

EASD 2023



Review of the 59th European Association for the Study of Diabetes (EASD) Annual Meeting

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On 2nd October, Chantal Mathieu, European Association for the Study of Diabetes (EASD) President, welcomed the more than 11,000 participants to the EASD's 59th Annual Meeting. This year, Hamburg, Germany, played host to what Mathieu introduced as "scientific fireworks," while the city celebrated German Unity Day.

In her opening address, Mathieu highlighted the exciting times in the field of diabetes, as we are getting to the core of the disease, with new insights into both Type 1 diabetes (T1D) and Type 2 diabetes, as well as better therapies. Disease-modifying therapies have represented a major advancement in the treatment of Type 2 diabetes, as well as insights into muscles and nutrition, leading to amazing clinical guidance. Implementing this knowledge, access to treatment, and clinicians being inert remain challenges. For T1D, as well as other forms of diabetes, new technologies, such as sensors, pumps, and artificial intelligence, are now helping patients improve glucose control and quality of life. Recent research has also identified biomarkers that provide better insights into the disease, allowing us to identify patients in early stages of the disease. Promising interventions are also helping delay the onset of clinical T1D, and protect β -cells after onset. In 2023, the first disease-modifying therapy teplizumab was approved by the U.S. Food and Drug Administration (FDA), and Mathieu hopes it will soon be available in Europe. Finally, stem cell

research has meant that islet transplantation will possibly become a cure for people with T1D soon. Another aspect of this exciting progress, Mathieu explained, is that we now acknowledge the voice of those living with diabetes in trials, research, and clinics. This has led the EASD to sign a pledge to end diabetes stigma and discrimination.

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This year marked the fifth anniversary of the EASD's e-learning platform. At its launch in 2018, this contained just three courses and five modules, but this has now increased to 31 courses and 83 modules, and the platform now has 9,000 registered users. The platform aims to educate, inform, and engage diabetes healthcare professionals around the world with high-quality content promoting holistic and patient-centred diabetes care. Mathieu further highlighted the EASD Academy, which aims to support, train, mentor, and create opportunities for students, scientists, and clinicians at an early or intermediate stage of their career. Through this initiative, the EASD wants to promote young people, and, as Mathieu stated: "the immersion of the butterfly from the caterpillar."



The congress offered a number of different sessions, including 58 symposia, 56 oral sessions, 96 short oral discussion sessions, 15 study groups and non-governmental organisation symposia, and 43 industry sessions. Mathieu took a moment to thank Tina Vilsbøll, EASD Honorary Secretary, as well as all members of the Programme Committee, for creating this exciting programme.

"The platform aims to educate, inform, and engage diabetes healthcare professionals."

The EASD recognised excellent diabetes science with the 2023 prize awardees, including Åke Lernmark, Lund University, Sweden, who received the 55th Claude Bernard Lecture; Stephan Herzig, Helmholtz Munich, Germany, recipient of the 38th Camillo Golgi lecture; and Yuval Dor, Hebre University of Jerusalem,

Israel, who was awarded the 17th Albert Renold Lecture. The EASD further presented the EASD/ NNF diabetes prize for excellence to Roman Hovorka, University of Cambridge, UK; the 58th Minkowski Lecture to Tino Müller, Helmholtz Munich, Germany; and the EASD-Lilly Centennial Anniversary Prize to Gerald Shulman, Yale School of Medicine, New Haven, Connecticut, USA. Four people were awarded the rising star symposium and fellowship: Lærke Smidt Gasbjerg, University of Copenhagen, Denmark; Theresia Sarabhai, German Diabetes Center, Düsseldorf, Germany; Luca D'Onofrio, Sapienza University of Rome, Italy; and Alessandro Mengozzi, University of Zürich, Switzerland.

