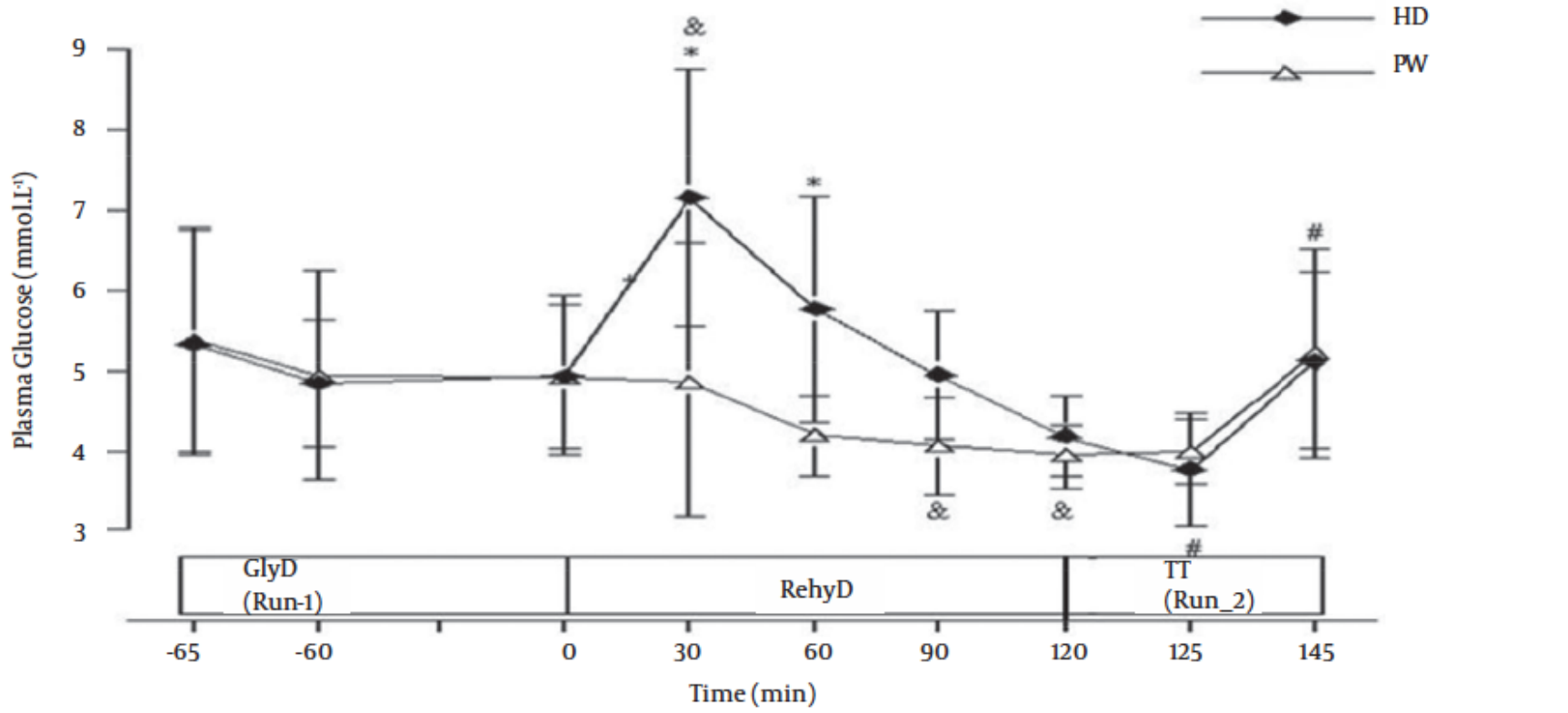
Figure 2. Plasma Glucose Concentration (mmol.L-1) During Run-1, Rehydration and Run-2 of Plain Water (PW) and Honey Drink (HD) Trials (Mean ± SD)



GlyD, glycogen depletion phase; RehyD, rehydration phase; TT, time trial phase; [&] $P < 0.05$ compared to respective end of Run-1; [#] $P < 0.05$ compared to respective end of rehydration phase; [*] $P < 0.05$ compared to corresponding time in PW trial; plasma glucose was significantly higher ($P < 0.05$) than respective end of Run-1 in HD at 30 min of rehydration phase; plasma glucose concentrations in PW were significantly lower ($P < 0.05$) than respective end of Run-1 at 90 minutes and end of rehydration phase.

