



Melvin Leow Khee Shing

Senior Consultant, Department of Endocrinology, TTSH
Associate Professor, LKCMedicine, NTU

Research Interests:

- Thyroid Physiology
- Adipocyte Biology
- Insulin Resistance

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Biography

A/Prof. Melvin Leow is an elected Fellow of the Academy of Medicine (Singapore), American College of Endocrinology, American College of Physicians, Royal College of Physicians of Edinburgh and Royal College of Pathologists. Following his medical and endocrinology training at MOH, NHG, Harvard and TTSH, he pursued intensive 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 150 international journals including an 18-chaptered book on thyroid systems engineering. He co-derived the Leow-Goede equations which led to a patented algorithm for computing the HPT axis set point. He co-discovered the existence of a novel thyroid-brown fat axis and an exosomal biomarker of brown fat activation, and 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 and the NMRC Scientist Award.

Selected Publications

- Bhanu Prakash KN, Verma SK, Yaligar J, Goggi J, Gopalan V, Lee SS, Tian X, Sugii S, Leow MK, Bhakoo K, Velan SS. Segmentation and characterization of interscapular brown adipose tissue in rats by multi-parametric magnetic resonance imaging. *Magnetic Resonance Materials in Physics, Biology and Medicine (MAGMA)*. 2016; 29: 277-86.
- Ang QY, Goh HJ, Cao YP, Li YQ, Chan SP, Swain JL, Henry CJ, Leow MK. A New Method of Infrared Thermography for Quantification of Brown Adipose Tissue Activation in Healthy Adults (TACTICAL): a double-blind, placebo-controlled RCT. *J Physiol Sci*. 2017; 67(3): 395-406.
- 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 ¹⁸F--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, Sadanathan 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.
- Yaligar J, Verma SK, Gopalan V, Anantharaj R, Le GT, Kaur K, Mallilankaraman K, Leow MK, Velan SS. Dynamic contrast-enhanced MRI of brown and beige adipose tissues. *Magn Reson Med*. 2020; 84: 384.
- Sun LJ, Goh HJ, Govindharajulu P, Sun L, Henry CJ, Leow MK. A Feedforward Loop within the Thyroid-Brown Fat Axis Facilitates Thermoregulation. *Sci Reps*. 2020; 10(1):9661.
- Tan CF, Teo HS, Park JE, Dutta B, Tse SW, Leow MK, Wahli W, Sze SK. Exploring extracellular vesicles biogenesis in hypothalamic cells through a heavy isotope pulse/trace proteomic approach. *Cells*. 2020; 9(5):1320.
- 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; e2002872.

Notable Research Awards and Grants From Past 5 Years

Name of Awards & Grants	Year Obtained
NMRC Clinician Scientist Award (CSA) Investigator Category for “ The Role of Thyroid Status in Regulating Brown Adipose Tissue Activity, White Adipose Tissue Partitioning and Resting Energy Expenditure (TRIBUTE) ”	2015
NMRC Clinician Scientist Award (CSA) Investigator Category for “ Brown fat activation and browning Efficiency Augmented by Chronic COLD and Nutraceuticals for Brown adipose tissue-mediated Effect Against Metabolic Syndrome (BEACON BEAMS Study)”	2018