HIGHLIGHTS

John B. Hynes Veterans
Memorial Convention Center
Boston, MA

NUTRITION 2018 DAILY

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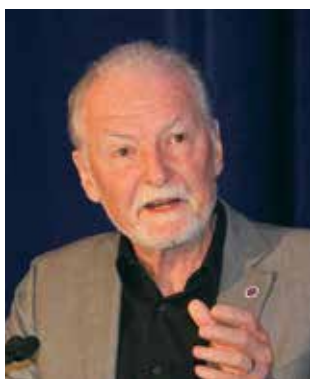
Calorie counting is no longer a simple equation

If you rely on the internet for nutrition advice, you'll get a strong sense that all calories are not the same, said James Hill, PhD, University of Colorado School of Medicine. But of course, the science is much more nuanced.

Hill gave an overview of the complicated calorie conundrum during the Sunday morning session Is a Calorie a Calorie: Reframing the Question.


Eric Ravussin, PhD


Frank Hu, MD, PhD

"A calorie is a calorie in that the laws of thermodynamics do apply to humans—using the framework of energy balance, it is theoretically possible to identify the fate of all energy consumed," he said. "But the energy balance system can be affected by many things. It's a complex, adaptive system, and any factor that impacts body weight must work through this system."

For instance, he said, obesity is an adaptation to an individual's environment. A person gains weight if they expend less energy than they take in. However, disruption of that person's energy balance can create changes in other components of the system in order to re-establish the balance.

This means caloric input can have different fates in different people depending on the overall state of their energy balance. And this factor is further complicated by an individual's metabolic regulatory system.

"If you have a metabolism like a Volkswagen bus, there's very little you can do on the diet side," Hill said. In other words, there could be a tipping point for metabolic regulation that's influenced by energy intake. Consequently, "we should do our studies not just in the overweight, diabetic folks, but in the people who have different metabolic flexibility," he said.

Kevin Hall, PhD, said like everything in life, there is no free ride when it comes to diets. Evidence shows that low-carbohydrate diets are at least as effective for weight loss as other diets, but energy expenditure and body fat appear to depend very little on the proportion of carbs to fat.

"Perhaps we should be considering what things regulate triglyceride storage," he said, citing evidence that insulin plays a huge role in regulating triglycerides, and carbohydrates drive up insulin. That increases the anabolic drive of fat storage and circulating metabolic fuels. An adaptive response may entail increasing energy intake and decreasing energy

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Nutrition 2018 makes history in Boston

ASN's inaugural flagship meeting was a tremendous success! Thank you to ASN leaders, members, attendees and partners for your support and active participation in Nutrition 2018! The meeting in review:

- 18 Planning Committee Members
- 65 countries represented
- 91 Session Proposals
- 702 Abstract Reviewers
- 2,058 Abstracts
- 3,636 Attendees
- 10,567 Abstract Reviews
- 1.2 million social media reach
- Immeasurable support from ASN volunteers and attendees!

We look forward to seeing you at Nutrition 2019 in Baltimore!

Nutrition.org/N19

The first Danone International Prize for Alimentation (DIPA) winner is Dr. Sophie Nicklaus

French scientist, Dr. Sophie Nicklaus, was presented the first Danone International Prize for Alimentation (DIPA) on Monday, June 11 in Boston at Nutrition 2018. The inaugural conference served as a hotspot for exciting new ways to celebrate the field of "alimentation" – the umbrella term for all factors influencing people's food choices, eating habits and food-related health. Awarded by the Danone Institute International and the Fondation pour la Recherche Médicale, DIPA is a 100,000 Euro award that recognizes outstanding, innovative and collaborative approaches to improving food-related health and to develop effective healthy eating strategies.

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In this issue

Emerging Leaders in Nutrition Science Poster Competition Finalists and Winners

Congratulations to all the 2018 Emerging Leaders in Nutrition Science Poster Competition Finalists and Winners. Thank you to event sponsor, Ingredion.