The 60th Annual Meeting of the EASD will take place in Madrid, Spain, from 9th–13th September 2024, promising fireworks again, and hopefully some sunshine. Read on for scientific insights from the congress, including universal screening for T1D, the impact of low doses of radiation on the development of diabetes, and more. ●



Type 1 Diabetes: Could Antiviral Treatments Preserve β -Cell Function?

COMBINATION antiviral treatment may help retain pancreatic β -cell function in those with newly diagnosed Type 1 diabetes (T1D), according to novel research presented at the EASD Annual Meeting 2023.

Ida Maria Mynarek and Knut Dahl-Jørgensen, Oslo University Hospital, Norway, and colleagues conducted a Phase II, placebo-controlled, double-blind, parallel-group trial including 96 children, aged 6–15 years, to elucidate whether combined pleconaril and ribavirin antiviral treatment impacted β -cell function from T1D onset.

The study, affiliated with INNODIA consortium, randomised children to receive either pleconaril and ribavirin (n=47; 19 females) or placebo (n=49; 21 females) for 6 months within the first 3 weeks of T1D diagnosis. Twelve-month residual endogenous insulin production was the study's primary endpoint. Area under the concentration-time curve (AUC) for C-peptide level in response to a 2-hour mixed-meal tolerance test was used to measure this.

C-peptide AUC was found to be significantly higher in children treated with combined antiviral therapy at 12 months when compared with children in the placebo group. Those in the

treatment group experienced an 11% decrease in C-peptide AUC at 12 months, compared with 24% in the placebo group. In the treatment group, 86% had maximal C-peptide levels >0.2 pmol/mL, an indicator of residual exogenous insulin production, at 12 months, compared with 67% in the placebo group (p=0.04).

No significant differences in glycated HbA1c, severe hypoglycaemic events or adverse events, glycated albumin, or insulin dosage at 12 months were identified between the two groups, and treatment was found to be safe, with no severe adverse events during the study.

From the findings, the researchers commented that a potential underlying mechanism for developing T1D could be persistent low-grade viral infection, and alluded that development of new vaccines could therefore aid prevention. They stated: "Among children with newly diagnosed T1D, a 26-weeks course with two antiviral drugs partially preserved stimulated C-peptide secretion 12 months after diagnosis, and a higher proportion of participants with clinically relevant preserved C-peptide secretion than placebo." They also discussed the rationale for identifying optimal antiviral therapeutics for use in treating T1D to help rescue β -cells at the time of diagnosis. ●

"C-peptide AUC was found to be significantly higher in children treated with combined antiviral therapy at 12 months."





Universal Screening of Type 1 Diabetes

UNIVERSAL screening for Type 1 diabetes (T1D) could increase access to education, monitoring, and disease-modifying therapies, suggests research presented at the EASD Annual Meeting 2023. Researchers have previously established that individuals with multiple islet autoantibodies have almost 100% risk of developing T1D over their lifetime, and screening for these antibodies at ages 2 and 5–7 years would predict most cases of T1D before the age of 15.

"Individuals with multiple islet autoantibodies have almost 100% risk of developing T1D."

This study, presented by Emily Sims, Center for Diabetes and Metabolic Diseases, Indiana University School of Medicine, Indianapolis, USA, highlighted that most people who develop T1D (85–90%) have no family history, despite screening programmes commonly focusing on people with a family history of T1D. Recently, increased understanding of the condition suggests T1D gradually develops, following the appearance of multiple islet-autoantibodies. Thus, by screening children and adults to identify individuals with early presymptomatic stages of disease, we could more accurately predict when they would first need insulin, thus helping to prevent cases of diabetic ketoacidosis.

Diabetic ketoacidosis is often the first sign of T1D in people who are undiagnosed, and can be dangerous, or even fatal.

Various research programmes aim to establish the best ways of implementing universal screening, ensuring guidelines for monitoring and screening are endorsed by diabetes advocacy societies prior to screening becoming general policy. This will also be helped by broader access to disease-modifying therapies.

