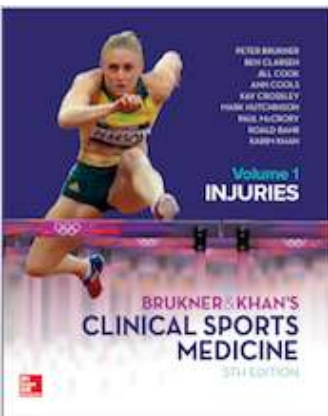


CARBS. FATS.

WHAT SHOULD THE ELITE

ATHLETE BE EATING?

Professor Peter Brukner
La Trobe Sport and Exercise Medicine
Research Centre
Melbourne, Australia



DISCLOSURES

- I am the founder of *SugarByHalf*, a not-for-profit campaign in Australia
- I am the author of *A Fat Lot of Good* (out in May 2018)







The Diet Bowl



The Carb Generation

**THE WORLD'S #1
SPORTS DRINK.**

AVAILABLE IN THREE NEW FLAVOURS:

TROPICAL BURST ORANGE TONIC BLUE



The image shows three bottles of Gatorade standing side-by-side. From left to right, they are Tropical Burst (red), Orange (orange), and Tonic Blue (blue). Each bottle has a large white 'G' logo on the front. The background is dark grey.





Energy utilization and repletion during endurance exercise: an historical perspective

T. D. Noakes

First published: February 1991 [Full publication history](#)



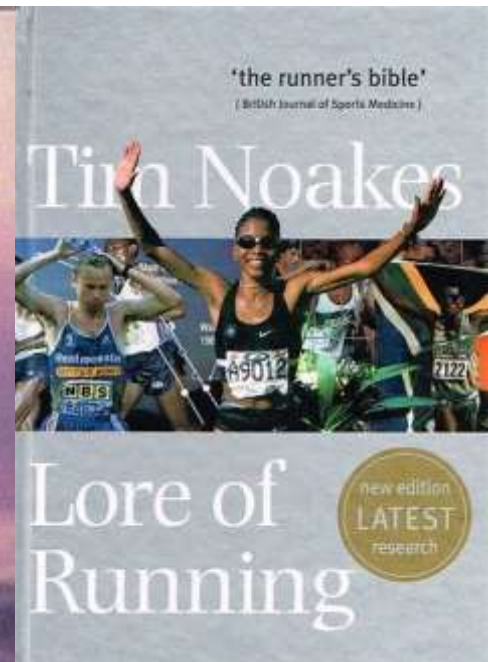
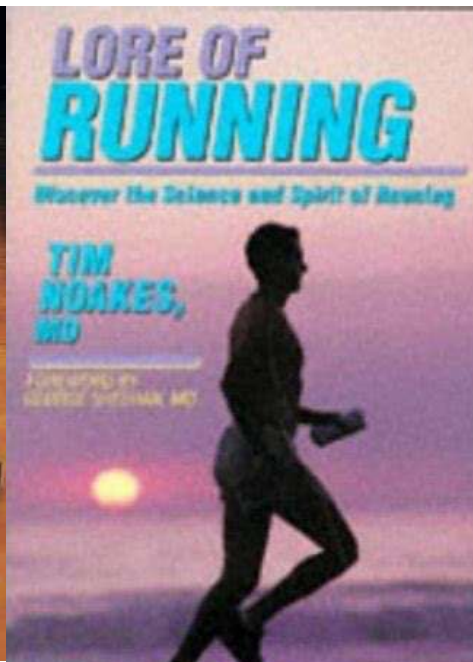
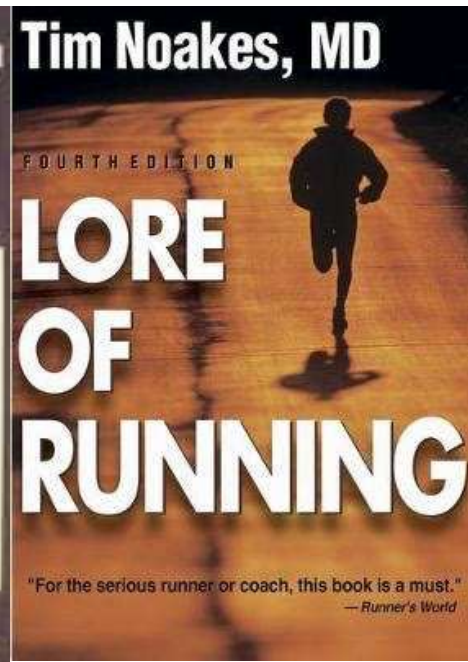
[View issue TOC](#)
Volume 4, Issue 1
February 1991

There is clear evidence that the provision of exogenous **carbohydrate** at high rates is **essential** to delay fatigue and optimize performance during prolonged exercise. It has also become apparent that high rates of both carbohydrate and fluid delivery can be achieved by the adoption of appropriate drinking techniques during exercise.

