



**International  
Sweeteners  
Association**



International Sweeteners Association (ISA)  
Symposium

## Sweetness without calories: Safety, benefits and role of low calorie sweeteners in obesity and diabetes

Date: Wednesday 13<sup>th</sup> June 2018

Time: 12.30 PM - 2.00 PM

Room: Turquesa 2 (third floor), Centro de Convenções Rebouças - São Paulo (Brazil)



# Sweetness without calories: Safety, benefits and role of low calorie sweeteners in obesity and diabetes

Wednesday 13<sup>th</sup> June 2018, 12.30 PM - 2.00 PM

## Detailed overview

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### 12.20 Low calorie sweeteners' safety: a review of evidence

Prof Carlo La Vecchia, MD,

*Professor of Medical Statistics and Epidemiology, Department of Clinical Sciences and Community Health, School of Medicine, Università degli Studi di Milano, Italy.*

The role of low calorie sweeteners (LCS) on cancer risk has been widely debated since the 70s, when animal studies found an excess bladder cancer risk in rodents treated with extremely high doses of saccharin. However, mechanistic data showed different saccharin metabolism in rodents and humans.

To provide information on the role of LCS on the risk of cancer at several sites, we considered data from an integrated network of case-control studies conducted in Italy between 1991 and 2008. Cases were 598 incident, histologically confirmed cancers of the oral cavity and pharynx, 304 of the oesophagus, 1953 of the colon-rectum, 460 of the larynx, 2569 of the breast, 1031 of the ovary, 1294 of the prostate, and 767 of the kidney (RCC). Controls were 7028 patients (3301 men and 3727 women) admitted to the same network of general and teaching hospitals, for acute non-neoplastic diseases. We also considered 230 patients with cancers of the stomach and 547 controls, 326 of the pancreas and 652 controls, and 454 of the endometrium and 908 controls. Odds ratios (OR) were obtained from multiple logistic regression analyses, including allowance for total energy, besides major recognized risk factors for each neoplasm. The ORs for an increase of one sachet-day of LCS were 0.81 for cancers of the oral cavity and pharynx, 1.09 for oesophagus, 0.96 for colon, 0.94 for rectum, 1.16 for larynx, 0.94 for breast, 0.87 for ovary, 1.03 for prostate, and 0.99 for kidney cancer. There was no material difference in risk for saccharin vs other low calorie sweeteners. After allowance for various confounding factors, the ORs for every user of low calorie sweeteners versus nonusers were 0.80 (95% CI, 0.45-1.43) for gastric cancer, 0.62 (95% CI, 0.37-1.04) for pancreatic cancer, and 0.96 (95% CI, 0.67-1.40) for endometrial cancer. Corresponding ORs for saccharin were 0.65, 0.19, and 0.71, and for other sweeteners were 0.86, 1.16, and 1.07, respectively. This is the first comprehensive dataset on the relation between sweeteners, digestive tract and selected other major cancers. Other data on brain and hematopoietic neoplasms also showed no association. Thus, there is now convincing epidemiologic evidence of the absence of association between LCS and the risk of several common neoplasms.

We also reviewed cardiovascular diseases and obstetric outcomes, and there was no consistent evidence of association between LCS and any of these conditions.

### 12.55 Sweetness without calories: effect of low calorie sweeteners on appetite and energy intake

Dr France Bellisle, PhD, DSc

*Psychologist. Nutritional Epidemiology. Université Paris 13. France.*

The World Health Organisation (WHO) recommends that adults and children reduce their intake of free sugars to less than 10% of the daily energy intake. This recommendation is challenging for many individuals and more so in certain parts of the world where the culturally accepted levels of sweetness in the diet are high.

Sweetness is a potent psychobiological stimulus in many animal species, including humans of all ages. Human newborns display an innate attraction to sweet substances, manifested by eager acceptance and a stereotyped gusto-facial reflex of relaxation and smile. As it does in other species, the human appetite for sweetness spontaneously decreases during growth. Adults vary largely in their preferred intensity of sweetness in a broad range of beverages and foods. Genetic influences and personal experiences with sweetness shape the adult responses.