Sims concluded: "The costs of screening, optimal ways to scale it up, and how to connect it with access to disease modifying therapies, such as the monoclonal anti-CD3 antibody that was recently [U.S. Food and Drug Administration] FDA-approved in the USA for delay of Stage 3 T1D in individuals meeting criteria for Stage 2 disease (multiple islet autoantibodies and changes in blood sugar), are all still to be worked out. Other important considerations moving forward include reaching traditionally understudied populations, and more tailored approaches for individual patients." Regarding when we could see the roll out of universal screening for T1D, Sims suggested that increased endorsement will be seen over the next 5 years, and as this occurs, countries will begin incorporating screening into routine care for young children. ●

Emergency Department Screening Could Detect Undiagnosed Diabetes Cases

RECENT research presented at the EASD Annual Meeting 2023 suggests that introducing screening for Type 2 diabetes (T2D) in accident and emergency (A&E) departments has the potential to uncover thousands of previously undiagnosed cases every year.

The study, presented by Edward Jude, Tameside and Glossop Integrated Care NHS Foundation Trust, Ashton-under-Lyne, UK, included 1,388 patients visiting the A&E department, all selected at random, who did not have a diabetes diagnosis. Each of the patients were screened for T2D using the HbA1c test, which gives an indication of average glucose levels over the previous 2–3 months. For this study, pre-diabetes was defined as HbA1c 39–47 mmol/mol, and diabetes as 48 mmol/mol or higher.

Patients additionally were required to complete a questionnaire about demographics, ethnicity, and diabetes risk factors to calculate each patient's Finnish Diabetes Risk Score (FINDRISC), and to assess those at risk of developing T2D. A score of more than 20 indicated a very high risk of developing diabetes (50% chance over 10 years), and scores of 12–20 indicated moderate to high risk (33% chance over 10 years).

Of the patients screened, 848 (61%) had normal blood glucose levels, while 420 (30%) were found to have pre-diabetes, and 120 (9%) were

diagnosed with T2D, with a similar proportion in males and females. Analysis of the data further showed that people of South Asian and other non-White backgrounds had a higher incidence of glucose intolerance than White patients (43% versus 38%), and were, therefore, twice as likely to be diagnosed with pre-diabetes or diabetes. Additionally, each unit increase in FINDRISC score above zero was found to be associated with a 7% increased risk of prediabetes, and a 15% increased risk of T2D (after adjusting for age and sex).

"Each of the patients were screened for Type 2 diabetes using the HbA1c test."

Jude concluded that although there were limitations to the study, such as only one hospital being taken into account, their results demonstrate the ability of A&E department screening to help discover thousands of undiagnosed diabetes and pre-diabetes cases across the country. "Our findings suggest that the FINDRISC score could also be used to help ensure those at highest risk of developing T2D are made aware of their risk," added Jude. ●





Low Doses of Radiation Could Contribute to Diabetes

EXPOSURE to low doses of radiation could contribute to an increased risk of diabetes, according to new research presented at the EASD Annual Meeting 2023. Huan Hu and Toshiteru Ohkubo, both from the Japanese National Institute of Occupational Safety and Health (JNIOSH), analysed the emergency workers who were exposed to radiation when responding to a radiation accident at the Fukushima Daiichi Nuclear Power Plant, Japan.

In March 2011, this nuclear power plant was hit by a huge tsunami, and the NEWS study was established in 2014 to determine the long-term health effects of radiation exposure in emergency workers. A total of 5,326 male emergency workers (average age: 46 years) took part in the study.

"The NEWS study was established in 2014 to determine the long-term health effects of radiation exposure."

The emergency workers' radiation exposure was measured with a dosimeter for external exposure, and a whole-body counter for internal exposure. Throughout the study, the participants

underwent health examinations that involved more than 70 component, including inflammation biomarkers, eye examinations, and blood sugar checks.