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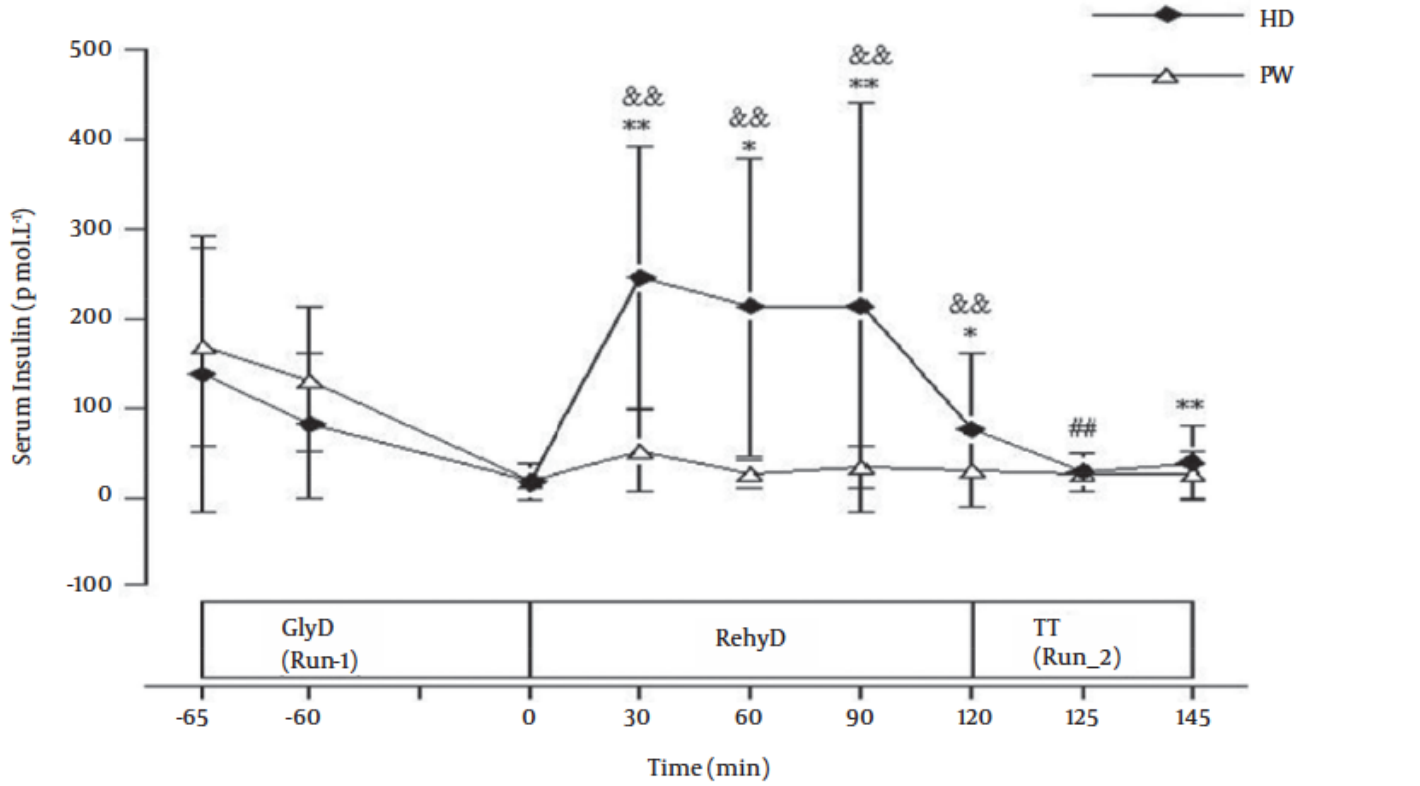
Figure 3. Serum Insulin Concentration (pmol.L-1) During Run-1, Rehydration, and Run-2 of Plain Water (PW) and Honey Drink (HD) Trials (Mean ± SD)



GlyD, glycogen depletion phase; rehyD, Rehydration phase; TT, time trial phase; $^{\&\&}$ $P < 0.01$ compared to respective end of Run-1; $^{\#\#}$ $P < 0.01$ compared to respective end of rehydration phase; *,** $P < 0.05$ and $P < 0.01$ compared to corresponding time in PW trial; In HD, serum insulin levels at 30, 60, 90 and 120 min of rehydration phase were significantly higher ($P < 0.01$) than the value at the end of Run-1, and also, significantly higher ($P < 0.05$) than PW trial at corresponding times.

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. Thus, Acacia honey drink can be recommended as an ergogenic aid for rehydration purposes in athletes who train and compete in the heat. Nevertheless, further study with urine analysis for confirming the rehydration status of the subjects is warranted. In addition, comparison between honey drink with another drink containing carbohydrate in their effects on sports performance is proposed to be carried out as our future study.

