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Nutrition Close-Up

What's inside…

SPECIAL FEATURE

Can culinary medicine succeed where diet drugs don't?

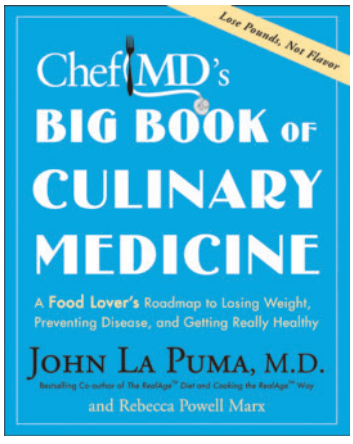
By John La Puma, MD

Recent approvals of obesity drugs Qsymia (Vivus) and Belviq (Arena) may help clinicians seeking solutions for their overweight patients. But many physicians still remember Phen-Fen with a shudder: heart valve abnormalities in young women put a stop to that off label combo in 1997. Other available diet drugs[1] have not performed well enough to help doctors overcome their fear of liability, or help enough patients overcome their fear of failure.

But neither Qsymia nor Belviq take the right direction, and not necessarily because there are concerns about their adverse effects, or their $100-plus monthly cost. Even under the best circumstances, Qsymia produces about a 10% weight loss over one year; Belviq only 5%.

Instead, it's because prescription drugs for weight loss fall short in more fundamental ways. Seventy percent of cases involving heart disease, stroke, diabetes, memory loss, premature wrinkling and impotence are preventable.[2] Sixty percent of cancers and many asthma and other lung-related diseases likely due to environmental causes such as toxin exposure, as well as diet and lifestyle, are preventable too.[3,4]

Food is the most underutilized weapon we have against chronic disease. Knowing more about what's in your food, and how it got there, can help you take your health into your own hands. You can stock your kitchen medicine cabinet, save money, and provide joy and energy for you and those you love.



Culinary medicine is a new evidence-based field that blends the art of food and cooking with the science of medicine, and is aimed at helping people reach good personal medical decisions about accessing and eating high quality meals that can prevent and treat disease and enhance well-being. Dietitians, physician assistants (PAs), and physicians have special roles to play in the field. Physicians should refer more to dietitians and PAs; all should have training in culinary medicine. Two recent culinary medicine publications: a randomized controlled trial on the effects of oral olive oil on healing time,[5] and a review of plant-based diets for those with Crohn's Disease.[6]

As we know, too much food has downsides. Obesity-related illness in the U.S. alone now costs more than $190 billion annually, about 21% of annual medical spending. By 2050, 60% of men, 50% of women and 25% of children are predicted to be obese.[7] The fastest rate of growth worldwide: Africa. The greatest number of obese adults: China. Some European countries (UK and Ireland) are catching up with America (70% overweight) and Mexico (71% overweight). Australia is already over 60%.

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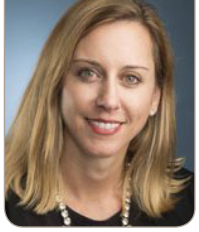
Nutrition research: a messy science

By Tia M. Rains, PhD



Imagine that you've just identified a substance with preliminary evidence that suggests it is effective in preventing a particular disease. In this case, let's pretend that the condition is type 2 diabetes (T2D) and that the substance is an extract. To test whether the extract prevents the onset of T2D, you would conduct a randomized, controlled intervention trial (RCT). Those individuals at risk for the development of T2D (e.g., those with prediabetes) would be recruited and upon meeting the pre-specified entry criteria, they would be randomized to receive a capsule that contained either the extract or an identical-looking capsule that acted as a placebo.

Neither the participant nor the study coordinators would know what treatment each participant was receiving. Subjects would be instructed to take the capsule every day for a determined period of time (such as 3 or 4 years) and otherwise, maintain their normal lifestyle behaviors (consistent diet and exercise habits). At regular visits throughout that period, participants would return to the clinical facility and be tested for the presence of T2D. All in all, little effort would be required of the participants (i.e., take a daily pill and report to a clinic several times per year).