Tim Noakes

Carbs Super Hero

Multiple MVP winner



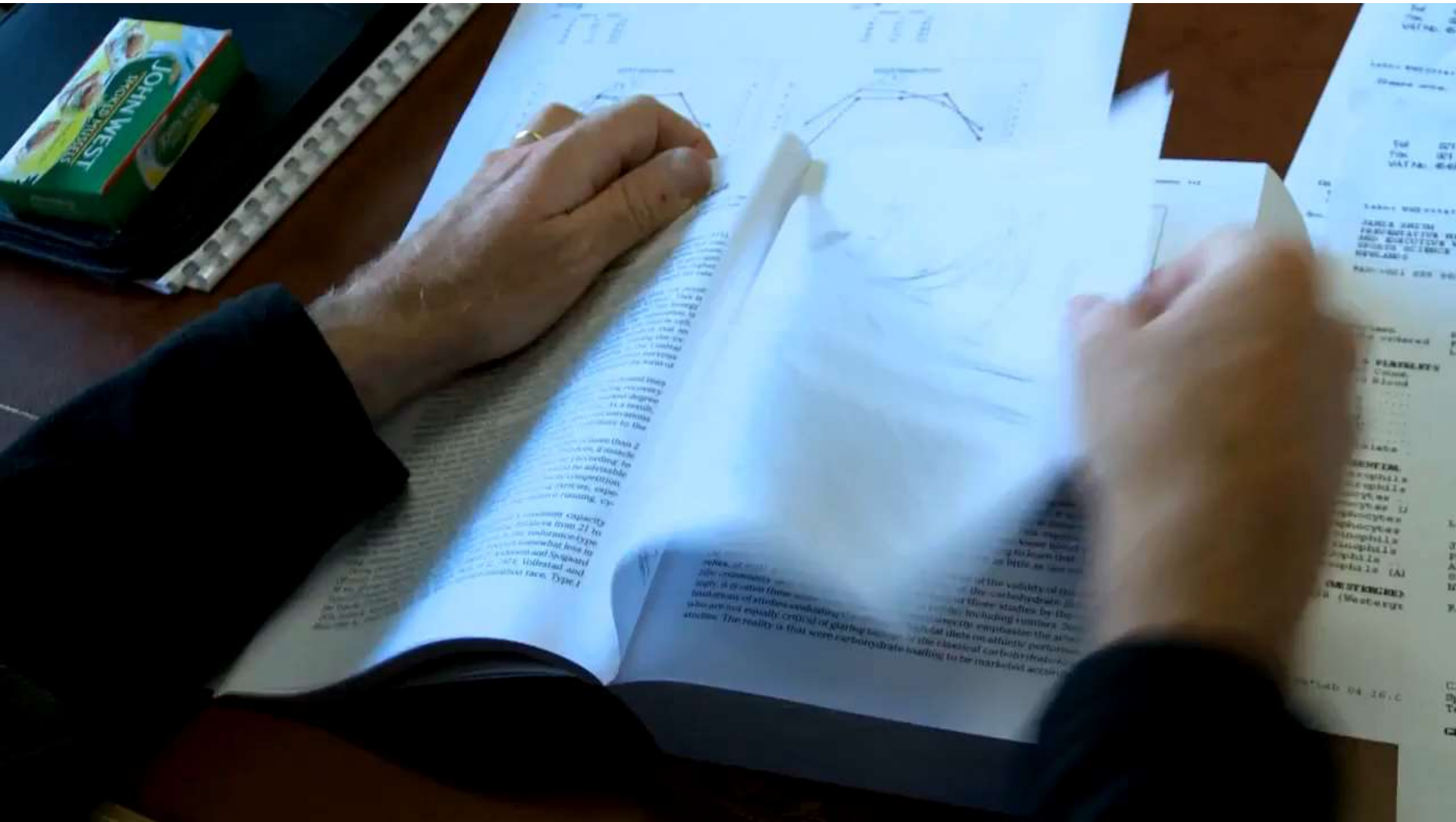
And then in 2012

Breaking News.....

Tim Noakes (South Africa) was today traded from **Team Carbs** to perennial underachievers **Team Fat**.

Will this be the turning point?

This has been the worst trade deal in the history of trade deals, maybe ever

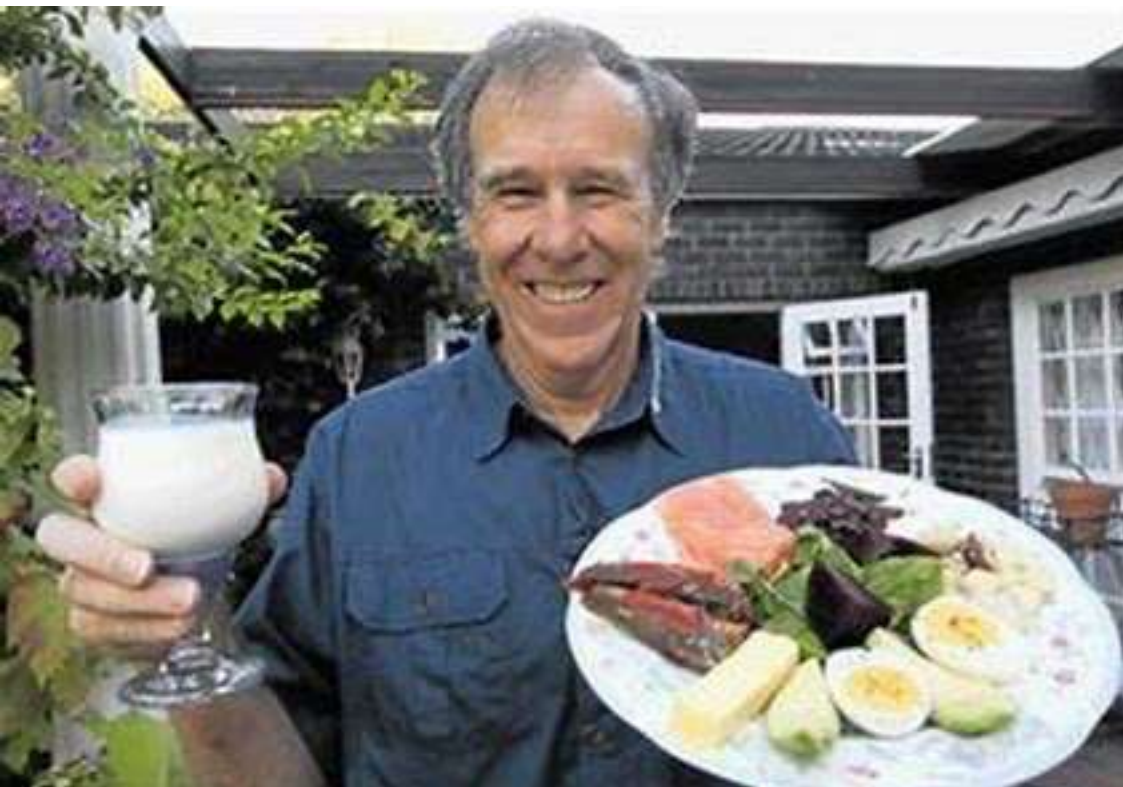


Tim Noakes: "If you've got Lore of Running, tear out the section on nutrition"



"I Knew Nothing"

How the legendary professor
Tim Noakes completely changed
his mind on food for health
and performance.