Aging and Chronic Disease
Yong-moon Park (First)
Nafisa Jadavji (Second)
Georgia Colleluori (Third)
Laura Bardon
Tahani Boumenna
Emily Hu
Yi-Hsuan Liu
Yuxin Wang

Biomarkers
Siran He (First)
Ruixue Hou (Second)

Carotenoids and Retinoids
Minkyung Bae (First)
Jelena Mustra Rakic (First)

Chronobiology
Lena Ho (First)
Raphaelle Jacob (First)

Climate/Environment, Health, Agriculture and Improved Nutrition
Zach Conrad (First)
Hande Ulus (First)

Community and Public Health Nutrition
Anna Grummon (First)
Traci Bekelman (Second)
Andrea Lopez-Cepero (Third)
Jessie Boukarim
Jordan Harris
Buyun Liu
Baibing Mi
Mary Scourboutakos

Hanqi Luo, University of California, presents her research during the poster competition

Diet and Cancer
Sneha Sundaram (First)
Niklas Aardema (Second)
Melissa Melough (Third)
Yong-moon Park
Sumira Phatak
Weiyi Sun

Dietary Bioactive Components
Mahrou Sadri (First)
Courtney Millar (Second)
Yanhui Han (Third)
Sergio Davinelli
Yongeun Kim
Lei Ma

Energy and Macronutrient Metabolism
Zahra Feizy (First)
Jyoti Sihag (Second)
Anthony Martin (Third)
Janie Allaire
Coby Eelderink
Huicui Meng
Jose Rodriguez-Morato
Pan Zhuang

Experimental Animal Nutrition
Jane Naberhuis (First)
Marko Rudar (Second)

Global Nutrition
Alyssa Friebert (First)
Yvonne Goh (First)
Nandita Perumal (Second)
Jillian Waid (Second)
Tania Aburto-Soto
Johanna Andrews Trevino
Yan Bai
Shruthi Cyriac
Jennifer Mandelbaum
Marianne Santoso
Masresha Tessema

Maternal, Perinatal and Pediatric Nutrition
Bryan Gannon (First)
Sarvenaz Vandyousefi (Second)
Paige Berger (Third)
Rong Fan (Suskind Student Travel Award)
Jun Shi Lai (Suskind Student Travel Award)
Ellen Francis
Megan Jarman
Jacqueline Lauer
Clark Sims

Medical Nutrition
Siqi Hu (First)
Brett Loman (First)
Tao Wang (Second)

Methods and Protocols
Micah Hartwell (First)
Benjamin Lee (First)

Neurobiology
Charlotte Bahnfleth (First)
Joanne Fil
Stephen Fleming
Maku Ocansey

Nutrient-Gene Interactions
Zhi Chai (First)
Yu-Han Chiu (Second)
Jessie Hoffman (Third)

Nutrition Education and Behavioral Sciences
Deborah Fetter (First)
Amy Morel L'Horset (Second)
Carli Liguori (Third)
Rebecca Hagedorn
Ayyoub Taher

Nutrition Translation
Kim Rounsefell (First)
Jonathan Kershaw

Nutritional Epidemiology
Nancy Lopez Olmedo (First - graduate student)
Hanqi Luo (First - postdoc)
Elise Carbonneau (Second - graduate student)
Kerry Ivey (Second - postdoc)
Fan Chen (Third - graduate student)
Ju-Sheng Zheng (Third - postdoc)
Shue Huang
Gang Liu

Nutritional Immunology
Miranda Crouch (First)
Lei Wu (Second)
Jinhee Kim (Third)

Nutritional Microbiology
Korin Albert (First)
Ezgi Özcan (First)

Obesity
Ambika Satija (First)
Yujiao Zu (Second)
Cécile Vors (Third)
Ying Meng
Alissa Smethers
Mikyoung You

Policy
Aviva Musicus (First)
Jillian Joyce

Sports Nutrition
Josie Jakubowski (First)
Mindy Patterson (Second)

Vitamins and Minerals
Emanuela Pannia (First)
Morgan Strong (First)
Alejandra Wiedeman (First)
Amat Bah
Buyun Liu
Amy Tan

A family friendly environment welcomes the youngest researchers to Nutrition 2018.

Beware of these study pitfalls

The Scientific and Statistical Principles session on June 9 put a variety of data collection methods to the test.

Peng Li, PhD, University of Alabama at Birmingham, began the session with a discussion of cluster randomized trials (CRTs). These trials differ from randomized controlled trials (RCTs) because they include groups of people who are connected geographically, socially, administratively, educationally, occupationally, or through hospitals or other sources.

Li said CRTs make it easier to randomize people and allow intervention on a cluster level. They are also more convenient from an administrative standpoint and have less risk of contamination. "In fact, we encourage individuals in the same cluster to talk to and influence each other," he said.

CRTs can also measure variances both within and between clusters, and can include intraclass correlation coefficients.

Li said minuses to CRTs include few available clusters, confounding, complexity of variance-covariance, and fewer degrees of freedom for hypotheses testing.