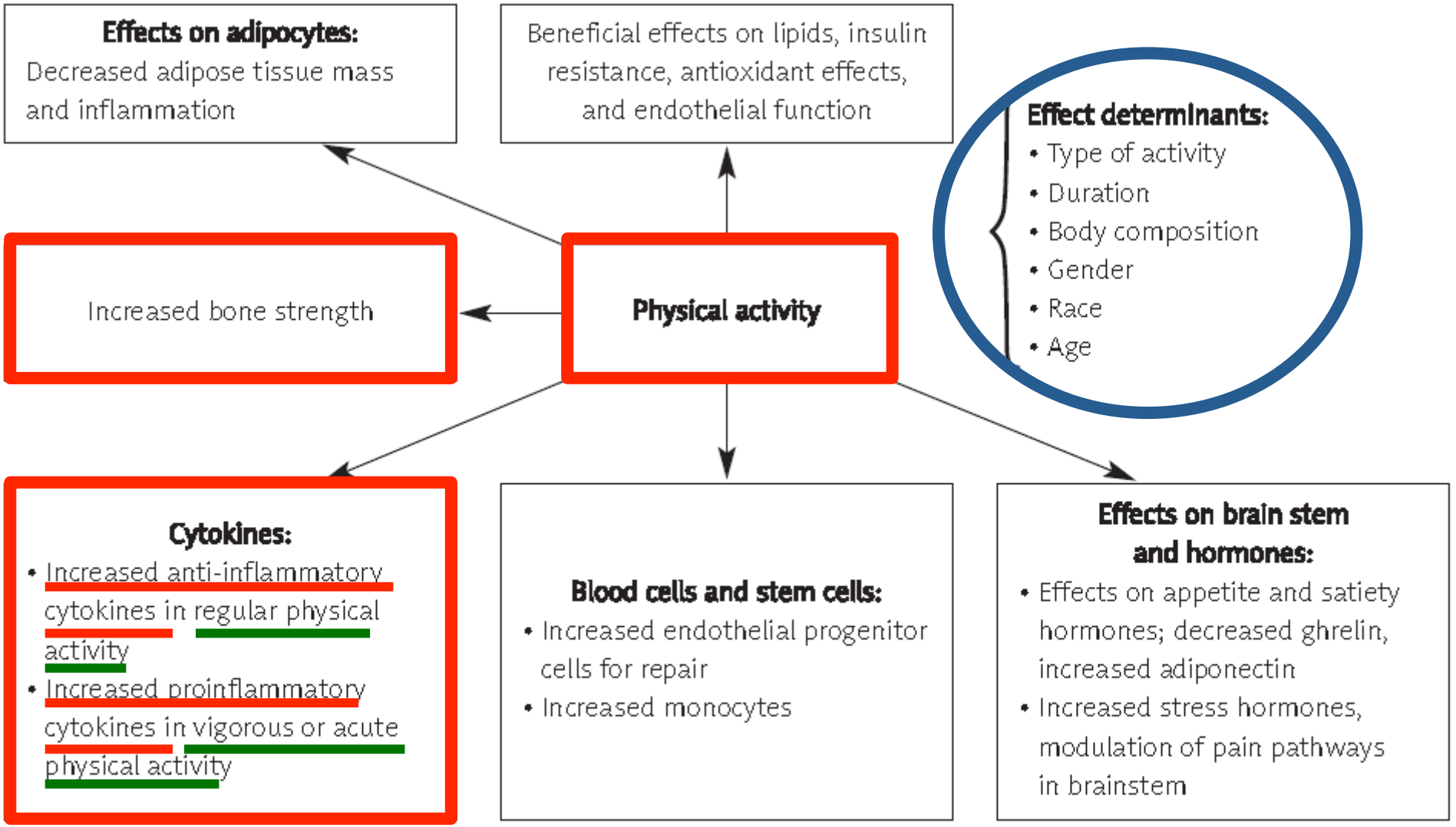


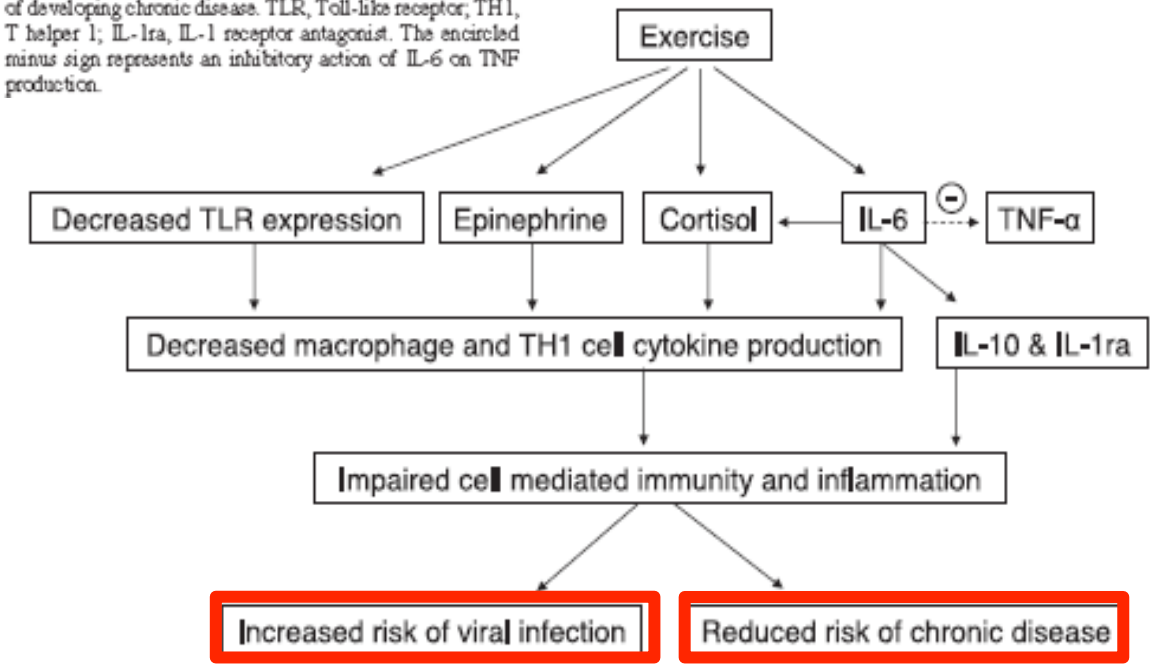
Figure 1. Systemic effects of physical activity and main determinants

