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Nature Café

Taste science, culture and communication

11 December 2017, 2.00 - 7.00 p.m.

Kings Place, 90 York Way, London, N1 9AG

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Agenda

Nature Café | Taste science, culture and communication

14:00-14:10 **Opening remarks**
Michelle Grayson
Nature Research, UK

14:10-14:30 **Making sense of taste: From the tongue to the brain**
Nicholas Ryba
National Institute of Dental and Craniofacial Research, USA

14:30-14:50 **Perception of flavour is more than meets the tongue**
Kathrin Ohla
German Institute of Human Nutrition, Germany

14:50-15:10 **The origin of flavour preferences**
Julie Mennella
Monell Chemical Senses Center, USA

15:10-15:30 **Food fact and fiction: Is what we eat safe, healthy and sustainable?**
John Krebs
University of Oxford, UK

15:30-15:50 **Historical perspective on umami and a way forward towards sustainability**
Takeshi Kimura
Ajinomoto Co., Inc. Japan

15:50-16:15 **Coffee break**

16:15-16:35 **Cooking demonstration Fundamentals of Japanese cuisine**
Dashi and umami - Chef Daisuke Hayashi
Tokimeitē, UK

16:35-17:35 **Panel discussion**

17:35-17:40 **Closing remarks**
Michelle Grayson

18:00 **Reception**

Overview

Taste is one of the canonical five human senses, but it is also probably the least well understood. From the taste buds on the tongue to the appreciation of flavour in the brain, there are plenty of unknowns that science is looking to fill. How many basic tastes are there? What shape is sharp cheese? How does our sense of taste interact with our hearing?

Enjoyment of food and drink is one of the great pleasures of being human. Research into flavours, down to the molecular level, can provide novel experiences and even turn healthy food into a gastronomic delight. But we shouldn't assume that these achievements will translate across the world: each culture has its own opinion on what constitutes a good meal. And just because the media tells us that something is bad for our health or is a superfood — doesn't make it so.

To whet your appetites, the event will include an on-site cooking demonstration by Chef Hayashi of Japanese restaurant Tokimeitē.

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nature café Presentation 1

Making sense of taste: From the tongue to the brain

Nicholas Ryba
Principle Investigator, National Institute of Dental and Craniofacial Research, USA

Taste evolved as a primary regulator and driver of food consumption. In mammals, the receptor cells are grouped into taste buds on the surface of the tongue. We now know that taste receptor cells are selectively tuned, each responding to just one of the five primary tastes of sweet, sour, bitter, salty and umami. This suggests that the brain just needs to monitor which receptor cells are activated to determine what the tongue is tasting. Indeed recent studies of taste representation in the brain strongly support the existence of hardwired labelled lines that help explain how specific tastes are recognized and elicit innate behaviours and preferences.

Nicholas Ryba received his D. Phil. in Biochemistry from Oxford, UK, completed post-doctoral training at the Max Planck Institute for Biophysical Chemistry in Göttingen, Germany and the University of Leeds, UK working on the biophysics and molecular biology of vision. In 1991, he joined NIDCR to establish an independent group studying the molecular and cellular mechanisms underlying the perception of taste and smell. Over the past 20 years, in a fruitful collaborative research effort with Charles Zuker, of the Howard Hughes Medical Institute and Columbia University, the researchers have identified the taste receptors for sweet, bitter, salty and savoury stimuli and exposed the logic of coding for all five distinct taste qualities at the level of the tongue. They also have begun to explore how taste information is represented and encoded in the brain to help explain how this hardwired chemosensory modality triggers innate responses and behaviors.

Conflicts of interest: None disclosed

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PHOTOGRAPHY TILL BUDDE

nature café Presentation 2

Perception of flavour is more than meets the tongue

Kathrin Ohla
Group Leader, German Institute of Human Nutrition, Germany

When it comes to flavour, it is not just the taste cells on the tongue that have an input - all the other senses as well as our memories and emotions play a role. What we like and dislike is a complex narrative.