"Common mistakes include ignoring ICC (intracluster correlation coefficients), using the wrong degrees of freedom in hypothesis testing, using one cluster per condition and having no details on statistics," he said.

Because of these significant complications, "don't do a CRT unless you need to," Li concluded.

John Dawson, PhD, Texas Tech University, followed with a discussion of the issues involved in multiple-outcome testing.

There are two broad categories of multiple-comparison adjustments, he said: family-wise error rate (FWER) and false discovery rate (FDR). FWER is the probability of making at least one type I error (false positive). FDR is the expected value of the proportion of false positives.

"FWER control is usually associated with frequent statistics, while FDR control is associated with Bayesian statistics—but either can be enforced in a given experiment," Dawson said.

FWER control is inherently stronger than FDR control, he said. Also, as M gets very large, FWER drastically reduces power.

"FWER versus FDR is often a question of philosophy," Dawson said. "Is multiple-comparisons adjustment needed when generating hypotheses as opposed to testing them?"

For FWER, Dawson recommends generally using the Sidak correction because it has the same threshold, is not sequential and is the most powerful when not making assumptions related to correlations among tests. "When you want to be extra cautious, use Bonferroni," he said, noting that sequential and D/AP approaches are computationally burdensome.

For FDR, Dawson said methods exist when starting from p-values, and Storey's q-value approach needs many tests to work well. Bayesian analysis approaches allow for

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John Dawson, PhD (left) and Peng Li, PhD discuss the navigation of studies and statistics on June 9.

Thoughts from an ASN Member, Blogger and Volunteer about Nutrition 2018

Good Morning, American Society for Nutrition

June 8th: *My suitcase wheels leave parallel trails of sand across the granite floor of the Boston Sheraton Hotel. The Smiling Coast of Africa sits 3,858 miles behind me. The inaugural ASN meeting awaits. I consume a lemon twist muffin in two bites. Good Morning, America.*

Carrying spinach quiche and chocolate croissants, Nutrition 2018 attendees flock from corner cafes, hotel buffets, and caffeine collectives. Someone probably enjoys a carbless commute. We unite in the name of science. I open my Nutrition 2018 app: 'Emotion Trumps Science. Why Science-based Facts are No Longer Enough to Educate the Public Effectively.' I adjust my badge and gulp the last swig of cream-filled coffee. My blood sugar soars with glee. I steer towards the 3rd floor escalator.

As the world's premiere Nutrition Society, ASN 2018 delivered an extensive nutrition experience. The greatest minds in nutrition science surrendered novel findings, shared the latest technologies, and strengthened existing partnerships. The exhaustive list of research themes made it impossible for patrons to attend every event. Here, I proffer one personal, fragmented, undeniably biased account of the proceedings:

The Hynes Convention Center fills with the familiar buzz of old friends, new members, and seasoned colleagues. We navigate the sea of posters, search for friendly faces, and scurry up and down the stairs searching for the next symposium. While waiting outside the overflowing microbiome theater room, I overhear colleagues' questions:

Do we promote muscadine grape extract, curcumin shots, supplement with flavonol-rich cocoa—or all three

We must finally decide on low calorie sweeteners. What is the best way to measure infant cognitive performance? How much longer must the nefarious

Laura Steiner, MRC Unit, The Gambia

GMO lurk in antipathy? What are the constraints and challenges in vegetable production (and distribution)? We discuss the success stories of various sectors.

June 9th: *Cascades of cheese beckoned from the second floor corridor. I had traveled across the sea from a small West African village called Keneba, where I was incidentally engaged in a two-week fasting experiment. The Ramadan fast is a month-long, annual ritual involving prayer, empathy, abstaining from smoking and gossiping, curbing negative thoughts and anger, etc. How quickly I pile my plate with pita bread and drizzle the salad with a symphony of sauces.*

It all goes back to an elementary principle my instructor wisely professed: everything in moderation. Easier said than done.

We continue to detect and characterize eating behavior, but numerous factors guide food and beverage choices. Somehow we must muster some magic and change the way humans think. How in the world can we alter the behavior of such irrational creatures?

If repeated behaviors alter brain function, how long does it take to subsequently rewire those circuits? (The answer is certainly more than a two-week, well-intentioned Ramadan fast.) A recent study investigated whether prolonged fasting or weight loss influenced neural activity in obese participants, and found that an 8-week weight loss intervention (but not a 48-hour fast), decreased activity in brain areas involved in feeding behavior and reward processing[1].

