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CONFLICT OF INTEREST STATEMENT

Shawn Arent currently has, or has had in the past 2 years, an affiliation or financial interest with Department of Defense, SOCOM, USMC, Danone, and Dymatize Nutrition around this presentation, including:

- Consulting
- Honoraria
- Research funding

Michelle Arent has no actual or potential conflict of interest in relation to this presentation.

OPTIMIZING BODY COMPOSITION, METABOLISM, & HEALTH: *TRAINING AND NUTRITION CONSIDERATIONS FOR WEIGHT LOSS*

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Optimizing Body Composition, Metabolism, and Health:

Training and nutrition considerations for weight loss

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Weight Loss vs Fat Loss

Weight loss

- Loss of mass
- Smaller number appears on scale
- Potential health impact
- Feelings of ‘success’ scale dependent

Fat loss

- Loss of fat mass
- Scale may or may not change
- Potential health impact
- Body recomposition

Optimized for Long-Term Success

Success defined by positive impact on body composition, metabolism, *and* health

- Caloric deficit required; more than one way to do that, however…
- Do no harm
- Above all else, protect muscle
  - "health savings account"
- Improved functionality; ADLs
- Look good, feel good

"I Want to Lose Weight."

What does your client really mean?

- "I need to see a smaller number on the scale."
- "My doctor told me I need to lose weight."
- "I'm not comfortable in my skin."
- "I don't like what I see in the mirror."
- "I'm unhappy and my weight must be the reason why."
- "I'm frustrated and losing weight will make me feel better."

Knowing Their 'WHY'

Getting comfortable asking deeper questions

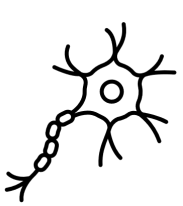
"I need to see a smaller number on the scale."

- Why?
- What will that mean to you?
- What does that signify for you?
- Will that 'solve' the problem?

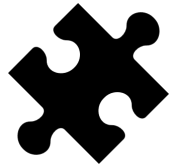
* Connecting with true driving factor will help when the going gets tough!

Complexity of the Human System

- Complex interplay between hormones and body systems
- Impossible to change one without affecting another
- Often presented from one viewpoint only
- Optimization of metabolism and health during weight loss requires us to look at the bigger picture



Pieces of the Puzzle



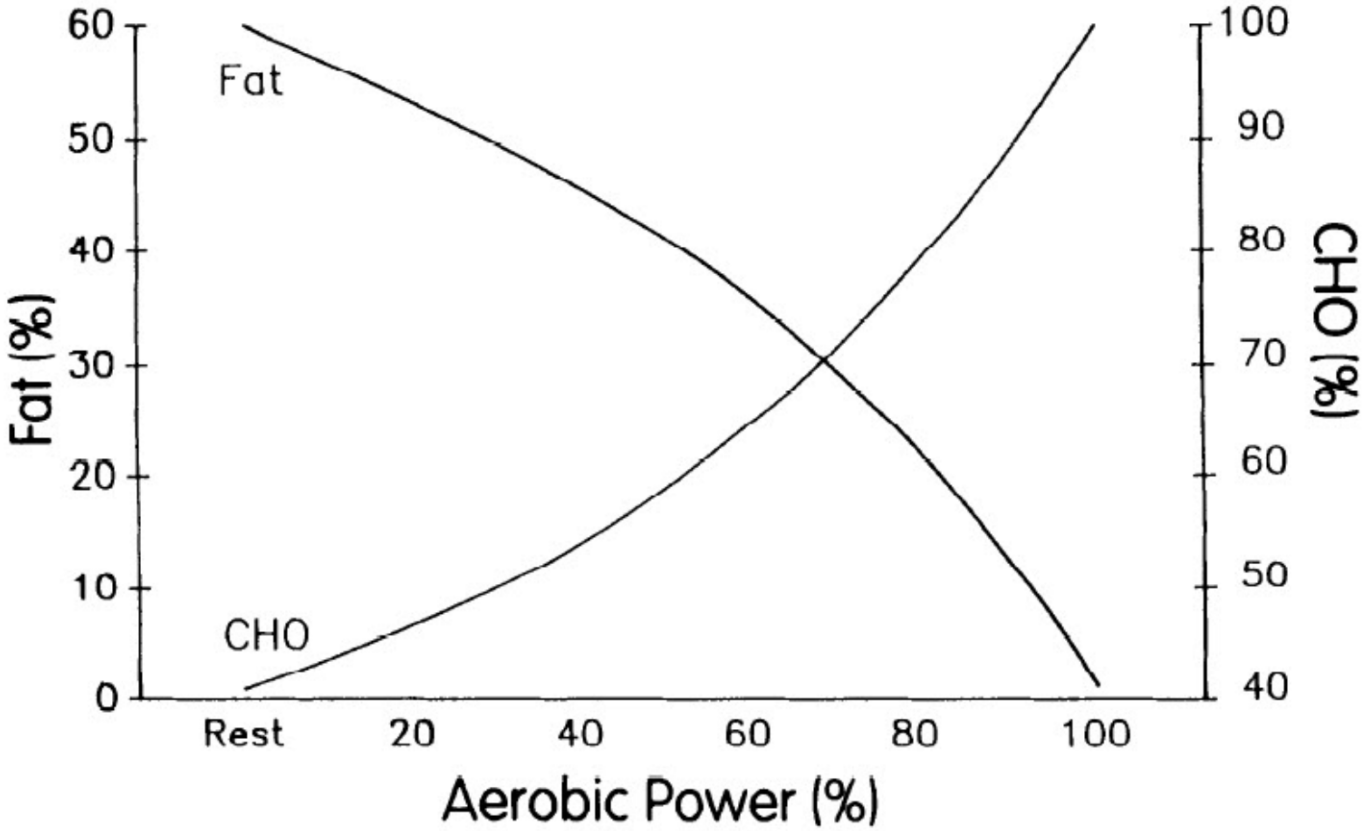
- Energy expenditure (physical activity and structured exercise)
- Energy intake (nutrition)
- Stress (mental health)
- Sleep