Now imagine that it's not an extract, but rather a food or dietary pattern. To test whether that prevents the onset of diabetes, you would still conduct a RCT trial in those individuals at risk for the development of T2D. However, imagine how the logistics would be different. Participants would need to consume the prescribed food or adhere to the dietary pattern every day for the same 3- to 4-year time frame, including weekends, vacations and holidays. To maintain energy balance, participants would need to be trained how to substitute the food for other foods they typically consume. To encourage compliance, study foods would be provided for each participant, requiring them to store large quantities of it at home, with assurances that other family members would not dip into the supply.

And participants would be required to maintain their same physical activity and body weight over this time period (since changes in body weight influence T2D risk), despite a dietary change. In order to affirm body weight is maintained, participants would be required to visit the clinic more frequently for weigh-ins than they would for T2D testing alone. They may also be instructed to complete a daily study diary to encourage compliance with the treatment.

In the end, the effort required of participants for testing a food or dietary pattern is far greater than that for the "capsule" scenario (which is more like a pharmaceutical trial). Participants would be much more likely to drop out, given the added burden; or at least adhere less vigilantly to study instructions (perhaps consuming far less than an effective dose to bring about meaningful change in any clinical endpoint). Moreover, the cost of the food or dietary pattern study would be astronomical.

> *"Observational evidence is being used as an equivalent substitute, even though such data are not designed to test cause and effect."*

Although overly simplistic and for illustrative purposes only, the latter scenario has been acknowledged within the field of nutrition as a major challenge to proving cause and effect relationships between dietary exposures and a disease.[1] So in the absence of RCT data, observational studies are often the next best type of scientific evidence. The prospective cohort study, in particular, is hailed as the strongest form of observational evidence because participants are evaluated over long periods of time with diet and lifestyle data being collected prior to the onset of disease and, therefore, subjects are less likely to modify dietary patterns following diagnosis of a disease or presence of disease risk factors. But we all know that observational data can only identify diet-disease associations and not prove cause and effect relationships.

In some instances, however, where RCT data are not available, observational evidence is being used as an equivalent substitute, even though such data are not designed to test cause and effect. Proponents of this approach acknowledge as much, but submit that given the importance of diet-disease relationships, we should rely on whatever data is available for the sake of public health.[1] However, observational data have not always been right, with data from RCT evidence often showing no effect or an opposite effect (e.g., hormone replacement therapy; B-vitamins, homocysteine and heart disease; antioxidant vitamins and heart disease).[2] These situations lead to radical changes in recommendations that, very often, result in mass confusion.

No nutritionist would argue that researching diet-disease relationships is challenging. However, it seems as though it's time to re-evaluate the limitations of all types of evidence and come to agreement on how best to draw diet-disease conclusions from the data that is available.

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Omega-3 fatty acids: are we getting enough?

By James D. House, PhD

The Food and Nutrition Board of the *Institute of Medicine* published in 2002 official estimates of the human requirements for fatty acids.[1] At that time, only two fatty acids, the major constituents of fats and oils, were deemed to be essential for the healthy, adult human population: linoleic acid (18:2n-6), an omega-6 fatty acid; and α-linolenic acid (18:3n-3), an omega-3 fatty acid. These fatty acids are considered essential because they cannot be synthesized by the body, and must therefore be supplied through the diet. Linoleic acid, a polyunsaturated fatty acid, is found in most dietary fats and oils, and is particularly high in corn and soybean oils. α-linolenic acid (ALA) is less prevalent in the diet, with potential sources including flaxseed and flax oil, hemp oil and canola oil, as well as certain animal products, including eggs (Table 1). With respect to requirement estimates, the current Adequate Intake (AI) values for linoleic acid are 12 and 17 g/d for young women and men, respectively. The Adequate Intake values for ALA are 1.1 and 1.6 g/d for young women and men, respectively.