June 10th: *At the front of the lunch line I peer across the ticket counter. Finished? "ASN is out of small sandwiches," I whisper dismally.*

Some of us know all too well the effects of a lackluster lunch. Many advocate for SNAP and other strategies within the United States. Around the world, stunting and childhood growth issues continue to puzzle scientists. How can we help children at risk for stunting grow taller? Wide gaps in the evidence for program effectiveness remain. Exposure to a comprehensive nutrition program among infants under 2 years old in Malawi led to a small but sustained increase in weight but not linear growth during the preschool-age period[2]. Perhaps we will see intergenerational benefits of India's national mid-day meal program— now in its third decade of implementation—but what is our next move[3]? Providing calories and vitamins alone probably won't do.

Perhaps our programs are too late. What must an expectant mother eat to ensure her future child's epigenome stays error-free? So far, little evidence indicates that the initiation of a comprehensive nutrition supplement during the preconception period prompts superior birth outcomes over initiation at the 1st and 2nd trimesters[4]. However, maternal choline supplementation during pregnancy recently showed improvements in executive functioning in children at age 7[5].

While global health experts consider blanket Vitamin-A supplementation and the prevalence of seasonal orange-palmed Zambian children[6], others discuss food matrix complexities, enteropathy, and protein needs. Much effort in international research is directed towards ending acute malnutrition and stunting[7]. Understanding which ingredients might bolster resistance against infection, fight cancer, and curb HIV is still a great challenge.

What happened to Laura on June 11 and June 12? Continue the story of her journey in Boston and back to Africa on the ASN Blog at https://nutrition.org/asn-blog/

Does mom know best? How genetics influence nutrition and public health

Personalized medicine is a hot topic for both nutritionists and consumers. During the Precision Nutrition session on June 10, four experts looked at how to apply genetic-based nutrition to the microbiome and key public health issues like obesity.

Marie-Claude Vohl, PhD, Université Laval, discussed genetic studies regarding variability in individual response to various dietary interventions, and potential application of genetic data in personalized nutrition.

The question, she said, is whether health professionals are ready to apply the results of these studies to patients?

Her data found that 76.9 percent of RDs know about nutrigenomics. However, 75.9 percent of RDs who work in public healthcare settings feel they don't have the knowledge necessary to incorporate genomics into their clinical practices. For RDs in private practice, that number drops to 62.9 percent.

Meanwhile, an online survey of 1,425 consumers with a mean age of 39 (82.3 percent women) found that 90.7 percent were willing to follow personalized dietary advice based on their genetic makeup.

And another study of 8,233 European men and women found that 30 percent were willing to pay more for personalized nutrition advice. The higher the socioeconomic status, the more money they were willing to commit for DNA-based dietary guidance, Vohl said.

Arne Astrup, MD, PhD, University of Copenhagen, discussed personalized medicine's role in obesity and diabetes.

Analyses of large international diet studies demonstrate that fasting blood glucose and insulin can be used as criteria for individual weight-loss diets, he said.

The evidence shows that normoglycemic, obese subjects lost more weight on a low-fat, high-carbohydrate diet. A medium-fat, lower-glycemic load, high-protein and high-fiber diet was most effective for pre-diabetics. And diabetic obese people had more satiety and success with a low-carb, high-protein and high-fat diet.

"One diet does not fit all," Astrup said. "The optimal diet for each patient can be selected based on simple fasting glucose and insulin/C-peptide levels."

He also noted that future studies should address supplementation

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Calories

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expenditure.

"The metabolic effects of carbohydrate (to increase insulin) cause the adipocyte to take in, store and trap too many calories," Hall said. "Subsequently, energy expenditure declines and hunger increases."

Eric Ravussin, PhD, Pennington Biomedical Research Center, tackled the complex topic of metabolic flexibility.

Metabolic flexibility was first defined as the capacity to adapt fuel oxidation to availability. But Ravussin said in recent years, that definition has been refined. Today, metabolic flexibility is seen as the "ability to efficiently adapt metabolism by substrate sensing, trafficking, storage and utilization, depending on energy availability and requirement," he said.

When it comes to measuring metabolic flexibility, the Clamp Method is not effective, Ravussin said. Newer methods evaluate how quickly people respond to specific diets. For instance, metabolic inflexibility can be defined by sluggish adaption to high-fat diets. Ravussin also cited research showing that physical activity improves adaption to high-fat diets.

"We need to develop better experimental procedures to assess metabolic flexibility," he said. "Translational approaches are necessary to uncover the molecular mechanisms of metabolic flexibility and inflexibility."