Physical Activity

It all counts

- Walking the dog
- Gardening
- Cleaning the house
- Movement throughout the workday
  - Take the stairs

"I Want Weight Loss, So I'll Focus on Fat-Burning Exercise"



Brooks, Fahey, Baldwin. Exercise Physiology Human Bioenergetics and Its Applications. 2005

Fat Utilization vs Fat Loss

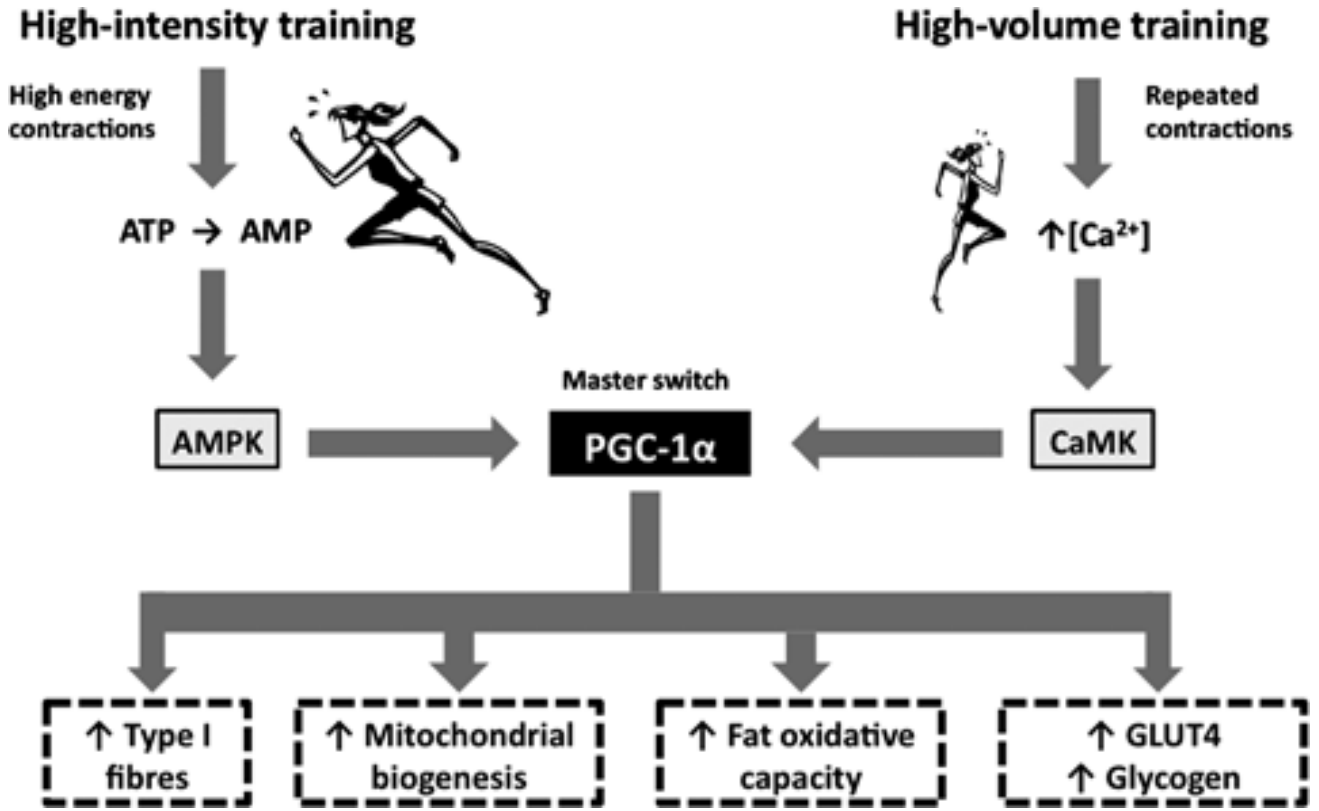
- Within session vs whole day
- Long term/chronic adaptations
- Improve fitness, improve fat utilization
- Ironically, “leanness” impacts ability to oxidize fat

Structured "Cardio" Exercise

- **Intervals/Metcon** –multiple modalities; rest interval may change based on client/athlete characteristics/needs

- **HIIT**- typically single modality focused on performance goal
  - Long-intervals (LIT) vs short/sprint intervals (SIT)
  - Typically based on %MHR or %Power

- **Steady state**
  - "Moderate intensity cardiovascular training" (MICT)



Scandinavian Journal of Medicine & Science in Sports, Volume: 20, Issue: s2, Pages: 1-10, First published: 14 September 2010, DOI: (10.1111/j.1600-0838.2010.01184.x)

Same output…different input

Burn, Baby, Burn! The Role of EPOC?

