Unlock Healthy Longevity

Supplements

29th February – 1st March 2024
National University of Singapore
Yong Loo Lin School of Medicine

CONFERENCE PROGRAM

NUS National University of Singapore | Yong Loo Lin School of Medicine

WELCOME!

A warm welcome to the "Unlock Healthy Longevity: Supplements" conference, organized by our wonderful team at the Yong Loo Lin School of Medicine, National University of Singapore. I am delighted to chair this pioneering event, the first of its kind, focusing on the critical role of supplements as a geroprotective intervention.

At the core of our mission is the notion that individual well-being and health is the bedrock of strong families and flourishing societies. This conference has been meticulously crafted to achieve a spectrum of objectives, ranging from discussing the evidence of supplements to optimize health and to navigating regulatory landscapes. Our collective vision encompasses delineating the distinctions between supplements and pharmaceuticals, informing evidence-based practices, promoting public awareness, and fostering collaborative networks.

As we gather here, we invite you to engage in enriching discussions, share your expertise, and contribute to the advancement of research and understanding in the realm of healthy longevity. This conference serves as a unique platform for multidisciplinary collaboration, where diverse perspectives converge to explore the potential of supplements in promoting healthy longevity.

We extend our sincere gratitude for your participation and look forward to the collective impact that will undoubtedly result from the intellectual exchanges and collaborations fostered during this momentous occasion. Your presence is instrumental in shaping the future landscape of healthy longevity medicine.

Thank you for being an integral part of this conference and shaping the future.

Warm regards,

Andrea B. Maier
Oon Chiew Seng Professor in Medicine, Healthy Ageing and Dementia Research,
National University of Singapore (NUS)

GENERAL INFORMATION

Contact number
If you need anything during the conference you can ask our support staff or call us at:

- +65 87873517, Louis Island
- +65 96646302, Elena Sandalova
- +65 85882114, Andrea Maier


Louis Island


Elena Sandalova


Andrea Maier

Venue
Shaw Foundation Alumni House Auditorium (11 Kent Ridge Dr, Singapore 119244) (map)

Wi-Fi on NUS campus
To access the "NUS_Guest" Wi-Fi, simply connect and open your browser. An engagement portal will pop up for SMS login. Enter your phone number and captcha, then click "I agree to the terms of use and proceed" button. You will be redirected to an OTP page. Enter the received OTP and click "Confirm." If you don't receive the OTP, hit "Resend." Once the OTP is successfully submitted, you are able to access the NUS Guest Wi-Fi.

Alternatively, if your phone number is not working, you can connect NUS Guest Wi-Fi with Pin Login UHL2024). Please follow the steps below to get access:

Connect to "NUS_Guest" wireless network
Select "Event Login" at the login page
Enter the Wi-Fi PIN that's provided below

Wi-Fi PIN: 6Y6OQ2
Event Name: UHL2024
Event Venue: Shaw Foundation Alumni House

Dress Code
Business casual is required for the conference. For speakers wearing dresses, a hand-held wireless microphone is recommended. Those in pants may opt for the lapel microphone, designed to conveniently attach to the pants rim. Dressing neatly and professionally ensures a focused and respectful conference environment.

Social media
Please follow us on LinkedIn at https://www.linkedin.com/company/centre-for-healthy-longevity/ tag us on your social media.

Recommended accommodation
Momentus Hotel Alexandra (map) offers special rates for our attendees at SGD 205++ per night (inclusive of breakfast and internet) which can be booked through this link. A 4-star establishment

GENERAL INFORMATION

situated in the heritage enclave of Queenstown, it offers a serene retreat from Singapore's bustling city life. With modern facilities, it's located a short drive from Vivocity shopping mall and Sentosa Island. The hotel provides a range of amenities including a club lounge, outdoor pool, gym, and restaurant, promising a blend of tranquillity and urban exploration. This makes it a convenient and comfortable accommodation choice for conference attendees. Alternatively, you may choose other accommodations that suit your needs or preference.

Travelling to the conference venue

Shuttle bus service is available for the conference speakers and attendees who stay at Momentus Hotel Alexandra to travel to the conference venue. The shuttle bus will leave at 7:40am from the hotel to the venue on 29th Feb and 1st Mar (gathering at 7:30am) and return at 9:45pm from the venue to the hotel on 29th Feb. There is no return shuttle bus on 1st Mar.

Public transportation: MRT to Kent Ridge station (Circle Line). Upon leaving from A exit, cross the underground passage to access Opp Kent Ridge MRT bus stop. From there, board the A2 NUS shuttle bus to Opp NUSS station which is next to the conference venue.

Driving: Parking is available at NUS Carpark 15.

Other services: Grab, taxi.

Getting around Singapore

Google Maps is one of the best tools for getting around in Singapore, which provides comprehensive and generally accurate times and routes. Specific public transports options include Singapore's MRT (Mass Rapid Transit) and bus systems. Most of popular attractions are just a short walk away from an MRT station, making our trains a great way to get around. Our bus routes are also some of the most scenic, allowing you to indulge in the lush greenery and beautiful architecture of our 'city in a garden'. All public buses are wheelchair accessible and open strollers are allowed. Please approach our friendly bus captains if you need assistance. However, once you're in the desired neighbourhood, walking is your best option. You may purchase MRT tickets at the station or pay cash to the bus driver. The more convenient payment option is to use an EZlink card which can be purchased at MRT stations and can be used for all MRT and bus systems in Singapore.

The popular private hire car services are Grab, Gojek, ComfortConnect, and TADA. You may install one of these Applications on your phone through App Store or Google Play store. Taxis are an alternative solution but do remember to ensure the driver is clear of your destination. Most drivers have basic commands of English.

Emergency Contacts

- Emergency Ambulance & Fire SCDF: 995
- Police Emergency: 999
- NUS Kent Ridge Campus Emergency & Security: +65 6874 1616

GENERAL INFORMATION

Preparing for Your Trip and Your Stay in Singapore

Please check your VISA requirement before coming to Singapore at the Immigration & Checkpoints Authority (ICA) website. All travellers must fill in the SGAC declaration up to 3 days before arrival. Only Singapore Citizens, Permanent Residents and Long-Term Pass Holders entering via land checkpoints do not need to fill in the SGAC. Make sure you have purchased a travel insurance as well.

What to bring

- Passport & relevant travel documents
- Vaccination passport if you come from/ recently visited a yellow-fever country
- Health Insurance Card (if any)
- Laptop and mobile phone as well as their chargers
- Travel adapter

  In Singapore, power plugs and sockets (outlets) of type G are used. The standard voltage is 230 V at a frequency of 50 Hz.

- Stationery
- Light clothing (Singapore is always around 30°C)
- Hat and sunscreen
- Products for personal use, e.g., toiletries, medication, or supplements
- Cash (Singapore dollars) and debit/credit cards

What NOT to bring

- Singapore is a very welcoming country but has some very strict rules.
- Do not bring any illegal drugs or substance to Singapore. The penalties are extremely high, capital punishment included. If you are using opioids for medical reasons, make sure that you carry a doctor's attest, to prove that you are using this for a medical condition.
- Also do not bring any chewing gum as possession and/or use of chewing gum is also illegal.

ZOOM WEBINAR FOR VIRTUAL PARTICIPANTS

Please log in with the email you used to register the conference.

Date and Time: Feb 29th, 2024 08:30 AM Singapore
Please click here to attend. If the hyperlink doesn't work, please paste the following link into your browser:

https://us02web.zoom.us/w/88586075372?tk=Lo4uSC4W57kLFAyeOUE54agOyqb1A5oR8Qe2gz-Md27w.DQYAAAAUoCQ87BpmYWtlQURHMHZ5X0dUWWFHRXdQNU1ia3JiQQAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA&pwd=UkRLVHd2enp4TE5qWTFHQVlaemtqQT09

Alternatively, please log in with the following details:
Webinar ID: 885 8607 5372
Passcode: UHL2024

Date and Time: Mar 1st, 2024 08:30 AM Singapore
Please click here to attend. If the hyperlink doesn't work, please paste the following link into your browser:

https://us02web.zoom.us/w/85921006634?tk=LPuvYenCuyrovEFnkYUvyOrawNqpY6Wgfg_ey-ChymVE.DQYAAAAUAUqEKhZQcDlhd1BtZ1I4eU45NFZ1RVdtMWpRAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA&pwd=YjVreHhxMDNMRDFSZzZRa0dGb1AwQT09&uuid=WN_hy-fO8_1uStqMXknUXCsiNg

Alternatively, please log in with the following details:
Webinar ID: 859 2100 6634
Passcode: UHL2024

Registration support contact:
Name: Kah Kei **Lee**
E-mail: medevents@nus.edu.sg

Technical support contact:
Name: Charlotte **Lee**
E-mail: charlottelee@themicestudio.com.sg

You can convert the time zone via this link.

CONFERENCE AGENDA

Day 1 | February 29, 2024

Shaw Foundation Alumni House

Morning session chair: Prof. Andrea Maier		
7:30 - 8:30	**Registration**	
8:30 - 8:40	**Opening remarks**	**Prof. Andrea Maier** Centre for Healthy Longevity **Prof. Chong Yap Seng** NUS Yong Loo Lin School of Medicine
8:40 - 9:05	**Hallmarks of ageing as targets for supplement interventions**	**Prof. Guido Kroemer** University of Paris Descartes
9:05 - 9:30	**How to deal with regulations: drugs vs supplement**	**Prof. Nir Barzilai** Albert Einstein College of Medicine
9:30 - 9:50	**Trends, opportunities and threats of longevity supplement industry**	**Mr. Phil Newman** Longevity.Technology
Metabolites: AKG **Session made possible by BLUE CALIFORNIA generous sponsorship.**		
9:50 - 10:15	**Alpha-ketoglurate (AKG) for healthspan**	**Prof. Brian Kennedy** NUS Yong Loo Lin School of Medicine
10:15 - 10:20	**AKG dietary supplementation to improve health in humans**	**Dr. Guan Shou Ping** NUS Yong Loo Lin School of Medicine
10:20 - 10:50	**Morning tea/Poster presentation/ Industry showcase**	
Metabolites: Urolithin A **Session made possible by XLONGEVITY generous sponsorship.**		
10:50 - 11:15	**Finding effective and safe supplements in healthy longevity**	**Asst. Prof Georges Janssens** Amsterdam University Medical Centers
11:15 - 11:30	**GoldenTrack: A multinational survey study on ageing well with supplements in Southeast Asia**	**Ms. Aida Gadzhieva-Moore** IQVIA
11:30 - 11:55	**The applications of Urolithin A and other mitophagy inducers in slowdown ageing and memory loss**	**Assoc. Prof Evandro Fei Fang** University of Oslo/Akershus University Hospital
11:55 - 12:10	**The polyphenol derived metabolite Urolithin A promotes longevity and healthspan in model organisms**	**Mr. Stephen Dinesh Raj** NUS Yong Loo Lin School of Medicine
12:10 - 12:15	**Targeting ageing with Urolithin A in humans**	**Dr. Ajla Hodzic Kuerec** Centre for Healthy Longevity
12:15 - 12:35	**xLongevity**	**Dr. Pierre-Edouard Sottas**

CONFERENCE AGENDA

Day 1 | February 29, 2024

Shaw Foundation Alumni House

12:35 - 13:35	**Lunch break**	
Afternoon Session chair: Asst. Prof Vincenzo Sorrentino		
Multisupplements **Session made possible by JIANLING UNDOAGE generous sponsorship.**		
13:35 - 14:00	**Supplements: How to separate hype from hope**	**Prof. Andrea Maier** Centre for Healthy Longevity
14:00 - 14:15	**The clinical validation of novel therapies for longevity medicine**	**Prof. Alexey Moskalev** Institute of biogerontology of Lobachevsky State University
14:15 - 14:35	**Personalizing multivitamins for healthy longevity**	**Dr. Julij Selb** Research and Innovation, NU
14:35 - 15:00	**Supplements to savings: A healthcare cost savings study**	**Mr. Daniel Quek** ASEAN Alliance of Health Supplement Associations
15:00 - 15:30	**Afternoon tea/Poster presentation/ Industry showcase**	
Clinical supplements use		
15:30 - 15:45	**Case Presentation: supplements in a healthy longevity clinic**	**Dr. Olivia Lesslar** Griffith University
15:45 - 16:00	**Case Presentation: supplements in a healthy longevity clinic**	**Dr. Eu Leong Oh** Chi longevity
16:00 - 16:40	**Panel discussion: How do clinicians and consumers choose supplements and why?**	**Prof. Hans Meij** (Moderator) NUS Yong Loo Lin School of Medicine **Assoc. Prof Ti Lian Kah** National University Hospital **Dr. Olivia Lesslar** Griffith University **Dr. Eu Leong Oh** Chi longevity **Mr. Oscar Wezenbeek** Sage Boardroom Consulting
16:40 - 17:20	**Startup pitch competition**	
17:20 - 18:30	**Networking/Industry showcase**	
18:30	**Dinner**	

CONFERENCE AGENDA

Day 2 | March 1, 2024

Shaw Foundation Alumni House

Morning Session chair: Prof. Brian Kennedy

NAD precursors

Session made possible by DSM-FIRMENICH generous sponsorship.

8:30 - 8:55	**NAD precursors**	**Prof. David Sinclair** Harvard Medical School
8:55 - 9:15	**New potential NAD precursors**	**Asst. Prof Vincenzo Sorrentino** NUS Yong Loo Lin School of Medicine
9:15 - 9:30	**Effect of NAD+ boosting on glucose metabolism in healthy individuals**	**Dr. Liliya Euro** University of Helsinki/NADMED Oy
9:30 - 9:35	**Preclinical and clinical evidence of NAD+ precursors in health, disease, and ageing**	**Dr. Weilan Wang** NUS Yong Loo Lin School of Medicine
9:35 - 9:55	**Coenzymes: an emerging class of anti-ageing nutritional supplements and preventive medicine**	**Prof. Jun Wang** GeneHarbor Biotechnologies
9:55 - 10:15	**Translating research: Impact in healthcare and Singapore's longevity leadership**	**Ms. Stephanie Dainow** Lifespan.io
10:15 - 10:45	**Morning tea/Poster presentation/ Industry showcase**	

Micronutrients

Session made possible by NIN JIOM HEALTH PRODUCTS LIMITED generous sponsorship.