Frank Hu, MD, PhD, Harvard T.H. Chan School of Public Health, followed with a look at saturated fat. The key, he said, is not whether saturated fat is "good" or "bad," but how it affects health if it's replaced with another nutrient—including trans fats, unsaturated fats and carbohydrates.

"Dietary patterns are more realistic representations of dietary intake in real life, and can be better translated into dietary guidelines," he said.

Healthy dietary patterns can include Mediterranean, alternative healthy eating index and DASH diets. Hu's 12-year study showed that all of these diets are associated with a significant reduction in cardiovascular disease and overall mortality. And healthy vegetarian diets showed a lowered risk of type 2 diabetes and heart disease.

"A moderate improvement in diet quality over time as an adult can have a meaningful effect on mortality and longevity," Hu concluded.

John Jakicic, PhD, University of Pittsburgh, wrapped up the session with a discussion of the role of physical activity in energy balance.

"If you have a metabolism like a Volkswagen bus, there's very little you can do on the diet side ... we should do our studies not just in the overweight, diabetic folks, but in the people who have different metabolic flexibility."
— James Hill, PhD

Many exercise studies have issues, Jakicic said. First of all, they don't recreate the real-world situation of how a new exercise program can also result in diet changes. "Then, they tend to think of activity as one big pot," he said. The common refrain is "we know exercise is good for you, so why do we need to study it?"

But not everyone who starts exercising has an increase in lean body mass, Jakicic said, perhaps due to the type of exercise they choose. There may also be an energy threshold where once someone starts exercising, they may take other compensatory actions like sitting more.

There's a physiology across the spectrum of physical activity, ranging from sleep to intense exercise, that researchers need to take into account, Jakicic said. "Sedentary behavior is a hot topic now, but the effects aren't between sitting and standing, but rather between sitting and moving."

The reality is that most people don't "exercise," like riding a bike, Jakicic said. Instead, they "move around" in patterns of activity. So researchers need to study sedentary and stationary behavior, activities of daily living and variable physical activity.

"Just as energy is divided into categories like protein, carbs and fats, so is energy expenditure," Jakicic said.

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Genetics

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with prebiotics and probiotics for weight loss and diabetes management.

E. Matthew Morris, PhD, University of Kansas Medical Center, discussed the role of exercise in obesity and metabolic disease.

Aerobic capacity is 50 percent to 70 percent genetically determined, Morris said. He cited mouse studies showing that while high-capacity runners had no health problems, low-capacity runners fed a healthy diet could still spontaneously develop high blood pressure, hyperinsulinemia, increased lipids, higher body weight, non-alcoholic fatty liver disease and reduced mitochondrial respiratory function (MRF).

Morris said key questions for future research on short-term, diet-induced weight gain include: Does peripheral tissue energy metabolism modulate our susceptibility, and how can liver energy metabolism alter food intake?

Factors influencing the latter question include vagal afferent signaling, primary causation—PGC-1a versus MRF, HCR/LCR food intake phenotyping and neural anatomy, and human brain/liver imaging such as fMRI BOLD and phosphorus MRS.

Daniel McDonald, PhD, University of California San Diego, closed the session with a discussion of studies he's involved in, including the Earth Microbiome Project, the American Gut Project and the Microsetta Initiative.

"One diet does not fit all. The optimal diet for each patient can be selected based on simple fasting glucose and insulin/ C-peptide levels."

— Arne Astrup, MD, PhD

For the American Gut Project, "we are quite literally trying to get everyone on the planet to send us their poop," through a crowdfunding portal called FundRazr, McDonald said. The project also includes a complex diet questionnaire for participants. In return, each participant receives a report about what's going on in their microbiome.

McDonald said the KU team has analyzed the microbial composition of more than 15,000 samples so far, and has found that diet doesn't necessary influence the microbiome in the same way. However, he said the diversity of plants in a diet is heavily associated with the microbiome. If someone eats more than 30 plant types in a week, that has a larger benefit to the microbiome than antibiotics have a detriment.

"People who have a very high diversity of plants in their diets tend to have a richer repertoire of molecules in their gut," McDonald said.

Data Collection

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straightforward FDR control, he said.

Lehana Thabane, PhD, McMaster University, tackled the topic of sensitivity analyses in clinical trials.

"All scientific methods rely on assumptions, and conducting scientific studies is often affected by challenges that are predictable or unpredictable," he said. "Building in sensitivity analyses to assess the robustness of scientific findings is an imperative for good science."