After adjusting for a range of potential confounders, such as age, BMI, alcohol consumption, smoking, and high blood pressure, the researchers assessed the link between cumulative radiation exposure and incident diabetes. According to the results, the risk of developing diabetes was 6% higher in workers exposed to 5–9 mSv of radiation than those exposed to 0–4 mSv. This risk was 33% and 47% higher in those exposed to 20–49 and 10–19 mSv, respectively.

A total of 392 participants developed diabetes between 2012–2021, indicating that emergency workers are at increased risk of diabetes when exposed to low levels of radiation. However, the study's findings show observational associations rather than cause and effect due to limitations, including a lack of data on diabetes types, confounding from unaccounted factors, or measurement inaccuracies. Hu stated: "Ongoing follow-up of NEWS participants will provide an even clearer picture of diabetes risk at low radiation doses." ●

Can Drinking Dark Tea Reduce Type 2 Diabetes Risk?

DAILY consumption of dark tea could help to reduce the risk of developing and progression of Type 2 diabetes, according to novel research presented at the EASD Annual Meeting 2023.

"These findings were most prominent in those who drank dark tea daily."

Tongzhi Wu, University of Adelaide and Hospital Research Foundation Fellow, Australia, and colleagues performed a cross-sectional, observational study of 1,923 adults across eight Chinese provinces. Of these, 1,135 had normal blood glucose levels, 352 had pre-diabetes, and 436 had a diabetes diagnosis. Participants were aged between 20–80 years and 562 were male.

The authors reviewed tea drinking frequency (never, occasionally, often, and daily) and type of tea consumed (black, dark, green, or other) to examine the association between type and frequency of tea consumption and urinary glucose excretion, insulin resistance, and glycaemic status. Urinary glucose excretion was measured using morning spot urine glucose-to-creatinine ratio (UGCR), insulin resistance was measured using the triglyceride and glucose index (TyG), and glycaemic status was defined as a history of Type 2 diabetes; current use of antidiabetic medication; or abnormal 75 g oral glucose tolerance test.

Differences in age, sex, and clinical and lifestyle factors were controlled for.

The analysis revealed that, compared with those who never drink tea, daily tea consumption was associated with a 0.11 mmol/mmol increase in UGCR and a 0.23 reduction in TyG score. Additionally, when compared with never tea-drinkers, daily tea consumption was associated with a 28% reduced risk for Type 2 diabetes and 15% reduced pre-diabetes risk. Interestingly, these findings were most prominent in those who drank dark tea daily, with a 0.16 mmol/mmol increase in UGCR and a TyG reduction of 0.31.

The authors stated: "Our findings hint at the protective effects of habitual tea drinking on blood sugar management via increased glucose excretion in urine, improved insulin resistance, and thus better control of blood sugar." Wu further commented that the findings could be indicative that bioactive compounds in dark tea could directly or indirectly modulate renal glucose excretion.

Whilst these findings are interesting, the authors noted the study was limited by the observational design and the potential for other residual lifestyle and physiological confounders. Currently, they are in the process of conducting a double-blind randomised trial to further investigate and validate their findings. ●





Testosterone Replacement Might Improve Blood Sugar Control

TESTOSTERONE replacement therapy (TRT) might improve glycaemic control for up to 2 years, according to real-world data from an ongoing international audit of testosterone deficiency in males with Type 2 diabetes (T2D), which was presented at the EASD Annual Meeting 2023. This decrease in HbA1c is likely due to the effects of the hormone on fat reduction and insulin resistance.

The link between low testosterone and prevalence of T2D in males was discovered 20 years ago, with estimates suggesting that approximately 40% of males with T2D have symptomatic testosterone deficiency, a condition that is linked with adverse effects on psychological wellbeing, osteoporosis, and cardiovascular risk factors, as well as a double risk of death in males with T2D. While previous data has shown benefits of TRT, including reducing insulin resistance, cholesterol, HbA1c, obesity, and mortality, uptake of the treatment has been slow due to conflicting findings on cardiovascular risk. Despite evidence on the safety of TRT from a recent randomised trial, “the use of testosterone among endocrinologists remains low and many diabetologists have

not even heard of the association between testosterone and diabetes,” stated lead author Hugh Jones, Barnsley Hospital, UK.