Kathrin Ohla studied Psychology at Magdeburg University in Germany and received her Ph.D. in Psychology from the University of Leipzig in Germany in 2007. Since then she has been investigating the brain mechanisms of chemosensory and multisensory perception: as postdoc at the Centre des Recherche Nestlé in Lausanne (Switzerland) and the Monell Chemical Senses Center in Philadelphia (USA). In June 2012, she returned to Germany and set up an independent research group at the German Institute of Human Nutrition Potsdam-Rehbruecke where she investigates the psychophysiological mechanisms of food perception. In September 2016, she received her teaching degree from the Humboldt-University in Berlin and took on a position as professor for General Psychology at the Medical School Berlin for two semesters.

Understanding the principles that drive food intake is a prerequisite for the development of targeted interventions to promote healthy eating. Her research aims include unravelling the workings of the human gustatory system, the gateway to nutrient sensing, and she asks how taste perception is influenced by attention and learning from prior exposure and experience. Because food is more than taste, she also asks how different senses interact and integrate to a holistic food experience. In her research, she combines electrophysiological and behavioral responses with mathematical analysis. Part of her work involves the development of novel stimulation techniques and psychophysical tests to allow achieving our goals.

Kathrin's research has been recognized by several national and international awards.

Conflicts of interest: No conflict of interest

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The origin of flavour preferences

Julie Mennella
Member, Monell Chemical Senses Center, USA

How do we get children off to a healthy start? Research is uncovering that early experiences, beginning even before the child has their first 'taste' of food, can shape preferences. Flavours from the maternal diet transmit to and flavour amniotic fluid and mother's milk, which can shape the child's food preferences. This emerging body of knowledge suggests that early life experiences with healthy tastes could have a significant impact in addressing many chronic diseases that plague modern society, which derive in large part from poor food choice, dictated by our taste preferences.

Julie Mennella obtained a Ph.D. from the Department of Behavioral Sciences at The University of Chicago in Chicago, IL. She joined the faculty at the Monell Chemical Senses Center in Philadelphia, PA in 1990 where she is now a Member. Her major research interests include investigating the timing of sensitive periods in human flavour learning and growth; uncovering how children are living in different taste worlds than adults and their vulnerabilities to the current food environment; and the development of psychophysical tools to study individual variation in taste and flavour perception. She is the recipient of several grants from the National Institute of Deafness and Other Communication Disorders and the Eunice Kennedy Shriver National Institute of Child Health and Human Development; the author or co-author of numerous peer-reviewed research papers and an internationally recognized speaker on the ontogeny of flavour preferences and its implications for health and nutritional programming.

Conflicts of interest: No conflict of interest

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Food fact and fiction: Is what we eat safe, healthy and sustainable?

John Krebs
Honorary Fellow and Former Principal, University of Oxford, UK

People have strong views about the safety and healthiness of food. Are these views based on evidence? Would having more evidence make any difference?

Lord John Krebs is Emeritus Professor of Zoology in the University of Oxford, UK. His research area is behavioural ecology and he has published more than 300 research papers, reviews, articles and books.

He completed his undergraduate degree in Zoology (1966) and his D. Phil. (1970) at Pembroke College Oxford. Lord Krebs was Chief Executive of the UK Natural Environment Research Council from 1994 to 1999 and the founding Chairman of the UK Food Standards Agency from 2000 to 2005. In 2005, he gave the Royal Institution Christmas Lecture. From 2005-2015 he served as Principal of Jesus College, Oxford.

Lord Krebs sits in the House of Lords, as an independent cross-bencher and served as Chairman of the House of Lords Science and Technology Select Committee from 2010 to 2014; he currently sits on the Energy and Environment Select Committee. He was Chairman of the UK Science and Technology Honours Committee from 2008 to 2014 and President of the British Science Association in 2012-13. He was a member of the UK Climate Change Committee and the founding Chair of its Adaptation Sub-Committee between 2009 and 2017. He is Deputy Chair of the Nuffield Foundation.

Lord Krebs has received a number of awards and honours including 17 honorary degrees, Fellowship of the Royal Society, the US National Academy of Sciences, the American Philosophical Society, the US Academy of Arts and Sciences, and the German National Academy of Sciences (Leopoldina).