10:45 - 11:10	**Lessons from the COSMOS trial on healthy aging through dietary supplementation**	**Assoc. Prof Howard Sesso** Brigham and Women's Hospital/ Harvard Medical School
11:10 - 11:35	**Taurine supplementation for healthy longevity**	**Asst. Prof Vijay K. Yadav** Columbia University
11:35 - 12:00	**Vitamin D in healthy longevity**	**Dr. Kalpana Bhaskaran** Temasek Polytechnic
12:00 - 12:20	**Fish oil and Omega 3 for healthy longevity**	**Prof. João Pedro de Magalhães** University of Birmingham
12:20 - 12:40	**NJ Health**	**Dr. Kevin Chu**
12:40 - 13:40	**Lunch break**	

CONFERENCE AGENDA

Day 2 | March 1, 2024

Shaw Foundation Alumni House

Afternoon Session chair: Asst. Prof Karen Crasta

Bioactives

13:40 - 14:05	**Repair or prevention of genome damage by supplements**	**Prof. Paul Robbins** University of Minnesota
14:05 - 14:30	**Fisetin supplementation for healthy longevity**	**Prof. Laura Niedernhofer** University of Minnesota
14:30 - 14:45	**Melon derived superoxide dismutase oral biopolymer increases cellular and mitochondrial enzymatic antioxidant mechanisms**	**Dr. Cory S. Goldberg** University of Toronto
14:45 - 15:00	**First-in-human results on ageing with d-Limonene oral supplementation**	**Prof. Patrizia Anna d'Alessio** AISA Therapeutics/Genopole Entreprises
15:00 - 15:25	**Ergothioneine supplementation in healthy longevity**	**Prof. Barry Halliwell** NUS Yong Loo Lin School of Medicine
15:25 - 15:55	**Afternoon tea/Poster presentation/ Industry showcase**	

Regulation, Quality and Implementation

15:55 - 16:10	**The necessity of companion diagnostics for longevity supplements**	**Dr. Pierre-Edouard Sottas** xLongevity
16:10 - 16:25	**Launch of XPRIZE**	**Asst Prof. Jamie Justice** XPRIZE Foundation
16:25 - 16:45	**A call for a dialogue: The composition of supplements and the label claim**	**Dr. Elena Sandalova** NUS Yong Loo Lin School of Medicine
16:45 - 17:25	**Panel discussion: Regulation of supplements - Should it be a supplement or drug?**	**Prof. Andrea Maier** (Moderator) Centre for Healthy Longevity **Assoc. Prof Jeremy Lim** AMiLi **Ms. Alicia Ng** Haleon **Mr. Phil Newman** Longevity.Technology **Mr. Richard Eu** Eu Yan Sang International Ltd **Mr. Marek Piotrowski** Longevity Advocate
17:25 - 17:45	**Award ceremony**	

HOST

Professor Dr Andrea B Maier

Prof. Andrea Maier graduated summa cum laude in Medicine (MD) in 2003 from the University of Lübeck (Germany). A specialist in Internal Medicine-Geriatrics, she was appointed Full Professor of Gerontology at Vrije Universiteit Amsterdam (The Netherlands) in 2013. She was the Head of Geriatrics at the Vrije Universiteit Medical Centre from 2012 to 2016. From 2016 to early 2021, Andrea served as Divisional Director of Medicine and Community Care at the Royal Melbourne Hospital, Australia, and as Professor of Medicine and Aged Care at the University of Melbourne, Australia. She continued her career at the National University of Singapore as Oon Chiew Seng Professor in Medicine, Healthy Ageing and Dementia Research.

Prof. Andrea Maier's research focuses on unravelling the mechanisms of ageing and age-related diseases to bring diagnostics and interventions to optimize health into clinical practice. She is heading international longitudinal cohort studies and geroscience interventions. She has published more than 400 peer-reviewed articles, achieving an H index of 72, spearheading the significant contributions of her highly acclaimed innovative, global, multidisciplinary @Age research group. She is a frequent guest on radio and television programs and book author to disseminate ageing research. Furthermore, she is invited member and advisor of several international academic and health policy committees and funding agencies, including the World Health Organization evaluating the United Nations Decade of Healthy Ageing and Hevolution.

She is the Founding President of the Healthy Longevity Medicine Society and serves as selected Member of The Royal Holland Society of Sciences and Humanities, Fellow of the Atria Academy of Science and Medicine, and Academy for Health and Lifespan Research. In 2023, she co-founded the NUS Academy for Healthy Longevity to disseminate Geroscience and evidence based Healthy Longevity Medicine.

GUEST SPEAKERS

Day 1 | February 29, 2024

Professor Chong Yap Seng

Prof. Yap-Seng Chong is the Dean of the Yong Loo Lin School of Medicine and a clinician-investigator with a special interest in fetal growth and early development. He is also the Chief Clinical Officer (CCO) of the Singapore Institute for Clinical Sciences, Agency for Science, Technology and Research (A*STAR) and the Lien Ying Chow Professor of Medicine in the Department of Obstetrics & Gynaecology, Yong Loo Lin School of Medicine, National University of Singapore (NUS). He is the Lead Principal Investigator of the Growing Up in Singapore Towards healthy Outcomes (GUSTO) and the Singapore Preconception Study of long-Term maternal and child Outcomes (S-PRESTO) studies. He is also a Senior Consultant in the Department of Obstetrics & Gynaecology at the National University Hospital (NUH), and a member of the Executive Group of the National University Health System (NUHS) as well as a board member of the National Medical Research Council. His other research interests include strategies to promote breastfeeding, natural childbirth, and intrapartum and postpartum management issues. He has over 390 research publications, including papers in The Lancet, JAMA, and BMJ, and received more than $100 million in research grant funding. He also has numerous collaborations with industry, particularly in the area of early human development and nutrition. He was awarded the National Outstanding Clinician Scientist Award by the Ministry of Health in 2017.

Professor Guido Kroemer

Prof. Guido Kroemer is currently Professor at the Faculty of Medicine of the University of Paris, Director of the research team “Metabolism, Cancer and Immunity” of the French Medical Research Council (INSERM), Director of the Metabolomics and Cell Biology platforms of the Gustave Roussy Comprehensive Cancer Center, and Hospital Practitioner at the Hôpital Européen George Pompidou, Paris, France. Prof. Kroemer’s work focuses on the pathophysiological implications of cell stress and death in the context of ageing, cancer and inflammation. His contributions have been recognized with multiple awards including the most prestigious cancer research prizes from Belgium (Baillet-Latour Health Prize), France (Prix Duquesne, Prix Léopold Griffuel, Grand Prix Ruban Rose) and Switzerland (Brupbacher Prize), the European Union-sponsored Descartes Prize, as well as the most important Italian science prize (Lombardia & Ricerca Prize). He received two European Research Council (ERC) Advanced Investigator Awards. Kroemer is the founding Editor-in-Chief of six journals: Cell Death & Disease, Cell Stress, OncoImmunology, MedComm Cancer, Microbial Cell, and Molecular & Cellular Oncology.

GUEST SPEAKERS

Day 1 | February 29, 2024

Professor Nir Barzilai

Prof. Nir Barzilai is the director of the Institute for Ageing Research at the Albert Einstein College of Medicine and the Director of the Paul F. Glenn Centre for the Biology of Human Ageing Research and of the National Institutes of Health's (NIH) Nathan Shock Centres of Excellence in the Basic Biology of Ageing. He is the Ingeborg and Ira Leon Rennert Chair of Ageing Research, professor in the Departments of Medicine and Genetics, and member of the Diabetes Research Centre and of the Divisions of Endocrinology & Diabetes and Geriatrics. Prof. Barzilai's research interests are in the biology and genetics of ageing. He is currently leading an international effort to approve drugs that can target ageing. Targeting Ageing with METformin (TAME) is a specific study designed to prove the concept that multi-morbidities of ageing can be delayed by metformin, working with the FDA to approve this approach which will serve as a template for future efforts to delay ageing and its diseases in humans.

Phil Newman

Mr. Phil Newman is Editor-in-Chief Longevity.Technology, the leading media and investment platform targeting the longevity megatrend. He also founded First Longevity which brings together international investors and Longevity start-ups. In his career, Phil has held C-level management positions; applying his marketing and business development expertise into tech sectors such as Longevity, The Internet of Things (IoT), Artificial Intelligence, Medical Devices, Biopharma, 3D Manufacturing, Smartgrid and Sustainability.

GUEST SPEAKERS

Day 1 | February 29, 2024

Professor Brian Kennedy

Prof. Brian Kennedy is a Distinguished Professor in the Departments of Biochemistry and Physiology at the Yong Loo Lin School of Medicine, National University Singapore. He serves as co-Director of the Centre for Healthy Longevity at the National University Health System and Director for the Healthy Longevity Translational Research Programme and the Asian Centre for Reproductive Longevity and Equality. Collectively, NUS ageing research seeks to demonstrate that longevity interventions can be successfully employed in humans to extend healthspan, the disease-free and highly functional period of life. From 2010 to 2016, Prof. Kennedy was the President and CEO of the Buck Institute for Research on Ageing and he maintained a professorship there through 2020. Prof. Kennedy has an adjunct appointment in the Department of Biochemistry at the University of Washington and, where he was a faculty member from 2001 to 2010. Prof. Kennedy is also actively involved with a number of Biotechnology companies and also served as a Co-Editor-In-Chief at Aging Cell from 2011-2021. Finally, Prof. Kennedy has a track record of interaction in China, where he was a Visiting Professor at the Ageing Research Institute at Guangdong Medical College from 2009 to 2014. His Ph.D. was performed in the laboratory of Leonard Guarente at M.I.T., where he published the first paper linking Sirtuins to ageing.

Assistant Professor Georges Janssens

Asst. Prof Georges Janssens is Assistant Professor in the Laboratory Genetic Metabolic Diseases, at the Amsterdam UMC, location AMC in The Netherlands. His work is focused on multi-omics data integration studying the molecular determinants of healthy aginggeing, and the development of neutraceuticals and pharmaceuticals to promote health during ageing. His research education has taken place in California, the UK, Sweden, and the Netherlands. During his postdoctoral work at the Karolinska institute in Stockholm, he pioneered transcriptome-based machine-learning enabled drug screening, an approach he continues to expand upon today in his independent research line. Asst. Prof Janssens has been awarded several prestigious fellowships including the FEBS (2017) and the VENI (2019). He has authored nearly 50 publications on ageing, with recent first or corresponding authorships in journals including Cell Metabolism, Cell Reports, Aging Cell, EMBO Molecular Medicine, and many more. He writes a popular-science blog that distills myths on ageing (AgingIsBeautiful.com) and is passionate to develop healthy ageing diagnostics and interventions that are accessible to the public.

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Associate Professor Evandro Fei Fang

Assoc. Prof Evandro F. Fang is an Associate Professor of Molecular Gerontology at the University of Oslo and Akershus University Hospital.He leads a research group dedicated to unraveling the molecular mechanisms of human ageing and age-related neurodegeneration. Focusing on "mitophagy," his lab explores how cells eliminate damaged mitochondria, particularly emphasizing the NAD+-mitophagy/autophagy axis in healthy ageing and Alzheimer's disease prevention. Actively translating findings into clinical applications, Assoc. Prof Fang contributes to five NAD+-based clinical trials, striving to pioneer safe biological approaches for extended and healthier human lives. With over 100 publications in prestigious journals, including Cell and Nature Neuroscience, he serves as a reviewer for esteemed foundations like the European Research Council (ERC) and the Medical Research Council (MRC). Recipient of accolades such as the Butler-Williams Scholar on Aging 2016, Assoc. Prof Fang is committed to advancing dementia research, recognized with the 2023 Norwegian National Dementia Research Award. Establishing his lab in Oslo in 2017, he fosters collaborations through networks like NO-Age and NO-AD, leaving a lasting impact on global scientific advancements in healthy ageing and Alzheimer's research.

Dr. Julij Selb

Dr. Julij Selb serves as the Vice President of Research and Innovation at NU, concurrently holding the role of Clinical Geneticist at the University Clinic Golnik. With a multifaceted background, Dr. Selb is not only a seasoned clinical geneticist but also an accomplished co-founder of OpenLoop, demonstrating a commitment to pushing the boundaries of innovation. Combining extensive clinical expertise with a proficiency in programming, bioinformatics, and biostatistics, Dr. Selb stands at the forefront of cutting-edge research. Actively engaged in the realms of allergology, cancer immunology, and supplementation for Healthy Longevity, Dr. Selb's work reflects a dedication to advancing medical knowledge and enhancing patient well-being.

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Daniel Quek

Mr. Daniel Quek, appointed Executive Director in 2021, boasts over 30 years of expertise in multinational corporations, specializing in corporate sustainability, regulatory affairs, and marketing communications. As the founding Chairman of the ASEAN Alliance of Health Supplement Associations from 2006 to 2021, Mr. Quek played a pivotal role in guiding the ASEAN Health Supplements (HS) industry through diverse government and regulatory policies, fostering growth for industry players and local economies. Currently, he represents the industry at the ASEAN Consultative Committee on Standards and Quality for Traditional Medicines and Health Supplements Product Working Group. Mr. Quek is also an Advisor and Honorary President of the Health Supplements Industry Association of Singapore. Dedicated to corporate sustainability, he serves as Honorary Secretary on the management committee of the UN Global Compact Network Singapore. Mr. Quek holds an MBA from James Cook University (Australia) and a Bachelor of Arts Honours degree, Postgraduate Diploma in Business Administration, and Postgraduate Diploma in Education from the National University of Singapore.

Dr. Olivia Ly Lesslar

Dr. Olivia Ly Lesslar, an Australian-educated professional, holds degrees in International Relations and Medicine. After completing her residency in 2016, she pursued postgraduate studies in skin cancer medicine and clinical nutrition. Currently undertaking a Diploma in Clinical Hypnosis, Dr. Olivia specializes in complex conditions like neurodegeneration, cancer, and allergies. Collaborating with international clinics like LifeSpan Medicine and Cingulum Health, she designs personalized programs using innovative approaches like transcranial magnetic stimulation and hyperbaric oxygen. As Chief Medical Officer of Atlus and Chief Operating Officer of LMC (London Metabolic Clinic), Dr. Olivia leads in integrative medicine. A trustee of the British College for Functional Medicine, she is a sought-after speaker, featured at events like the Smart Ageing Summit at Oxford University and TEDx Melbourne. Recognized in NYC Journal 50 under 50 in 2021, Dr. Olivia is dedicated to advancing research and industry in functional medicine.

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Dr. Eu Leong Oh

Dr. Eu Leong Oh is a physician focusing on the burgeoning clinical field of longevity medicine. His place of practice deals with advanced diagnostics, nutritional interventions, exercise physiology, sleep physiology, emotional and mental health, and pharmacology combined with the aim of improving patient healthspan (the period of life spent in good health) and lifespan. He has acquired a combined 14 years of clinical experience in fields such as oncology, internal medicine, dermatology, radiology, pathology, general practice, health screening and aesthetic medicine. He also holds advanced degrees in engineering and finance.

Professor
Dr JJ (Hans) Meij

Prof. Hans Meij, an innovative executive with over 45 years of healthcare experience, specializes in strategy development for hospitals and academic networks. Trained as a medical anthropologist (1992, Vrije Universiteit, Amsterdam), he earned an MBA in hospital management in 1996 and a PhD in Medicine in 2008, focusing on the genetic basis of healthy longevity and ageing in rural Africa. Co-founding the Leyden Academy on Vitality and Ageing (2008-2010) and serving on the Executive Board of Amphia Hospital, Breda (2010-2016), Prof. Meij contributed significantly to healthcare advancements in the Netherlands. He then became the inaugural director of Melbourne Academic Centre for Health (MACH) in Australia (2016-2019). Currently, as a Professor at Amsterdam University Medical Center, he heads the department of Human Genetics and serves as division chair for outpatients and ambulatory care. Additionally, he holds the position of Vice-Dean International Affairs at Amsterdam UMC and, since 2023, is a Professor of Medicine at the Yong Loo Lin School of Medicine, National University of Singapore, and the Director and co-founder of the NUS Academy for Healthy Longevity.