Table 1: Omega-3 fatty acid composition of common fats, oils and representative foods

Source	ALA (g/100 g)	EPA + DHA (mg/100 g)
Oils[1]		
Flax	53.4	0.0
Hemp	19.0	0.0
Canola	9.1	0.0
Soybean	6.8	0.0
Corn	1.2	0.0
Fats[1]		
Butter	0.3	0.0
Beef tallow	0.6	0.0
Pork lard	1.0	0.0
Seafood[1]		
Salmon (wild Atlantic, cooked)	0.4	1840
Tuna (canned)	0.07	862
Halibut (cooked)	0.01	235
Tilapia	0.05	135
Eggs		
Classic[1]	0.04	58
Omega-3 enriched[2]	0.52	180

Notes

1. USDA National Nutrient Database for Standard Reference, Release 27.
2. Data from Reference 10. (Hens fed 10% flaxseed).

With respect to ALA, dietary modeling exercises using NHANES data have estimated intakes of 1.5 g/d for adults,[2] thus providing evidence that the AI for this fatty acid is being met. However, arguments are being put forward to revise our current thinking in relation to fatty acid requirements. Specifically, questions are being posed as to whether Dietary Reference Intake (DRI) values should be established for the long chain polyunsaturated fatty acids (LCPUFA) that are derived from ALA.[3] While the body can convert ALA to eicosapentaenoic acid (EPA, 20:5n-3) and later to docosahexaenoic acid (DHA, 22:6n-3), the conversion of ALA to these omega-3 LCPUFA is inefficient, with some estimates of the conversion of ALA to DHA being less than 0.5%.[4] As EPA and DHA are integral to normal cell growth and development, and for optimal neural, visual and cognitive function, dietary sources of the long chain n-3 PUFA are important. Recent calls to establish DRI values for EPA and DHA have been primarily framed around the available evidence linking their consumption to reduced risk of cardiovascular disease.[3] The 2010 Dietary Guidelines for Americans recommends the consumption of 3.5 oz (100 g) of seafood per week in order to ingest, on average, approximately 250 mg of EPA +DPA per day.[5] Other groups, including the American Heart Association, have advocated higher intakes (>500 mg EPA + DHA per day)[6] for healthy adults, with the intake coming primarily from fatty fish. Current estimates of EPA + DHA intake indicate that Americans are consuming significantly less than 250 mg/d, with some estimates being below 100 mg/d.[7]

Given the recommendations of certain authorities, coupled with evidence of low habitual intake from seafood, additional opportunities to provide the omega-3 LCPUFA to the population should be considered. These opportunities could include:

1. Creating greater awareness of the need to consume fatty fish
2. Using supplements
3. Selection and breeding (traditional or via genetic modification) of plants with oils high in omega-3 fatty acids or the precursor fatty acid stearidonic acid, or
4. Using fortified foods.

With respect to the latter opportunity, enhancing foods with marine oils is feasible, yet requires strict attention to the resultant sensory attributes of the final food product. The use of microencapsulated oils can achieve this goal. Alternatively, the enrichment of animal products with DHA + EPA is attainable, and the egg is particularly amenable to modification. Laying hens are capable of efficiently converting ALA from plant-based ingredients, such as flaxseed, into the omega-3 LC-PUFA.[8] Furthermore, hens are efficient at depositing pre-formed dietary DHA, either from

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Easy habit-changing tips for a healthier you in 2015

By Christopher R. Mohr, PhD, RD

It's that time of year. Men and women everywhere are feverishly trying to pinpoint their "bad" eating and exercise habits and pledging to adopt a healthier lifestyle. It's 2015, a new year and a new you! Unfortunately, this habit-changing alarm bell probably went off at the same time last year. And quite likely the year before that, too.

It's not that New Year resolutions can't be effective. It's just that a change in mindset is usually required to make them stick. Most resolutions fail because we set unrealistic goals—as if going to extremes will make us more determined to succeed—which invariably leads us down a path that rarely leads to a permanent change of bad habits. Habits die hard!

