Melvin Leow Khee Shing

MBBS, MMed (Int Med), FAMS, FACE, FACP, FRCP (Edin), FRCPath, PhD

Senior Consultant, Department of Endocrinology, TTSH
Senior Principal Investigator, IHDP & SIFBI, A*STAR
Clinical Director & Dy Head, Clinical Nutrition Research Centre, A*STAR
Adjunct Professor, YLLSoM, NUS and Duke-NUS Medical School
Professor, LKC Sch of Medicine, NTU

Research Interests:

- Thyroid physiology
- Adipocyte biology
- Insulin resistance
- Mathematical modeling

Biography

Prof. Melvin Leow is an elected Fellow of the Academy of Medicine (Singapore), College of Clinician Scientists (Singapore), American College of Endocrinology, American College of Physicians, Royal College of Physicians of Edinburgh and Royal College of Pathologists. He is also a past president of the Endocrine and Metabolic Society of Singapore. Following his medical and endocrinology training at MOH, NHG, Harvard and TTSH, he pursued intensive lab benchwork and research training at A*STAR from 2008 and earned his PhD in biological sciences at NTU. His field of interests includes adipocyte biology, metabolic syndrome/diabetes, thyroidology, endocrine manifestations of systemic disorders and mathematical modelling of endocrine physiology. He has published works in over 200 international journals including co-authoring an 18-chapter book on thyroid systems engineering and co-editor of a 12-chapter e-book on thyroid hormones and cardiac arrhythmias. His present H-index is 47 with over 7600 citations. His co-derived Leow-Goede equations led to a patented algorithm for computing the HPT axis euthyroid set-point. He co-discovered the existence of a novel thyroid-brown fat axis and an exosomal biomarker of brown fat activation. He is a co-founder of the A*STAR spin-off AdipoSight.AI start-up company. His research focus is on brown adipose tissue, thermogenesis and white adipocytes browning with nutraceuticals, pharmaceuticals, endogenous peptides/hormones. His achievements include the Clinician Scientist Career Scheme (Senior) Award, the NHG Doctor Award for Translational Research, Dean's Award for Teaching Excellence, NHG-LKC School of Medicine Clinician Scientist Fellowship Award, NMRC Individual Research Grant Award, NMRC Clinician Scientist Awards (Investigator category – 2015 & 2018; Senior Investigator category – 2023), and Dean's Award for Research – 2024.

Selected Publications

- Leow MK, Goede S.The Homeostatic Set Point of the Hypothalamus-Pituitary-Thyroid Axis: Maximum Curvature Theory for Personalized Euthyroid Targets. ***Theor Biol Med Model*** 2014; 11(1):35

- Leow MK. A Review of the Phenomenon of Hysteresis in the Hypothalamus-Pituitary-Thyroid Axis. ***Front Endocrinol – Thyroid Endocrinol*** 2016; 7:64.

- Xu D, Xu S, Kyaw AM, Lim YC, Chia SY, Alvarez-Dominiguez JR, Chen P, Leow MK, Sun L. RNA binding protein, Ybx2, regulates RNA stability during cold-induced brown fat activation. ***Diabetes*** 2017; 66(12): 2987-3000.

- Ding CM, Lim YC, Chia SY, Arcinas C, Xu SH, Lo AK, Zhao YL, Zhu DW, Shan ZH, Chen QF, Leow MK, Xu D, Sun L. De novo reconstruction of human adipose transcriptome reveals conserved lncRNAs as regulators of brown adipogenesis. ***Nature Comm*** 2018; 9(1): 1321.

- Sun LJ, Verma SK, Navin M, Camps SG, Velan SS, Goh HJ, Priya G, Sadanathan S, Tottman J, Townsend D, Goh PN, Chan SP, Henry CJ, Houchen HH, Sun L, Boehm BO, Lim SC, Sze SK, Leow MK. Brown Adipose Tissue Activation by Capsinoids and Cold Stimulation Quantified by Whole Body Calorimetry Combined with Tri-modality Imaging using ^{18}F--FDG-Positron Emission Tomography, Fat Fraction Magnetic Resonance Imaging and Infrared Thermography (TACTICAL-II). ***Obesity*** 2019; 27(9):1434-42.

- Sun LJ, Yan JH, Goh HJ, Govindharajulu P, Verma S, Michael N, Sadananthan SA, Henry CJ, Velan SS, Leow MK. Fibroblast Growth Factor-21, Leptin and Adiponectin Responses to Acute Cold-Induced Brown Adipose Tissue Activation ***J Clin Endocrinol Metab*** 2020; 105(3): dgaa005.

- Sun LJ, Goh HJ, Govindharajulu P, Sun L, Henry CJ, Leow MK. A Feedforward Loop within the Thyroid-Brown Fat Axis Facilitates Thermoregulation. ***Sci Rep*** 2020; 10(1):9661

- Leow MK, Rengaraj A, Narasimhan K, Kumar SK, Jadegoud Y, Thu GL, Sun LJ, Goh HJ, Govindharajulu P, Sadananthan SA, Michael N, Wei M, Gallart-Palau X, Sun L, Karnani N, Sze SK, Velan SS. Activated Brown Adipose Tissue Releases Exosomes Containing Mitochondrial Methylene Tetrahydrofolate Dehydrogenase (NADP-dependent) 1-Like Protein (MTHFD1L). ***Biosci Rep*** 2022; 42(5): BSR20212543

- Than A, Duong PK, Zan P, Liu JJ, Leow MK, Chen P. Lancing drug-reservoirs into subcutaneous fat to combat obesity and associated metabolic diseases. ***Small*** 2020 Jun 30:e2002872.

- Leow MK. Brown fat detection by infrared thermography – an invaluable research methodology with noteworthy uncertainties confirmed by a mathematical proof. ***Endocrinol Diabetes Metab*** 2022l 6(1): e378

- Meng F, Abisheganaden JA, Ang GY, Kannapiran PSR, Yap MMC, Lee SY, Leow MK, Lim CL. Oral Glucose Tolerance Test Glucose Curve Morphology and Metabolic Health in Healthy Adults: Insights from a Singaporean Cross-Sectional Study. ***Diabetes Metab J*** 2025 Sep;49(5):1133-1136.

- Simon L. Goede, Leow MK. Thyroid Systems Engineering: A Primer on Mathematical Modeling of the HPT Axis – River Publishers 2018 – indexed in Web of Science Book Citation Index, CrossRef & Google Scholar; Google Books ID: AR1nswEACAAJ ; ISBN-13: 978-87-93609-59-4 (Hardback – 18 chapters, 300 pages), ISBN: 978-87-93609-58-7 (E-book - 18 chapters)