Townsend, R.J. et al.: EXCESS POST-EXERCISE OXYGEN CONSUMPTION (EPOC)... Kinesiology 45(2013) 1:16-21

EXCESS POST-EXERCISE OXYGEN CONSUMPTION (EPOC) FOLLOWING MULTIPLE EFFORT SPRINT AND MODERATE AEROBIC EXERCISE

Jeremy R. Townsend[1], Jeffrey R. Stout[1], Aaron B. Morton[2], Adam R. Jajtner[1], Adam M. Gonzalez[1], Adam J. Wells[1], Gerald T. Mangine[1], William P. McCormack[1], Nadia S. Emerson[1], Edward H. Robinson IV[1], Jay R. Hoffman[1], Maren S. Fragala[1] and Ludmila Cosio-Lima[2]

[1]Institute of Exercise Physiology & Wellness, University of Central Florida, Orlando, FL, USA
[2]University of West Florida, Pensacola, FL, USA

Wingfield et al. Sports Medicine - Open (2015) 1:11
DOI 10.1186/s40798-015-0010-3

Sports Medicine – Open
a SpringerOpen Journal

ORIGINAL RESEARCH ARTICLE Open Access

The acute effect of exercise modality and nutrition manipulations on post-exercise resting energy expenditure and respiratory exchange ratio in women: a randomized trial

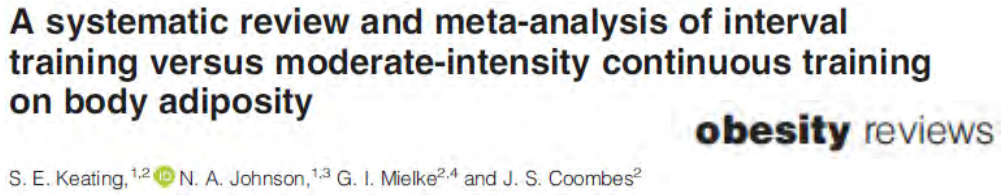
Hailee L Wingfield[1], Abbie E Smith-Ryan[1*], Malia N Melvin[1], Erica J Roelofs[1], Eric T Trexler[1], Anthony C Hackney[1,2], Mark A Weaver[3] and Eric D Ryan[1]

High-intensity interval exercise induces 24-h energy expenditure similar to traditional endurance exercise despite reduced time commitment

Lauren E. Skelly, Patricia C. Andrews, Jenna B. Gillen, Brian J. Martin, Michael E. Percival,

Impacts on Body Composition & Training Outcomes

- Body fat



- Muscle
- Issues with considering modality in isolation?
- HIIT may "match" better with RT, but is that also "too much of a good thing"?
  - Flockhart et al. (2021) – 5 d of HIIT per week led to mitochondrial dysfunction and impaired glucose tolerance
  - …or did it?

- HIIT can increase muscle CSA in overweight/untrained individuals
- There may be sex differences in protein synthesis and mitochondrial biogenesis, even if performance changes are similar

Lift Things Up and Put Them Down

The role of resistance exercise

- Resistance exercise is one of the only ways to truly change the shape of your body
- Building and preserving lean tissue (muscle) is one of the most important factors for lifelong health and function
  - Worry less about adding years to your life and more about adding life to your years
- Changes in RMR – small but mighty?

Lift Things Up and Put Them Down

The role of resistance exercise

- RE positively impacts EPOC – in some cases producing a modest increase even 1-2 days later (Melby et al., 2003; Scheunke et al., 2002)
  - Also positively impacts the fuel MIX in favor of fat oxidation
- A caloric deficit will ultimately have a negative impact on RMR, but RE can offset this and help maintain lean mass

Clinical Nutrition 38 (2019) 372–382

Contents lists available at ScienceDirect

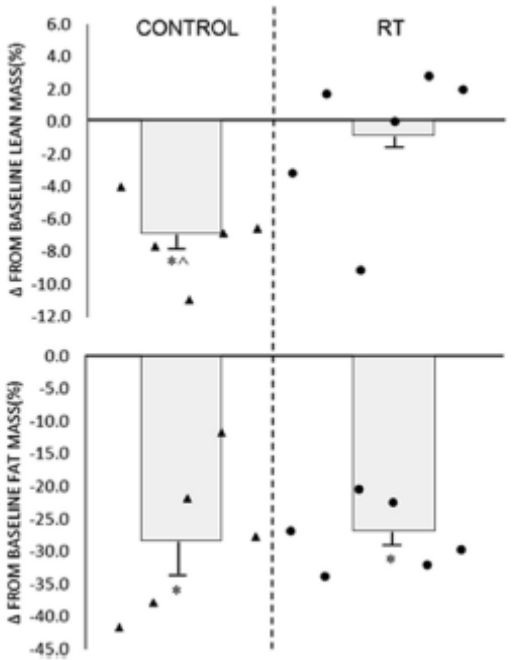
Clinical Nutrition

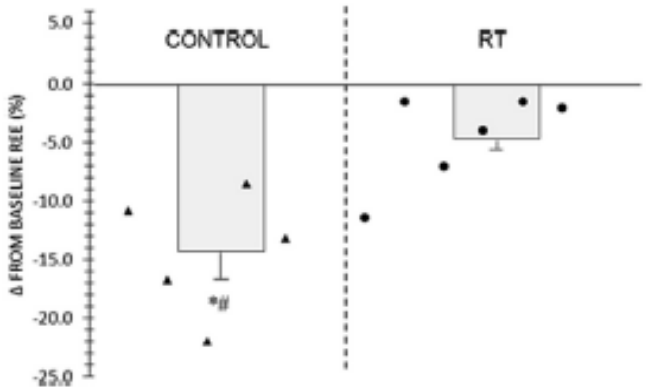
journal homepage: http://www.elsevier.com/locate/clnu

Original article

Resistance training during a 12-week protein supplemented VLCD treatment enhances weight-loss outcomes in obese patients

Edward Jo [a], Phillip R. Worts [b], Marcus L. Elam [a], Ann Frost Brown [e], Andy V. Khamoui [f], Do-Houn Kim [b], Ming-Chia Yeh [b], Michael J. Ormsbee [b, c, d], Carla M. Prado [g], Angelina Cain [h], Katie Snyder [h], Jeong-Su Kim [b, c, *]





Resistance Exercise and Adipose Tissue

- In addition to positive effects on muscle, RE also has a positive impact on both lipolysis AND fat oxidation!
- Muscle → Fat communication
- This can occur both during and after the RE bout (Allman et al., 2019; Ormsbee et al., 2007)
  - Over 70% greater than control condition in some cases
- The notable rise in GH, E, & NE with RE appears to play an important role
  - Cytokines also impact lipolysis and glucose regulation

Resistance Exercise and Adipose Tissue

- Obesity blunts this hormonal response and also decreases the lipolytic and fat oxidation effects (Ormsbee et al., 2009)
  - α_2-AR sensitivity plays a role (Stich et al., 2000)
- RE still has a positive effect on this response, though (Chatzinikolaou et al., 2008)
  - Leaner individuals are just more “efficient” at oxidizing fat

So Which Modality Has the Biggest Impact on Obesity?