How can 2015 be different? What can we do to improve our health without focusing on giving up this, eating less of that, or promising this will be the year we are out of bed every day at 5 a.m. to make time for a 90-minute exercise session?

Let's examine a few tips and strategies that can lead to solutions to improve health.

Eat breakfast daily. While this seems elementary, it's one of the most important and effective strategies to jumpstart change. Current research shows that barely more than 60% of men ages 20 to 29 are eating breakfast.[1] Unfortunately, more and more clients are questioning the benefits of eating breakfast, as a small but vocal minority is saying now that breakfast eaters are not necessarily leaner and healthier. But a protein-rich breakfast provides essential fuel to the brain and muscles in the morning. Studies show that eating 25-30 grams of protein each morning can also help increase feelings of fullness throughout the day.[2] Here's a favorite tip for the time-squeezed among us racing out the door in the morning: Add 2 whole eggs and 3 egg whites to a large (empty) coffee mug. Whisk, then add a handful of cheese, 1/2 cup of beans and cook for two minutes in the microwave. Enjoy it with a piece of fruit and your protein-rich, nutrient-dense breakfast is done.

Eat a veggie and/or fruit with every meal. This is a simple addition that is a positive change anyone can make to measurably improve nutrient intake. It doesn't take much effort, but focusing on adding foods— versus a typical 'dieting' mentality of subtracting foods—is a powerful step in the right direction. In fact, the higher the daily intake of fruits and vegetables, the lower the chances of developing heart disease. One study found that those who ate less than 1.5 daily servings were 30% more likely to have a heart attack or stroke compared to those who averaged 8 daily servings.[3] Considering heart disease is the leading cause of death in men, affecting 1 out of 4, this is certainly one healthy habit to add to your new eating regimen.

Include protein with each meal. While research shows that the overall average protein intake of Americans is within current guidelines, the timing of protein consumption in the U.S. is far from optimal. Most Americans eat very little protein in the morning, not much more at lunch, and save the majority of their protein intake for dinner. Instead, try to encourage clients to divide their protein intake more evenly throughout the day. This is not only effective for maintaining energy levels throughout the day, but also for stimulating muscle protein synthesis as well. Several research studies by Dr. Heather Leidy, Dr. Douglas Paddon-Jones, and others have confirmed this notion of the importance of protein timing.[2,4] This is particularly true for the growing number of baby boomers (born 1946-64), where muscle loss is a common consequence of aging. Most data suggest eating 25-30 grams of protein at each of the three main meals throughout the day to optimize this benefit of dietary protein, and perhaps adding more protein-rich snacks as needed.

As health professionals, we know clients are successful at making short-term changes. Permanent change is much more challenging. Encourage clients to incorporate these tips into their daily routine. While not profound, they are small steps that will count toward the larger picture. These simple tips will help move the needle in the right direction and give clients the jumpstart they want in 2015.

Christopher R. Mohr, PhD, RD *is a nutrition consultant, spokesperson and speaker who presents around the world. Dr. Mohr works with a variety of clients and corporations, including Reebok, The National Cattleman's Beef Association and more.*

Messages

- Eat a veggie and/or fruit with every meal. Focusing on adding foods—versus a typical 'dieting' mentality of subtracting foods—is a powerful step in the right direction.
- New Year resolutions fail because we set unrealistic goals for ourselves. Start with easy and attainable healthy habits and watch for that needle to begin moving in the right direction.

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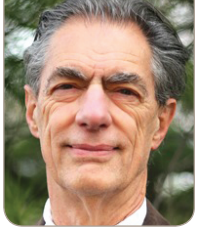
Translating research into public policy can be tricky

By David C. Madsen, PhD



This is a short account of science…not about how it is done but more about what is done with its results. It is also about learning from our mistakes. Will we?