The ABCD audit aimed to determine safety and real-world benefits of TRT on glycaemic control, obesity, and other diabetes complications or cardiometabolic parameters. Patients used either long-acting testosterone undecanoate intramuscular injections or gels. HbA1c was evaluated after 3, 12, and 24 months. The average HbA1c fell by 7.9 mmol/mol after 3 months, 9.6 mmol/mol after 12 months, and 15.4 mmol/mol after 24 months.

Results of the audit provide insights into whether TRT could have a beneficial effect on diabetes and obesity. More data is needed to determine whether there are indicators of which type of patient is likely to respond to TRT. Jones said: “These findings will also form the evidence basis for general practitioners and endocrinologists to proactively ask patients with T2D about their symptoms, and investigate and diagnose testosterone deficiency appropriately and treat them with testosterone where indicated.” ●

Severe Hypoglycaemia More Common in Adults with Food Insecurity

PEOPLE experiencing food insecurity were more likely to be severely hypoglycaemic, according to an analysis of USA data that was presented at the EASD Annual Meeting 2023. Little population-based research has been conducted to investigate the effect of food insecurity on rates of severe hypoglycaemia, so this was the first study of its kind. Alexandria Ratzki-Leewing, Western University, London, Ontario, Canada, led the secondary analysis of data from the US iNPHORM study, a 12-month prospective panel survey of real-world hypoglycaemia risk. Severe hypoglycaemia was 2.2 times more frequent in people experiencing food insecurity.

A total of 1,001 adults (49.6% male) with either Type 1 diabetes (16.1%) or Type 2 diabetes were included, and had to have been treated with insulin and/or secretagogues for at least 1 year. Average age of participants was 51 years, and median diabetes duration was 12 years. Questionnaires at baseline (Spring 2020) and over 12 consecutive months captured data on characteristics and frequency of severe hypoglycaemia. Severe hypoglycaemia was defined as a Level 3 low blood glucose concentration, regardless of blood glucose value, causing altered mental and/or physical status requiring professional or non-professional aid for recovery, based on the American Diabetes Association (ADA) Standards of Care guidelines. At baseline, participants were asked the question: "Within the past 12 months, did you ever cut the size of your meals or skip meals because there was not enough food?" Those who answered 'yes' were classified as having experienced food insecurity. Around one in five of the cohort reported that they had experienced food insecurity; these rates were similar in Type 1 diabetes (18.6%) and Type 2 diabetes (20.4%). In these individuals, over half experienced at least one Level 3 event in the past year.

The authors performed a multivariable regression to determine if food insecurity caused higher rates of severe hypoglycaemia revealing, after adjustment for potential confounders (e.g., age, annual gross household income, insurance coverage, living arrangements, and diabetes type) that those with food insecurity experienced twice as many severe hypoglycaemic events than those not exposed to food insecurity, during the year studied.

"We showed that food insecurity is alarmingly common across this population."

Ratzki-Leewing described the novelty of this study: "This is the first community-based, prospective study to look at the impact of food insecurity on rates of Level 3 (severe) hypoglycaemia in adults in the US with diabetes on insulin and/or secretagogues." She went on to stress: "We showed that food insecurity is alarmingly common across this population, and that it more than doubles the rate of severe hypoglycaemia," and advised "clinicians use our screening question, and exercise vigilance when managing individuals with food insecurity prescribed insulin or secretagogues. Public health strategies to address food insecurity are also vital to prevent severe hypoglycaemia and its profound consequences." Applying this work to the wider world, and guiding future strategies, Ratzki-Leewing concluded: "Ultimately, our study uncovers a key opportunity to reduce the burden of diabetes-related severe hypoglycaemia, while improving overall health. The results are timely given the rising cost of living, not only in the US, but also globally." ●