GUEST SPEAKERS

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Associate Professor Ti Lian Kah

Assoc.Prof Ti Lian Kah is a Senior Consultant and Director of Cardiac Anaesthesia with the Department of Anaesthesia, NUH. He currently serves as the Academic Head and Director of Research in the Department of Anaesthesia at the NUS Yong Loo Lin School of Medicine, where he holds a tenured position as Associate Professor. Assoc. Prof Ti graduated from the National University of Singapore; and completed his fellowship training in Cardiac Anaesthesia at Duke University Medical Center in the United States, and is credentialed in perioperative transesophageal echocardiography. His research interests are in outcomes after cardiac anaesthesia and surgery; conduct of anaesthesia; transesophageal echocardiography; and medical education. Assoc.Prof Ti has published more than 50 research papers in peer-reviewed journals. He actively mentors medical students and residents in research, and together with his mentees have won several abstract awards in international conferences. He is currently the President of the College of Anaesthesiologists Singapore, a professional body that represents the interests of the specialty of Anaesthesiology in the Academy of Medicine, Singapore.

Oscar Wezenbeek

Mr. Oscar Wezenbeek, Founder and Managing Partner of Sage Boardroom Consulting in Singapore, leads a boutique C-suite management consulting firm specializing in joint venture setup and management. With over 30 years in executive roles across Europe and Asia, Mr. Wezenbeek brings strategic expertise to businesses navigating change. He has chaired publicly listed companies in India and Pakistan, served on joint venture boards in China, South Korea, Indonesia, Vietnam, Sri Lanka, and Malaysia, and facilitated successful business integrations after M&A activities. Holding a master's degree in industrial engineering and business administration, Mr. Wezenbeek is an alumnus of INSEAD, IMD, and Yale University. Recognized for driving growth, he is a strategic thinker with a proven track record in enhancing top-line performance, market share, and profitability. A skilled people manager, Mr. Wezenbeek emphasizes sustainability and fosters engagement and purpose within organizations.

GUEST SPEAKERS

Day 2 | March 1, 2024

Professor
David Sinclair

Prof. David Sinclair is a tenured Professor in the Department of Genetics at the Paul F. Glenn Center for Biology of Aging Research at Harvard Medical School and serves as President of the Academy for Health and Lifespan Research. During his postdoctoral research in Dr. Leonard Guarente's lab at MIT, he co-discovered a cause of ageing for yeast as well as the role of Sir2 in epigenetic changes driven by genome instability. His lab was the first to identify a role for NAD+ biosynthesis in regulation of lifespan. Prof. Sinclair is co-founder of several biotechnology companies and is on the boards of several others. He is also co-founder and co-chief editor of the journal Aging. His work is featured in seven books, three documentary movies, 60 Minutes, Morgan Freeman's "Through the Wormhole" and other media. He also co-authored the New York Times' Best Sellers, "Lifespan: Why We Age—and Why We Don't Have To".

Assistant Professor
Vincenzo Sorrentino

Asst. Prof Vincenzo Sorrentino is an Italian-born scientist in the fields of ageing, mitochondrial biology and neuromuscular degeneration. After his PhD with honors obtained at the University of Amsterdam in Medical Biochemistry, he carried his postdoctoral research in Prof. Johan Auwerx's lab at the EPFL in Switzerland. His work focused on mitochondria and NAD+ metabolism in Alzheimer's disease and muscle ageing, with his discoveries appearing in Nature (2017) and Cell Reports (2021). From 2019 till 2022, he took a role as Group Leader at the Nestlé Institute of Health Sciences in Switzerland (NIHS), to lead research focused on integrating basic discoveries on natural bioactives that modulate NAD+, mitochondria and protein homeostasis with their possible translation into clinical applications. Currently, he is Assistant Professor and launched his research lab at the NUS with the Dept. of Biochemistry and the Healthy Longevity Transitional Research Program, Yong Loo Lin School of Medicine.

GUEST SPEAKERS

Day 2 | March 1, 2024

Professor Jun Wang

Prof. Jun Wang serves as the President and Chief Executive Officer of GeneHarbor (Hong Kong) Biotechnologies LTD. He had been a professor at Biochemistry Department, the Chinese University of Hong Kong for over 15 years. He has over 35 years of research experience in China, USA, Australia and Hong Kong. Prof. Wang held the first Industrial Research Chair funded by Innovation and Technology Commission of Hong Kong Government. He has acted as senior advisors to several pharmaceutical companies. Prof. Wang obtained his Ph.D in Molecular Biology from the University of Wisconsin-Madison. Prof. Wang has more than 250 scientific publications in peer reviewed scientific journals, more than 50 editorials/reviews/chapters and has edited three books. He was a Managing Director at Roth Capital Partners at its headquarters in Newport Beach, California and is also a Director of the Board of Chelsea Therapeutics (CHTP) and other privately held companies.

Stephanie Dainow

Ms. Stephanie Dainow is Board Director and Executive Director at Lifespan.io (Lifespan Extension Advocacy Foundation), a non-profit advocacy foundation committed to accelerating biomedical technologies that will increase healthy human lifespan. The organization is well-known for responsible journalism, research, funding mechanisms, education, and decentralized science initiatives.Ms. Dainow is also a Business Mentor to UC Davis' Venture Catalyst and SOSV's IndieBio venture fund and accelerator, consulting deep tech startup founders on business development and strategy, fundraising, and executive leadership. In 2022, she was given the Rising Star award at the Dublin Longevity Summit in recognition of her work in the ageing and longevity field. Previously, Ms. Dainow was with Singularity University in Silicon Valley, working across their Innovation Consultancy, Tech Think Tank, University for the Future, and Impact-based Startup Incubator. She's worked for a global management consultancy as a Life Sciences Business Manager and served as Account Director for BioMarin Pharmaceutical. Her early career in NYC spanned global growth for Interpublic Group's media arm, celebrity and brand marketing, and commercial entertainment. She is passionate about empowering leaders to think differently about emerging technologies, disruption, and the future of corporate business.

GUEST SPEAKERS

Day 2 | March 1, 2024

Associate Professor Howard Sesso

Assoc. Prof Howard Sesso is an Associate Epidemiologist at the Division of Preventive Medicine at Brigham and Women's Hospital, Associate Professor of Medicine at Harvard Medical School, and Associate Professor of Epidemiology at the Harvard Chan School of Public Health. He designs and conducts randomized clinical trials and epidemiologic studies, focusing on dietary supplements, nutrition, and lifestyle factors to prevent ageing-related outcomes. Assoc. Prof Sesso is the Associate Director of the Division of Preventive Medicine and Director of Nutrition and Supplement Research at the Osher Center for Integrative Medicine. Assoc. Prof Sesso leads the Physicians' Health Study, consisting of two trials testing aspirin, beta-carotene, vitamin E, vitamin C, and a multivitamin on ageing-related outcomes in 29,071 men. Assoc. Prof Sesso is also examining vitamin D and fish oil supplements on blood pressure, hypertension, and other outcomes in the VITamin D and OmegA-3 TriaL (VITAL). Finally, Assoc. Prof Sesso is Co-Principal Investigator of the COcoa Supplement and Multivitamin Outcomes Study (COSMOS), a recently completed trial testing cocoa extract and multivitamin supplements in the prevention of CVD and cancer in 21,442 older women and men. He has published more than 350 papers, teaches courses on clinical trials and epidemiology, and enjoys mentoring students and faculty.

Assistant Professor Vijay K. Yadav

Asst. Prof Vijay Yadav is an Assistant Professor of Genetics and Developmentav at Columbia University. He obtained his Ph.D. training at the Indian Institute of Science in the area of molecular physiology. He is a recipient of several prestigious awards including John Haddad Young Investigator Award from American Society for Bone and Mineral Research and Rodan Fellowship Award from International Bone and Mineral Society. Asst. Prof Yadav leads Systems Biology of Aging Laboratory, which aims to identify novel functional connections between organs and to unravel factors that underlie human metabolism and its disorders. His current research focus includes understanding how the molecular constitution of organisms change during ageing, and its role in the development of novel anti-ageing interventions. So far, his laboratory has uncovered the role of essential micronutrients such as vitamin B12 in the ageing process.

GUEST SPEAKERS

Day 2 | March 1, 2024

Dr. Kalpana Bhaskaran

Dr. Kalpana Bhaskaran, Deputy Director and Head of the Glycemic Index Research Unit at Temasek Polytechnic, Singapore, boasts over two decades of expertise in food and nutrition. As the driving force behind Singapore's first accredited Glycemic Index Research Unit, she spearheads numerous nutrition intervention and efficacy trials. Serving as the Nutrition and Health-Tech Cluster co-chair, Dr. Kalpana leads applied research institution-wide. Recognized as an expert advisor to the Ministry of Health, Singapore, she has played a pivotal role in initiatives like sugar and sodium reduction and the Nutri-Grade label for sugar-sweetened beverages. Holding leadership roles in organizations such as the Singapore Nutrition & Dietetics Association and Diabetes Singapore, Dr. Kalpana's global impact extends through roles in the Asian Nutrition Society for Sports and Health and the Federation of Asian Nutrition Societies. Her outstanding contributions have earned accolades, including the National Day commendation award in 2014. In 2022, she received the "Exemplary Overcomer Award," followed by the "Exemplary Leader Award" in 2023, recognizing her resilience and innovative leadership.

Professor João Pedro de Magalhães

Prof. João Pedro de Magalhaes, a prominent scientist, graduated in Microbiology from the Escola Superior de Biotecnologia in Porto, Portugal, and earned his PhD from the University of Namur in Belgium in 2004. After a postdoc with genomics pioneer Prof. George Church at Harvard Medical School, he established his genomic ageing research group at the University of Liverpool in 2008. In 2022, he joined the University of Birmingham as Chair of Molecular Biogerontology, leading the Genomics of Ageing and Rejuvenation Lab. Focused on deciphering the human genome and ageing processes, his lab employs experimental and computational methods to bridge the genotype-phenotype gap. A world-leader in genomics and bioinformatics for ageing studies, Prof. de Magalhaes has authored over 100 publications, given numerous invited talks, and featured in global media outlets. He serves as an advisor/consultant for various organizations, aiming to develop interventions preserving health and combating diseases by manipulating ageing processes.

GUEST SPEAKERS

Day 2 | March 1, 2024

Professor Paul Robbins

Prof. Paul Robbins received his B.A. from Haverford College, his Ph.D. from the University of California at Berkeley and then worked as a post-doctoral fellow in the laboratory of Dr. Richard Mulligan at the Whitehead Institute at MIT. He was an Assistant, Associate and then full Professor of Microbiology and Molecular Genetics at the University of Pittsburgh School of Medicine as well as Director of Basic Research for the Molecular Medicine Institute and Co-Director of the Paul Wellstone Cooperative Muscular Research Center. He then was a Professor of Molecular Medicine at Scripps Research in Jupiter, Florida and Director of the Center on Ageing. He currently is a Professor of Biochemistry, Molecular Biology and Biophysics and Associate Director of the Institute on the Biology of Ageing and Metabolism at the University of Minnesota. His current research is focused on developing therapeutic approaches to extend healthspan including senotherapeutics. He has co-authored more than 360 peer-reviewed manuscripts and 210 book chapters and reviews with an H-index of 137, i10-index of 500 and ~74,000 citations and has edited four books.

Professor Laura Niedernhofer

Prof. Laura Niedernhofer's expertise is in DNA damage and repair, genome instability disorders, cellular senescence and ageing. Her research program is centered on studying fundamental mechanisms of ageing and developing therapeutics to target them. Her research program implements a murine model of a human progeroid syndrome caused by a defect in DNA repair. She contributed to the discovery of a new class of drugs called senolytics. Prof. Niedernhofer has served on study sections for NCI, NIEHS and NIA. She has been awarded for research in ageing, cancer and environmental health science.

GUEST SPEAKERS

Day 2 | March 1, 2024

Prof. Barry Halliwell

Prof. Barry Halliwell, Senior Advisor in Academic Appointments and Research Excellence at the Office of the Provost, graduated with top honors from the University of Oxford, holding BA (1st class) and D.Phil degrees, along with a D.Sc degree from the University of London. A distinguished biochemist, he served on the faculty of the University of London, King's College, and held a prestigious Lister Institute Research fellowship. With international acclaim for his work on free radicals and antioxidants in biological systems, Prof. Halliwell authored the widely cited book "Free Radicals in Biology and Medicine." Recognized for lifetime achievements, he received the Singapore President's Science and Technology Medal and the "Lifetime Achievement Award" from the Society for Free Radical Biology and Medicine. His research, focused on free radicals and antioxidants in human disease, has critical implications for conditions like Alzheimer's. Prof. Halliwell's contributions were acknowledged with the NUS University Outstanding Service Award in 2023. A highly cited researcher, he continues to shape global biochemistry discussions through editorial roles, keynote addresses, and advisory positions for universities, companies, and government agencies.

Dr. Pierre-Edouard Sottas

With a multidisciplinary education in physics, biology, life sciences and AI, Dr. Pierre-Edouard Sottas then specialized in the nuanced field of biomarker testing, emphasizing the importance of accurate measurement and meaningful interpretation. His greatest invention? The biological passport, a map to treasure troves of personal biological data. He has spent his life (and a couple of startups at C-level) decoding the human body's data to let people live their best lives. Off duty, he is biohacking his way to joy, proving life is not just about the years in your life, but the life in your years.

GUEST SPEAKERS

Day 2 | March 1, 2024

Assistant Professor Jamie Justice

Asst. Prof Jamie Justice serves as the Executive Vice President of the Health Domain at XPRIZE Foundation, and she holds an Adjunct Professor position at Wake Forest University School of Medicine. Her dedication to Geroscience research focuses on targeting the basic biology of ageing to delay or prevent multiple age-related diseases. Trained at the University of Colorado Boulder and WFUSM, Asst. Prof Justice leads translational research and clinical trials networks to test the Geroscience hypothesis in humans. As the former director of the Biogerontology Lab and co-leader of the Integrative Biology Core at WFUSM, she played a vital role in advancing ageing research. Recognized for her contributions, Asst. Prof Justice has received prestigious awards, including the 2022 Vincent Cristofalo Rising Star in Ageing Research and the 2022 NIA Nathan W Shock Awardee. In her current role, she leads international networks to drive innovative, accessible, and affordable solutions for human health and ageing.

Dr. Elena Sandalova

Dr. Elena Sandalova earned her PhD in Immunobiology from the Karolinska Institute and subsequently joined the Agency for Science and Research in Singapore. Her expertise encompasses diverse areas of immunology, including infectious diseases, immunotherapy, and allergy. Transitioning into the industry, she contributed to Danone Nutricia Research, concentrating on testing nutritional concepts in clinical trials, particularly focusing on the role of nutrition in early life. Engaging in clinical research involving vulnerable populations, especially children, necessitates the development of non-invasive approaches. Consequently, Dr. Sandalova and her team conducted numerous studies delving into non-invasive biomarkers, including saliva, stool, and skin tapes. Additionally, she played a pivotal role in educating healthcare professionals on diagnosing and managing allergies in the pediatric population. In NUS, Healthy Longevity Translational Research Programme, Dr. Sandalova leads the design and implementation of geroprotective clinical trials aimed at discovering interventions that increase healthspan. Many of these studies explore the role of supplements in healthy longevity. The success of the trials depends on the quality of the supplement of interest. Thus, she initiated the study to explore the amount of active ingredients in common longevity supplements. The forthcoming presentation will detail the analysis of Nicotinamide mononucleotide supplements, focusing on the amount of NMN present.