Sibel Ertek[1], Arrigo Cicero[2]

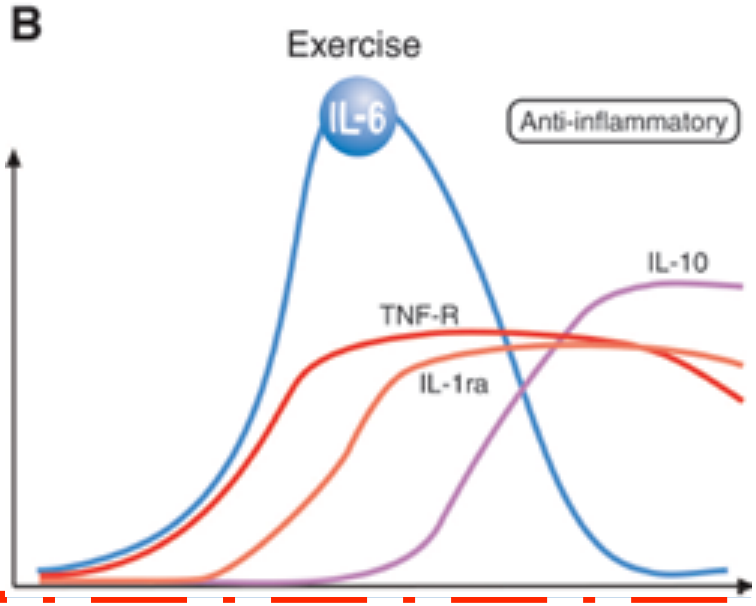
Arch Med Sci 5, October / 2012

Fig. 1. Possible mechanisms by which exercise increases susceptibility to infection but reduces inflammation and risk of developing chronic disease. TLR, Toll-like receptor; TH1, T helper 1; IL-1ra, IL-1 receptor antagonist. The encircled minus sign represents an inhibitory action of IL-6 on TNF production.

IMMUNE FUNCTION IN SPORT AND EXERCISE



Gleeson M " Immune function in sport and exercise " (2007) J Appl Physiol 103: 693-99



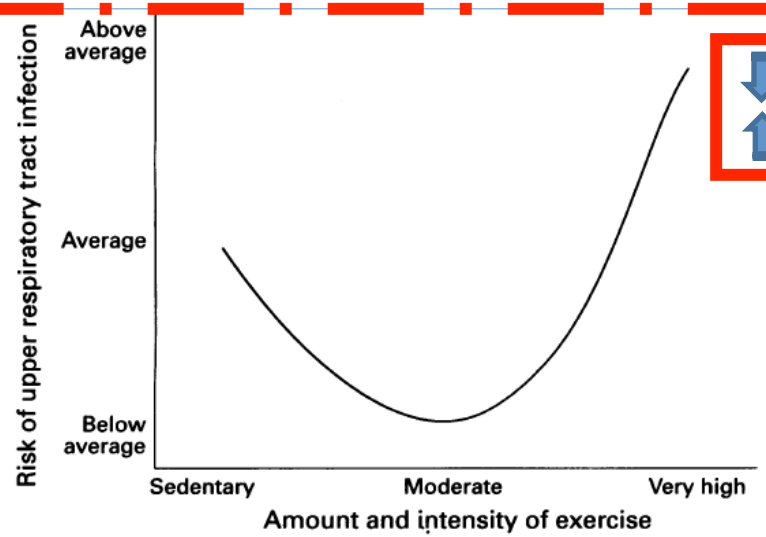
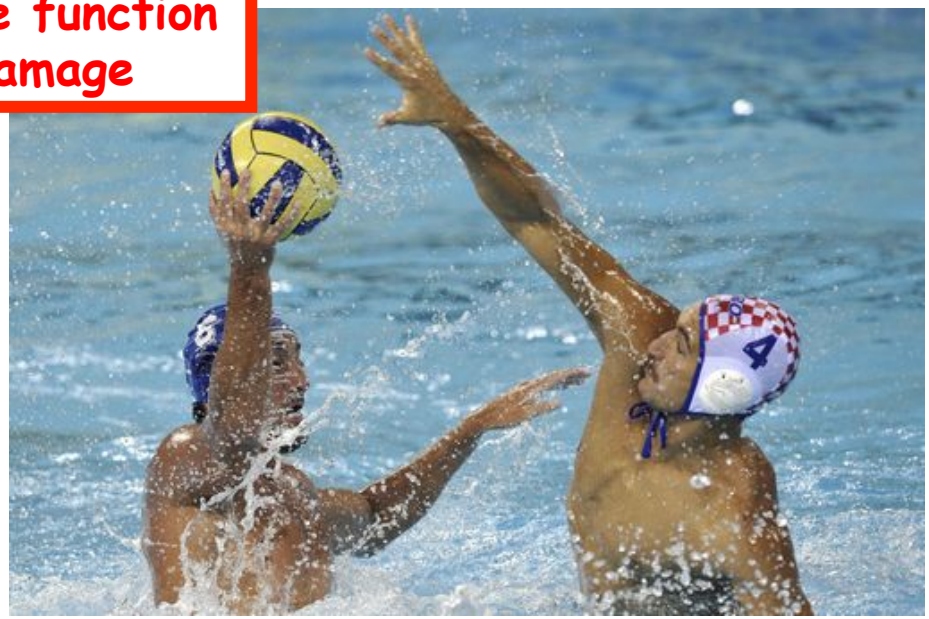