Breastfeeding Linked to Lower Body Fat Percentage in Children

ACCORDING to new research presented at the EASD Annual Meeting 2023, there may be an association between infant formula and higher levels of body fat later in childhood. The study, presented by Catherine Cohen, University of Colorado Anschutz Medical Campus, Aurora, USA, shows that children who were breastfed as infants for at least 6 months had a lower percentage of body fat by age 9 years compared with those who did not receive breast milk.

The research team analysed data from over 700 mother–child pairs who had been taking part in the Healthy Start longitudinal cohort study. Interviews were conducted when the infants were 6 and 18 months old, during which the mothers were asked about feeding practices, including duration and exclusivity of breastfeeding versus formula feeding. The age at which the children were introduced to complementary foods (including solids and any liquid other than breastmilk or formula) was also recorded.

"Interviews were conducted when the infants were 6 and 18 months old."

The infants were grouped according to the duration of breastfeeding (6 months or more versus less than 6 months); the age at which the baby was introduced to complementary foods (at or before 4 months, or 5 months and over); and the age at which they were introduced to soda (18 months or more versus less than 18 months). The majority of the infants (65%) were breastfed for 6 months or more, and 86% were introduced to soda after 18 months. At an assessment of percentage fat mass at a median age of 5 years, it was 19.7% on average, and at the second assessment, at median age 9 years, it was 18.1% on average.

It was found that infants who were breastfed for less than 6 months had 3.5% more body fat, on average, at age 9 than those who were breastfed for 6 months or more. The team also reported that infants who were introduced to soda before 18 months had about 7.8% more body fat, on average, at age 9 than those who first tried soda at 18 months or older. Cohen commented: "Our findings add to the larger body of evidence supporting the potential health benefits of breastfeeding for both mothers and their children." ●





Blood Sugar Control: Natural Light Versus Artificial Light

NATURAL light could help to prevent and treat Type 2 diabetes, according to research presented at the EASD Annual Meeting 2023. Previous research by Ivo Habets, Maastricht University, the Netherlands, and colleagues has shown that people at high risk of Type 2 diabetes are less able to switch from using carbohydrates as an energy source during the day, to using fat during the night. Therefore, the researchers wanted to see if exposure to natural light made this switch easier in people who already have diabetes.

A total of 13 participants (average age: 70 years; BMI: 30.1 kg/m²; HbA1c: 6.1; fasting plasma glucose: 8.1 mmol/L) were exposed to two lighting conditions during typical office hours (8 a.m.–5 p.m.). Participants were exposed to natural daylight from windows and LED lighting for 4.5 days each, with a 4-week gap in between. Natural light was most intense at 12:30 p.m., with an average reading of 2,453 lux; however, the LED lighting was consistently 300 lux.

The participants' blood sugar levels were constantly monitored through monitors that were worn on the upper arm. They were provided with the same meals during both lighting conditions, and evenings were spent in light measuring 5 lux, with their sleeping period (11 p.m.–7 a.m.) in darkness.

The researchers found that blood glucose levels stayed in the normal range (4.4–7.8 mmol/L) for longer in natural light than in artificial light (59% of the 4.5 days versus 51%). Furthermore, blood sugar control was better when the participants were exposed to natural light, suggesting that exposure to natural daylight is beneficial to metabolism, and could be used to prevent and treat Type 2 diabetes and other metabolic conditions, such as obesity.

Habets suggested that those who work in an office, with no exposure to natural daylight, should get outdoors, and get as much daylight as possible, as this lack of exposure has an impact on metabolism and risk of Type 2 diabetes. ●

"Participants were exposed to natural daylight from windows and LED lighting for 4.5 days each."