THE REAL MEAL REVOLUTION

PROF. TIM NOAKES
SALLY-ANN CREED
JOHNO PROUDFOOT
DAVID GRIER



Jeff S. Volek, PhD, RD
Stephen D. Phinney, MD, PhD



**THE ART AND SCIENCE OF
LOW
CARBOHYDRATE
PERFORMANCE**

Diet Bowl: Previous winners 2012-

WINNER

MVP

2012: Team Carbs

Louise Burke

2013: Team Carbs

Louise Burke

2014: Team Carbs

Louise Burke

2015: Team Carbs

Louise Burke

2016: Team Carbs

Louise Burke

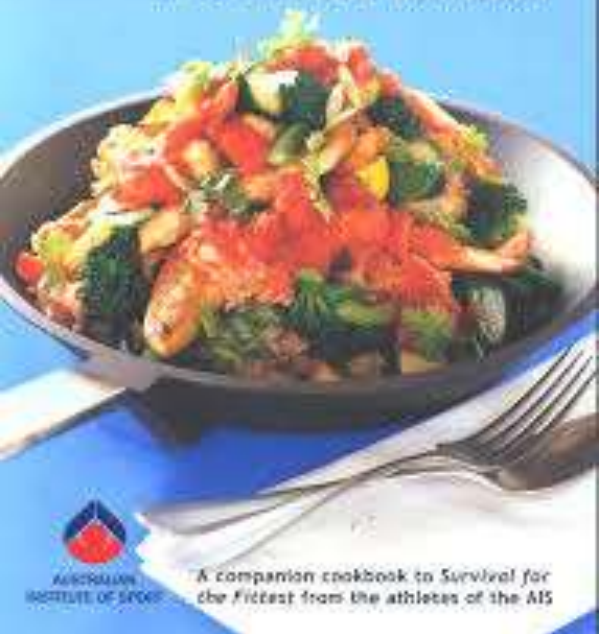
2017: Team Carbs

Louise Burke

2018 ??????????

survival

FROM THE FITTEST

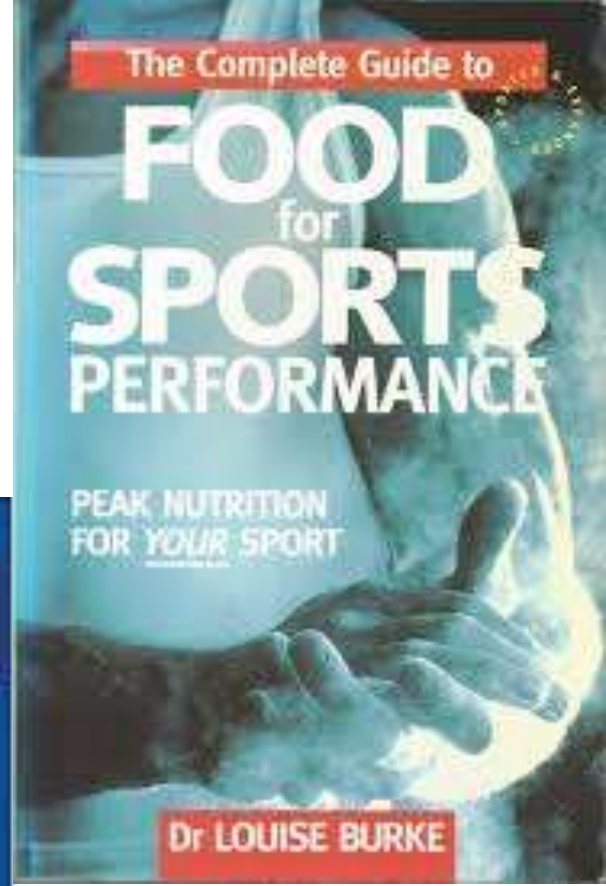


A companion cookbook to Survival for the Fittest from the athletes of the AIS



Practical Sports Nutrition

Louise Burke



The Complete Guide to

FOOD for SPORTS PERFORMANCE

PEAK NUTRITION FOR YOUR SPORT

Dr LOUISE BURKE

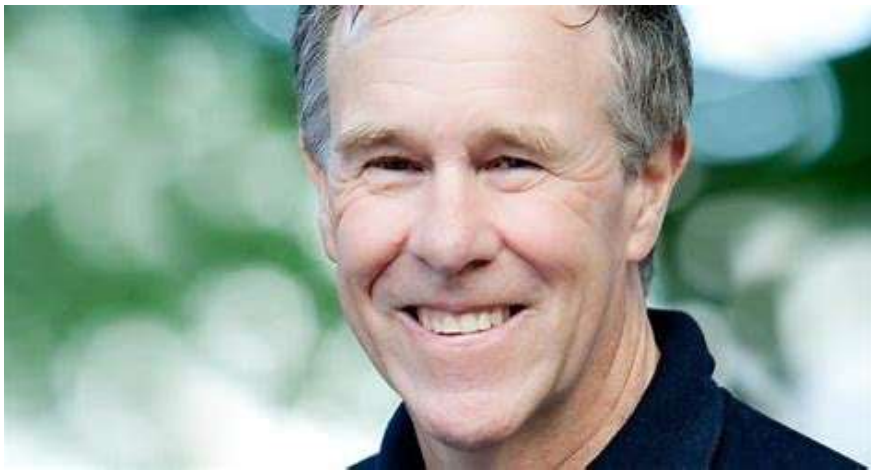
Gatorade

Gatorade supports AIS Sports Nutrition by funding the Gatorade Sports Nutrition Fellowship. The Gatorade Fellow is involved in cutting edge research in hydration. This complements the research already conducted at the [Gatorade Sports Science Institute](#), Gatorade's own centre for research. The Gatorade Fellow also provides nutrition services to AIS athletes, coordinates the provision of Gatorade product to athletes and develops nutrition resources.



“Brukner and Noakes should be in jail”





So what is the best fuel?





Zach Bitter is the 100-mile American record holder. He also eats almost no carbs.

For Zach Bitter, who can travel ultramarathon distances faster than pretty much any other American, carb-cutting is a way of life. Here's how he makes an ultra-low-carb diet work—and how you can do the same.



by Spenser Mestel



August 11, 2017 11:33am



Chris Froome Cut Back on Carbs, Lost 20 Pounds and Won the Tour de France – 3 Times!

July 27 by Dr. Andreas Eenfeldt in Exercise, Low Carb High Fat



Kobe Bryant, Los Angeles Lakers Embrace Bacon As Good Food For Training Table

Thursday, July 3, 2014 4:42 pm | Written by: Dan Russo



After Kobe Bryant suffered his Achilles injury in April 2013, the Mamba embarked on an eight-month recovery process. His diet included a food source that provided natural anti-inflammatory products: Bacon.

The sizzling meat played a role in Bryant's paleo-style diet, implemented by the Lakers strength and conditioning coach, Tim DiFrancesco, in the 2012-13 season.