Figure 1 "J"-shaped model of the relationship between varying amounts of exercise and risk of upper respiratory tract infection. This model suggests that moderate exercise may lower the risk of upper respiratory tract infection while excessive amounts may increase the risk.

⬇ Immune function
⬆ DNA damage



Factors Affecting Immunosuppression

- Fasting/ inappropriate diet
- Low Glycogen stores
- Dehydration
- Sleep Deprivation
- Altitude (hypoxia)
- Jet Lag
- Psychological stress
- Extremes of heat/ cold
- Weather conditions
- Over-exertion

International Journal of Sport Nutrition and Exercise Metabolism, 2009, 19, 1-14

Effect of Ingesting a Honey-Sweetened Beverage on Soccer Performance and Exercise-Induced Cytokine Response

Elizabeth L. Abbey and Janet Walberg Rankin

Purpose: This study compared the effect of a honey-sweetened beverage with those of a commercial sports drink and a placebo on performance and inflammatory response to a 90-min soccer simulation. ***Methods:*** Ten experienced male soccer players randomly performed 3 trials (honey [H], sports drink [S], and placebo [P]), consuming the beverage before and during halftime for a total of 1.0 g/kg carbohydrate for H and S. Performance measures included 5 sets (T1–T5) of a high-intensity run and agility and ball-shooting tests followed by a final progressive shuttle-run (PSR) test to exhaustion. Blood samples were drawn pretest, posttest (B2), and 1 hr posttest (B3) for markers of inflammation, oxygen radical absorbance capacity (ORAC), and hormone response. ***Results:*** T2–T5 were significantly slower than T1 ($p < .05$), and a

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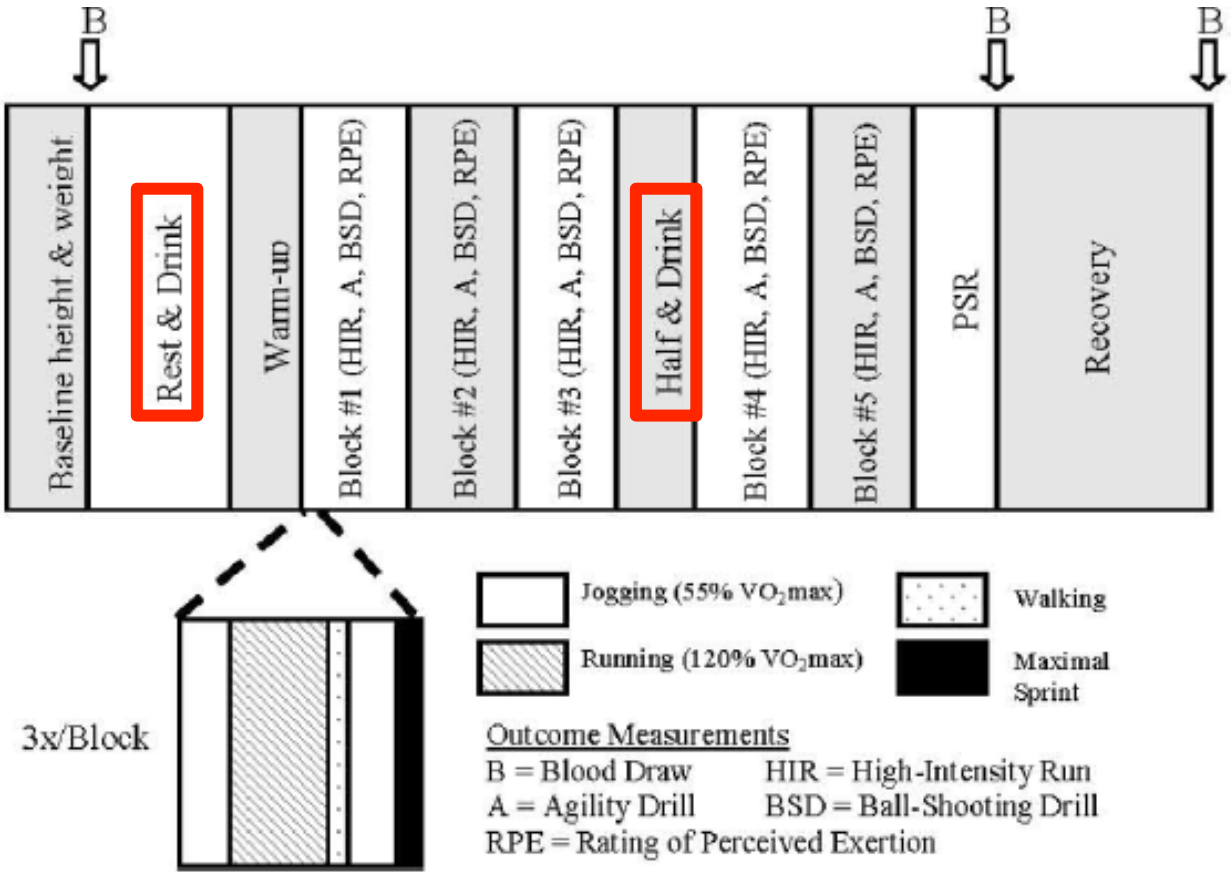