Comparative Exercise Physiology, 2017; 13 (4): 227-235

Wageningen Academic Publishers

Postprandial hormone response after endurance or resistance exercise in obese women

P.M. Davitt[1#], G.C. Henderson[3#], A.J. Walker[4] and S.M. Arent[2,4*#]

J Appl Physiol 114: 1743–1754, 2013.
First published April 11, 2013; doi:10.1152/japplphysiol.00095.2013.

Postprandial triglyceride and free fatty acid metabolism in obese women after either endurance or resistance exercise

Patrick M. Davitt,[1] Shawn M. Arent,[1] Marc A. Tuazon,[1,2] Devon L. Golem,[1] and Gregory C. Henderson[1,2]

Which Modality is Most Important for Fat Loss and Metabolism?

- Yes.
- Concurrent training = best of both worlds
- Combination of RE & AE produced the greatest changes in VAT, BM, %BF, insulin sensitivity, and HDL-C (Said et al., IN PRESS; Waters et al., 2021)
- A sweet-spot for METCON?!
- Recent metabolomic evidence suggests exercise…is exercise!

- RE can enhance fat oxidation in subsequent AE bout (particularly if closer in time) (Goto et al., 2007)

RE & AE: Does Order Matter?

THE EFFECTS OF A COMBINED RESISTANCE TRAINING AND ENDURANCE EXERCISE PROGRAM IN INACTIVE COLLEGE FEMALE SUBJECTS: DOES ORDER MATTER?

PATRICK M. DAVITT,[1] JOSEPH K. PELLEGRINO,[2] JARRETT R. SCHANZER,[2] HARISICS TJIONAS,[2] AND SHAWN M. ARENT[2]

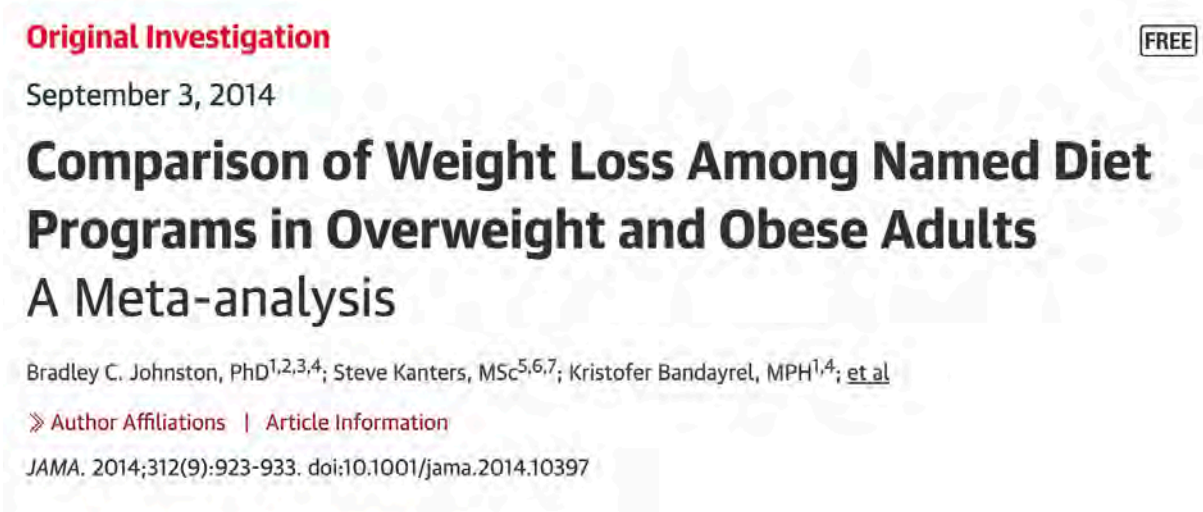
J Strength Cond Res 28(7): 1937–1945, 2014

General Exercise Prescription Considerations

- Enjoyable-ish
- Sustainable; discipline beats motivation
- Timeline to assess progress, celebrate wins, revisit goals
- Interval or HIIT + SS + RE + PA
- Order may matter more with increasing levels of fitness
- Don’t forget to recover

Nutritional Considerations for Optimizing Body Composition, Metabolism and *Health During Weight Loss*

Which 'Diet' is Best for Weight Loss?



Original Investigation

FREE

September 3, 2014

Comparison of Weight Loss Among Named Diet Programs in Overweight and Obese Adults

A Meta-analysis

Bradley C. Johnston, PhD[1,2,3,4]; Steve Kanters, MSc[5,6,7]; Kristofer Bandayrel, MPH[1,4]; et al

» Author Affiliations | Article Information

JAMA. 2014;312(9):923-933. doi:10.1001/jama.2014.10397

✓ The one they will do

Beware of Nutrient Deficiencies

International Journal of Sport Nutrition and Exercise Metabolism, (Ahead of Print)
https://doi.org/10.1123/ijsnem.2017-0323

Human Kinetics
ORIGINAL RESEARCH

A Comparison of the Nutrient Intakes of Macronutrient-Based Dieting and Strict Dieting Bodybuilders

Ahmed Ismaeel, Suzy Weems, and Darryn S. Willoughby
Baylor University

- IIFYM vs Strict
  - No diff between macro intake for men between groups
  - Strict dieting females consumed less of each macro vs IIFYM females
  - Greater proportion of IIFYM met RDA/AI micronutrients…HOWEVER many deficient in both groups (both sexes deficient in A, D, E, Potassium, fiber; women also deficient in iron)