GUEST SPEAKERS

Day 2 | March 1, 2024

Associate Professor Jeremy Lim

Assoc. Prof Jeremy Lim is the co-founder and CEO of AMiLi, the first dedicated gut microbiome full service company in Southeast Asia. He is also Director of the Leadership Institute for Global Health Transformation (LIGHT) at the NUS Saw Swee Hock School of Public Health where he works to enhance cooperation, capacity building and knowledge sharing across the region. Trained in surgery and public health, Assoc. Prof Lim attained various post graduate qualifications including membership in the Royal College of Surgeons (Edinburgh), masters of medicine (NUS) and masters of public health (Johns Hopkins, as a Fulbright scholarship awardee). He was an inaugural fellow of the Asia Society A21 young leaders programme in 2006. Assoc. Prof Lim has a special interest in ways that technology can increase health equity and access to care. He advises a number of health technology companies and programmes in the region and globally. He also serves on the boards of/advises various charities and social enterprises, including HealthServe, Dover Park Hospice and SNTC. Assoc. Prof Lim has worked in executive roles in both public and private sectors, including time spent as a senior official in the Ministry of Health, Singapore and was prior to AMiLi, founding partner of global consultancy Oliver Wyman's Asia health and life sciences practice (2013).

Alicia Ng

With 30 years of diverse experience in consumer healthcare R&D, Ms. Alicia Ng is currently the Vice President and R&D Head of Wider Asia at HALEON (formerly GlaxoSmithKline Consumer Healthcare). Leading a team of over 100 professionals, she oversees innovation, development, regulatory affairs, medical affairs, and consumer science in the Asia Pacific region. Ms. Ng's career includes roles as Head of Regulatory & Medical Affairs Asia Pacific at Pfizer and over a decade at Nestlé, contributing to nutrition product development and global regulatory affairs. Trained as a nutritionist, Ms. Ng holds a Master of Jurisprudence from Michigan State University College of Law, USA, and graduate certificates in International Food Regulations and Health Product Regulations. Her passion lies in navigating and advocating for science-based food/drug interface policies and regulations, showcasing her commitment to innovation in the healthcare industry.

GUEST SPEAKERS

Day 2 | March 1, 2024

Richard Eu

Mr. Richard Eu Yee Ming is a Singaporean businessperson and musician. He is the chairman of healthcare firm Eu Yan Sang International Ltd. He graduated from the University of London with a degree in law (LLB). Mr. Eu actively participates in community projects and non-profit organisations, and currently serves as chairman of the Board of Singapore University of Social Sciences. He also sits on the board of Thye Hua Kwan Moral Charities Limited and Thye Hua Kwan Ang Mo Kio Hospital. In 2020, he was conferred the Public Service Medal at the Singapore National Day Awards.

Mr. Marek Piotrowski

Mr. Marek Piotrowski, Longevity Advocate, Marketing Strategist and producer of a movie "Beyond Time. A Father-Son Quest for Longevity Around the World". Former CEO of successful ad agencies working for top global brands, has seamlessly transitioned his expertise from the business world to the realm of longevity promotion. With a robust background as a CMO in robotics, he's now dedicated to demystifying breakthroughs in the field of longevity, offering practical advice and protocols to empower individuals to embrace longer, healthier, and more active lives. Mr. Piotrowski's mission is to bridge the gap between cutting-edge research and the public, igniting inspiration and belief in the attainability of longevity, and driving both interest and investment to fuel the growth of the longevity industry and accelerate scientific advancements for extended healthspans and lifespans. Alongside his son Alex (18yo), Mr. Piotrowski initiated the "Beyond Time" project, embarking on a year-long global journey to unearth the best longevity solutions, engaging with industry luminaries, and creating a movie to share remarkable breakthroughs and ready-to-apply protocols.

FLASH TALK SPEAKERS

Dr. Guan Shou Ping

Dr. Guan Shou Ping, under the guidance of Professor Brian Kennedy, serves as a senior research fellow. His primary research revolves around exploring the molecular mechanisms of AKG supplementation in mice and humans. Additionally, he delves into the foundational aspects of ageing, actively seeking and identifying effective strategies to postpone the ageing process.

Dr. Ajla Hodzic Kuerec

Dr. Ajla Hodzic Kuerec is a medical doctor who after her MD specialized in Medical pharmacology. Following this, she joined the Center for Healthy Longevity as a postdoctoral research fellow. Her work primarily focuses on longevity, geroprotectors, designing and conducting clinical trials in the longevity field. Dr. Ajla Hodzic Kuerec is dedicated to exploring ways to extend human healthspan.

Dr. Weilan Wang

Dr Weilan Wang, currently a Research Fellow at the Centre for Healthy Longevity at the National University of Singapore (NUS), specializes in data science and biostatistics with a specific focus on promoting healthy longevity. Her expertise lies in predicting adverse health outcomes and uncovering their underlying mechanisms. Dr Wang's interests extend to analyzing multi-omics data derived from various cohort studies, contributing to the healthy longevity research.

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At xLongevity, we are dedicated to empowering individuals on their journey towards a healthier and more vibrant life. As we join this conference, we extend our wholehearted support for its themes of longevity, wellness and holistic well-being. We believe that by fostering collaboration and sharing knowledge, we can inspire positive change and contribute to a healthier future for all. Wishing all participants a fruitful and insightful conference experience.

Best regards,
Pierre-Edourad Sottas
CEO, xLongevity

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Blue California is a science-driven solutions provider and manufacturer of nature-inspired ingredients used in dietary supplements, foods and beverages. Through our advanced precision fermentation and bioconversion platforms, our bio-forward ingredients offer more sustainable solutions for health and wellness. Our flagship ingredient, ErgoActive® ergothioneine, offers benefits for healthy longevity through cellular support, telomere protection, cognitive support and sleep. Our other specialty ingredients include Taxifolin BC-DHQ®, L-TeaActive® L-theanine, and more.

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Linda May-Zhang, PhD, VP Science & Innovation
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STARTUP COMPETITION

Presenter Name and Title:
Nikolay Vasev, PhD, Chief Operating Officer

Startup Name:
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Company Bio:
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https://www.epix.ai/

Presenter Name and Title:
Dr. Shefali Sabharanjak, PhD, PhD, Head - Science & Research

Startup Name:
Serotonin Labs Inc.

Company Bio:
Project Serotonin is an 8-year journey of a 17-member multidisciplinary founding team of PhDs in nutrition/biochemistry, hardware & software engineers, and designers to build an industry-first digital health platform for precision nutrition & healthy aging. We spent years evaluating and stratifying scientific research, developing sophisticated software systems, designing & developing our app & hardware, and over 7 generations of the platform & algorithms, to bring you the world's most advanced platform for precision nutrition and preventive health.

Website:
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STARTUP COMPETITION

Presenter Name and Title:
Kenneth Lou, Co-Founder, and CEO of Mito Health

Startup Name:
Mito Health

Company Bio:
Our name originates from 'Mitochondria', the powerhouses that generate chemical energy in our cells. Our mission is to help our members lead healthier, better lives. We bring together expertise in medicine and technology. We're combining our passion for health with technological advances to revolutionise the future of personalised preventative care.

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Presenter Name and Title:
Kevin Yang, Founder

Startup Name:
Uda

Company Bio:
Company Bio: At UDA we have one mission: to make healthy longevity available to all. We're doing this by taking a simple cup of coffee and infusing it with ingredients that target the core pathways of ageing. UDA was created to make longevity easy and routine. We believe that coffee, as a highly commonplace beverage, is the perfect delivery system for our advanced anti-ageing formula. Simply replace your current coffee routine with UDA for effortless longevity!

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STARTUP COMPETITION

Presenter Name and Title:
Julia Laukemann, Founder

Startup Name:
L'évive Labs

Company Bio:
L'évive Labs is Southeast Asia's first Online Longevity Clinic. Through our longevity essentials supplements, our DNA & epigenetics-based longevity plans, our online clinic and future longevity suites, we want to enable 1M people in (Southeast) Asia to extend their health span to a happier overall life span. We plan to build the first epigenetics clock for Asia, based on future lab partnerships in the region and supported by an underlying AI-based tech platform. Our team has a track record of pioneering innovation and transformation in Europe and Asia.

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ABSTRACTS FOR ORAL PRESENTATION

(The presenting author is underlined)

GoldenTrack: A multinational survey study on aging well with supplements in Southeast Asia

Aida Gadzhieva-Moore, Khee Suan Bang

Real World Solutions, IQVIA
Email: aida.moore@iqvia.com

Background and aims: Southeast Asia (SEA) is undergoing a profound aging transition, with 22% of its population expected to reach 60 years of age by mid-century. This poses significant challenges and opportunities for the health and well-being of older adults and their caregivers.

Methods: We conducted the first wave of a multi-year annual online survey study of 3,808 respondents across six SEA markets, comprising three respondent segments: Active aging consumers (aged 60 and above), pre-active aging consumers (aged 45-59), and caregivers (care for elderly aged 60 and above). We measured their self-perceived health, lifestyle habits, chronic conditions, healthcare product purchase, and medical device usage in this survey.

Results: We found that 75.5% of respondents reported good self-perceived health, despite having multiple chronic conditions. Despite the positive rating of their own health, consumers in SEA are actively practicing healthy lifestyle habits, including sufficient sleep (75%), regular fruits and vegetables consumption (77%), exercising (59%), and taking supplements (57%). Generally there is a good consensus between what consumers think as important and what they actually do. Vitamins, minerals, and health supplements dominated the healthcare product purchase in the region, reflecting the growing self-care trend. Surprisingly, general socio-economic status of the markets did not seem to have an influence on this trend.

Conclusions: Interim year 1 results of our study provided insights into the healthy aging phenomenon in SEA, and the role of supplements in extending the healthspan of active aging, pre-active aging adults and their caregivers. We also discuss the opportunities, trends and implications for healthcare providers, policymakers, and consumer health industry in addressing the needs and preferences of this growing segment.

ABSTRACTS FOR ORAL PRESENTATION

(The presenting author is underlined)

The Polyphenol derived metabolite Urolithin A promotes longevity and healthspan in model organisms

Raj SD [1,2], Lee, J. H [1,2], Raventhiran, S [1,2], Koh TW [3], Tolwinski N[4,5] , Kennedy BK [1,2]

[1]Healthy Longevity Translational Research Program, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

[2]Centre For Healthy Longevity, National University Health System, National University of Singapore, Singapore

[3]Temasek Life Sciences Laboratory, National University of Singapore, Singapore

[4]Science Division, Yale-NUS College, Singapore

[5]Cancer and Stem Cell Biology Program, Duke-NUS Medical School, Singapore

Email: e0384386@u.nus.edu

Background and aims: In light of the globally aging population, geroprotectors may play a key role in the promotion of healthspan and reducing the disease burden in society. Urolithin A was recently proposed as a geroprotetive candidate in 2016. Although it has been well studied in multiple disease models, its geroprotective effects have not been well validated in the current literature. Therefore, our objective is to validate the robustness of Urolithin A as a longevity therapeutic.

Methods: Drosophila, African Turquoise Killifish and Mouse models were used to investigate the geroprotective effects of Urolithin A

Results: We demonstrated that Urolithin A promotes lifespan extension in both drosophila and killifish models. We further show that Urolithin A reduces frailty and improves healthspan in 28 month-old mice.

Conclusions: Urolithin A shows robust effects as a longevity therapeutic in multiple model organisms. Clinical trials are warranted to investigate its geroprotective effects in humans.

ABSTRACTS FOR ORAL PRESENTATION

(The presenting author is underlined)

The clinical validation of novel therapies for longevity medicine

Moskalev A[1], Isaev F[2], Maganova F[3]
[1] Institute of biogerontology of Lobachevsky State University, Nizhny Novgorod
[2] Kivach Klinic, Petrozavodsk
[3] Initium-Pharm, Moscow

Email: amoskalev@list.ru

The field of Healthy Longevity Medicine has recently gained traction as a form of preventive medicine that utilizes biological age clocks to detect early age-related health conditions. However, there is currently a lack of clinically proven therapies for use in healthy longevity centers.

To address this gap, we utilized algorithms for assessing biological age, specifically Aging.AI (2016) and Arterial Indices (2017), which were developed with our involvement.

Our clinical studies involved 43 patients from Kivach Clinic who underwent a 14-day medical spa treatment. We observed a median decrease in biological age of 3 years using the Aging.AI algorithm. Additionally, we conducted a prospective randomized comparative placebo-controlled double-blind study on the Arterial Indices model of biological age with 60 men and women aged 40-65 years. The main group received a dietary supplement containing a complex of Siberian fir terpenes, limonene, alpha-linolenic acid, and vitamin E for 90 days, while the comparison group received a placebo. We found that the Arterial Indices decreased by 2.5 years in the main group compared to baseline levels, while there was no change in the comparison group. We also observed a significant decrease in pulse wave velocity (by 10%) and minimum thickness of the intima-media complex (by 45%).

Taken together, our findings suggest that comprehensive medical spa programs and the nutritional supplement Abisil can have a positive impact on biological age clocks.

ABSTRACTS FOR ORAL PRESENTATION

(The presenting author is underlined)

Effect of NAD+ boosting on glucose metabolism in healthy individuals

Liliya Euro[1], Kimmo Haimilahti[1], Sonja Jansson[1], Jana Buzkova1, Anu Suomalainen[1,2]

[1]Research Programs Unit, Stem Cells and Metabolism Research Program (STEMM), Faculty of Medicine, Haartmaninkatu 8, University of Helsinki, Helsinki, 00014 Finland

[2]HUS Diagnostic Centre, 00260 Helsinki, Finland

Presenting author: Liliya Euro

Email: liliya.euro@helsinki.fi

Background and aims: Nicotinamide adenine nucleotide NAD+ and its derivatives NADH, NADP+, and NADPH or NADs are rapidly gaining attention as central metabolic regulators. Studies on animal models show decrease of NAD+ in tissues upon aging. Pre-clinical studies indicate that various diseases are accompanied by NAD+ drop in affected tissues despite sufficient nutrient intake. The possibility to effect NAD+ levels by fueling its synthesis pathways by supplementation with precursors makes the NAD+ deficiency curable. Boosting of NAD+ levels is considered beneficial to slow down aging processes and to prevent disease development. However, there is no data whether NAD+ boosting can cause unfavorable metabolic changes in healthy individuals.

Methods: To answer this question we analyzed blood samples from clinical trial where eight healthy individuals received increasing doses of niacin for 16 weeks. Blood samples were collected each or every second week during the study. All four NAD metabolites were measured with proprietary NADMED method. Other blood tests were performed in clinical laboratory.