Nina Teicholz wrote in the Fall 2014 issue of ENC's Nutrition Close-Up[1] about the seminal work of Dr. Ancel Keys and colleagues. She recounted their thoughtful and innovative studies on the relationships between diet and health in the 1950s, in this case heart disease (HD). The overall conclusion was that excess dietary fat and cholesterol were strongly linked to HD. Continuing research refined the information and distinguished dietary saturated fatty acids (SFA) as "bad fat," while polyunsaturated fatty acids (PUFA) was "good fat." Additionally, the negative role of "trans fats," an artifact of manufacturing, was deduced.

As is now well known, the "good" and "bad" dietary fats are designated as such because of their effects on cholesterol and triglycerides concentrations in the bloodstream. The cholesterol fraction was determined to exist in two states: "good cholesterol" (in HDL*) and "bad cholesterol" (in LDL*). A goal of "blood health" thus came to be: more HDL is better; less LDL is better. The relationships between dietary fats and blood fats (lipids) can be summarized, very simply, for illustrative purposes:

Dietary fat	Effect on blood HDL cholesterol (result)	Effect on blood LDL cholesterol (result)
Trans	Decrease (bad)	Increase (bad)
Saturated fat	Increase (good)	Increse (bad)
PUFA	Increase (good)	Decrease (good)

* HDL – High Density Lipoprotein; LDL – Low Density Lipoproteins

Application

The research produced conclusions that, while not exceedingly complex, were "nuanced," meaning that attention to detail was important in their interpretation. During the transition from acceptance of research to creation of guidelines (by National Heart, Lung, and Blood Institute, American Heart Association, and others) and subsequently into public messaging, some of the nuance was omitted. Policy makers wanted simple, practical messages, which led to over-simplified statements, such as "reduce total fat intake." Doing so, of course, does indeed reduce intake of "bad fats." Research and messaging continued on the health benefits of dietary PUFA, but the concept was not communicated well and ran against the "low-fat" mantra that had been put in place.

As a result, low-fat diet campaigns were launched, which spread to cookbooks. The food industry responded with a myriad of low-fat products. The process of reformulating foods to be low in fat necessarily meant replacement of the fat, typically with carbohydrate, and usually with the least costly types, including maltodextrins and sugars. Thus, even where saturated fat intake was reduced, caloric intake was not (these are generalities, of course). And in the process, ingredients and nutrients got most of the attention, while total calorie intake, balanced diets, and whole foods were de-emphasized.

Today

A large analysis published this year by Chowdhury et al.[2] in the *Annals of Internal Medicine* addressed the official recommendations for dietary fat consumption. After reviewing many previous studies the paper concluded: "current evidence does not clearly support cardiovascular guidelines that encourage high consumption of polyunsaturated fatty acids and low consumption of total saturated fat." This appeared to be in conflict with what had become "conventional wisdom."

The Chowdhury study unleashed a feeding frenzy by some in the science press. The cover of *Time* magazine touted: "… Eat Butter. Scientists labeled fat the enemy. Why they were wrong." [3] As often happens, the more sensational and inaccurate the stories became, the more attention they got.

Meantime, some inconsistencies were identified in the study, e.g. certain key data were not included. Letters to the editor flew; public and private discussion occurred. Study authors were amazed by the inaccurate or exaggerated reporting, due in part to the wording of the conclusions. The senior author of the *Annals* study offered that the paper only showed that "the story on saturated fat is slightly more complicated than we thought."[4] In fact it is clearly presented in the discussion portion of the paper that while conclusions do follow from the data, there are several potential and actual limitations of the data and the analysis that could have accounted for the conclusions.

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Messages

- The process of reformulating foods to be low in fat typically increased the carbohydrate content of the foods, most often with maltodextrins and sugars. Thus, even where saturated fat intake was reduced, caloric intake was not.
- Translation of research into public policy is not always an easy process. Mistakes in how science is communicated and applied can lead to unintended consequences.

