NANYANG TECHNOLOGICAL UNIVERSITY

School of Biological Sciences

Reg. No. 200604393R

Research Theme: **Immunology**

Research Project Title: **Cross talk between resident macrophages and adipose tissue in obesity: searching for culprits**

Principal Investigator/Supervisor: **Prof Christiane Ruedl**

Co-supervisor/ Collaborator(s) (if any):

Project Description

Immune cell infiltration in visceral adipose tissue (VAT) during obesity is associated with local chronic inflammation and the development of metabolic syndrome, a plague of aging societies. Adipose tissue macrophages (ATMs), one of the major leukocyte fractions in the VAT, are not only the key cells for maintenance of VAT homeostasis, but they could also play a major role in a metabolic dysregulation during aging and obesity. At least three phenotypically distinct subpopulations of ATMs are present in the VAT showing different frequencies not only in aging but also during the progression of obesity suggesting that the tissue environment drives ATM heterogeneity and vice versa that ATMs contribute to VAT homeostasis and inflammation.

Here, by capitalizing our expertise, we will characterize and investigate the potential roles of different types of ATMs during development of obesity as well as during aging probing beyond the superficial M1/M2 dichotomy. By exploiting our unique transgenic mouse models we are able to determine the ontogeny of different types of ATMs and also to determine how they impact on the complex cellular VAT *microenvironment.* Extensive multi-colour flow cytometry and imaging is complemented with RNAseq analysis to monitor the functional changes of ATM subpopulations. In addition, VAT-specific metabolome and single cell RNAseq analysis of the VAT will be determined in the presence and absence of ATMs in a novel transgenic mouse model in order to probe the importance of the interplay of ATMs and VAT. Furthermore, epigenetic regulation and memory of ATMs will be analysed at different stages of obesity and subsequent weight loss with the aim to identify differentially methylated sites associated with the disease progression/recovery.

Supervisor contact:

If you have questions regarding this project, please email the Principal Investigator: Ruedl@ntu.edu.sg

SBS contact and how to apply:

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Please apply at the following:

http://admissions.ntu.edu.sg/graduate/R-Programs/R-WhenYouApply/Pages/R-ApplyOnline.aspx

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