Results: We found that niacin supplementation increased blood NAD+ levels to saturation. NAD+ levels positively correlated with fasting HbA1c at baseline and with fasting insulin, C-peptide, and HOMA1-IR (insulin resistance score) after combining data from all the time points. Interestingly, fasting insulin and HOMA1-IR started to rise only after 500 mg of niacin while fasting glucose increased already at the dose of 250 mg. The fasting glucose and insulin values remained primarily within the reference values, but average HOMA1-IR increased over 1.9 after 500 mg of niacin, a value generally kept as a threshold for increased insulin resistance. Individuals with higher baseline insulin and HOMA1-IR also tended to have higher increase in these parameters during supplementation.

Conclusions: Supplementation with NAD+ boosters of healthy individuals with normal NAD+ is associated with risk of development of diabetic changes compromising expected longevity outcome.

ABSTRACTS FOR ORAL PRESENTATION

(The presenting author is underlined)

Melon Derived Superoxide Dismutase Oral Biopolymer Increases Cellular and Mitochondrial Enzymatic Antioxidant Mechanisms

Cory S. Goldberg BSc, MD, MASc, FRCSC, FACS, MBA

Email: cory@healthspan.digital

Background and aims: Oxidative stress causes DNA damage, disease, and aging. The aim is to evaluate a unique oral biopolymer from melon (Cucumis melo) superoxide dismutase (SOD) extract and wheat (Triticum vulgare) gliadin which increases cellular and mitochondrial SOD resulting in clinically relevant, multi-system organ health benefits through increasing enzymatic antioxidant function.

Methods: Presented are a selection of published data from 3 double-blind, randomized, controlled studies.

Results:

1. Balb/c mice (control vs. SOD-gliadin, n=20, t=28d) treatment group circulating SOD increased 89% ($p<0.01$) increasing resistance to oxidative stress induced hemolysis ($p<0.01$). Hepatocyte SOD increased 440% ($p<0.001$) causing delayed decrease in mitochondrial depolarization ($\Delta\Psi m$) from peroxynitrite donor Sin-1 ($p<0.05$). SOD-gliadin thus elevated SOD levels providing cytoprotection in blood and liver.

2. Human scuba divers were pretreated for 14d (placebo vs. SOD-gliadin, n=20) and then subjected to 100% 2.5 ATM hyperbaric oxygen - an established oxidative stress model. SOD-gliadin group had significantly lower F2-isoprostane level ($p=0.049$) and reduced DNA strand breaks (tail moments) determined using the comet assay ($p=0.03$) thus demonstrating reduced inflammation and resultant DNA protection.

3. Asymptomatic humans with cardiovascular risk had serial carotid intima media thickness (IMT) measurements over 2 years using B-mode ultrasound (placebo vs. SOD-gliadin, n=76). There was slight increase in control IMT, while SOD-gliadin subject IMT decreased and reached significance at D365, D545 and D730 ($p<0.001$). Thus, SOD-gliadin was effective at a preclinical stage in subjects with cardiovascular risk. Safety was also demonstrated after two years of treatment in humans at 500mg/day.

Conclusions: SOD-gliadin enhances cellular and mitochondrial enzymatic antioxidant function, provides multi-system reduction in oxidative stress and resultant harm including DNA protection, and warrants further investigation regarding healthspan.

ABSTRACTS FOR ORAL PRESENTATION

(The presenting author is underlined)

First-in-human results on ageing with d-Limonene oral supplementation

Patrizia Anna d'Alessio, MD, PhD
CEO AISA Therapeutics
Genopole Entreprise 4, rue Pierre Fontaine 91058 EVRY France
Email: patriz.dalessio@gmail.com

Background and aims: The small molecule d-Limonene, a monoterpene, was singled-out from a bio-guided research aimed at the identification of non-toxic anti-inflammatory molecules. After experiments demonstrating its ability to inhibit the inflammatory phenotype of senescent endothelial cells, extensive pre-clinical work on rodents confirmed d-Limonene anti-inflammatory effects in colitis and dermatitis models, together with an anti-stress effect in a rat model.

Methods: The first-in-human multicenter project RISTOMED, selected by the EU-FP7 Framework Program enrolled 138 patients of three nationalities, with balanced gender, aged between 65 and 85 years-old. Inflammatory, metabolic and functional parameters, together with QoL questionnaires and microbiota data were collected. Three different nutritional anti-aging strategies were compared to a baseline diet, supplemented with i) argan oil, ii) pro-biotics and iii) d-Limonene.

Results:
d-Limonene supplementation was demonstrated to be the only one displaying a significant efficacy, including inflammation decrease, ameliorated cardio-metabolic markers, improved grip test, microbiota reshuffling, and even mood enhancement.

Conclusions: Small molecules of natural origin may display non-toxic anti-inflammatory effects equivalent to those of biologics. Monoterpenes are indeed small molecules. d-Limonene, first discovered in a healing plant of the rain forest at the border of Vietnam and China, is equally present in citrus fruit peels. It is highly performing for the maintenance of youthfulness. Its anti-inflammatory action is associated to gut barrier repair and wound healing. Concomitantly to senescent phenotype reversion, nutraceutical supplements such as d-Limonene engage both the central nervous system and the peripheral "brains" present in the gut and skin. Innovative early interventions for the primary prevention of aging should consider these new tools/partners.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

The efficacy and safety of β-nicotinamide mononucleotide (NMN) supplementation in healthy middle-aged adults: a randomized, multicenter, double-blind, placebo-controlled, parallel-group, dose-dependent clinical trial

Lin Yi [1], Andrea B. Maier [2,3,4], Rongsheng Tao [5], Zhigang Lin [6], Aditi Vaidya [7], Sohal Pendse [7], Sornaraja Thasma 7, Niranjan Andhalkar 7, Ganesh Avhad 8, Vidyadhar Kumbhar 9

[1]Abinopharm, Inc., 3 Enterprise Drive, Suite 407, Shelton, CT 06484, USA

[2]Department of Human Movement Sciences, @AgeAmsterdam, Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, Van der Boechorststraat 7, 1081 BT Amsterdam, The Netherlands.

[3]Healthy Longevity Translational Research Program, Yong Loo Lin School of Medicine, National University of Singapore, Singapore 119228, Singapore.

[4]Centre for Healthy Longevity, @AgeSingapore, National University Health System, 10 Medical Drive, Singapore 117597, Singapore.

[5]Huzhou Yihui Biotechnology Co., Ltd., 1366 Hong Feng Road, Huzhou, Zhejiang 313000, P. R. China

[6]ABA Chemicals Corporation, 67 Libing Road, Building 4, Zhangjian Hi-Tech Park, Shanghai 201203, P. R. China

[7]ProRelix Services LLP, 102 A/B, Park Plaza, Karve Road, Karve Nagar, Pune, Maharashtra 411052, India

[8] Lotus Healthcare & Aesthetics Clinic, 5 Bramha Chambers, 2010 Sadashivpeth, Tilak Road, Pune, Maharashtra 411030, India

[9] Sunad Ayurved, Siddhivinayak Apart, Jeevan Nagar, Chinwad, Pune, Maharashtra 411033, India

Email: lin.yi@abinopharm.com

Background and aims: In animal studies, β-nicotinamide mononucleotide (NMN) supplementation increases nicotinamide adenine dinucleotide (NAD) concentrations and improves healthspan and lifespan with great safety. However, it is unclear if these effects can be transferred to humans.

Methods: This randomized, multicenter, double-blind, placebo-controlled, parallel-group, dose-dependent clinical trial included 80 middle-aged healthy adults being randomized for a 60-day clinical trial with once daily oral dosing of placebo, 300mg, 600mg, or 900mg NMN. The primary objective was to evaluate blood NAD concentration with dose-dependent regimens. The secondary objectives were to assess the safety and tolerability of NMN supplementation, next to the evaluation of clinical efficacy by measuring physical performance (six-minute walking test), blood biological age (Aging.Ai 3.0 calculator), Homeostatic Model Assessment for Insulin Resistance (HOMA-IR), and subjective general health assessment [36-Item Short Form Survey Instrument (SF-36)]. Statistical analysis was performed using the Per-Protocol analysis with significant level set at $p=0.05$.

Results: All 80 participants completed the trial without trial protocol violation. Blood NAD concentrations were statistically increased among all NMN treated groups at day 30 and day 60 when compared to both placebo and baseline (all $p<0.001$). Blood NAD concentrations were

highest in the groups taking 600mg and 900mg NMN. No safety issues, based on monitoring adverse events (AEs), laboratory and clinical measures, were found, and NMN supplementation was well tolerated. Walking distance increase during the six-minute walking test was statistically significantly higher in the 300mg, 600mg and 900mg groups compared to placebo at both day 30 and 60 (all $p<0.01$), with longest walking distances measured in the 600mg and 900mg groups. The blood biological age increased significantly in the placebo group and stayed unchanged in all NMN treated groups at day 60, which resulted in a significant difference between the treated groups and placebo (all $p<0.05$). The HOMA-IR showed no statistically significant differences for all NMN treated groups as compared to placebo at day 60. The change of SF-36 scores at day 30 and day 60 indicated statistically significantly better health of all three treated groups when compared to the placebo group ($p<0.05$), except for the SF-36 score change in the 300mg group at day 30.

Conclusions: NMN supplementation increases blood NAD concentrations and is safe and well tolerated with dosing up to 900mg NMN daily. Clinical efficacy expressed by blood NAD concentration and physical performance reaches highest at a dose of 600mg daily oral intake.

Conflicts of Interests: LY is an employee of Abinopharm, Inc., RT and ZL are employees of Aba Chemicals, Co., and AM, AV, SP, ST, NA, GA, and VK declare no conflict of interest.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Therapeutic effect of dietary ingredients on cellular senescence in animals and humans: A systematic review

#Lihuan Guan [1,2], #Anna Eisenmenger [1,2], Karen C. Crasta [1,2,3,4,5], Elena Sandalova [1,2], Andrea B. Maier[1,2,6]

[1] Healthy Longevity Translational Research Program, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

[2] Centre for Healthy Longevity, @AgeSingapore, National University Health System, Singapore

[3] Department of Physiology, National University of Singapore, Singapore

[4] NUS Centre for Cancer Research, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

[5] Agency for Science, Technology & Research (A*STAR), Institute of Molecular and Cell Biology (IMCB), Singapore

[6] Department of Human Movement Sciences, @AgeAmsterdam, Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, the Netherlands

#Equal contribution

Email: lihuan@nus.edu.sg

Background: Cellular senescence has been regarded as a therapeutic target for ageing and age-related diseases. Several senotherapeutic agents have been proposed, including compounds derived from natural products which hold the translational potential to promote healthy ageing. This systematic review examined the association of dietary ingredients with cellular senescence in animals and humans, with an intent to identify dietary ingredients with senotherapeutic potential.

Methods: This systematic review was registered at PROSPERO International prospective register of systematic reviews (Reg #: CRD42022338885). The databases PubMed and Embase were systematically searched for key terms related to cellular senescence, senescence markers, diets, nutrients and bioactive compounds. Intervention and observational studies on human and animals investigating the effects of dietary ingredients via oral administration on cellular senescence load were included. The SYRCLE's risk of bias tool and Cochrane risk of bias tool v2.0 were used to assess the risk of bias for animal and human studies respectively.

Results: Out of 5707 identified articles, 83 articles consisting of 78 animal studies and 5 human studies aimed to reduce cellular senescence load using dietary ingredients. In animal studies, the most-frequently used senescence model was normative ageing (26 studies), followed by D-galactose-induced models (17 studies). Resveratrol (8 studies), vitamin E (4 studies) and soy protein isolate (3 studies) showed positive effects on reducing the level of senescence markers such as p53, p21, p16 and senescence-associated ß-galactosidase in various tissues of physiological systems. In three out of five human studies, ginsenoside Rg1 had no positive effect on reducing senescence in muscle tissues after exercise. The risk of bias for both animal and human studies was largely unclear.

Conclusions: Resveratrol, vitamin E and soy protein isolate are promising senotherapeutics studied in animal models. Studies testing dietary ingredients with senotherapeutic potential in humans are limited and translation is highly warranted.

Keywords: Ageing; cellular senescence; diet; dietary supplements; therapeutics

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Improving health-related quality of life by modulation of gut microbiota: a randomized, double-blind, placebo controlled trial

Martin CS Wong[1,2], Siew C Ng[3,4], Francis KL Chan[3,4]
[1]The Jockey Club School of Public Health and Primary Care, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong SAR, China
[2]The Centre for Health Education and Health Promotion, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong SAR, China
[3]Microbiota I-Center (MagIC), Hong Kong SAR, China
[4]Centre for Gut Microbiota Research, Faculty of Medicine, The Chinese University of Hong Kong, China

Email: borskyp@lfhk.cuni.cz

Background and aims: Gut microbiota has been shown to reduce adverse health outcomes, yet its impact on health-related quality of life (QOL) has not been evaluated. We examined the effectiveness of a novel oral microbiome formula (SIM01) on improving three major indicators of QOL among a group of diabetes patients and elderly individuals.

Methods: We performed a double-blind, randomised, parallel-arm, placebo-controlled trial in a University clinic in Hong Kong from April 2021 to March 2022. Subjects were recruited from a territory-wide recruitment initiative that reached the general population. Eligible participants included subjects aged ≥ 65 years and diabetes patients. Enrolled individuals were randomised in a 1:1 ratio to receive three months of SIM01 or placebo (vitamin C). SIM01 is an oral microencapsulated formulation of three lyophilised Bifidobacteria at a dose of 20 billion CFU per day and 3 prebiotics. Both the researchers and participants were blinded to the groups allocated. We assessed the sleep quality, skin appearance, and mood three months after the baseline visit by a validated questionnaire. Outcomes were compared between groups by $\chi 2$ tests.

Results: We enrolled 453 subjects, with 224 individuals assigned to SIM01 and 229 assigned to placebo. The mean age was 67.5 years (SD: 8.1) with an equal gender ratio (female 50%). Among them, 49.7% were elderly and 50.3% were diabetes patients. Their baseline characteristics were similar and the attrition rate was 14.7% and 16.2%, respectively. At three months, more subjects who received SIM01 than the placebo reported better sleep quality (53 [41.4%] vs. 22 [19.3%], $p < 0.001$), improved skin condition (18 [14.1%] vs. 8 [7.0%], $p = 0.043$), and better mood (27 [21.2%] vs. 13 [11.4%], $p = 0.043$).

Conclusions: The study findings demonstrated that SIM01 could improve QOL in elderly and diabetes patients. The formula may bear potential to promote healthy ageing.

Funding: The study was supported by the Health Bureau, The Government of the Hong Kong Special Administrative Region (Funding number: Ref.: COVID19F07). The findings from this abstract have been presented in *Nutrients*2023;15,1982.