Sensitivity analysis is a way to measure the impact of a variation in factors that are key to determining the outcome, doing the analysis or conducting a study, Thabane said. This includes outliers, protocol violations, missing data, outcome definitions and baseline imbalance, clustering or correlation in multicenter RCTs, competing risks, and distributional assumptions.

On the other hand, sensitivity analysis is not a multiplicity problem, nor are subgroup analysis and secondary analysis forms of sensitivity analysis, he said.

Thabane cited his paper showing that only about 18 percent of nutrition journal articles published since 2013 contained sensitivity analysis.

"Overall, the planning of sensitivity analysis in studies is not adequate," he said. "Searching for sensitivity analysis in reporting guidelines show that none exist," which opens up an opportunity to develop proper standards.

David Allison, PhD, Indiana University, closed the session with a discussion of regression to the mean, which he called a "frequently neglected source of confused conclusions."

Whenever you have two variables that aren't perfectly correlated, there will be regression to the mean (RTM) or mediocrity, Allison said. Concluding that there was a treatment effect would be erroneous when there's just an observation or phenomenon of the data.

For instance, if a person has relatively good health and then suddenly their health declines and they start a new diet, it's likely that their health will improve—not simply because of the diet, but because they started the diet at their lowest health point, Allison said.

Ignoring RTM can lead to mistakes in study design and conclusions. Allison cited a study in which weight loss was observed in subjects one year after spinal surgery. The conclusion was that spinal surgery may result in weight loss. But there was no comparison of the findings to a control group, meaning that the results were probably regression to the mean.

"When these errors are noted, let's just be honest and say we made a mistake," Allison said.

Brain food: Can diet changes improve mental health?

Declining diet quality and an aging population are increasing the incidence of neurodegenerative diseases and mood disorders in the U.S. That makes it fitting that Nutrition 2018's two-day clinical track kicked off June 9 with a trio of sessions devoted to brain health.

"This is my political movement: Everyone with a brain deserves good nutrition," said Joseph Hibbeln, MD, NIH Intramural Research Program. "But nutrition has neglected this organ, which is only 2 percent of our body weight but consumes 20 percent of our oxygen."

Hibbeln's presentation focused on omega-3 fatty acids and brain health. "There's a reason why people evolved next to seas, because essential fats from fish are biologically important for neurons," he said.

Hibbeln cited research linking declining omega-3 consumption with increased incidence of depression, ADHD, aggression, anxiety, addiction and suicide

One study found that omega-3–deficient diets cause a 50 percent decrease in dopaminergic neurons in animals. And Hibbeln cited meta-analyses showing that people who eat a Mediterranean diet are 30 percent less likely than their peers to have depression, and those that eat fish are 20 percent less likely to be depressed.

Other studies found that EPA may be more efficacious than DHA for major depressive disorder.

Hibbeln cited one study showing that EPA was more than twice as effective as antidepressants and psychotherapy.

In Hibbeln's NORAA randomized trial, which involved 36 adults with ADHD, participants received a daily smoothie with 3 grams of omega-3s or a placebo. After 16 weeks, the DHA and EPA group had improved reward responses. "The test activated the bilateral insular cortex and the superior temporal cortex, which is involved in processing the meaning of reward," he said.

Hibbeln also cited statistics showing that there is about 30 percent less homicide prevalence in countries where people eat more fish. And another of his studies showed about 40 percent less aggression in children after fatty acid consumption for six months.

Other research found decreased psychological aggression among intimate partners after 12 months of omega-3 consumption. And one study reported a 37 percent

As people move away from the coasts, their essential fatty acid consumption drops, said Joseph Hibbeln, MD.

reduction in felony violent offences among prisoners who simply ingested the RDA of vitamins, minerals and EFAs.

"Reducing violence is something that nutrition could do to help the world," Hibbeln said.

Barbara Shukitt-Hale, PhD, USDA, said oxidative stress and inflammation are two of the main factors in brain aging. But research shows that polyphenols and other components, such as omega-3s, in berries and walnuts can decrease sensitivity to oxidative stress and inflammation.

Studies of 19-month-old rats, which translates to age 60 to 65 in humans, found that supplementing a well-fortified diet with the equivalent of about half a cup of blueberries (2 percent of the diet) forestalled age-related deficits in memory and cognitive function, and in some cases even reversed deficits.

Shukitt-Hale said the same effects were found with walnuts, at 6 percent of the diet, or the equivalent of 1 ounce. However, the effects declined with more walnut consumption.