I Want to Lose it 'Quick'

Original Article
OBESITY BIOLOGY AND INTEGRATED PHYSIOLOGY

Obesity

Metabolic Adaptation Following Massive Weight Loss is Related to the Degree of Energy Imbalance and Changes in Circulating Leptin

Nicolas D. Knuth[1], Darcy L. Johannsen[2]*, Robyn A. Tamboli[3], Pamela A. Marks-Shulman[3], Robert Huizenga[4], Kong Y. Chen[1], Naji N. Abumrad[3], Eric Ravussin[2] and Kevin D. Hall[1]*

Received: 30 January 2014; **Accepted:** 20 August 2014; **Published online 00 Month 2014. doi:10.1002/oby.20900**

- 1 year: RMR decreased ~ 600 kcal/d which was 400 kcal/d more than expected

Weight Loss, or Maintenance of Loss?

Original Article
ENERGY EXPENDITURE AND WEIGHT CONTROL

Obesity

Persistent Metabolic Adaptation 6 Years After "The Biggest Loser" Competition

Erin Fothergill[1], Juen Guo[1], Lilian Howard[1], Jennifer C. Kerns[2], Nicolas D. Knuth[3], Robert Brychta[1], Kong Y. Chen[1], Monica C. Skarulis[1], Mary Walter[1], Peter J. Walter[1], and Kevin D. Hall[1]

Obesity (2016) **24**, 1612-1619. doi:10.1002/oby.21538

- Baseline RMR 2,607 ± 649kcal/d
- 30 week RMR 1,996 ± 385 kcal/d
- 6 year RMR 1,903 ± 466 kcal/d *

*despite weight regain

Nutrients Matter

The FASEB Journal • Research Communication

Effects of high-protein diets on fat-free mass and muscle protein synthesis following weight loss: a randomized controlled trial

Stefan M. Pasiakos,*,[1] Jay J. Cao,[†] Lee M. Margolis,* Edward R. Sauter,[‡] Leah D. Whigham,[†] James P. McClung,* Jennifer C. Rood,[§] John W. Carbone,[‖] Gerald F. Combs, Jr.,[†] and Andrew J. Young*

2013. The FASEB Journal, *27*(9), 3837-3847.

Progressive bone mineral content loss in children with intractable epilepsy treated with the ketogenic diet

AG Christina Bergqvist, Joan I Schall, Virginia A Stallings, Babette S Zemel

Author Notes

The American Journal of Clinical Nutrition, Volume 88, Issue 6, December 2008, Pages 1678–1684, https://doi.org/10.3945/ajcn.2008.26099

Published: 01 December 2008 **Article history**

ORIGINAL RESEARCH article

Front. Endocrinol., 21 January 2020 | https://doi.org/10.3389/fendo.2019.00880

A Short-Term Ketogenic Diet Impairs Markers of Bone Health in Response to Exercise

Ida A. Heikura[1,2†], Louise M. Burke[1,2*†], John A. Hawley[2], Megan L. Ross[1,2], Laura Garvican-Lewis[1,2], Avish P. Sharma[1,3], Alannah K. A. McKay[1,4], Jill J. Leckey[2], Marijke Welvaert[1,5,6], Lauren McCall[7] and Kathryn E. Ackerman[7,8]

Simple vs Complex

Dietary Fiber Decreases the Metabolizable Energy Content and Nutrient Digestibility of Mixed Diets Fed to Humans[1]

David J. Baer,[2] William V. Rumpler, Carolyn W. Miles and George C. Fahey, Jr.*

*U.S. Department of Agriculture, Agricultural Research Service, Diet and Human Performance Laboratory, Beltsville Human Nutrition Research Center, Beltsville, MD 20705 and *Department of Animal Sciences, University of Illinois, Urbana, IL 61801*

- ↑ fiber ↓ ME from FAT, PRO
- "Interactions among fiber, protein, and fat affect the digestibility of nutrients and ME available from mixed diets."
- Important gut health

Energetic consequences of thermal and nonthermal food processing

Rachel N. Carmody[a,1], Gil S. Weintraub[a], and Richard W. Wrangham[a,b]

[a]Department of Human Evolutionary Biology, Peabody Museum, Harvard University, Cambridge, MA 02138; and [b]Stellenbosch Institute for Advanced Study (STIAS), Wallenberg Research Centre at Stellenbosch University, Stellenbosch 7600, South Africa

Edited by James O'Connell, University of Utah, Salt Lake City, UT, and approved October 6, 2011 (received for review July 26, 2011)

- Mice fed cooked tubers ↑ energy gain & weight; those fed raw tubers ↓energy gain & weight
- Mice fed cooked meat ↑energy gain
- Mice fed raw meat ↓ energy gain

Processed and Ultra-Processed Foods

International Journal of Obesity (2008) 32, 322–328

0307-0565/08 $30.00
www.nature.com/ijo

ORIGINAL ARTICLE

Peanut digestion and energy balance

CJ Traoret[1], P Lokko[2], ACRF Cruz[3], CG Oliveira[3], NMB Costa[3], J Bressan[3], RCG Alfenas[3] and RD Mattes[1]

[1]*Department of Foods and Nutrition, Purdue University, West Lafayette, IN, USA;* [2]*Food Research Institute, Accra, Ghana and* [3]*Universidade Federal de Vicosa, Vicosa, Brazil*

- 70g of peanuts, peanut butter, peanut oil, or peanut flour for 7-9 days
- ↑ fat excreted in feces for peanut group
- ↓ fat excreted in feces in peanut butter and peanut flour

- Whole food sandwich vs processed food sandwich
- Whole food energy expenditure
  - 137 ±4.1 kcal, 19.9% of meal energy
- Processed food
  - 73 ± 10.2 kcal, 10.7% of meal energy