Figure 1 — Schematic representation of soccer simulation and measurement schedule.

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were provided in beverage form. S was a commercially available sports drink (Gatorade, Barrington, IL). For the H treatment, honey was mixed into the placebo (lemonade-flavored drink sweetened with NutraSweet), and 110 mg sodium were added per 240 ml of fluid to be comparable to S in this electrolyte. Both H and S were 6% carbohydrate and were fed in volumes to provide 0.5 g/kg carbohydrate at each of the two consumption times for a total of 1.0 g/kg over the trial. This translated to 8.8 ml/kg of the treatment beverage 30 min before the start of the exercise test and at the 10-min halftime for all treatments.

Table 3 Cytokine Concentrations Normalized to Pretest Values (± *SEM*) and Mean Concentrations (± *SEM*) for ORAC

Treatment	Pretest	Posttest	1 hr posttest
IL-6#			
honey	1.00	6.90 (1.52)*	3.16 (0.64)*†
sports drink	1.00	5.92 (1.06)*	3.67 (0.61)*†
placebo	1.00	6.63 (1.70)*	4.09 (1.23)*†
IL-1ra#			
honey	1.00	1.26 (0.07)*	1.40 (0.12)*
sports drink	1.00	1.66 (0.16)*‡	1.67 (0.17)*
placebo	1.00	1.64 (0.20)*	1.96 (0.24)*‡
IL-10#			
honey	1.00	5.19 (1.73)*	3.98 (1.19)*
sports drink	1.00	6.19 (1.67)*	3.64 (0.75)*
placebo	1.00	7.04 (2.11)*	6.49 (2.22)*
$ORAC_{total}$ (μmol TE/g)			
honey	9,518 (286)	11,016 (432)*	9,984 (417)†
sports drink	9,847 (237)	11,158 (296)*	9,853 (456)†
placebo	9,984 (251)	11,674 (437)*	10,535 (375)†
$ORAC_{pca}$ (μmol TE/g)			
honey	913 (41)	1,028 (61)*	937 (55) †
sports drink	924 (40)	1,069 (55)*	944 (43) †
placebo	938 (37)	1,096 (49)*	978 (45) †

*Significantly different from pretest ($p < .05$). †Significantly different from posttest ($p < .05$). ‡Significantly different from honey ($p < .05$). #Absolute pretest concentrations (pg/ml) for honey, sports drink, and placebo for IL-6 (0.79, 0.82, and 1.15), IL-1ra (193.7, 143.5, and 152.3), and IL-10 (1.15, 1.01, and 1.13).

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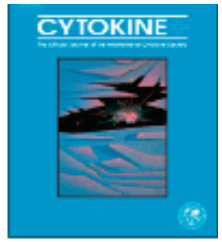
Conclusion: Acute ingestion of honey and a carbohydrate sports drink before and during a soccer-simulation test did not improve performance, although honey attenuated a rise in IL-1ra. Ingestion of carbohydrate and/or antioxidant-containing beverages at frequencies typical of a regulation match may not be beneficial for trained soccer players.

Contents lists available at ScienceDirect

Cytokine

journal homepage: www.journals.elsevier.com/cytokine



A randomized controlled trial examining the effects of 16 weeks of moderate-to-intensive cycling and honey supplementation on lymphocyte oxidative DNA damage and cytokine changes in male road cyclists

Behzad Hajizadeh Maleki [a,*], Bakhtyar Tartibian [b], Frank C. Mooren [a], Karsten Krüger [a], Leah Z. FitzGerald [c], Mohammad Chehrazi [d]

A B S T R A C T

The aim of this study was to investigate whether honey supplementation (70 g, ninety minutes before each training session) attenuates changes in lymphocyte counts, DNA damage, cytokines, antioxidative and peroxidative biomarkers following moderate-to-intensive exercise training in male road cyclists. Healthy nonprofessional cyclists (n = 24, aged 17–26 years) were randomly assigned to exercise + supplement (EX + S, n = 12) and exercise (EX, n = 12) groups for an experimental period of 16 weeks. Moderate-to-intensive exercise training increased lymphocytes DNA damage, cytokines and peroxidative biomarkers as well as decreased antioxidative biomarkers in the EX group. These changes were significantly attenuated in the EX + S group. Furthermore, for both groups the observed changes in peroxidative and antioxidative biomarkers could be correlated positively and negatively, respectively, with lymphocyte DNA damage and cytokines. Findings suggest that honey attenuates oxidative stress and lymphocyte DNA damage after exercise, activities that are most likely attributable to its high antioxidant capacity.