LOS ANGELES LAKERS STORIES



POWERED BY THEPOSTGAME.COM

"Contrary to what people might think, we actually want our players to eat as much grass fed butter and bacon as we can get into them," **DiFrancesco told Lakers.com.** "Will that sky-rocket cholesterol? No, just look into the science on it."

The team's nutritionist, Dr. Cate Shanahan, also helped design Bryant's recovery diet. The paleo-style diet focuses on using natural fats as the

EDGE

Inside LeBron James' weight loss and low-carb diet



More >



Photo: Issac Baldizon/NBAE via Getty Images



NFL

NFL Linemen Turn to Fatty, No-Carb Diet, but Science Is Unclear

Players say 'ketogenic' diet makes them leaner and reduces soreness after exercise, allowing them to train with greater intensity and for longer periods





Kourtney Kardashian Just Gave The Keto Diet A Rave Review

Here's exactly what she ate on the plan.

WH By Tamara Fuentes Feb 28, 2018



MORE FROM
WEIGHT LOSS



'I Lost Weight Eating 2,200 Calories Per Day'



HALLE BERRY REVEALS DIET THAT SLOWED 'AGING PROCESS' AND REVERSED DIABETES DIAGNOSIS

Carbs vs Fats

Where is the science?



1983

The Human Metabolic Response to Chronic Ketosis Without Caloric Restriction: Preservation of Submaximal Exercise Capability with Reduced Carbohydrate Oxidation

S. D. Phinney, B. R. Bistrian, W. J. Evans, E. Gervino, and G. L. Blackburn

To study the effect of chronic ketosis on exercise performance in endurance-trained humans, five well-trained cyclists were fed a eucaloric balanced diet (EBD) for one week providing 35–50 kcal/kg/d, 1.75 g protein/kg/d and the remainder of kilocalories as two-thirds carbohydrate (CHO) and one-third fat. This was followed by four weeks of a eucaloric ketogenic diet (EKD), isocaloric and isonitrogenous with the EBD but providing less than 20 g CHO daily. Both diets were appropriately supplemented to meet the recommended daily allowances for vitamins and minerals. Pedal ergometer testing of maximal oxygen uptake ($\dot{V}O_{2\max}$) was unchanged between the control week (EBD-1) and week 3 of the ketogenic diet (EKD-3). The mean ergometer endurance time for continuous exercise to exhaustion (ENDUR) at 62%–64% of $\dot{V}O_{2\max}$ was 147 minutes at EBD-1 and 151 minutes at EKD-4. The ENDUR steady-state RQ dropped from 0.83 to 0.72 ($P < 0.01$) from EBD-1 to EKD-4. In agreement with this were a three-fold drop in glucose oxidation (from 15.1 to 5.1 mg/kg/min, $P < 0.05$) and a four-fold reduction in muscle glycogen use (0.61 to 0.13 mmol/kg/min, $P < 0.01$). Neither clinical nor biochemical evidence of hypoglycemia was observed during ENDUR at EKD-4. These results indicate that aerobic endurance exercise by well-trained cyclists was not compromised by four weeks of ketosis. This was accomplished by a dramatic physiologic adaptation that conserved limited carbohydrate stores (both glucose and muscle glycogen) and made fat the predominant muscle substrate at this submaximal power level.

Interaction of training and diet on metabolism and endurance during exercise in man

Jørn Wulff Helge, Erik A. Richter and Bente Kiens*

Copenhagen Muscle Research Centre, August Krogh Institute, University of Copenhagen, DK-2100 Copenhagen, Denmark

Ingesting a fat-rich diet during an endurance training programme is **detrimental** to improvement in endurance.

Endurance Capacity and High-Intensity Exercise Performance Responses to a High-Fat Diet

*Jesse Fleming, Matthew J. Sharman, Neva G. Avery,
Dawn M. Love, Ana L. Gómez, Timothy P. Scheett,
William J. Kraemer, and Jeff S. Volek*

Adaptation to a 6-week HFMP diet in non-highly trained men resulted in increased fat oxidation during exercise and **small decrements** in peak power output and endurance performance.

Fat adaptation followed by carbohydrate loading compromises high-intensity sprint performance

L. Havemann,¹ S. J. West,¹ J. H. Goedecke,¹ I. A. Macdonald,²
A. St Clair Gibson,¹ T. D. Noakes,¹ and E. V. Lambert¹

¹*University of Cape Town/Medical Research Council Research Unit for Exercise Science and Sports Medicine, Department of Human Biology, University of Cape Town, South Africa; and* ²*School of Biomedical Sciences, University of Nottingham Medical School, Queen's Medical Centre, Nottingham, United Kingdom*

Overall 100-km time-trial performance was not different between diets; however, 1-km sprint power output after HFD-CHO was lower (P 0.05) compared with HCD-CHO.

The HFD-CHO dietary strategy increased fat oxidation, but **compromised high intensity sprint performance**, possibly by increased sympathetic activation or altered contractile function.

REVIEW ARTICLE

Carbohydrate Dependence During Prolonged, Intense Endurance Exercise

John A. Hawley^{1,2} · Jill J. Leckey¹

Fat-rich diets **do not improve** training capacity or performance, but directly impair rates of muscle glycogenolysis and energy flux, limiting high-intensity ATP production.

When highly trained athletes compete in endurance events lasting up to 3 h, CHO-, not fat-based fuels are the predominant fuel for the working muscles and CHO, not fat, availability becomes rate limiting for performance.

Article

The Effects of a Ketogenic Diet on Exercise Metabolism and Physical Performance in Off-Road Cyclists

Adam Zajac ¹, Stanisław Poprzecki ², Adam Maszczyk ^{1,*}, Miłosz Czuba ¹,
Małgorzata Michalczyk ³ and Grzegorz Zydek ³

Low carbohydrate ketogenic diets **decrease the ability** to perform high intensity work, due to decreased glycogen muscle stores and the lower activity of glycolytic enzymes

RESEARCH ARTICLE

Open Access



Ketogenic diet benefits body composition and well-being but not performance in a pilot case study of New Zealand endurance athletes

Caryn Zinn^{*} , Matthew Wood, Mikki Williden, Simon Chatterton and Ed Maunder

Effects of short-term fat adaptation on metabolism and performance of prolonged exercise