## Agenda

- 12.30 Opening**  
by chair Prof Carlo La Vecchia
- 12.30 Low calorie sweeteners' safety: a review of evidence**  
Prof Carlo La Vecchia
- 12.55 Sweetness without calories: effect of low calorie sweeteners on appetite and energy intake**  
Dr France Bellisle
- 13.20 Role of low calorie sweeteners in obesity and diabetes from a public health perspective**  
Dr Caomhan Logue
- 13.45 Panel discussion**

Experimental reports and recent meta-analyses confirm that the use of LCS is associated with lower energy and sugar intake in the context of weight loss programs. LCS also facilitate the maintenance of the reduced weight after the end of a diet. Disproving early suggestions that LCS may enhance the natural appetite for sweetness and paradoxically stimulate the consumption of other sweet (sugar-containing) products, experimental trials show that LCS satiate rather than enhance the appetite for sweet tasting products and facilitate the reduction of sugar intake. More research is needed to assess the role of LCS in the management of sweetness appetite over the life span and in the prevention of weight gain, particularly in individuals at risk of overweight/obesity.

### 13.20 Role of low calorie sweeteners in obesity and diabetes from a public health perspective

Dr Caomhan Logue,

*Nutrition Innovation Centre for Food and Health, Ulster University, Coleraine, United Kingdom*

Obesity and diabetes have become important global health issues over recent decades and public health initiatives for tackling these issues recommend cross-sectoral, multi-stakeholder approaches. (1,2) Core components of these approaches include the promotion of healthier dietary practices and increased physical activity and one dietary practice that has gained considerable attention in recent years is limiting consumption of free sugars to 5-10% of total energy intake. (3,4) With intakes of free sugars currently exceeding these recommendations, several approaches have been suggested for reducing intakes including the promotion of healthier choices, changes to portion sizes and product reformulation. (5)

Low calorie sweeteners (LCS) are food additives that provide a desired sweet taste without the addition of energy and therefore can help maintain the palatability of reformulated products. Before going to market, LCS are subject to stringent safety evaluations that consider available safety and toxicological data, which usually result in the assignment of an acceptable daily intake (ADI), with recent global intake data indicating little/no cause for concern in this regard. (6) It has been suggested that LCS may have a positive contribution to make towards achieving important public health goals in relation to obesity and diabetes with recently published systematic reviews with meta-analyses concluding that LCS can have a beneficial effect on weight status when used to replace free sugars. (7,8) Indeed, recent evidence-based guidelines for the prevention and management of diabetes suggest that LCS may be beneficial for those who commonly consume sugar-sweetened products. (9) Despite this, debate persists around the use of LCS in relation to health, largely as a result of mixed findings from observational studies, some of which have found positive associations between LCS consumption and the risk of weight gain and diabetes. These findings may be attributed to reverse causality or to the presence of confounding factors. However, a further, yet less well documented, explanation may be inadequate assessment of LCS intakes in population-based studies. Therefore, alternative approaches that generate more objective and comprehensive LCS-intake data, such as a biomarker approach (10), may help address this important limitation and enhance population-based research in the area.

Existing evidence suggests that LCS can make a positive and sustainable contribution to the prevention and management of obesity and diabetes by helping to reduce free sugars consumption while maintaining the palatability of the diet.

#### References:

1. WHO (2015) Obesity and Overweight, Fact sheet No. 311.
2. WHO (2016) Global Report on Diabetes.
3. WHO (2015) Sugar intakes for adults and children.
4. Scientific Advisory Committee on Nutrition (2015) Carbohydrates and health.
5. Public Health England (2017) Sugar Reduction: Achieving the 20%.
6. Martyn D et al (2018) *Nutrients* 10(3): 357.
7. Miller PE & Perez V (2014) *Am J Clin Nutr* 100(3): 765-777.
8. Rogers P et al (2016) *Int J Obes* 40(3): 381-394.
9. Diabetes UK (2018) Evidence-based guidelines for the prevention and management of diabetes.
10. Logue C et al (2017) *J Agric Food Chem* 65(22): 4516-4525.