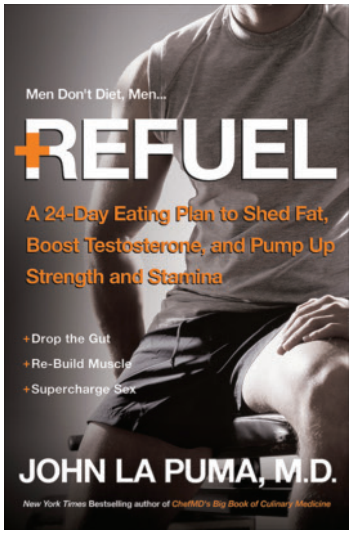
Can culinary medicine succeed where diet drugs don't?

Continued from page 1.

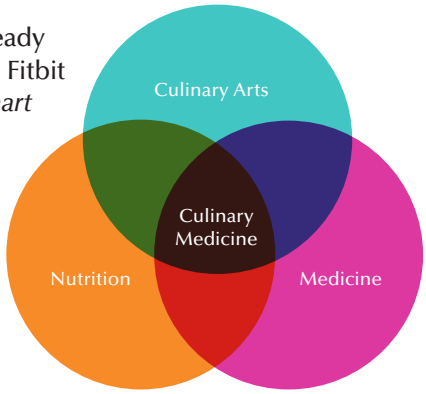
These data are scary, but one solution is not. How well you sleep, how intensely you exercise, how your mindset affects your metabolism, and which foods you use as fuel and which get stored as fat, can all now be beamed to you (and to your friends or coach, if you choose). You can now see, in real time, what you are doing to make yourself healthy and, conversely, what you're doing to make yourself sick.

> *"Food is the most underutilized weapon we have against chronic disease. Knowing more about what's in your food, and how it got there, can help you take your health into your own hands."*

The obesity solution I like best is one that makes wellness fun. Mobile technology, tracking companies, and game creators are coming together to do this. The most innovative companies today are developing ways to send to your mobile device your most relevant data—food and beverage intake, activity, weight, sleep, stress response—and combine it with game-like managed competition.[8] The objective, of course, is to entice you to compete with your social network for the healthiest lifestyle, and be rewarded along the way with ongoing coaching and other incentives.



Programs such as Apple's *HealthKit*, *Google Fit* and Samsung *S Health* are ready for take-off. Devices like Fitbit (wristwatch) and *wifi smart scales* (body comp analysis), and apps like *myfitnesspal* and *runkeeper* automatically upload activity data and provide feedback. Heart rate, blood pressure, and glucose levels will soon follow. Devices and apps are changing the landscape of how people can get healthy, and helping them achieve sequential personal bests.



Clinicians should be able to recommend trusted apps, devices and websites, write culinary medicine prescriptions, and know how food, like medicine, works in the body. Clinicians should be able to offer condition-specific food and lifestyle measures, with tech-enabled tracking support if desired, before recommending prescription medication for most chronic conditions.

Diet drugs have their place, but not first place. A new consciousness about the power of food and cooking, combined with ever-advancing mobile technology, can put care back where it belongs: in the patient's own hands.

A culinary medicine prescription coupled with technology for an obese nation is new, and potentially profitable. Companies that see obesity as the economic threat that it is—and get it under control in their workforce—will have a powerful tool to increase productivity. The time to fill that prescription is now.

John La Puma, MD, *is a board certified practicing internist, professionally trained chef, and New York Times bestselling author. His latest book is* ***REFUEL®, an eating plan for men to boost low T, strength and stamina****. Dr. La Puma also hosts a cooking and food shopping nutrition series on PBS, "ChefMD® Shorts." He is based and sees patients in Santa Barbara, Calif. Visit him online at www.drjohnlapuma.com.*

Messages

- Food is the most underutilized weapon against chronic disease. Knowing what's in your food, and how it got there, can help you take your health into your own hands, and save money.
- Culinary medicine is a new evidence-based field, blending the art of food and cooking with the science of medicine, aimed at helping people reach good decisions about eating high quality meals that can prevent and treat disease and enhance well-being.
- The most innovative companies today are developing ways to send to your mobile device your most relevant data—food and beverage intake, activity, weight, sleep, stress response—and often combine it with game-like managed competition and personal bests.