LOUISE M. BURKE and JOHN A. HAWLEY

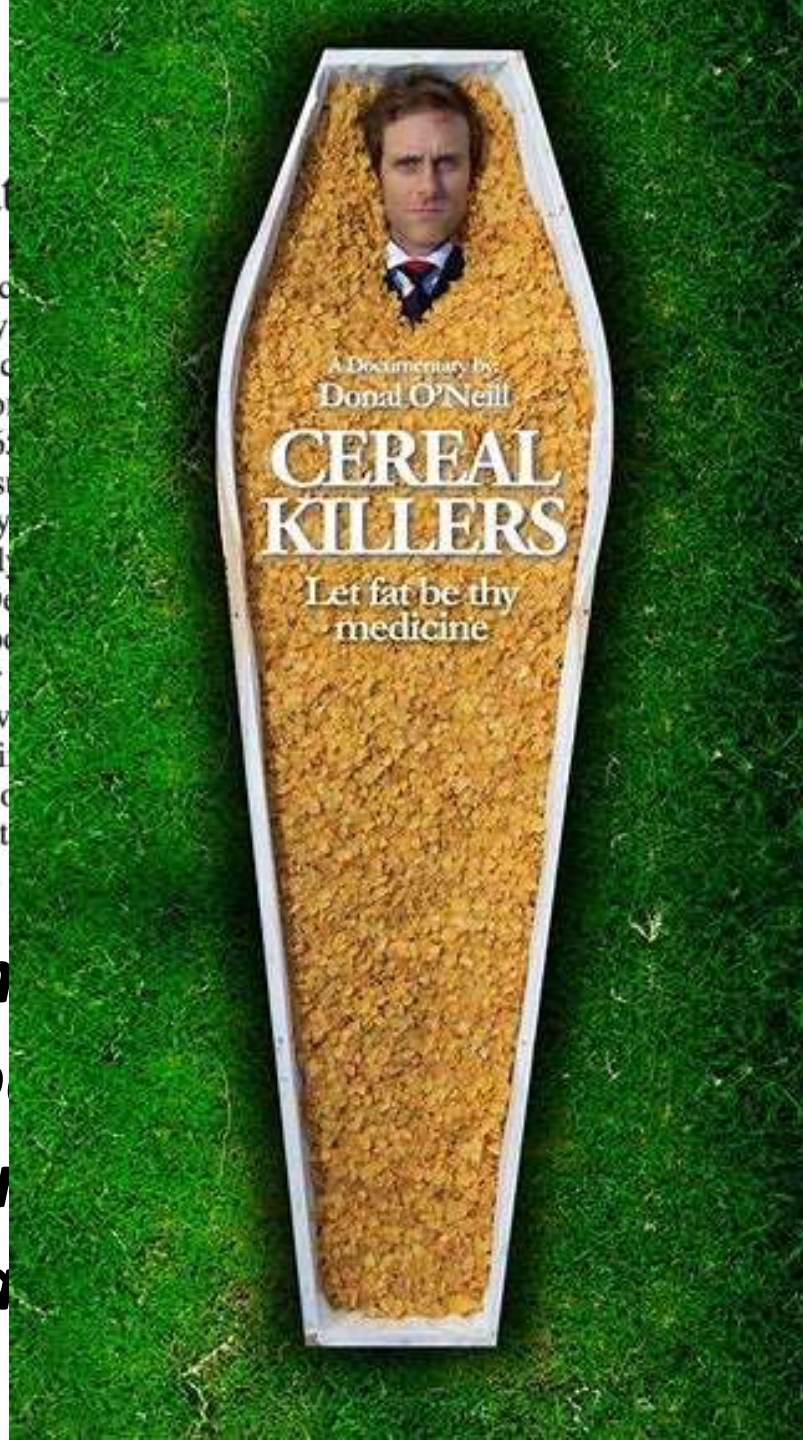
Department of Sports Nutrition, Australian Institute of Sport, Canberra, A.C.T., AUSTRALIA; and Exercise Metabolism Group, School of Medical Sciences, Faculty of Life Sciences, R.M.I.T. University, Bundoora, Victoria, AUSTRALIA

Despite marked changes in the patterns of fuel utilization that favor fat oxidation, fat-adaptation/CHO restoration strategies **do not provide** clear benefits to the performance of prolonged endurance exercise.

“Fat adaptation” for a

ENDURANCE ATHLETES have a high capacity for oxidation of fat during exercise as a legacy of evolution. Therefore, it is intriguing that this capacity is attenuated by the chronic consumption of a low-fat diet (<2.5 g·kg⁻¹·day⁻¹), high-fat (~6 g·kg⁻¹·day⁻¹). For example, 2–4 wk of exposure to such a diet in individuals has been shown to markedly reduce the utilization of muscle glycogen during submaximal exercise (10, 11). Does this enhanced ability to “tap into your body fat” does not seem to lead to a clear improvement in capacity or performance (for review see 12). It is at least a short-term increase in performance during training (2, 3) and an impairment of performance when the high-fat, low-carbohydrate diet is consumed for periods longer than 4 wk, based on

“Those at the top of the list delete fat from their list of genuine endurance sports”



coffin?

adaptations to a fat-rich diet may include a shift in the balance of carbohydrate metabolism or a change in the rate of carbohydrate restoration strategies are associated with a decrease in the activity of pyruvate dehydrogenase; this leads to lower rates of glycogenolysis at a time when energy requirements are high. The present study (6) furthers our knowledge by comparing a carbohydrate restoration model to a model that involves several features of a high-fat diet and the interspersing of high-intensity segments with more moderate-intensity segments. The study (6) shows that the dietary strategy has no effect on performance in a 100-km time trial but compromises performance in high-intensity

nutrition can delete fat from their list of genuine endurance sports”

Then a
strange thing
happened.....

Carbohydrate availability and exercise training adaptation: Too much of a good thing?

JONATHAN D. BARTLETT¹, JOHN A. HAWLEY^{1,2}, & JAMES P. MORTON¹

¹Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, UK, ²Exercise & Nutrition Research Group, School of Exercise Sciences, Australian Catholic University (ACU), Fitzroy, VIC, Australia

Deliberately training in conditions of **reduced CHO availability** can promote training-induced adaptations of human skeletal muscle (i.e. increased maximal mitochondrial enzyme activities and/or mitochondrial content, increased rates of lipid oxidation and, in some instances, improved exercise capacity).

Carbohydrate availability and exercise training adaptation: Too much of a good thing?