While quite a few foods can boost memory and cognitive function, there are only a handful that increase motor function as well, Shukitt-Hale said. These include blueberries, walnuts, Concord grape juice, cranberries, raspberries, strawberries and coffee.

In addition, "different berries can produce different beneficial effects on cognition, perhaps due to their different polyphenolic compositions," she said.

For instance, blueberries' ability to improve executive function may be associated with the prefrontal cortex, which is particularly vulnerable to age-related degeneration. And strawberries have been shown in some research to affect the hippocampus, which is also impacted by age and affects spatial and recognition memory.

Shukitt-Hale said there's evidence that blueberries don't alter levels of circulating inflammatory biomarkers. However, in vitro studies showed that serum from older adults who consumed blueberries reduced LPS-induced inflammatory stress-mediated signals in stressed HAPI microglia.

"These results suggest that parent compounds or metabolites from the berry fruit, which are present in the circulating blood, may be mediating the inflammatory effects," she said.

Brad Lowell, MD, PhD, Harvard Medical School, said the brain plays a critical role in homeostasis. It detects "errors" in parameters via the blood, the vagus nerve and spinal nerves; integrates these signals with other needs; and corrects the "errors" using multiple effector pathways such as drives, hormones, and the sympathetic and parasympathetic nervous systems.

Neuron connections "look like a Jackson Pollock painting," Lowell said. But neuroscience has undergone a technological revolution. "For any type of neuron, we can now selectively turn it on and off (through optogenetic and chemogenetic tools); measure its activity in awake, behaving mice; and map its inputs and outputs," he said.

"With these tools, we can now go from a Jackson Pollock painting to a wiring diagram," and that helps researchers understand homeostasis and the brain's drive to consume food, water and salt, Lowell said.

Specifically, AgRP neurons influence the hunger drive, MnPO neurons affect thirst, and HSD2 and SFO neurons influence salt appetite, he said.

Process to receive Continuing Education credits

To receive continuing education credits, you must complete the conference evaluation. The easiest way to access the evaluation is through the Nutrition 2018 mobile app or schedule planner. To download the mobile app, search for "ASN Meetings" in either the App Store or Google Play. You will need to create an account to complete the evaluation online or in the app. If you prefer, you can also download and return a hard copy of the evaluation to ASN.

General Certificate of Attendance

If you need a certificate to show attendance immediately, click here to download the General Certificate of Attendance.

Mobile app/schedule planner:

Once you complete the evaluation, you can email, download or print one of the following certificates:

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Once you complete the evaluation, please return it to ASN at education@nutrition.org or by mail at American Society for Nutrition, 9211 Corporate Blvd., Suite 300, Rockville, MD 20850. Click here to download a hard copy of the evaluation.

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DIPA

Continued from page 1

Dr. Nicklaus's ground-breaking research conducted over the past decade assesses and rethinks the early influences of food choices. Starting in the womb and continuing through infancy, her research demonstrates the impact of food intake on sustaining a healthy diet through adulthood. She presented her award lecture titled *Nurturing health through the pleasure of eating; the right choices from the start*.

Dr. Nicklaus pursued a career centered around her fascination with food. In 1995, she graduated with a degree in agricultural engineering from the National Agricultural Institute Paris-Grignon, Paris. Her work since, directly relates to how factors influence a person's eating behaviors and overall health. She is the Research Director at the French National Institute for Agricultural Research, Centre for Taste and Feeding Behavior in Dijon, France. She has investigated and is able to provide insightful tips to steer children onto the right path to healthy eating throughout life. One tip encourages parental figures to be a positive role model and involve children in the process of making healthy food choices; another being exposure to a variety of food types, flavors and textures during infancy. Her work carefully considers the additional characteristics that drive individual food choices such as pleasure and social, psychological and cultural factors.

Dr. Sophie Nicklaus

Dr. Nicklaus' research has shown that children learn to derive pleasure from food through their early eating experiences, such as being exposed to the taste, appearance and flavor of healthy foods; sharing positive experiences of eating sociably with family and friends; and subsequently developing positive attitudes towards foods. Further, once a child likes a food, this preference is carried through to adult life.

Instilling children with a sense of pleasure of eating is a crucial and fundamental way to encourage healthy eating in later life. Pleasure can be a valuable tool in encouraging healthy eating because it drives food choices.

Dr. Nicklaus plans to use DIPA to promote healthy eating by bridging the gap between research and everyday life. "We need to empower parents and children to make healthy food choices for life," she says. She also plans to pilot an intervention for healthy eating in schools in her local town of Dijon and to disseminate a framework for applying this approach to other cities and cultures.