Postprandial energy expenditure in whole-food and processed-food meals: implications for daily energy expenditure

Sadie B. Barr and Jonathan C. Wright*

Health Impact of Processed and Ultra-Processed Foods

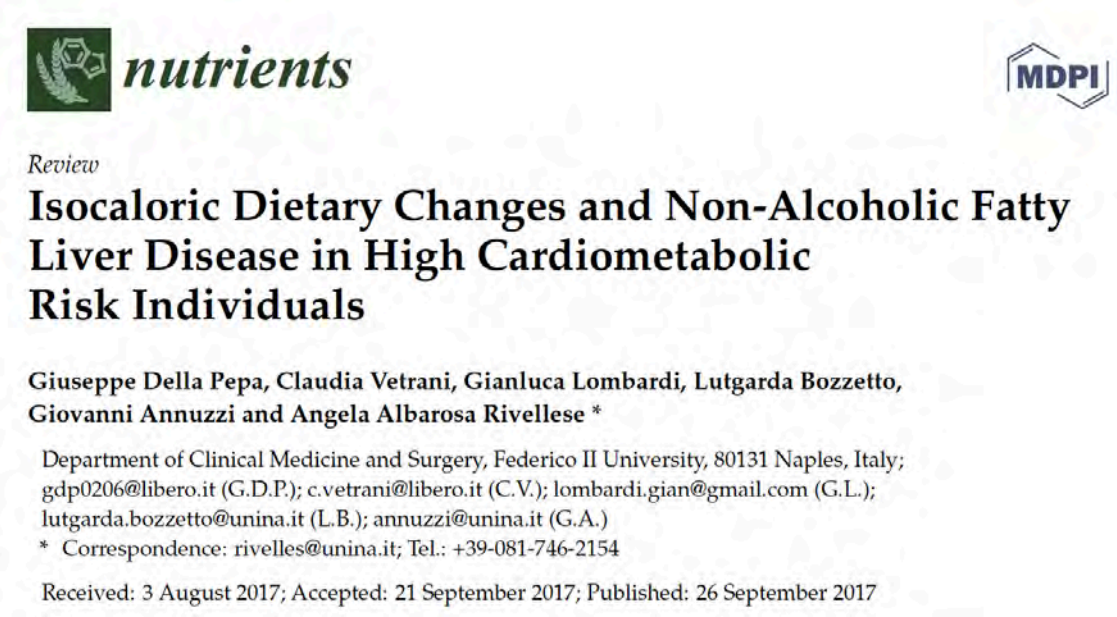
Published in final edited form as:
Obesity (Silver Spring). 2016 February ; 24(2): 453–460. doi:10.1002/oby.21371.

Isocaloric fructose restriction and metabolic improvement in children with obesity and metabolic syndrome

Robert H. Lustig, M.D., M.S.L.[1], **Kathleen Mulligan, Ph.D.**[2,4], **Susan M. Noworolski, Ph.D.**[3], **Viva W. Tai, R.D., M.P.H.**[2], **Michael J. Wen, M.S.**[2], **Ayca Erkin-Cakmak, M.D., M.P.H.**[1], **Alejandro Gugliucci, M.D., Ph.D.**[4], and **Jean-Marc Schwarz, Ph.D.**[5]

- Children w/MetS; 9 days
- Total CHO, calories maintained (% macros maintained); replaced added sugars with whole foods:
    - no weight loss (.9kg)
    - signif ↓DBP; ↓fasting glucose;↓ fasting insulin;↓ HOMA-IR; ↓LDL
- Effects independent of caloric value or △ weight

Health Impact of Processed and Ultra-Processed Foods



nutrients

MDPI

Review

Isocaloric Dietary Changes and Non-Alcoholic Fatty Liver Disease in High Cardiometabolic Risk Individuals

Giuseppe Della Pepa, Claudia Vetrani, Gianluca Lombardi, Lutgarda Bozzetto, Giovanni Annuzzi and Angela Albarosa Rivellese *

Department of Clinical Medicine and Surgery, Federico II University, 80131 Naples, Italy; gdp0206@libero.it (G.D.P.); c.vetrani@libero.it (C.V.); lombardi.gian@gmail.com (G.L.); lutgarda.bozzetto@unina.it (L.B.); annuzzi@unina.it (G.A.)

* Correspondence: rivelles@unina.it; Tel.: +39-081-746-2154

Received: 3 August 2017; Accepted: 21 September 2017; Published: 26 September 2017

- Only difference: nutrient quality
- PUFA and MUFA ↓liver fat compared to SFA
- High GI CHO ↑liver fat; Low GI CHO↓liver fat (7 days)
- High fiber foods ↓*de novo* lipogenesis

Nutrition to Support Metabolism and Health

Protein-Pacing Caloric-Restriction Enhances Body Composition Similarly in Obese Men and Women during Weight Loss and Sustains Efficacy during Long-Term Weight Maintenance

by Paul J. Arciero [1,*], Rohan Edmonds [1], Feng He [1,2], Emery Ward [1], Eric Gumpricht [3], Alex Mohr [3], Michael J. Ormsbee [4,5] and Arne Astrup [6]

1 Human Nutrition and Metabolism Laboratory, Health and Exercise Sciences Department, Skidmore College, Saratoga Springs, NY 12866, USA
2 Department of Kinesiology, California State University-Chico, Chico, CA 95929, USA
3 Isagenix International LLC, Gilbert, AZ 85297, USA
4 Department of Nutrition, Food and Exercise Sciences, Florida State University, Tallahassee, FL 32306, USA
5 Department of Biokinetics, Exercise and Leisure Sciences, University of KwaZulu-Natal, Durban 4000, South Africa
6 Department of Nutrition, Exercise and Sports, University of Copenhagen, København 1017, Denmark
* Author to whom correspondence should be addressed.