JONATHAN D. BARTLETT¹, JOHN A. HAWLEY^{1,2}, & JAMES P. MORTON¹

¹Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, UK, ²Exercise & Nutrition Research Group, School of Exercise Sciences, Australian Catholic University (ACU), Fitzroy, VIC, Australia

Such data have led to the concept of **‘training low, but competing high’**

whereby selected training sessions are completed in conditions of reduced CHO availability (so as to promote training adaptation), but CHO reserves are restored immediately prior to an important competition.

REVIEW ARTICLE

Re-Examining High-Fat Diets for Sports Performance: Did We Call the ‘Nail in the Coffin’ Too Soon?

Louise M. Burke^{1,2}



Re-Examining High-Fat Diets for Sports Performance: Did We Call the ‘Nail in the Coffin’ Too Soon?

Louise M. Burke^{1,2}

The current guidelines for carbohydrate intake in the athlete’s training diet appear to be poorly understood. Sports nutrition experts do not promote a “high carbohydrate diet” for all athletes.

REVIEW ARTICLE

A Step Towards Personalized Sports Nutrition: Carbohydrate Intake During Exercise

Asker Jeukendrup

Sports Med

DOI 10.1007/s40279-017-0694-2



CrossMark

REVIEW ARTICLE

Periodized Nutrition for Athletes

Asker E Jeukendrup¹

Scand J Med Sci Sports 2010; 20 (Suppl. 2): 48–58
doi: 10.1111/j.1600-0838.2010.01185.x

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SCANDINAVIAN JOURNAL OF
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IN SPORTS

Review

Fueling strategies to optimize performance: training high or training low?

L. M. Burke

Department of Sports Nutrition, Australian Institute of Sport, Belconnen ACT, Australia

Corresponding author: Louise M Burke, PhD, Department of Sports Nutrition, Australian Institute of Sport, PO Box 176, Belconnen ACT 2616, Australia. Tel: +61 2 6214 1351, Fax: +61 2 6214 1603, E-mail: louise.burke@ausport.gov.au

Re-Examining High-Fat Diets for Sports Performance: Did We Call the ‘Nail in the Coffin’ Too Soon?

Louise M. Burke^{1,2}

The evolving model is that athletes should follow an **individualized approach, whereby carbohydrate intake is periodized** throughout the training cycle according to the fuel needs of each workout, the importance of performing well in the session and/or the potential to amplify the adaptive response to exercise via exposure to low carbohydrate availability.

REVIEW ARTICLE

Re-Examining High-Fat Diets for Sports Performance: Did We Call the ‘Nail in the Coffin’ Too Soon?

Louise M. Burke^{1,2}

There is a need for ongoing research and practice to identify a range of approaches to optimal training and competition diets according to the specific requirements of an event and the experience of the individual athlete.

Low carbohydrate, high fat diet impairs exercise economy and negates the performance benefit from intensified training in elite race walkers

Louise M. Burke^{1,2}, Megan L. Ross^{1,2}, Laura A. Garvican-Lewis^{1,2}, Marijke Welvaert^{3,4}, Ida A. Heikura^{1,2}, Sara G. Forbes¹, Joanne G. Mirtschin¹, Louise E. Cato¹, Nicki Strobel⁵, Avish P. Sharma⁶ and John A. Hawley^{2,7}

¹Sports Nutrition, Australian Institute of Sport, Canberra, Australia 2616

²Mary MacKillop Institute for Health Research, Australian Catholic University, Melbourne, Australia 3000

³University of Canberra Research Institute for Sport and Exercise, Canberra, Australia 2617

⁴Innovation, Research and Development, Australian Institute of Sport, Canberra, Australia 2616

⁵University College Zealand, Akerhus, Denmark

⁶Physiology, Australian Institute of Sport, Canberra, Australia 2616

⁷Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, UK

Key points

- Three weeks of intensified training and mild energy deficit in elite race walkers increases peak aerobic capacity independent of dietary support.
- Adaptation to a ketogenic low carbohydrate, high fat (LCHF) diet markedly increases rates of whole-body fat oxidation during exercise in race walkers over a range of exercise intensities.
- The increased rates of fat oxidation result in reduced economy (increased oxygen demand for a given speed) at velocities that translate to real-life race performance in elite race walkers.
- In contrast to training with diets providing chronic or periodised high carbohydrate availability, adaptation to an LCHF diet impairs performance in elite endurance athletes despite a significant improvement in peak aerobic capacity.

Abstract We investigated the effects of adaptation to a ketogenic low carbohydrate (CHO), high fat diet (LCHF) during 3 weeks of intensified training on metabolism and performance of world-class endurance athletes. We controlled three isoenergetic diets in elite race walkers: high CHO availability ($\text{g kg}^{-1} \text{day}^{-1}$: 8.6 CHO, 2.1 protein, 1.2 fat) consumed before, during and after training (HCHO, $n = 9$); identical macronutrient intake, periodised within or between days to alternate between low and high CHO availability (PCHO, $n = 10$); LCHF ($< 50 \text{ g day}^{-1}$ CHO; 78% energy as fat; $2.1 \text{ g kg}^{-1} \text{day}^{-1}$ protein; LCHF, $n = 10$). Post-intervention, $\dot{V}_{\text{O}_{2\text{peak}}}$ during race walking increased in all groups ($P < 0.001$, 90% CI: 2.55, 5.20%). LCHF was associated with markedly increased rates of whole-body fat oxidation, attaining peak rates of $1.57 \pm 0.32 \text{ g min}^{-1}$ during 2 h of walking at $\sim 80\% \dot{V}_{\text{O}_{2\text{peak}}}$. However, LCHF also increased the oxygen (O_2) cost of race walking at velocities relevant to real-life race performance: O_2 uptake (expressed as a percentage of new $\dot{V}_{\text{O}_{2\text{peak}}}$) at a speed approximating 20 km race pace was reduced in HCHO and PCHO (90% CI: -7.047 , -2.55 and -5.18 , -0.86 , respectively), but was maintained at pre-intervention levels in LCHF. HCHO and PCHO groups improved times for 10 km race walk: 6.6% (90% CI: 4.1, 9.1%) and 5.3% (3.4, 7.2%), with no improvement (-1.6% (-8.5 , 5.3%)) for the LCHF group. In contrast to training with diets providing chronic or periodised high-CHO availability, and despite a significant improvement in $\dot{V}_{\text{O}_{2\text{peak}}}$, adaptation to the topical LCHF diet negated performance benefits in elite endurance athletes, in part due to reduced exercise economy.