Conflict of interests: MCSW is the honorary medical advisor of GenieBiome Ltd. and honorary consultant of SunRise Ltd. and BGI. He is an advisory committee member of Pfizer; an external expert of GlaxoSmithKline Limited; a member of the advisory board of AstraZeneca and has been paid consultancy fees for providing advice on research. SCN and FKLC report serving as founding members for GenieBiome Limited. SCN also has served as an advisory board member for Pfizer, Ferring, Janssen, and Abbvie and a speaker for Ferring, Tillotts, Menarini, Janssen, Abbvie, and Takeda. She has received research grants from Olympus, Ferring, and Abbvie. FKC has served as the director and board member of CUHK Medical Centre Limited and the First Director of the Board of Directors for CUHK Multi-Scale Medical Robotics Centre Limited. He also has served as an advisor and lecture speaker for Eisai Co., Ltd., AstraZeneca, Pfizer Inc, Takeda Pharmaceutical Co., and Takeda (China) Holdings Co., Ltd. SCN and FKLC are inventors of patent applications for "Composition for Improving Immunity" (CN202010657312.5, CN202011259564.9, CN202110223880.9, PCT/CN2021/090531, and TW110115155); and "Therapeutic and Diagnostic Use of Microorganisms for COVID-19" (US63/016,759, US63/015,310,US63/064,821, PCT/CN2021/090488, and TW110115153). No other potential conflict of interest relevant to this abstract was reported.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Time-resolved transcriptomic profiling of senescence-associated secretory phenotype (SASP) in multiple senescent cell subtypes

Nurhanani Razali, Yohsuke Moriyama, Yatzu Chiu, Kojiro Suda & Keiko Kono
Membranology Unit, Okinawa Institute of Science and Technology Graduate University. 1919-1, Tancha, Onna-son, Kunigami-gun, Okinawa 904-0495, Japan

Email: nurhananibinti.razali@oist.jp

Cellular senescence is induced by various triggers including telomere shortening, oncogene activation, and DNA damage. Senescent cells exhibit the senescence-associated secretory phenotype (SASP), which contributes to several pathophysiological consequences including organismal aging and wound repair. We have previously shown that transient plasma membrane damage (PMD) induces a novel subtype of senescence, accompanied by Ca2+ influx, upregulation of p53, p21, p16, and SASP. However, these hallmarks of senescence, particularly SASP, is diverse in senescent cell subtypes and the overall expression profile of SASP in PMD-dependent senescent cells (PMD-Sen) is unknown. Here, we performed mRNA-seq, qPCR, and bioinformatics analyses to reveal the time-resolved SASP transcriptomic profile in PMD-Sen compared to the senescent cells induced by Ca2+ influx (Ca2+-Sen), DNA damage (DDR-Sen), and repeated cell division (Rep-Sen) using normal human fibroblasts WI-38 cells. Although the expression of SASP was postulated to increase steadily during senescence, we counterintuitively found that the specific feature of PMD-Sen was the upregulation of IL6, MMP1, and MMP3, the SASP factors associated with wound healing, peaked at zero or one day after the transient PMD treatment. Analogous to PMD-Sen, some SASP factors were overlapping in Ca2+-Sen, although the molecular mechanisms are partly different. In contrast, in DDR-Sen, SASP diversity was relatively constant until 16 days after transient stress treatment. Pathway comparison and upstream regulator analyses suggest that these wound-healing SASP factors might inhibit the GP collagen signaling pathway, which in turn further upregulates the same SASP factors, possibly forming a feedback loop. The common feature of SASP profiles in all senescent cells was the increase of CCL2 and/or IL6 mRNA levels at late senescence. These results may explain the diversity of senescence in senescent-cell subtype- and time-specific paracrine/autocrine functions. Senolytics treatment nowadays use a 'hit-and-run' approach where senolytics drugs are administered intermittently, to reduce the toxicity side effects. Such approach, however, reduces the drug's efficacy if they kill senescent cells or block SASP when they are actually functioning in tissue regeneration and wound repair. With regards to these limitations, this study is ideal to assess the senescence intervention, when exactly senescent cells and SASP are exerting their beneficial and deleterious effects.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

A human clinical trial of plasmapheresis without supplementation does not lead to rejuvenation

Pavel Borsky[1,*], Zdenek Fiala[1], Drahomira Holmannova[1], Ctirad Andrys[2], Jan Kremlacek[3], Vit Rehacek[4], Helena Parova[5], Tereza Maresova[1] and Lenka Borska[1]
[1]Institute of Preventive Medicine, Faculty of Medicine in Hradec Kralove, Charles University, Hradec Kralove, 500 03, Czech Republic
[2]Institute of Clinical Immunology and Allergology, University Hospital and Faculty of Medicine in Hradec Kralove, Charles University, Hradec Kralove, 500 03, Czech Republic
[3]Institute of Medical Biophysics, Faculty of Medicine in Hradec Kralove, Charles University, Hradec Kralove, 500 03, Czech Republic
[4]Transfusion center, University Hospital, Hradec Kralove, 500 03, Czech Republic
[5]Department of Clinical Biochemistry and Diagnostics, University Hospital and Faculty of Medicine in Hradec Kralove, Charles University, Hradec Kralove, 500 03, Czech Republic

Email: borskyp@lfhk.cuni.cz

Background: Plasmapheresis is a medical procedure that separates whole blood into cellular components and plasma which is extracted. Plasmapheresis also serves as a therapeutic procedure that can alleviate a variety of diseases by removing dangerous molecules from the circulation. According to some studies, plasmapheresis can have a positive effect on aging, as it removes some of the factors involved in the aging process, potentially lowering the systemic chronic inflammation present in aged individuals (inflammaging).

Objectives: The aim of the study was to evaluate the changes of blood parameters occurring in time during repetitive plasmaphereses and to estimate whether the interventions have positive impact on biological age of donors. The protocol was conducted using no supplements added to the donors.

Methods: Automatic plasma collection system, Haemonetics PCS2, was used for plasmapheresis. Healthy blood donors were divided into two groups using stratified randomization in a cross-over study with subjects undergoing 8 plasmaphereses (8 pp) or 4 plasmaphereses (4 pp) for 18 weeks with the minimum period between plasmaphereses of 2 weeks (14 days). Samples were tested for biochemical and hematological analyses and biological blood age (aging.ai).

Results: We documented the alteration in serum minerals, decreased serum lipids, mainly total cholesterol, non-HDL, TAG and apolipoprotein A levels. Total proteins and albumin decreased after 4 and 8 pp. Among hematologic parameters, we found a difference in RDW and MCHC (increased). No significant change in biological blood age was documented.

Conclusion: Plasmapheresis has the potential to change the levels of proinflammatory and other pro-aging molecules in the circulation, however the selected protocol of 8 pp in 18 weeks (4 pp in 9 weeks respectively) has not shown conclusive data supporting benefits of plasma extraction as no rejuvenation of biological blood age was shown. It appears that merely extracting plasma and adding no compounds (e.g. supplements) back to the individuals' circulatory system is not helpful to the plasma donors. More research is needed on the protocols (length, intervals, supplements, etc.).

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

A novel epigenetic biomarker of chronic inflammation that responds to a nutritional intervention

Lisa J. Schmunk [1], Toby P. Call [1], Waylon J. Hastings [2], Kirsty McGee [3], Jack Sullivan [3], Daniel L McCartney [4], Thomas Jackson [3], Janet M. Lord [3], Riccardo E Marioni [4], Daniel E. Martin-Herranz [1]

[1] Hurdle / Chronomics Ltd., London, UK, 2 Department of Psychiatry and Behavioral Sciences,

Tulane University School of Medicine, New Orleans, LA, USA, 3 Institute of Inflammation and Ageing, University of Birmingham, Birmingham, UK. 4 Centre for Genomic and Experimental Medicine, Institute of Genetics and Cancer, University of Edinburgh. This work was financially supported by Bayer Consumer Health.

Email: lisa.schmunk@chronomics.com

Background and Aims: Increased systemic chronic inflammation (SCI) is associated with a higher risk of developing age-related diseases. SCI biomarkers such as the inflammatory ageing clock iAge have used machine learning to integrate individual inflammatory biomarkers measured from venous blood to predict inflammatory age. However, we propose that an accessible SCI biomarker should be created from a non-invasive tissue suitable for at-home testing, use an assay that is widely available and cost-effective, and a technology that removes noise from shortterm acute inflammation fluctuations.

Methods: Here, we developed a novel biomarker for "InflammAge" using saliva DNA methylation (DNAm), a type of epigenetic data that can be quantified using Illumina methylation arrays. Levels of canonical blood inflammatory biomarkers can be predicted from blood DNAm data. We transferred these signatures to saliva and used the resulting features to train a machine learning model to predict chronological age.

Results: Trained on DNAm array data from saliva samples covering the adult human lifespan in two sexes and diverse genetic backgrounds, the model selected features including DNAm proxies for inflammatory biomarkers, achieving a performance comparable to gold standard epigenetic clocks. When tested in an independent dataset, individuals with a higher saliva InflammAge Acceleration also showed a higher number of blood inflammatory biomarkers outside of healthy reference ranges. We validated performance of the biomarker using larger cohorts, and tested whether it responds to interventions using an eight-component nutraceutical supplement. In this study of 80 healthy older adults and a 12-week intervention, the supplement reduced InflammAge ($p<0.024$) but only in those adults who had a raised InflammAge score at baseline.

Conclusion: In summary, we present a novel saliva biomarker for chronic inflammation, that can be deployed at scale thanks to choice of tissue type and technology and help democratise access to preventative ageing diagnostics.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Reverse the clock: An interim analysis of Collagen Activator effects on skin quality

Chabloz Sophie (MSc., CH); Sharma Arastu (MSc., CH); Knufinke Marie (MSc., CH); Pramono Intan (Dr. med., CH), Jasinski Adam (MSc., CH), Rümmelein Bettina (Dr. med., CH); Brügger Victoria (MSc., CH), Ewald Collin (Prof. Dr., CH)

Email: sophie@avea-life.com

Skin aging is a complex process influenced by intrinsic and extrinsic factors, leading to visible signs such as wrinkles, reduced elasticity, and decreased hydration. The decline in collagen production and alterations in the skin's extracellular matrix play a central role in these changes. Therefore, this study aims to determine the impact of a collagen precursor-based formula containing the amino acids (glycine, proline, and hydroxyproline).

We assessed a total of 60 healthy adults over 35 years of age. Participants took the collagen activator every day for 1 month, and skin tests were conducted at baseline and after 1 month, including measurements with a corneometer, cutometer, ultrascan, and Visia scan. We utilized paired t-tests and linear mixed-effect models to investigate the association of collagen activator intake with skin hydration, elasticity, thickness, density, pigmentation, wrinkles, texture, UV-spots, pores, redness, and porphyrins.

The study's findings may provide insights into the mechanisms underlying skin aging and offer valuable information on the efficacy of collagen precursor supplements in enhancing skin health and appearance.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Biology-inspired network medicine approach to drug discovery

Dr. Qingpeng Zhang

Email: qpzhang@hku.hk

Drug and supplement discovery is a challenging and costly process that requires a deep understanding of the mechanism of drug action (MODA), which is how a drug affects the biological system at the molecular level. In this talk, I will present our recent studies on using a network-based machine learning approach to characterize MODA by analyzing a comprehensive biological network that captures the complex high-dimensional molecular interactions between genes, proteins and chemicals. I will show that our methods outperform state-of-the-art machine learning baselines in predicting MODA. I will also demonstrate that our methods can identify explicit critical paths that are consistent with clinical evidence, and explain how these paths reveal the underlying biological mechanisms of drug (and supplement) action. Applications in traditional Chinese medicine herb safety management will be presented as well. Our research provides a novel interpretable artificial intelligence perspective on drug and supplement discovery, and has the potential to facilitate the development of new and effective drugs.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Supplements for Exercise as Longevity Medicine: Five Novel Questions Worthy of Future Research

Chia Eng Hock (Dr)

Acorn Biotech, Singapore
Email: sweetgardening@icloud.com

"Exercise as medicine" is an important component of lifestyle medicine and has been garnering increasing attention. It is seen as an important adjunct to the treatment of a whole range of chronic diseases, from cancer to cardiac rehabilitation to interventions for Mild Cognitive Impairment.
"Exercise as longevity medicine" is a far newer version that seeks not only the alleviation of chronic illnesses but the primordial prevention of these diseases where the greatest risk factor is aging. It also seeks to address not just life extension, but also the prolongation of healthspan, in other words, the compression of morbidity.

This sets the next stage to implement exercise as personalized and as precision medicine and this focus has been the subject of recent biomedical literature. However, work on the relationship between exercise for longevity and the interactions with supplements is even more nascent. Research on sports supplements have a much longer history, but the focus here is on performance rather than its effects on healthspan and lifespan.

Based on a brief survey of extant literature, this paper presents 5 key questions and considerations to be investigated if supplements are to be useful for augmenting the beneficial effects of exercise and physical activities.

Examples of supplements commonly used in each category and supported by the literature are given in parentheses. With regard to these specific supplements, where there is also research to answer the questions posed, it will also be cited.

1. Could supplements for enhancing athletic performance be re-purposed for enhancing the effects of exercise as longevity medicine? (Creatine, Hydroxymethylbutyrate)
2. Could the use of ergogenic aids be useful as a motivational tool for exercise adherence? (Coffee, not decaffeinated)
3. Are there instances when supplements could ameliorate risks of more intense exercise? (Aspirin, Taurine, Niacinamide, Nettle leaf)
4. Are there senolytics that interfere with the benefits of exercise? (Metformin, Nicotinamide riboside, Alpha-ketoglutarate, Curcumin)
5. What insights can we obtain from medical anthropology studies of hunter gatherer societies, and research relating to longevity hotspots and masters athletes? (Lithium orotate, Fucoidan)

Just as drug interactions are of importance in polypharmacy, so too the interactions between supplements and exercise, as both become the standard of care for smart aging.

This is of especial importance as proven exercise mimetics are yet to be discovered. Until then supplements enhancing the benefits of exercise are an essential adjunct for a large segment of older adults who are unable to engage fully in physical activities to the recommended levels.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Using proteomics in the development of screening tools for age-related illnesses: The case for cancer

Renu Balyan[1], Tarif Awad[1], Marijana Rucevic[1], María Bueno Álvez[2], Ryan Lamers[1], Ola Caster[1], Hilda Andersson[1], Fredrik Edfors[2], Linn Fagerberg[1], and Mathias Uhlen[2]
[1]Olink Proteomics; [2]Science for Life Laboratory, Department of Protein Science, KTH Royal Institute of Technology, Sweden

Email: renu.balyan@olink.com

Despite decades of outstanding research and the impact of genomics, cancer remains an overwhelming burden on global healthcare resources and a challenge for the scientific community. Advancing age is the most important risk factor for cancer overall, with the incidence of most cancers increasing with age. However, to understand the age-associated risks of cancer and advance precision medicine, it is necessary to understand the factors underlying cancer biology.

Next-generation proteomics technologies are increasingly emerging to better understand cancer biology and identify early diagnostic, prognostic, and therapeutic response biomarkers essential to drive development of new, more effective therapies. Here, comprehensive proteome profiling, using the Olink® Explore platform, was used to measure 1,463 proteins in plasma—collected at the time of diagnosis and before treatment—from more than 1,500 patients representing 15 common cancer types.

The results were used as a foundation to establish the Olink Insight platform, an open-access digital data resource to accelerate adoption of proteomics in the research community. Olink Insight comprises features such as pathway browser, panel/biomarker selection, and proteomics publication explorer. In Olink Insight, we are creating a collection of proteomic profiles for important diseases, beginning with cancer. Results can be interactively explored through a variety of analyses and visualizations, including differential expression analysis, pathway enrichment, annotation, breakdown of samples by age, and predictive protein groups identified by machine learning. Using a complementary multi-step statistical approach for Human Protein Atlas (HPA), a panel of 83 proteins was identified that can discriminate 12 different types of cancer with extremely high accuracy. The plasma profiles for all measured proteins across these cancer types are available in HPA.