Nutrients **2016**, *8*(8), 476; https://doi.org/10.3390/nu8080476

- 6 meals/d, 30% protein with 25% caloric restriction for WL
- Then modified higher protein for WM vs 'HH' 3 meals/d, 15% pro
- Higher protein regained less wt, total fat, and abdominal fat at I year

Nutrition to Support Metabolism and Health

Open Access | Published: 26 March 2014

Interventions and public health nutrition

Weight loss effects from vegetable intake: a 12-month randomised controlled trial

L C Tapsell ✉, M J Batterham, R L Thorne, J E O'Shea, S J Grafenauer & Y C Probst

European Journal of Clinical Nutrition **68**, 778–785 (2014) | Cite this article

↑ Veggie intake corresponded to weight loss

- 5 servings of veggies/d, no PA
- .5 cup cooked, 1 cup raw vs 1 cup cooked, 2 cups raw
- Increased HDL, decreased fasting insulin, decreased waist circumference
- Decreased hunger, decreased desire for sweets with greater veggie intake
- Weight lost at 3 months maintained at 12 months
- Need awareness of calories and macronutrient contribution, not just 'counting macros'

Nutrient Timing

Morning Meal More Efficient for Fat Loss in a 3-Month Lifestyle Intervention

Mauro Lombardo, MD, Alfonso Bellia, MD, PhD, Elvira Padua, PhD, Giuseppe Annino, PhD, Valeria Guglielmi, MD, PhD, Monica D'Adamo, MD, PhD, Ferdinando Iellamo, MD, PhD, Paolo Sbraccia, MD, PhD

San Raffaele Rome Open University (M.L., E.P.), Department of Systems Medicine (M.L., A.B., V.G., M.D., P.S.), and School of Human Movement Science, Faculty of Medicine and Surgery, Tor Vergata University (E.P., F.I.), Rome, ITALY

- 600 kcal/d deficit Mediterranean-style diet
- 70% morning/afternoon, 30% evening vs 55% morning/afternoon, 45% evening
- Both improved BP and lipid profile
- Morning group lost more weight, FM, greater decrease waist circumference, greater improvement HOMA-IR

- Eating veggies and protein first lower post meal glucose and insulin response

Nutrition and Exercise

Published: 31 May 2005

Long-term weight loss after diet and exercise: a systematic review

C C Curioni & P M Lourenço

International Journal of Obesity **29**, 1168–1174 (2005) | Cite this article

20% greater initial weight loss with exercise
20% greater sustained wt loss at 1 yr
BUT both groups regained ~1/2 wt lost by 1 yr

Nutrient Intake With Training

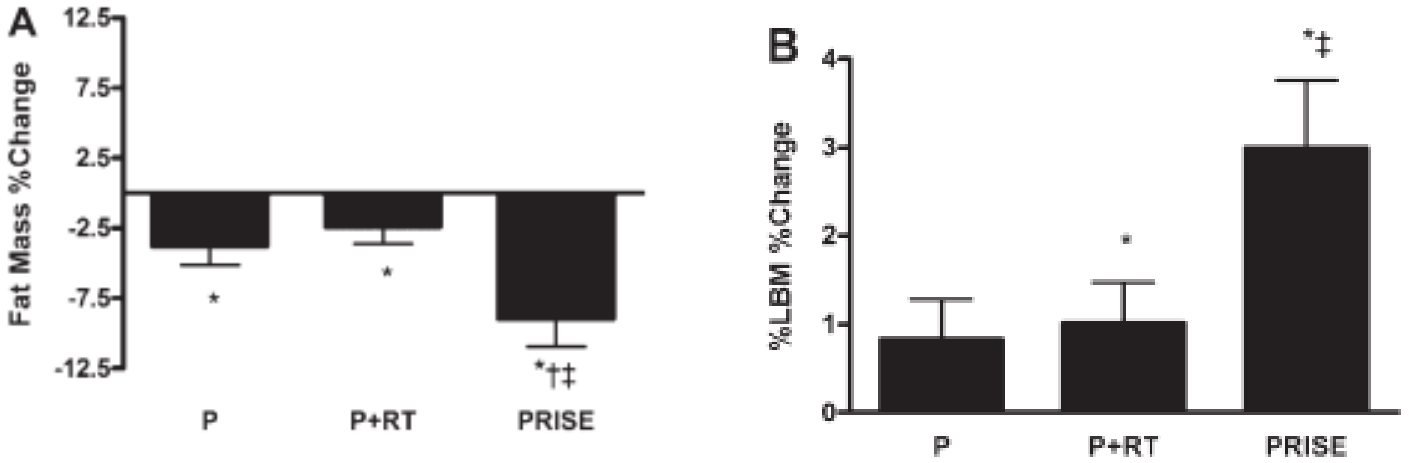
J Appl Physiol 117: 1–10, 2014.
First published May 15, 2014; doi:10.1152/japplphysiol.00152.2014.