(Received 17 August 2016; accepted after revision 23 November 2016; first published online 23 December 2016)

Corresponding author L. M. Burke: AIS Sports Nutrition, Leverrier Crescent, Bruce, ACT, Australia 2616. Email: louise.burke@ausport.gov.au



Low carbohydrate, high fat diet impairs exercise economy and negates the performance benefit from intensified training in elite race walkers.

Burke LM^{1,2}, Ross ML^{1,2}, Garvican-Lewis LA^{1,2}, Welvaert M^{3,4}, Heikura IA^{1,2}, Forbes SG¹, Mirtschin JG¹, Cato LE¹, Strobel N⁵, Sharma AP⁶, Hawley JA^{2,7}.

 **Author information**

Adaptation to a ketogenic low carbohydrate (CHO), high fat diet (LCHF) during 3 weeks of intensified training on metabolism and performance of world-class endurance athletes.

Low carbohydrate, high fat diet impairs exercise economy and negates the performance benefit from intensified training in elite race walkers.

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Three isoenergetic diets in elite race walkers:

1. high CHO availability consumed before, during and after training
2. identical macronutrient intake, periodised within or between days (to alternate between low and high CHO availability)
3. LCHF.

Low carbohydrate, high fat diet impairs exercise economy and negates the performance benefit from intensified training in elite race walkers.



Burke LM^{1,2}, Ross ML^{1,2}, Garvican-Lewis LA^{1,2}, Welvaert M^{3,4}, Heikura IA^{1,2}, Forbes SG¹, Mirtschin JG¹, Cato LE¹, Strobel N⁵, Sharma AP⁶, Hawley JA^{2,7}.

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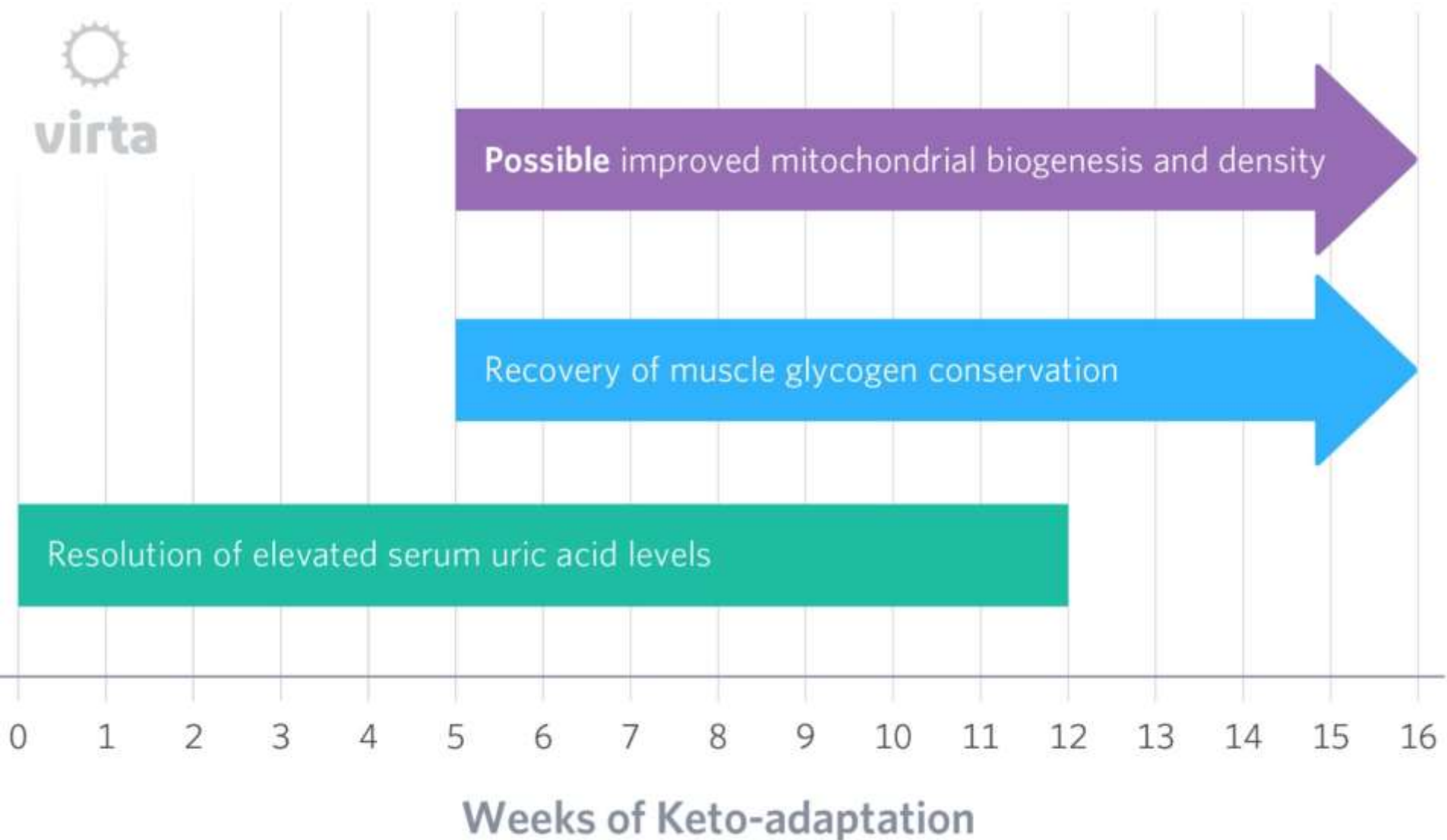
In contrast to training with diets providing chronic or periodised high carbohydrate availability, adaptation to an LCHF diet **impairs performance** in elite endurance athletes despite a significant improvement in peak aerobic capacity



Keto-Adaptation

 Stephen Phinney, MD, PhD  Jeff Volek, PhD, RD on January 23, 2018

“ While a ketogenic diet can put you into a state of nutritional ketosis in a matter of days, it can take weeks to months to become fully keto adapted.