## About the speakers

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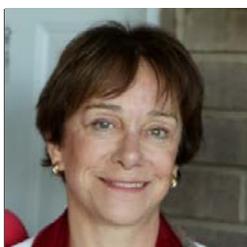


### **Prof Carlo La Vecchia, MD**

Dr La Vecchia received his medical degree from the University of Milan and a master of science degree in clinical epidemiology from Oxford University. He is recognized worldwide as a leading authority in cancer aetiology and epidemiology. Presently, he is Professor of Epidemiology and Biostatistics at the School of Medicine at the University of Milan. Dr La Vecchia serves as an editor for numerous clinical and epidemiologic journals. He is among the most renowned and productive epidemiologists in the field with over 2,000 peer-reviewed papers in the literature (Pubmed) and is among the most highly cited medical researchers in the world, according to ISI Highly Cited.com, the developer and publisher of the Science Citation Index (h index, 152, h-10 index 1532, total IF over 9000, over 109,000 quotations, second Italian in the field of Clinical Medicine). Dr La Vecchia is an Adjunct Professor of Medicine at Vanderbilt Medical Center and the Vanderbilt-Ingram Cancer Center.

Dr La Vecchia is a temporary advisor at the World Health Organization in Geneva, and a registered journalist in Milan. He was Adjunct Associate Professor of Epidemiology at Harvard School of Public Health between 1996 and 2001 and Adjunct Professor of Epidemiology at the University of Lausanne, CH (2000-14), Senior Research Fellow at the International Agency for Research on Cancer IARC/WHO between 2006 and 2008, and Head of the Department of Epidemiology at the Mario Negri Institute, Milan between 2007 and 2014.

Dr La Vecchia's main fields of interest include cancer epidemiology and the risk related to diet, tobacco, hormone use and occupational or environmental exposure to toxic substances; and analysis of temporal trends and geographical distribution of mortality from cancer, cardiovascular diseases, perinatal and other selected conditions.



### **Dr France Bellisle, PhD, DSc**

Following her Bachelor Degree (McGill University, Montreal) and a Masters Degree (Concordia University, Montreal) in experimental psychology, France Bellisle worked at the College de France in Paris in the laboratory of Jacques Le Magnen. She obtained Doctorate Degrees from the University of Paris. From 1982 until 2010, in the context of French National Research Institutes (CNRS, INRA), she developed original research in the field of human ingestive behaviours. Her research interests cover all types of determinants of food and fluid intake in human consumers, including psychological, sensory and metabolic factors as well as environmental influences. She has published over 250 articles in peer reviewed journals and contributed chapters to several books. She is now an independent consultant for scientific projects in the field of human appetite.



### **Dr Caomhan Logue**

Caomhan Logue is a Registered Dietitian who works as a Lecturer in Dietetics at the Nutrition Innovation Centre for Food and Health (NICHE), Ulster University (UU), Northern Ireland. Caomhan graduated in 2012 with BSc Hons Dietetics and subsequently worked as a Clinical Dietitian before completing his PhD at UU, which focused on developing and investigating the feasibility of a urinary biomarker approach for objectively assessing intakes of low calorie sweeteners (LCS). Within this work he developed a novel LC-MS/MS methodology for simultaneously determining urinary concentrations of five commonly used LCS, namely acesulfame-k, saccharin, cyclamate, sucralose and the excretory metabolite of steviol glycosides. His current research interests focus on applying this novel approach, which allows for more objective assessment of LCS intake/exposure, to investigate the relationship between LCS and health. Caomhan also has a keen interest in public health nutrition in the context of health inequalities and works closely with the Healthy Living Centre Alliance (Northern Ireland), which delivers a range of community-based programmes aimed at improving the health and well-being of local populations who live in areas of high socio-economic deprivation.

Please visit us at ISA booth in Salão Nobre to find out more about the role low calorie sweeteners can play in the diet, and to share your views on low calorie sweeteners by taking part in our survey.

For more information about low calorie sweeteners, please visit:  
[www.sweeteners.org](http://www.sweeteners.org)