Olink Insight and the Human Disease Blood Atlas represent a significant step towards uncovering human disease proteome and will be a valuable resource for researchers in many areas of medicine and biology.

ABSTRACTS FOR POSTER PRESENTATION

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Using proteomics in the development of screening tools for age-related illnesses: The case for cancer

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[1]Olink Proteomics; [2]Science for Life Laboratory, Department of Protein Science, KTH Royal Institute of Technology, Sweden

Email: renu.balyan@olink.com

Despite decades of outstanding research and the impact of genomics, cancer remains an overwhelming burden on global healthcare resources and a challenge for the scientific community. Advancing age is the most important risk factor for cancer overall, with the incidence of most cancers increasing with age. However, to understand the age-associated risks of cancer and advance precision medicine, it is necessary to understand the factors underlying cancer biology.

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Olink Insight and the Human Disease Blood Atlas represent a significant step towards uncovering human disease proteome and will be a valuable resource for researchers in many areas of medicine and biology.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Effect of Methylfolate, Pyridoxal-5'-phosphate, and Methylcobalamin Supplementation on Homocysteine and LDL-C Levels in Patients with MTHFR, MTR, and MTRR Polymorphisms: A Randomized Controlled Trial

E. Pokushalov, MD,PhD(1,2), A. Ponomarenko, MD (1,2), S. Bayramova, MD (1), C. Garcia, MD (2), I. Pak, MD (1), E. Shrainer, MD (1), Elena Voronina, MD (3), Ekaterina Sokolova, MD (3), M. Johnson, MD, PhD (2), R. Miller, MD, PhD (2)
(1) Center for New Medical Technologies, Novosibirsk, Russia
(2) Scientific research laboratory, Triangel Scientific, San Francisco, USA
(3) Institute of Chemical Biology and Fundamental Medicine, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia

Email: dayshadoff@gmail.com

Background: Exploring the link between genetic polymorphisms in folate metabolism genes (MTHFR, MTR, MTRR) and cardiovascular disease (CVD), this study evaluates the effect of B vitamin supplements (methylfolate, pyridoxal-5'-phosphate, and methylcobalamin) on homocysteine and lipid levels, potentially guiding personalized CVD risk management.

Methods: In a randomized, double-blind, placebo-controlled trial, 54 patients aged 40-75 with elevated homocysteine and moderate LDL-C levels were divided based on MTHFR, MTR, and MTRR genetic polymorphisms. Over six months, they received either a combination of methylfolate, P5P, and methylcobalamin or a placebo.

Results: At 6-month follow-up, the treatment group demonstrated a significant reduction in homocysteine levels by 30.0% (95% CI: -39.7% to -20.3%) and LDL-C by 7.5% (95% CI: -10.3% to -4.7%), compared to the placebo ($p<0.01$ for all).

In the subgroup analysis, homozygous minor allele carriers showed a more significant reduction in homocysteine levels (48.3%, 95% CI: -62.3% to -34.3%, $p<0.01$) compared to mixed allele carriers (18.6%, 95% CI: -25.6% to -11.6%, $p<0.01$), with a notable intergroup difference (29.7%, 95% CI: -50.7% to -8.7%, $p<0.01$). LDL-C levels decreased by 11.8% in homozygous carriers (95% CI: -15.8% to -7.8%, $p<0.01$) and 4.8% in mixed allele carriers (95% CI: -6.8% to -2.8%, $p<0.01$), with a significant between-group difference (7.0%, 95% CI: -13.0% to -1.0%, $p<0.01$).

Conclusion: Methylfolate, P5P, and methylcobalamin supplementation tailored to genetic profiles effectively reduced homocysteine and LDL-C levels in patients with specific MTHFR, MTR, and MTRR polymorphisms, particularly with homozygous minor allele polymorphisms.

Trial Registration: ClinicalTrials.gov NCT06163443.

Key words: MTHFR, MTR, and MTRR polymorphisms, methylfolate, pyridoxal-5'-phosphate, methylcobalamin, homocysteine, LDL-C, triglycerides, cardiovascular health, personalized medicine.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Towards personalized nicotinamide mononucleotide supplementation: nicotinamide adenine dinucleotide concentration

Ajla Hodzic Kuerec, PhD, MD[1, 2†], Weilan Wang PhD[1, 2†], Lin Yi PhD[3], Rongsheng Tao PhD[4], Zhigang Lin PhD[5], Aditi Vaidya[6], Sohal Pendse[6], Sornaraja Thasma[6], Niranjan Andhalkar[6], Ganesh Avhad[7], Vidyadhar Kumbhar[8], Andrea B. Maier[1,2,9*]

[1] Healthy Longevity Translational Research Program, Yong Loo Lin School of Medicine, National University of Singapore, Singapore 119228, Singapore

[2] Centre for Healthy Longevity, @AgeSingapore, National University Health System, 10 Medical Drive, Singapore 117597, Singapore

[3] Abinopharm, Inc, 3 Enterprise Drive, Suite 407, Shelton, CT 06484, The United State

[4] Huzhou Yihui Biotechnology Co., Ltd, 1366 Hong Feng Road, Huzhou, Zhejiang 313000, People's Republic of China

[5] ABA Chemicals Corporation, 67 Libing Road, Building 4, Zhangjian Hi-Tech Park, Shanghai 201203, People's Republic of China

[6] ProRelix Services LLP, 102 A/B, Park Plaza, Karve Road, Karve Nagar, Pune, Maharashtra 411052, India

[7] Lotus Healthcare & Aesthetics Clinic, 5 Bramha Chambers, 2010 Sadashivpeth, Tilak Road, Pune, Maharashtra, India

[8] Sunad Ayurved, Siddhivinayak Apart, Jeevan Nagar, Pune, Maharashtra 411033 Chinchwad, India

[9] Vrije Universiteit Amsterdam, Department of Human Movement Sciences, @AgeAmsterdam, Amsterdam Movement Sciences, Van der Boechorststraat 7, 1081 BT Amsterdam, The Netherlands

[†] These two authors contributed equally.

Email: weilan.w@nus.edu.sg

Background: Nicotinamide adenine dinucleotide (NAD) is a crucial cofactor of enzymes playing essential roles. However, a decline in NAD concentration with age has been observed in various studies. Nicotinamide mononucleotide (NMN) is a precursor of NAD, and supplementation has been shown to improve blood NAD concentration.

Method: This is a post-hoc analysis of a double-blinded clinical trial involving 80 generally healthy adults aged 40 to 65 years. The participants received placebo or daily 300, 600, or 900 mg NMN for 60 days. Blood NAD concentration, blood biological age, homeostatic model assessment for insulin resistance (HOMA-IR), 6-minute walk test, and 36-item short form survey (SF-36) were measured at baseline and day 60.

Results: A significant dose-dependent NAD concentration change (NADD) improvement was observed following supplementation, However, there were high individual variations in NAD response (coefficient of variation = 29.2-106.7%). There was no significant association between baseline NAD concentration or NADDand chronological or biological age, sex, or HOMA-IR. The increase in NADD was associated with an improvement in the walking distance in the 6-minute walk test and SF-36 score. The median effective dose (ED50) of NADD after 60-days for the 6-minute

walk test and SF-36 score was 15.7 nmol/L (95% CI: 10.9-20.5 nmol/L) and 13.5 nmol/L (95% CI; 10.5-16.5 nmol/L), respectively.

Conclusion: Monitoring NAD concentration provides valuable insights into NMN utilization and optimal NMN regime because of the high individual NMN response variance. Further studies are needed to determine the factors influencing NADΔ and the relationship between NADΔ and clinical outcomes in order to establish the optimal therapeutic range of NAD concentrations.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

FusionAge: Multimodal machine learning-based aging clock leveraging laboratory biomarkers, digital biomarkers and functional tests, and its application to geroprotective drug target discovery

Robert Chen[1], Nicholas Bartelo1, Olivier Elemento1
1Weill Cornell Medicine, New York, NY

Email: rchen25emory@gmail.com

Background: Traditional aging clocks based on epigenetic features from peripheral blood leukocytes require expensive molecular testing modalities, and do not incorporate functional tests that are relevant to activities of daily living. Furthermore, they generally use linear regression based models, prohibiting the capture of complex nonlinear relationships between multimodal features. We propose FusionAge, a multimodal machine learning based aging clock leveraging multiple data domains.

Method: A cohort of 502,366 individuals was extracted from the UK Biobank dataset. Features were extracted for several domains including quantified physiological measurements (metabolomics, telomere, blood chemistry, urine chemistry, pulse wave analysis, sex, vital signs) as well as functional measurements (cardiorespiratory fitness test, strength test, cognitive test, spirometry). Feature domains are concatenated and used in an XGBoost regression task for predicting chronological age (CA). The biological age (BA) is defined as the predicted for any individual. Biological age acceleration (BAA) is defined as the difference between chronological age and biological age (BAA=BA-CA); BAA is used as a marker of pace of aging (lower="fast ager", higher="slow ager").
Three versions of the model are reported: a "full" model using all individuals with non-missing values for at least one feature domain (n=499,689), a "fair" model using individuals with non-missing values for every feature domain (n=9,733), and a "digital" model using only digital biomarkers which are easily obtained by individuals outside of healthcare setting (n=13,161). For each version, the cohort is split into training (70%), cross-validation (10%) and test (20%) sets. Performance against baseline methods (PhenoAge, deep neural network, random forest, ElasticNet, lasso, linear regression) is assessed with Pearson's correlation coefficient (R), mean absolute error (MAE) and root mean squared error (RMSE), as scored on the test set.

Results: FusionAge ("full" model) using XGBoost regression achieves superior performance to all baselines, with R=0.91, RMSE=3.6, and MAE=3.0. In the "full" model, spirometry features are most contributory to the biological age, followed by sex, and various blood chemistry markers (cystatin C, hemoglobin A1c, oestradiol, IGF-1). In the "fair" model, cardiorespiratory fitness test results were the most predictive (maximum workload, maximum heart rate, maximum rate of oxygen consumption (VO2max)).

FusionAge is significantly associated with occurrence and mortality from major diseases of aging, including prediabetes, dementia, cardiovascular disease, and cancer (lung, breast, prostate, renal, colorectal) (P<1e-16, across all diseases). Additionally, FusionAge (BAA) is associated with disease progression from prediabetes to type 2 diabetes (P=0.004, HR=1.4 [1.2, 1.5]) (Figure 1).

Using FusionAge (BA) to prioritize geroprotective compounds (Figure 2), we identified 37 putative geroprotective compounds where taking the compound confers lower biological age acceleration; putative geroprotective compounds include glucosamine (P=4e-17), omega-3/fish oil (P=2e-8), chondroitin (P=3e-6), multivitamins (P=3e-5), folic acid (P=2e-4), garlic (P=3e-4), evening primrose oil (P=4e-4).

Finally, we demonstrate the utility of FusionAge for identification of geroprotective behaviors, where prominent anti-aging behaviors associated with lower BAA included fast walking pace, time spent on computer, whole grain bread, cheese intake and red wine; age-inducing behaviors associated with higher biological age acceleration included tobacco use, alcohol intake frequency, and exposure to smoke.

Discussion and Conclusion: FusionAge is the first implementation of an aging clock that leverages multiple functional feature domains as well as measured physiological analytes; its strong association with major comorbidities of aging, and its utility in predicting disease progression demonstrate its potential as a tool for clinical decision-making.

As a proof of concept, FusionAge was successfully used as an endpoint for geroprotective drug discovery tasks, where putative compounds' positive effects on longevity have been previously reported in the literature. Future work includes advanced feature construction and modeling (e.g., deep neural network based methods), incorporation of additional functional domains such as strength and stability, experimental validation of putative geroprotective compounds, as well as randomized controlled trials in humans.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Glycine supplementation restores mitochondrial function and protein degradation pathways in skeletal muscle of healthy old mice

Giulia Lizzo[1], Eleonora Porcu[1], Jonathan Thevenet[1], Christen Stefan[1], Kamila Muller[1], José-Luis Sanchez Garcia[1], Gabriele Civiletto[1], Sylviane Metairon[2], Lorane Texari[2], Kim Zarse[3], Michael Ristow[3], Robert T Broke[4], Steve Horvath[5,6], Myriam Chimen[1], Philipp Gut[1]

[1] Nestlé Institute of Health Sciences, Nestlé Research, 1015 Lausanne, Switzerland

[2] Nestlé Institute of Food Safety and Analytical Sciences, Nestlé Research; 1015 Lausanne, Switzerland

[3] Energy Metabolism Laboratory, D-HEST, Swiss Federal Institute of Technology (ETH) Zurich, Zurich, Switzerland

[4] Epigenetic Clock Development Foundation, Los Angeles, CA, USA

[5] Department of Human Genetics, David Geffen School of Medicine, University of California; 90095 Los Angeles, USA.

[6] Altos Labs; San Diego, CA, USA.

Email: myriam.chimen@rd.nestle.com

Background and aims: Glycine is a simple amino acid that has a pivotal role in several metabolic processes, such as being a building block of glutathione, collagen and purines, or taking part in methylation reactions, detoxification and ammonia metabolism. In certain conditions, cellular glycine levels from food intake and endogenous synthesis cannot sustain all cellular processes in which glycine is involved. During aging, some of these cellular processes are impaired and we hypothesize that glycine supplementation can reduce cellular impairment due to aging.

Method: C56BL/6J wild type mice of 21-months old were supplemented to their normal diet with 1.6g/kg of glycine for 6 weeks. Parameters related to mitochondrial function, metabolomics and transcriptomics in muscles have been explored.

Results: We observed that across aged species, including humans, glycine levels are significantly decreased in different tissues. Using the UK-Biobank dataset, we show that in humans a decline in glycine levels with age correlates with markers of longevity. Diet supplementation of healthy old mice with glycine for six weeks significantly restored glycine levels in skeletal muscle. Glycine supplementation improved mitochondrial function, particularly within glycolytic skeletal muscle fibers, which declined in untreated old animals. At transcriptomic levels, we deciphered an effect of glycine on the reprogramming of the protein degradation pathways in muscle and highlighted a rejuvenation of these processes, including a decrease in the biological age of the muscle.

Conclusion: These results suggest that glycine deficiency in aging contributes to muscle decline and that providing a dietary supplementation could slow down biological aging of skeletal muscle.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

TELOMIR-1 induces telomere extensions in primary human cell strains

Danielle R. Baker[1], PhD; Stephen Gacheru[1], PhD, Jim Shaw[1], PhD, Jenna Brager[2], PhD, Michael Roizen[3], MD, and Chris Chapman[2], MD
[1]Frontage Laboratories, Inc. Exton, Pennsylvania, USA
[2]Telomir Pharmaceuticals, Inc., Tampa, FL, USA
[3]Cleveland Clinic, Cleveland, OH, USA

Email: dpiazza@frontagelab.com

Background: Telomere repeats, (TTAGGG)n, are added to chromosome ends by the enzyme telomerase, but shortened by cell divisions. Telomere shortening is associated with senescence, idiopathic pulmonary fibrosis, and numerous other features, eliciting the quest for telomere modifying compounds. Numerous tobacco-derived alkaloids exhibit anti-inflammatory properties and analgesic effects. These alkaloids have been shown to have activity in cell cycle regulation including binding to DNA and modifying enzyme function; some alkaloids may be responsible for epigenetic modifications leading to changes in gene expression. A structurally modified version of one of these alkaloids, TELOMIR-1, is posited to modulate telomere length. Aims: To test the effect of TELOMIR-1 on telomere length in 3 human cell lines: MRC-5 fetal lung fibroblasts, human umbilical endothelial cells (HUVEC), and mesenchymal stem cells (MSC).