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Omega-3 fatty acids

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fish or algal sources, into the egg, and these feeding regimens tend to give higher final DHA levels in the egg.[9] Depending on the chicken feeding regimen employed, one omega 3-enriched egg can contain upwards of 400 mg of total omega-3 fatty acids, with 150-200 mg of EPA + DHA, thus providing consumers a choice between conventional and omega-3 eggs.[10]

Returning to the central question as to whether we are consuming sufficient omega-3 fatty acids, a qualified response is best at this stage. Based on available evidence, ALA intakes are in agreement with current guidelines; however, intake of the omega-3 LCPUFA (EPA and DHA) is not in keeping with guidelines established by national and international bodies. The latter does not include the DRI estimates, and future expert panels will need to be convened in order to weigh the available evidence in support of an Adequate Intake value for the omega-3 LCPUFAs.

James D. House, PhD, *is Professor and Head of the Department of Nutritional Sciences at the University of Manitoba in Winnipeg, Canada. Dr. House is studying the relationship between water soluble vitamin nutrition, the metabolism of amino acids, and how they relate to optimal growth and health of individuals. He also maintains a strong focus towards the development of functional foods of animal origin, including eggs with enhanced nutritional value.*

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Messages

- Dietary reference intake values have been established for both linoleic acid and α-linolenic acid (ALA), but not for other fatty acids.
- While current estimates of intakes of the omega-3 fatty acid ALA are consistent with the dietary reference intakes, the consumption of the long chain omega-3 fatty acids, EPA and DHA, are below current dietary guidelines.
- Alternative food sources enriched in the long chain omega-3 fatty acids may help the population achieve intake targets.

Translating research into policy

Continued from page 5.

Lessons

This case study illustrates that translation of research into public policy is not easy to do faithfully, or quickly. Confusing recommendations, combined with clever advertising, served in this case to narrow our attention to the level of individual food ingredients, and even to nutrients. And this occurred at the expense of food, diet, and lifestyle. We seem to have forgotten how to eat, and in the process, how to live well.

I contend that the science, in this case, was not "wrong." Where we messed up is what we did with the information… we erred on how the science was communicated and applied.

There have been attempts recently to put whole foods back at center stage. We are developing more realistic "food-based recommendations" and "dietary patterns." We will be better off talking about foods, and about balance and lifestyle.

Have we learned from this experience? Can we now get it right? I finish with two contrasting responses.

- First is the recent storm of attention paid to sugar in its various forms. Scathing attacks paint sugar as something approaching evil, prompting calls at all levels to limit it, or even eliminate it, from all food. Doing so, they say, will result in better health for all. Sound familiar?
- The second is a news story by chef Yotam Ottolenghi, who said: "… instead of eliminating fat from my diet I revel in it daily…a healthy balance alongside…lots of green veg and roots; animal protein as well as protein from lentils, nuts and dairy products, fruit, grains, seeds, spices and different beans; and sugar too, sometimes unrefined, in dark chocolate or lightly whipped cream."[5]

Perhaps Chef Ottolenghi should write our dietary recommendations. At the very least he can come to my house anytime...as long as he cooks.

David Madsen, PhD, *has worked in the nutrition, food and pharmaceutical industries for more than three decades, and occasionally writes on topics of interest in those areas.*