Conflicts of interest: Advisor to Ajinomoto, Marks and Spencer and Tesco. Chairman of an Oxford University Spinout (Oxford Risk)

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Historical perspective on umami and a way forward towards sustainability

Takeshi Kimura
Member of the Board & Corporate Vice President, Management of R&D; Quality Assurance; Intellectual Property; Nutrition Improvement, Ajinomoto Co., Inc. Japan

Throughout the years, the Ajinomoto Group has engaged in research and development centred on amino acids, resulting in expertise in biosciences, fine chemicals and seasoning technologies. With these technologies at our core, we have evolved into a unique food company group, diversifying our business to span in a wide range of fields, from food to healthcare and life support. We believe that our Food and AminoScience businesses can contribute significantly to the resolution of issues facing society in the 21st century, related to health and well-being, food resources, and global sustainability. Through dialogue with our stakeholders, we also understand that even larger expectations are being asked of us to resolve such issues.

Takeshi Kimura, Ph.D. is a Board Member and Corporate Vice President for Ajinomoto Co., Inc. and is currently in charge of Research and Development, Intellectual Property, Quality Assurance, Nutrition Improvement and Production Technology Strategy. He studied Cell and Molecular Biology at University of London, King's College and obtained a Ph.D. in Biochemistry from University of London in 1984. In 1989 he joined Ajinomoto and worked at the Central Research Laboratories and External Scientific Affairs Department. He became General Manager of R&D Planning Department in 2010 and became Board Member in 2013.

Dr Kimura is also Chairman of Japan Alliance of Health Food Associations, a member of the Board of Trustees for International Life Sciences Institute and Research Foundation based in Washington, DC, International Advisory Council Member for Monell Chemical Senses Center in Philadelphia and Japanese Private Sector Member for APEC Policy Partnership for Food Security.

Conflicts of interest: Employed by Ajinomoto Co., Inc.

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Fundamentals of Japanese cuisine – Dashi and umami

Daisuke Hayashi
Executive chef, Tokimeitē, London
Japan Culinary Academy UK

For a long time, around the world it was thought that there were four basic tastes: sweet, salty, sour, and bitter. In 2000, researchers discovered within taste buds receptors for umami next to those for sweetness, making umami the fifth basic taste. This changed the global foodscape: in London, for example, "Umami Taste No. 5 Paste" was developed and sold.

Umami is at the centre of Japanese cuisine. Only Japan has the unique soup stock known as dashi. Dashi and its taste of umami are fundamental in Japanese cuisine. The most common type of dashi is made with konbu and katsuobushi (dried skipjack tuna) flakes. The umami in dashi is there to bring out the flavours of the other ingredients to their best advantage, thereby reducing the use of salt and animal fat.

Many chefs are learning the basics of dashi and umami in order to better utilize the original umami-rich foods from their own countries.
There are many umami rich ingredients in the UK including Marmite, aged cheese, ripened tomatoes, Worcestershire sauce, etc.
I will introduce dashi and how to use UK style umami in healthy eating.

Daisuke Hayashi became an apprentice at age 18 to the third owner and chef of Kikunoi, the prestigious and a high-end traditional Japanese restaurant founded in Kyoto in 1912. He participated in the opening of Kikunoi in Akasaka, Tokyo in 2004 as sous-chef. He moved to Europe in 2009 to promote Japanese food culture. Hayashi is currently Deputy Chairman of the Japanese Culinary Academy UK and Executive Chef of Japanese restaurant Tokimeitē in London.

Conflicts of interest: None

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Michelle Grayson
Senior Editor, Nature Research

Michelle Grayson is the senior editor on the Nature Outlook series of supplements, and has worked at *Nature* for more than 8 years. In that time, she has created supplements on subjects as diverse as Bladder cancer, Cognitive health, Quantum computing and Bees. But the Nature Outlook on Taste from 2012 remains one of her all-time favourites.

Conflicts of interest: None

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Notes