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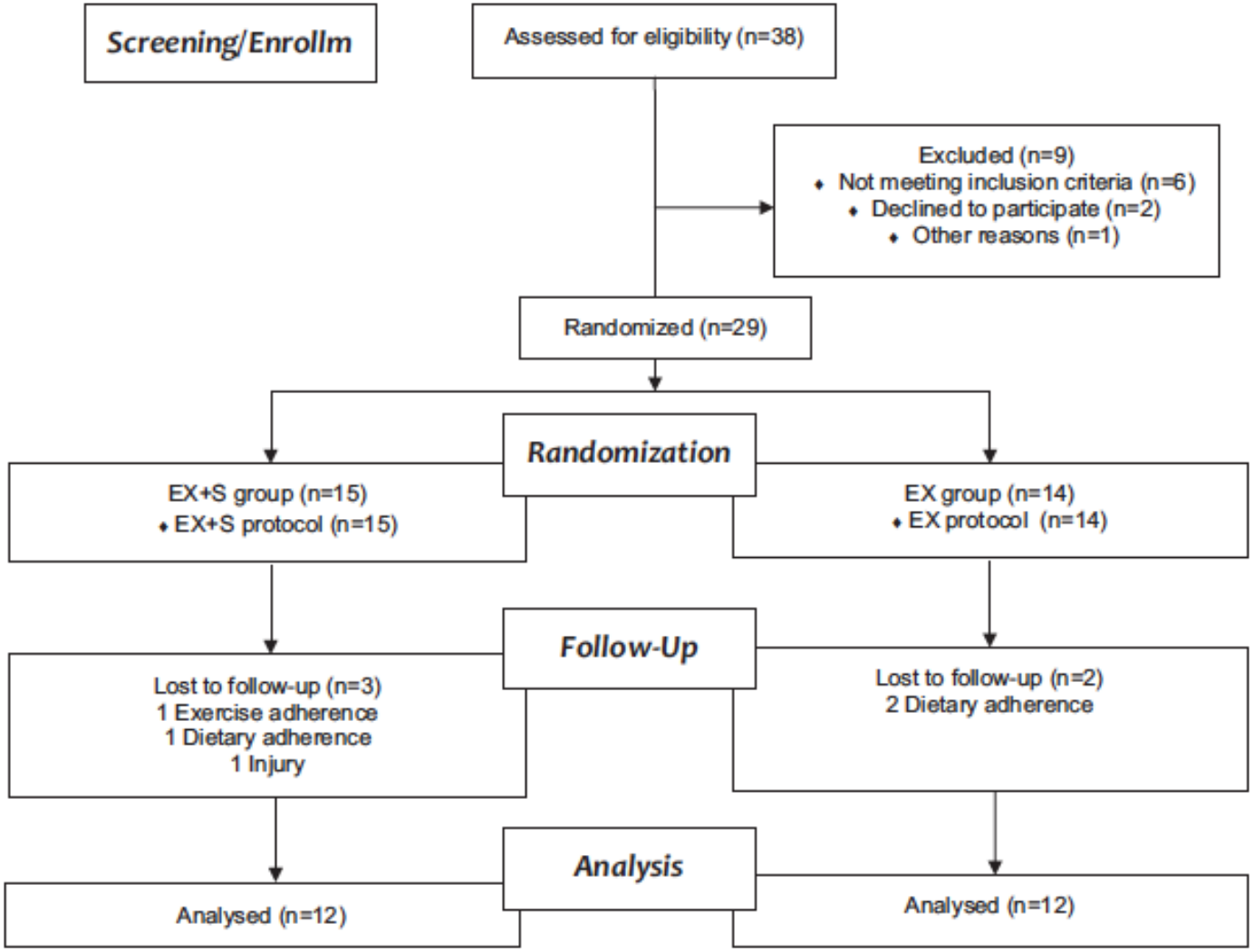

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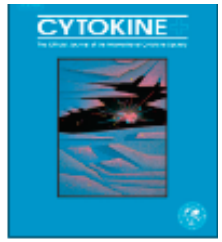

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Our data demonstrated that lymphocytes oxidative DNA damage, blood levels of cytokines, peroxidative biomarkers and lymphocyte counts were significantly increased in male road cyclists following a 16 week moderate-to-intensive cycling training, whereas blood antioxidative biomarkers were significantly decreased. Honey supplementation was effective in diminishing these effects.