References

1. Teicholz N, "Update: saturated foods not so bad after all." ENC Nutrition Close-up Fall 2014 Internet: http://www.eggnutritioncenter.org/health-professionals/nutrition-close-up/nutrition-close-up-fall-2014/
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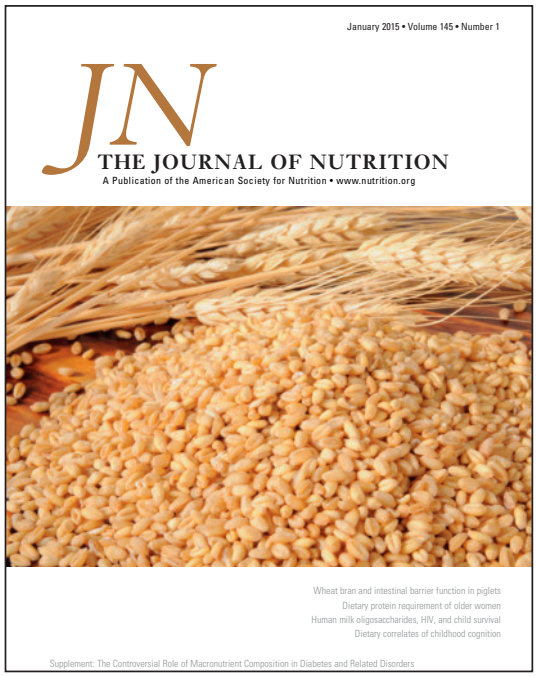

The Controversial Role of Dietary Protein in Diabetes and Related Disorders

ENC-sponsored symposium proceedings now available in *Journal of Nutrition*, 2015;145:157S-183S. Papers include:

- *Dietary Substitutions for Refined Carbohydrate That Show Promise for Reducing Risk of Type 2 Diabetes in Men and Women*. Kevin C Maki and Alyssa K Phillips.
- *Dietary Protein Is Important in the Practical Management of Prediabetes and Type 2 Diabetes*. Amy P Campbell and Tia M Rains.
- *Differing Statistical Approaches Affect the Relation between Egg Consumption, Adiposity, and Cardiovascular Risk Factors in Adults*. Theresa A Nicklas, Carol E O'Neil, and Victor L Fulgoni III.
- *A Lower-Carbohydrate, Higher-Fat Diet Reduces Abdominal and Intermuscular Fat and Increases Insulin Sensitivity in Adults at Risk of Type 2 Diabetes*. Barbara A Gower and Amy M Goss.

Please visit www.eggnutritioncenter.org to access the papers above.

ENC 2015 Spring Calendar

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Health Professional Events

Experimental Biology 2015
March 28-April 1 – Boston, MA

"Determinants of Disease Risk in the Postprandial Period"
Sunday, March 29: 8:00-10:00 am

Chairs: Barbara O. Schneeman, PhD and Tia M. Rains, PhD
Presentations:

- Advances in the understanding of enterocyte lipid handling. Elizabeth J. Parks, PhD, University of Missouri, Columbia, MO
- Gut peptide regulation of intestinal lipoprotein particle production. Gary F. Lewis, MD, University Health Network, Toronto, ON Canada
- Postprandial hyperglycemia-mediated vascular endothelial dysfunction. Richard S. Bruno, PhD, RD, Ohio State University, Columbus, OH
- Sleep, free fatty acids and diabetes risk. Esra Tasali, MD, University of Chicago, Chicago, IL

American College of Sports Medicine (ACSM) Health & Fitness Summit & Exposition
March 31-April 3 – Phoenix, AZ

Preconference symposium: *"Energy Balance and Weight Management"*
Tuesday, March 31: 8:30 am – 2:30 pm

Presenters: Mitch Kanter, PhD; Laura Kruskall, PhD, RDN; Kara Mohr, PhD; Amy Bidwell, PhD
Sponsored by ENC

Sports, Cardiovascular, and Wellness Nutrition (SCAN) Symposium: Nutritional Dogma versus Data
May 1-3 – Colorado Springs, CO

"Advanced Practice Protein Summit: Protein Science, Controversies and Contemporary Applications for Practitioners"
Saturday, May 2: 8:00-10:00 am
Sponsored by ENC, National Dairy Council, and Beef Checkoff

Presenters:

- Nancy R. Rodriguez, PhD, RD, University of Connecticut, Storrs, CN
- G. Harvey Anderson, PhD, University of Toronto, Toronto, Canada
- Stuart M. Phillips, PhD, McMaster University, Hamilton, Canada

ENC Mission Statement:
ENC is a credible source of nutrition and health science information and the acknowledged leader in research and education related to eggs.

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