Method: First, primary and stem cell strains were treated with TELOMIR-1 for 48 hours. TELOMIR-1 was dissolved in ethanol (ETOH) as a vehicle, and EtOH alone at 1% was the vehicle control. After 48 hours, Alamar Blue assayed the cells for cytotoxicity, or their DNA was extracted and subjected to telomere length qPCR.

Results: Total telomere length was augmented following TELOMIR-1 treatment at 1, 50, 100, and 500 µM, supporting the hypothesis that TELOMIR-1 extends telomere modulation in MRC-5, HUVEC, and MSC cells. Telomere lengthening was seen in passage 3 of HUVEC and MSCs, and through passage 8 of MRC-5 cells. TELOMIR-1 exhibited moderate cytotoxicity at concentrations above 500 µM in HUVEC and MRC-5 cells, and greater cytotoxicity at 1 mM. Major cell loss was observed in the MSC culture treated with EtOH vehicle and TELOMIR-1 compound at 10 µM and above.

Conclusion: This in vitro study shows that TELOMIR-1 increases telomere length at concentrations below the cytotoxicity threshold and provides an accurate platform to validate the potency of TELOMIR-1, critical for regulatory submissions.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

A lipidome Aging Clock shows Age Acceleration in individuals with Autism

Djakim Latumalea[1-3], Maximilian Unfried[1,3], Diogo Barardo[1,3], Jan Gruber[1,3,6], Brian K. Kennedy[1,3-5,*]

[1]Healthy Longevity Translational Research Programme, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

[2]Institute for Life Sciences & Technology, Hanze University of Applied Sciences, Groningen, The Netherlands

[3]Department of Biochemistry, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

[4]Department of Physiology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

[5]Centre for Healthy Longevity, National University of Singapore, Singapore, Singapore

[6]Science Division, Yale-NUS College, Singapore, Singapore

Email: djakim@nus.edu.sg

Recent advances in lipidomics and machine learning have been harnessed to explore biological age prediction in individuals. This study delves into age acceleration patterns, entropy, and the role of dolichol as a potential aging biomarker. We present a novel aging clock in combination with explainable AI that utilizes lipid composition of the prefrontal cortex to predict biological age of individuals without known neurological conditions, as well as in those with autism, schizophrenia, or Down syndrome. Significant age acceleration was observed in individuals with autism, with a higher acceleration after the age of 40. In addition, entropy increases significantly around the age of 40, indicative of mevalonate pathway dysregulation. These findings underscore the feasibility of predicting biological age using lipidomics data, opening avenues for feature research into the intricate relationship between lipid alterations and aging of the prefrontal cortex, while providing valuable insights into the associated molecular mechanisms.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

The impact of short-lived controls on the interpretation of lifespan experiments and progress in geroscience

Kamil Pabis [1,2,3], Diogo Barardo [1,2,11], Jan Gruber [1,3,4], Olga Sirbu[5], Marco Malavolta[6], Kumar Selvarajoo [6,7,8], Matt Kaeberlein [9], Brian K. Kennedy [1,2,3,10]

[1] Healthy Longevity Translational Research Programme, Yong Loo Lin School of Medicine, National University of Singapore

[2] Centre for Healthy Longevity, National University Health System

[3] Departments of Biochemistry and Physiology, Yong Loo Lin School of Medicine, National University of Singapore

[4] Science Divisions, Yale-NUS College, Singapore, 138527, Singapore

[5] Bioinformatics Institute (BII), Agency for Science, Technology and Research (A*STAR), Singapore, 138671, Republic of Singapore

[6] Advanced Technology Center for Aging Research and Geriatric Mouse Clinic, IRCCS INRCA, 60121, Ancona, Italy.

[7] Synthetic Biology for Clinical and Technological Innovation (SynCTI), National University of Singapore (NUS), Singapore, 117456, Republic of Singapore

[8] School of Biological Sciences, Nanyang Technological University (NTU), 639798, Republic of Singapore

[9] Optispan, Inc., Seattle, WA USA

[10] Department of Physiology, Yong Loo Lin School of Medicine, National University of Singapore

[11] NOVOS Labs, 100 Park Avenue, 16th Fl, New York NY 10017

Email: Kamil.pabis@u.nus.edu, Kamil.pabis@gmail.com

Although lifespan extension remains the gold standard for assessing interventions proposed to impact the biology of aging, there are important limitations to this approach. Our reanalysis of lifespan studies from multiple sources suggests that the use of short-lived control cohorts tends to exaggerate the relative efficacy of putative longevity interventions. Moreover, due to the high cost and long timeframes of mouse studies, it is rare that a particular longevity intervention will be independently replicated by multiple groups.

To facilitate identification of successful interventions, we propose an alternative approach. The level of confidence we can have in an intervention is proportional to the degree of lifespan extension above the strain- and species-specific upper limit of lifespan, which we can estimate from comparison to historical controls. In the absence of independent replication, a putative mouse longevity intervention should only be considered with high confidence when control median lifespans are close to 900 days or if the final lifespan of the treated group is considerably above 900 days. Using this “900-day rule” we identified several candidate interventions from the literature that merit follow-up studies. Finally, we extend and adapt this rule to invertebrate models. Using this modified rule we select and re-rank promising supplements and nutraceuticals from the DrugAge database for further analysis.

Keywords: meta-analysis, systematic review, mouse husbandry, caloric restriction, Interventions Testing Program

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Trigonelline Is A Novel NAD+ Precursor With Muscle Longevity Benefits Across Species

Khalishah Yusri[1,2], Mathieu Membrez[3], Eugenia Migliavacca[3], Stefan Christen[3], Maria Pilar Giner[3], Francesco Morandini[3,4], Leonidas Karagounis[5], Marie Migaud[6], Neerja Karnani[7], Stacey K.H. Tay[8], Karen Lillycrop[9], Keith M. Godfrey[9], Sofia Moco[3], Rene Koopman[10], Gordon Lynch[10], Jerome N. Feige[3,4], Vincenzo Sorrentino[1,2]

[1]Healthy Longevity Translational Research Programme, Yong Loo Lin School of Medicine, NUS, Singapore
[2]Department of Biochemistry, Yong Loo Lin School of Medicine, NUS, Singapore
[3]Nestlé Institute of Health Sciences, Nestlé Research, Lausanne, Switzerland
[4]School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland
[5]Translation Research, Nestle Health Science, Lausanne, Switzerland
[6]Mitchell Cancer Institute, University of South Alabama, Alabama, USA
[7]Singapore Institute for Clinical Sciences (A*STAR), Singapore
[8]-KTP-National University Children's Medical Institute, National University Hospital, Singapore
[9]Medical Research Council Lifecourse Epidemiology Unit, University of Southampton, UK
[10]Centre for Muscle Research, University of Melbourne, Victoria, Australia

Email: kyusri@nus.edu.sg

Declining cellular NAD+ is a molecular hallmark of aging and sarcopenia, both also characterized by impaired mitochondrial function. However, how systemic metabolic changes reflect tissue adaptation and the observed muscle deficits during sarcopenia, is still uncharacterized. Using a multi-species approach from nematodes to humans, we have uncovered a functional link between NAD+ levels, muscle health and trigonelline, a natural plant derived alkaloid and endogenous metabolite structurally related to nicotinic acid. In humans, serum trigonelline levels decrease during sarcopenia, and correlate positively with muscle strength and mitochondrial oxidative phosphorylation gene expression in muscle biopsies. In the nematode C. elegans, trigonelline supplementation extends lifespan in a sirtuin and nprt-1-dependent manner, and reduces aging-dependent mitochondrial dysfunction, muscle alterations and mobility decline. Finally, we demonstrate that trigonelline treatment increases mitochondrial function in vitro during NAD+ depletion in multiple cell lines, and in vivo in muscle. Collectively, our cross-species approach identifies trigonelline as a novel NAD+ precursor able to improve age-associated muscle decline.

ABSTRACTS FOR POSTER PRESENTATION

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Predicting Novel Anti-aging Supplements through Deconvoluting Aging Transcriptomics

Weihan Huai[1], Li Fang Ng[2], Jan Gruber[1,2], Brian Kennedy[1]
[1]Department of Biochemistry, Yong Loo Lin School of medicine, National University of Singapore.
[2]Yale-NUS College Singapore.

Email: e1101914@u.nus.edu

Background and aims: During aging, significant changes occur in the transcriptome, yet the implications of these changes remain largely unexplored. Despite the identification of numerous anti-aging interventions in model organisms and the proposal of several pathways associated with aging, the fundamental mechanisms by which these interventions delay the aging process are still unclear.

This study aims to elucidate the impact of aging-associated gene expression changes on the aging process and to predict novel anti-aging drugs by targeting the gene expression level of aging-promoting modules conserved among species.

Methods and results: We employed C. *elegans* as our model organism and utilized network analysis combined with meta-analysis to distill the complex aging transcriptome into co-expression modules. This approach allowed us to identify modules associated with aging-adaptive and aging-promoting processes, along with their implicated biological functions. By querying the drug repurposing database CMap, we identified drugs that suppress the expression of genes linked to previously identified aging-promoting processes, revealing a strong enrichment of known anti-aging interventions. Our hypothesis posited that drugs lowering the transcriptomic expression of biological processes could serve as potential anti-aging interventions. To test this, we selected two compounds from our findings: Compound E, a food dye, and Compound B, a mucolytics. Both compounds demonstrated increased lifespan in C. *elegans*.

Conclusion: The study provides an alternative method to deconvolute the aging transcriptomics and identified critical aging processes and how they can be altered in different interventions and predicted novel potential anti-aging supplements with low toxicity and high potential applicability in wide populations.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

AKG Supplementation Increases Endogenous Taurine Synthesis

Guan Shou Ping[1], **Brian Kennedy**[1]
[1]**Centre for Healthy Longevity, Yong Loo Lin School of medicine, National University of Singapore.**
Email: shouping.guan@nus.edu.sg

Taurine, a sulfur-containing amino acid, is considered conditionally essential for humans. Its levels decrease with age, but supplementation has been shown to increase healthy lifespan in worms and mice, as well as healthspan in monkeys. However, taurine supplementation can remodel the gut microbiota, leading to the proliferation of taurine-utilizing bacteria that produce ammonia, acetate, and sulfide, including hydrogen sulfide, a toxic gas implicated in gut inflammation and bowel diseases, often diminishing beneficial bacteria like Lactic acid bacteria. To mitigate these side effects, our focus on boosting endogenous taurine synthesis. Taurine is naturally derived from L-cysteine, which suffers from poor bioavailability due to oxidation in the digestive tract. However, L-cysteine can be synthesized internally via the transsulfuration pathway, where the sulfur atom of methionine is transferred to serine, ultimately yielding cysteine. Serine, in turn, can be synthesized from the glycolytic intermediate 3P-glycerate. Hence, we propose to increase carbon sources for 3P-glycerate synthesis, thereby enhancing serine and, consequently, taurine levels. In pursuit of this, we administered 13C-AKG to mice and tracked its metabolites via NMR analysis in various tissue es. Two hours post-supplementation, labeled 13C-a-KG and its transamine product, 13C Gln, were detected in the stomach, small intestine, and colon. Notably, in the colon, 13C-AKG was further metabolized into lactate, creatinine, and taurine, indicating that AKG supplementation facilitated glutamine production, contributing to the synthesis of creatinine and taurine via serine metabolism in colonocytes, as serine serves as an essential precursor for both compounds. Thus, we have identified an alternative strategy to augment endogenous taurine synthesis, with ongoing validation through additional methods.

Disclosure of conflicts of interest: I hereby declare that there are no conflicts of interest regarding the study and my professional endeavours.

ABSTRACTS FOR POSTER PRESENTATION

(The presenting author is underlined)

Advancing Longevity: CURATE.AI For Customized NMN Utilization And Treatment Enhancement (ACCURATE) - clinical trial protocol

Ajla Hodzic Kuerec[1], Keona Fokke[2], Leung Y. Ting[3], Nicole Leung[3], Yoann S. Sapanel[3], Nigel Foo[3], Dean Ho[3], Andrea B. Maier1,4

[1]Healthy Longevity Translational Research Program, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

[2]Utrecht University, School of Pharmacy, Utrecht, The Netherlands

[3]The N.1 Institute for Health (N.1), National University of Singapore, 117456, Singapore

[4]Vrije Universiteit Amsterdam, Department of Human Movement Sciences @AgeAmsterdam, Amsterdam Movement Sciences, Amsterdam, The Netherlands

Nicotinamide mononucleotide (NMN), a precursor to nicotinamide adenine dinucleotide (NAD), plays a pivotal role in cellular processes crucial for health, including redox regulation, metabolism, and DNA repair. Supplementation with NMN has been reported to significantly improve insulin sensitivity in prediabetes women, 6-minute walk test, and the 36-item short-form survey results in healthy middle-aged individuals.

In healthy individuals, supplementation with NMN had a dose-dependent effect on the increase of whole blood NAD, but with high interindividual variability in the increase. A 15 nmol/L increase in whole blood NAD produced a clinically significant improvement in the 6-minute walk test and the 36-item short-form survey score. A cross-sectional study reported that individuals with whole blood NAD concentration ≥36.4 nmol/L had a three times higher risk of having metabolism diseases than those with <29.4 nmol/L. These findings indicate that NAD blood levels should be considered for NMN titration in clinical practice.

CURATE.AI. is an artificial intelligence system that utilizes dynamic calibration based on individual response trajectories. It is calibrated to each patient using at least three input–output data points, creating a parabola. The parabola determines the drug inputs required to keep a patient within the output range and is continuously calibrated as further data are entered. In this study, the input refers to the NMN drug dose and the output corresponds to the blood NAD concentration change.

ACCURATE is a clinical trial where 120 individuals will receive CURATE.AI-guided dosing of NMN (300-1200 mg/day) for 30 days, followed by two weeks washout period before dose escalation. The aim of this trial is to assess the feasibility of CURATE.AI NMN in optimizing NAD concentrations and aging-related outcomes (biological, clinical, digital) for NMN dose titration in healthy individuals.

THE CONFERENCE TEAM

Conference Chair

Prof. Andrea B. Maier

Partnership and marketing

Louis Island, Tung Hoang Thanh, Diya Tibrewal, Jonas John Posko Amalaraj, Ajla Kuerec Hodzic

Scientific committee

Elena Sandalova, Lihuan Guan, Kaisy Xinhong Ye, Stephen Dinesh Raj, Shou Ping Guan

Event management

Louis Island, Karter Lee Whee Hung, Lee Kah Kei, Nicole Chan, Shermaine Koh, Tiffany Ngiam

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