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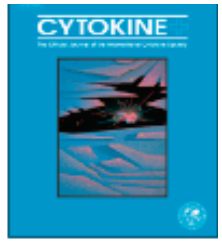

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These results further indicate that honey intake suppresses excessive increases in inflammatory reactions following intense exercise. Whether this has consequences for the immunological function remain to be shown. The beneficial effect of honey on immune responses during different exercise programs has already been reported

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Cytokine

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In conclusion, this study demonstrates that honey is able to modulate exercise-induced peroxidative, antioxidative and immunological changes in male road cyclists following chronic low-to-intensive exercise training. Therefore, honey may be used as an anti-inflammatory and antioxidant supplement for competing athletes who participate in long-term moderate-to-intensive exercise training protocols.

Nutritional Facts of Honey

Ingredient	Amount in 100 g
Carbohydrates (kcal)	300
Proteins (g)	0.5
Fats (g)	0
Minerals (mg)	
Sodium (Na)	1.6-17
Calcium (Ca)	3-31
Potassium (K)	40-3500
Magnesium (Mg)	0.7-13
Phosphorus (P)	2-15
Zinc (Zn)	0.05-2
Copper (Cu)	0.02-0.6
Iron (Fe)	0.03-4
Manganese (Mn)	0.02-2
Chromium (Cr)	0.01-0.3
Selenium (Se)	0.002-0.01
Vitamins (mg)	
Phyllochinon (K)	0.025
Thiamin (B1)	0.00-0.01
Riboflavin (B2)	0.01-0.02
Niacin2 (B3)	0.10-0.20
Panthothenic acid (B5)	0.02-0.11
Pyridoxin (B6)	0.01-0.32
Folic acid (B9)	0.01-0.7
Ascorbic acid (C)	2.2-2.5

(Adapted from Bogdanov et al., 2008)

Effects of Combined Aerobic Dance Exercise and Honey Supplementation on Bone Turnover Markers in Young Females

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Honey supplementation. A honey drink was consumed by the subjects in the honey (H) group and combined aerobic dance exercise and honey supplementation (HEx) group in the dose of 20g (Sulaiman et al., 2011) of Malaysian local Gelam honey diluted in 300ml of plain water (Gisolfi & Duchman, 1992), for 7 days per week for a total of 6 weeks duration. On the exercising days, the subjects of the combined aerobic dance exercise and honey supplementation (HEx) group were required to consume the honey drink 30 minutes before performing aerobic dance exercises.

20 g miele in 300 ml acqua 30' prima

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Bone Turnover Markers

Bone formation marker: Serum alkaline phosphatase. The bone formation marker of serum alkaline phosphatase (ALP) concentrations in all the groups at pretest and posttests are presented in Table 3. At pretests and posttests, there were no significant differences in ALP among the groups. After 6 weeks of experimental period, there were significant ($p < 0.05$) increases in ALP in H (+15.91%) and HEx (+31.79%) groups at posttest compared to pretest values.

Bone resorption marker: Serum C-terminal telopeptide of type 1 collagen (1CTP). Results of serum C-terminal telopeptide of type 1 collagen (1CTP), a bone resorption marker, of all the groups at pretests and posttests are shown in Table 4. At the pretest, there were no significant differences in 1CTP among the groups. After 6 weeks of experimental period, no significant differences were observed in 1CTP among the groups at posttest. Additionally, there was no statistical difference between pretests and posttests in all the groups.

Effects of Combined Aerobic Dance Exercise and Honey Supplementation on Bone Turnover Markers in Young Females

Conclusion

In summary, the most notable finding of the present study is that the combination of aerobic dance exercise and honey supplementation may elicit more beneficial effects on bone health by increasing bone formation marker in young females compared to honey or exercise alone. The present study findings reflect that the 6-week combination of aerobic dance exercise at 3 times per week, 1 hour per session with 20g of Gelam honey supplementation per day given for 7 days per week, may affect bone health positively in the young female subjects where aerobic dance exercises were carried out 30 min after consumption of honey.

Building and maintaining healthy bones throughout life is dependent on lifestyle factors. Our study results imply that engagement in regular physical activities by having a certain level of exercise such as aerobic dance exercise and implementing healthy nutritional habits by consuming optimal amount of honey supplementation may help in maintaining and enhancing bone health. In conclusion, combination of aerobic dance and honey supplementation has potential to be proposed for formulating guidelines in planning exercise and nutritional promotion programmes for the maintenance of bone health in young females.

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AMERICAN COLLEGE of SPORTS MEDICINE

Dietitians of Canada
Les diététistes du Canada

eat right. American Dietetic Association

JOINT POSITION STATEMENT

Nutrition and Athletic Performance

DIETARY SUPPLEMENTS AND ERGOGENIC AIDS

The overwhelming number and increased availability of sports supplements presents an ongoing challenge for the practitioner and the athlete to keep up-to-date about the **validity of the claims and scientific evidence**. Although dietary supplements and nutritional ergogenic aids, such as nutritional products that enhance performance, are highly prevalent, **the fact remains that very few improve performance (117–119) and some may cause concern**.

[…] **Dietary supplements or ergogenic aids will never substitute for genetic makeup, years of training, and optimum nutrition.**

Med Sci Sports Exerc. **2009 Mar**; 41(3):709-31
JADA **2009 Mar**; 109 (3): 509-527.

Il miele è un alimento e "integratore" adatto e utile per tutti gli sportivi