The Singapore Bioimaging Consortium (SBIC)
presents a seminar on

"What talks to Brown Fat?"

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Host : **Dr Sendhil Velan**
Date : **Thursday, 25 July 2019**
Time : **9.30am – 10.15am**
Venue : **SBIC Seminar Room**
11 Biopolis Way
Level 2, Helios Building, Singapore 138667
(Please enter via Level 1)

Abstract

In the standard picture of brown adipose tissue, the tissue is innervated by the sympathetic nervous system and it is the activity of these nerves that – through the release of norepinephrine – stimulates not only the acute activity of the tissue but also the recruitment process, including increased cell proliferation, decreased apoptosis, and advanced cell differentiation. Concerning the tissue's response to cold stress and cold acclimation, it is well established that it is the sympathetic innervation that controls these processes and that the ability to adapt to cold through classical non shivering thermogenesis is abolished in UCP1-KO mice. However, presently a series of other organs and hormones have been suggested to modify or even control brown (and brite/beige) adipose tissue activity. The organs include white adipose tissue, the gut, the liver and the heart, and the hormones (or other primary messengers) include leptin, secretin, glucagon, FGF21, ANP, glucocorticoids, and thyroid hormones. We summarize here the outcome of experiments that especially examine whether the effects seen of (some of) these hormones and organs on thermogenesis are UCP1-dependent and whether they are direct effects on the brown adipocytes or whether they affect the tissue through interaction with the innervation via the brain. We particularly note that the analysis of the effects of some of these agents is complicated by the existence of what we would denote a "pseudo-atrophied" state of the tissue. This is a state where the tissue morphologically (by being lipid-filled), biochemically (by showing decreased UCP1 protein per mg protein (Western blots) and molecularly (as UCP1 mRNA per household protein mRNA) demonstrates indices of having a lowered thermogenic capacity – but where the total amount of tissue, tissue protein and tissue RNA have increased, such that the total thermogenic capacity of the tissue, as estimated from these parameters, is maintained. In these cases, the thermogenic potential of the tissue in the intact animal is also unchanged, when observed as the thermogenic response to adrenergic stimulation. This concept alters the interpretation of the

effects of several of the agents and organs that have been discussed to talk to brown fat.

About the Speaker

Prof Jan Nedergaard has been Dean of Biology at Stockholm University and is a member of the Royal Swedish Academy of Sciences and serves as the secretary of its National Committee for Physiology. He has authored or co-authored about 200 peer-reviewed publications and about 100 review articles. Prof Nedergaard received his B.Sc. degree in chemistry and biology at the University of Gothenburg and his PhD at Stockholm University.

--- Admission is free and all are welcome ---