Available online at www.sciencedirect.com

Metabolism

www.metabolismjournal.com



Keto-adaptation enhances exercise performance and body composition responses to training in endurance athletes



Fionn T. McSwiney^a, Bruce Wardrop^a, Parker N. Hyde^b, Richard A. Lafountain^b, Jeff S. Volek^b, Lorna Doyle^{a,*}

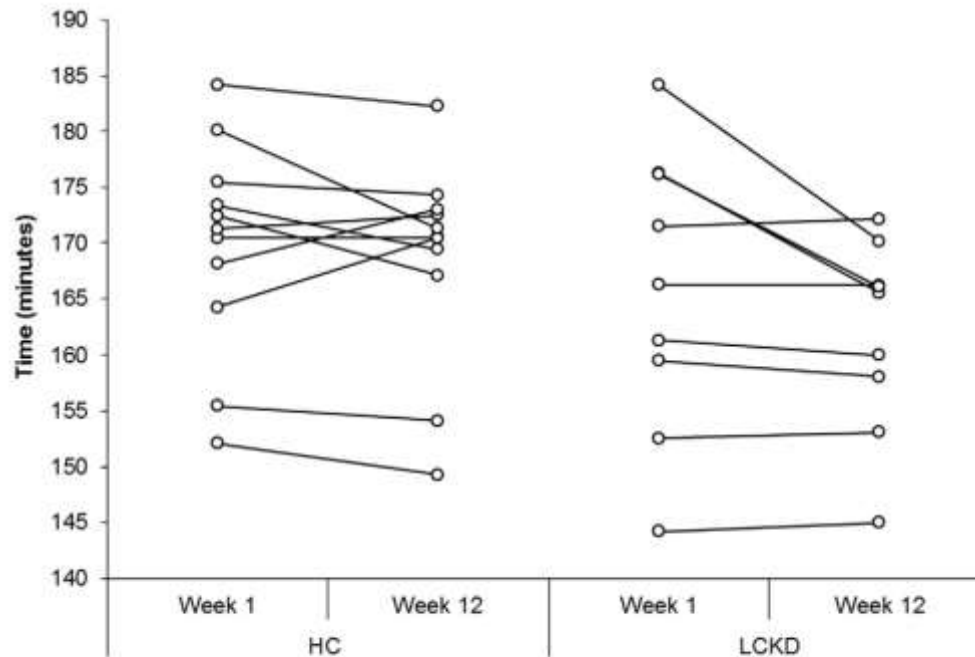
^a Department of Sport, and Exercise Science, Waterford Institute of Technology, Waterford, Ireland

^b Kinesiology Program, Department of Human Sciences, The Ohio State University, Columbus, OH, USA

12 weeks diet and training

LCKD group

- ↓ Body mass (5.9 vs 0.8kg)
- ↓ % body fat (5.2 vs 0.7)
- No change 100km time trial



2 - Individual 100 km TT times for HC, and LCKD groups at pre and post-intervention testing.

LCKD group

- ↑ SS sprint peak power
- ↑ Critical power test (peak)
- No change in average powers
- Significant change in RER

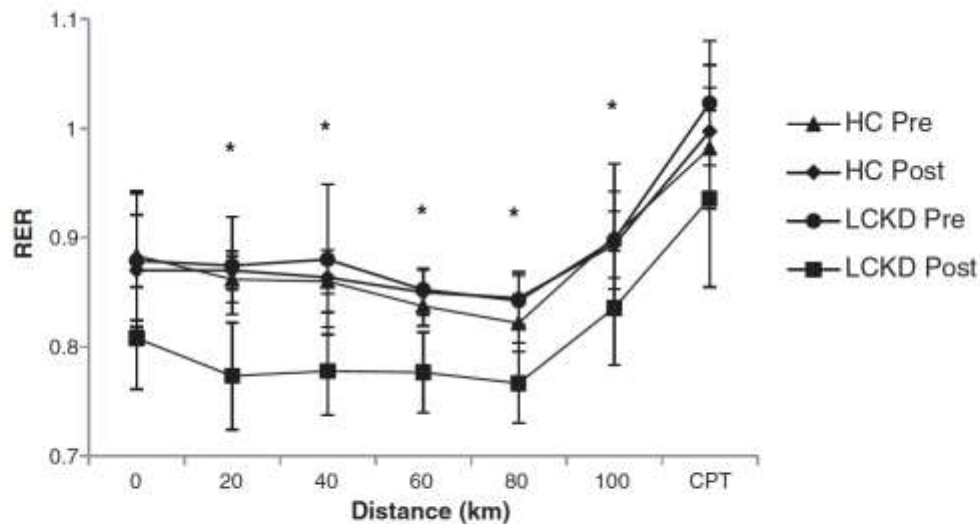


Fig. 3 - RER for HC and LCKD groups at 0 km, 20 km, 40 km, 60 km, 80 km, 100 km and CPT data points, at pre and post-intervention testing. *Indicates significant ($P < 0.05$) difference from ANCOVA, with changes within the LCKD group.



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Metabolism

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Keto-adaptation enhances exercise performance and body composition responses to training in endurance athletes



Fionn T. McSwiney^a, Bruce Wardrop^a, Parker N. Hyde^b, Richard A. Lafountain^b,
Jeff S. Volek^b, Lorna Doyle^{a,*}

^a Department of Sport, and Exercise Science, Waterford Institute of Technology, Waterford, Ireland

^b Kinesiology Program, Department of Human Sciences, The Ohio State University, Columbus, OH, USA

LCKD participants noted a drop in energy levels, and performance during the first 7–10, and a “lag” in performance for the first 4–6 weeks.

It is important to highlight that the LCKD diet **may not be suitable for everyone**, 5 participants found the LCKD diet too difficult to adhere to, and two participants were unable to complete post-intervention testing.

Additional advantages of LCHF/keto

- Weight loss, ↑ power/weight ratio
- Metabolic health
 - Long term effects of high carb intake?
- Recovery
- Reduced inflammation
- Reduced need to re-fuel during activity

What we know

- LCHF/keto diets increase fat oxidation
- Anecdotally some athletes esp endurance athletes perform better on LCHF/keto
- High intensity activity appears to be compromised with LCHF/keto
- Research evidence is not clear – more high quality studies need to be done

What we don't know

- How long does it take to fully adapt?
- With full adaptation, does endurance performance improve?
- What about other sports?
 - Strength, high intensity intermittent



What I suspect

- There is considerable individual variation
 - Responders and non-responders
- LCHF/keto generally better for ultra-endurance, moderate intensity
- Most need additional carbs for high intensity
- Train low, compete high

What do I tell my athletes

- Your basic diet should be low carb, healthy fat, real food avoiding sugar, processed foods and seed oils
- Give yourself plenty of time to adapt to the change of eating pattern
- You may find that you need to top up with some carbs before and/or during higher intensity activity
- Everyone is different, find what works for you



Thank you