Through hard work and an impeccable emphasis on "alimentation", Dr. Nicklaus is the rightful winner of the 2018 DIPA. View Dr. Nicklaus's full lecture presented at Nutrition 2018 and learn more about Dr. Nicklaus' work and the Danone International Prize for Alimentation.

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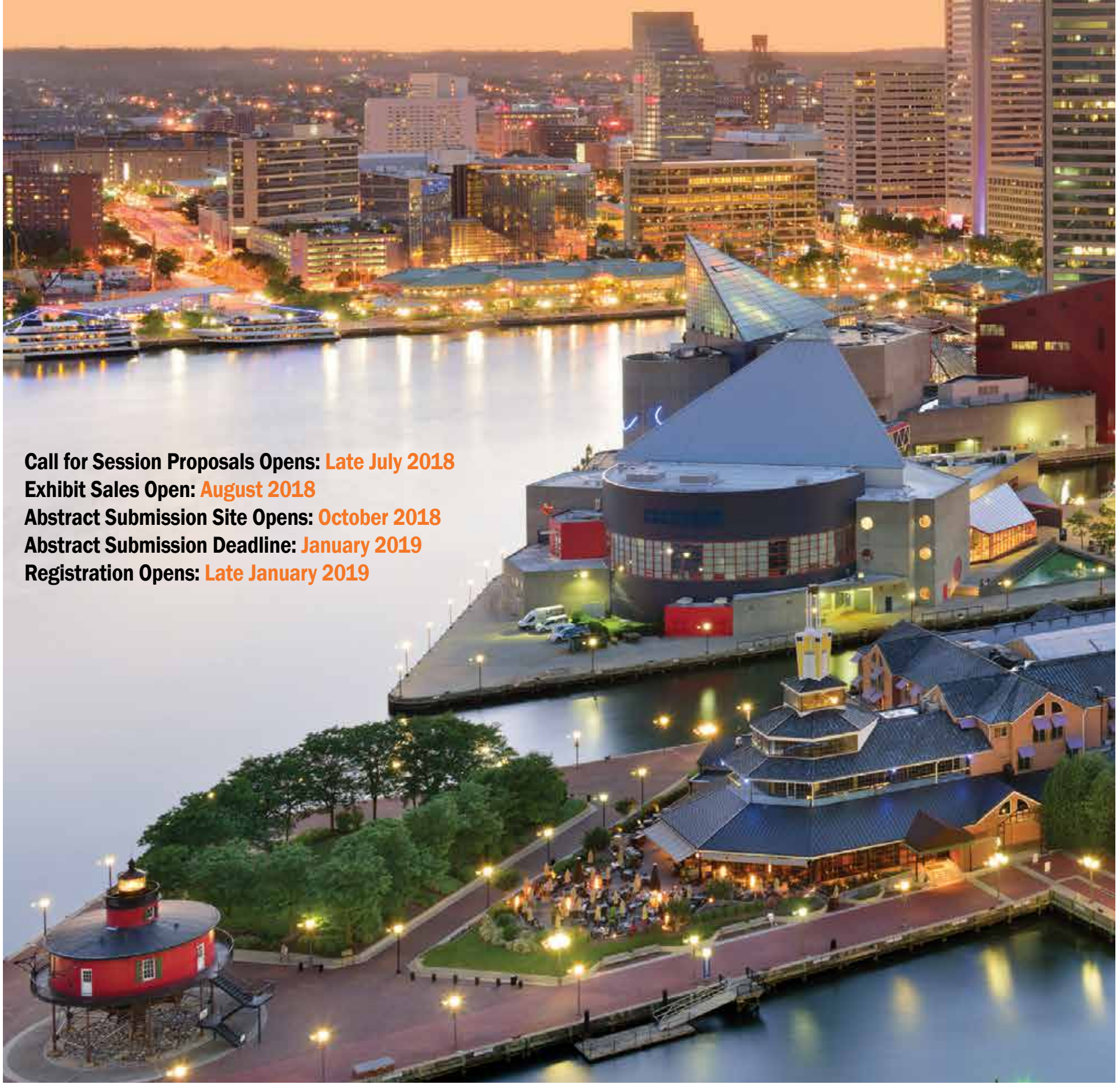

Call for Session Proposals Opens: Late July 2018
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Abstract Submission Site Opens: October 2018
Abstract Submission Deadline: January 2019
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