Timed-daily ingestion of whey protein and exercise training reduces visceral adipose tissue mass and improves insulin resistance: the PRISE study

Paul J. Arciero,[1] Daniel Baur,[2] Scott Connelly,[3] and Michael J. Ormsbee[2,4]
[1]*Skidmore College, Human Nutrition and Metabolism Laboratory, Health and Exercise Sciences Department, Saratoga Springs, New York;* [2]*Florida State University, Department of Nutrition, Food and Exercise Sciences, Tallahassee, Florida;* [3]*Scott Connelly Foundation, Corona Del Mar, California; and* [4]*University of KwaZulu-Natal, Durban, South Africa*

Submitted 18 February 2014; accepted in final form 14 May 2014

Journal of the American College of Nutrition, Vol. 33, No. 3, 198–205 (2014) © American College of Nutrition
Published by Taylor & Francis Group, LLC



- 20g WP, 3X/day added to habitual diet of overweight/obese men/women for 16 weeks.
- HOMA-IR improved, leptin decreased, adiponectin increased only in P +RT and PRISE group

Nutrient Intake With Training

Original Research Article | Open Access | Published: 05 June 2015

The acute effect of exercise modality and nutrition manipulations on post-exercise resting energy expenditure and respiratory exchange ratio in women: a randomized trial

Hailee L Wingfield, Abbie E Smith-Ryan, Malia N Melvin, Erica J Roelofs, Eric T Trexler, Anthony C Hackney, Mark A Weaver & Eric D Ryan

Sports Medicine - Open 1, Article number: 11 (2015) | Cite this article

- 20 women
- Double-blind cross-over
  - PRO (25 g Whey isolate)
  - CHO (25 g maltodextrin)
- REE/RER post AEE, HIRT, HIIT
- Significant increase in REE and decrease in RER with HIIT
- Significant increase in REE and decrease in RER post exercise with PRO

REE (kcals/day) for each treatment and time. (Mean ± SD)

Treatment	Base	IP	30min	60min
CHO	1688 ± 177	2301 ± 277	1729 ± 211	1649 ± 209
PRO	1646 ± 277	2388 ± 294*	1811 ± 168*	1759 ± 159*

* Indicates significant difference between PRO and CHO (p=0.0017-p=0.0098)

RER (a.u.) for each treatment and time. (Mean ± SD)

Treatment	Base	IP	30min	60min
CHO	0.83 ± 0.04	0.91 ± 0.04	0.79 ± 0.03	0.81 ± 0.04
PRO	0.85 ± 0.04	0.90 ± 0.06	0.76 ± 0.04*	0.77 ± 0.03*

* Indicates significant difference between PRO and CHO (p<0.0001-p=0.0012)

General Nutritional Recommendations

- What you eat and when you eat it matters
- PRO intake min 1.6 g/kg; evenly spread throughout the day; including pre-training (esp female)
- CHO adjusted based on daily and exercise needs
  - Increased intake vegetables and fruits
- Caloric deficit required, but not too big. Remember, there's more than one way to create it.

Additional Considerations

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Insufficient sleep undermines dietary efforts to reduce adiposity

Arlet V. Nedeltcheva, MD[1], **Jennifer M. Kilkus, MS**[2], **Jacqueline Imperial, RN**[2], **Dale A. Schoeller, PhD**[3], and **Plamen D. Penev, MD, PhD**[1]

- 14 days 90% energy needs
- Sleep 8.5 or 5.5 hrs
- 5.5 hrs sleep lost more Fat free mass; had increased hunger; less fat oxidation

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Biol Psychiatry. 2015 April 1; 77(7): 653–660. doi:10.1016/j.biopsych.2014.05.018.

Daily Stressors, Past Depression, and Metabolic Responses to High-Fat Meals: A Novel Path to Obesity

Janice K. Kiecolt-Glaser, Diane L. Habash, Christopher P. Fagundes, Rebecca Andridge, Juan Peng, William B. Malarkey, and **Martha A. Belury**

- Increased # of prior day stressors decreased REE and fat ox post consumption
- +1 stressor, dec REE by ~100 kcal over 6 hours

Fat Burners: A History Lesson

- Proposed mechanism: Raise metabolic rate
  - Does it work?
  - Adrenergic properties
  - The role of caffeine…
- Proposed outcome: Lose weight
  - Does it work?
  - Consider this: max impact of Ephedra is additional loss of 0.9 kg/month compared to placebo
    - Replication issues
  - In general, if there weren't side effects, there wasn't additional weight loss
- Effects are fairly small (if at all) and ironically appear to be less effective if very overweight
- Side effects?

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The Combined Effects of Exercise, Diet, and a Multi-Ingredient Dietary Supplement on Body Composition and Adipokine Changes in Overweight Adults

Shawn M. Arent, PhD[a], Alan J. Walker, MS[a], Joseph K. Pellegrino, MS[a], David J. Sanders, MS[a], Bridget A. McFadden, MS[a], Tim N. Ziegenfuss, PhD[b], and Hector L. Lopez, MD[b]

- 40:30:30 diet with ~500 kcal/d deficit
- EXP = raspberry ketone, caffeine, capsaicin, garlic organosulfur compounds, gingerols, shogaols, Citrus aurantium and related alkaloids, B vitamins, and chromium
- Both groups lost body fat, improved adipokines and leptin, and gained LBM
- Modestly larger gains in LBM for men in EXP
- Modestly greater decrease in hip girth for women in EXP
- Greater decrease in leptin and increase in adiponectin in EXP
- Exercise and diet are the driving force

Putting It All Together

- Not just about weight loss, but weight loss maintenance. Think about long-term impact before taking aggressive steps with diet and exercise.
- Change perspective on exercise – it's more than just "burning calories" or "burning fat"
- Change perspective on food – it's more than just "decreased calorie intake"
- Exercise (RT+ HIIT + MICT + METCON)
- Primarily eat whole foods; limit intake of processed "stuff"; micronutrients matter, too
- Start with PRO (1.6-2.2 g/kg); fill in with CHO & Fat
  - 20-50 g of PRO/meal spaced throughout the day (frequent feedings)

Putting It All Together

- Carbohydrates are important for fuel, hormone function, bone health, and GI function
- Diets too low in fat (<20%) can negatively impact hormones
- There are no quick fixes or magic pills
- Discipline > Motivation
- If you eat late at night, make it PRO
- Enjoy your food; be social; don't diet away your life
- There are no "bad" foods; Eat intuitively, not neurotically
- Play hard

Thank You!

- Dr. Abbie Smith-Ryan
- Dr. Mike Ormsbee
- The NSCA
- Nadja

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