Singapore Immunology Network (SIgN)								
No.	**Department**	**A*STAR Supervisor's Name**	**Designation**	**Email**	**Project Title**	**Project Description**	**Degree Awarded By Upon Graduation**	**Website Link (if any)**
1	Single-Cell Immune Computational/System Biology	Chen Jinmiao	Principal Investigator, Adj. A/Prof, NUS	Chen_Jinmiao@immunol.a-star.edu.sg	1. Develop single-cell artificial intelligent(AI) platform using deep learning 2. Single-cell analysis of cross-talk between tumor and immune cells in human cancers 3. Single-cell analysis of hematopoietic stem and progenitor cell heterogeneity and lineages in health and hematological disorders 4. Building Asian single-cell immune atlas (ASIA) 5. Multiplex immunohistochemistry images for spatial information of different cell sub-types 6. Mapping hematopoietic lineages of healthy and high-risk acute myeloid leukemia patients with FLT3-ITD mutations using single-cell omics 7. Integrate single-cell omics data for system immunology using AI approaches 8. Immunomonitoring for Response and Adverse Events in Hepatocellular Carcinoma (HCC) Patients Treated With Immunotherapy		NUS/NTU/SUTD	
2	Human Innate Immunity	Subhra K Biswas	Principal Investigator, Adj. A/Prof NUS and LKC School	subhra_biswas@immunol.a-star.edu.sg	Investigating dysregulated response of monocyte/macrophage in human disease.		NUS/NTU/SUTD	

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3	NUS (Microbiology & Immunology)	Giulia Adriani	Principal Investigator	giulia_adriani@immunol.a-star.edu.sg	Elucidating PD-1 inhibitory receptor signalling during anti-tumour CD8+ T cell responses using a 3D microfluidic assay	Immune checkpoint blockade therapies such as programmed death-1 (PD-1) blockade are having promising results in clinical trials to improve anti-tumour T cell functions for different cancers, including melanoma. However, there are still major limitations, such as low response rate and adverse immune-mediated side effects, because the molecular mechanisms of T cell inhibitory signalling remain very poorly understood. The project aims to combine a melanoma murine model and T cell receptor (TCR) transgenic mice together with a 3D microfluidic-based multicellular culture platform to study ex vivo the molecular mechanisms of PD-1 receptor signalling during CD8+ T cell anti-melanoma responses. The use of a 3D tumour microenvironment (TME) model will allow us to create a more physiologically relevant system compared to other 2D or 3D culture assays that fail to reproduce the complex extracellular matrix-cancer interactions and/or utilize a gravity-mediated interaction between cells. These proposed experiments will potentially identify entirely novel molecular mechanisms regulating PD-1 inhibitory signalling in a physiologically relevant 3D TME	NUS PhD	https://www.a-star.edu.sg/sign/people/principal-investigators/giulia-adriani
4	NUS (Pharmacy)	Giulia Adriani	Principal Investigator	giulia_adriani@immunol.a-star.edu.sg	Evaluation of combination drug therapy and nanocarrier strategies in a 3D multicellular tumor model	Current chemotherapeutic approaches have evolved toward the use of small molecules to selectively inhibit or modulate tumor growth. However, these strategies have often overlooked the importance of tumor heterogeneity, and this remains one of the main reasons why certain chemotherapeutic agents, despite being used as drug cocktail, may result clinically ineffective. Tumor heterogeneity, encompassing genetic, epigenetic and microenvironmental variables, is extremely complex and presents challenges to cancer diagnosis and therapy. Therefore, the possibility to develop a 3D microfluidic tumor model that includes multicellular tissues would enable the identification of key cellular and molecular players within the tumor microenvironment responsible for complex phenomena like disease progression and drug resistance (especially towards Pt-based drugs like cisplatin). On the other hand, the need to early recognize and strike this "moving target" is now directing the scientific community toward the incorporation of drugs into suitable carriers that are able to effectively shield the chemical entities from potential damage to healthy tissues, and only specifically target cancerous tissues in the form of "magic bullet". We propose to perform a quantitative evaluation, in 3D in vitro tumor microenvironment models, of the anti-cancer functions of different drug combinations. At the tissue level, we will focus on improving drug uptake inside cancer cells by encapsulating otherwise impermeable active molecules into suitable nanocarriers. At the molecular level, we propose to disrupt inflammation pathways as a new tactic against cisplatin resistance through inhibition of mitochondrial respiration. This project will allow the PhD student to carry out an interdisciplinary work involving oncology, immunology, pharmacology, microfluidics and nanomedicine.	NUS PhD	https://www.a-star.edu.sg/sign/people/principal-investigators/giulia-adriani

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5	Microbial Immunity	Dr Ng Lisa	Principal Investigator, Adj. A/Prof at YYLLSOM, NUS	lisa_ng@immunol.a-star.edu.sg	Understanding immune responses against clinically important alphaviruses		NUS/NTU/SUTD	
6	Functional Immune Imaging	Dr Ng Lai Guan	Principal Investigator, Adj. A/Prof at YLLSOM, NUS and SBS, NTU	Ng_Lai_Guan@immunol.a-star.edu.sg	1 Myeloid cell trafficking in health and disease. 2 Understanding inflammatory responses by intravital multiphoton microscopy		NUS/NTU/SUTD	
7	Human Monoclonal Antibodies	Wang Cheng-I	Snr PrincipaI Investigator Technologist, Adj. A/Prof at NTU	wang_chengi@immunol.a-star.edu.sg	Development of novel antibody-based immunotherapy.		NUS/NTU/SUTD	
8	Ageing and Immunity	Dr Anis Larbi	Principal Investigator, Adj. A/Prof, NUS	anis_larbi@immunol.a-star.edu.sg	How our immune system age and what we can do about it.		NUS/NTU/SUTD	
9	Functional Immune Imaging	Ng Lai Guan	Principal Investigator, Adj. A/Prof LKC School of Medicine, NTU	Ng_Lai_Guan@immunol.a-star.edu.sg	1. Myeloid cell trafficking in health and disease. 2. Understanding inflammatory responses by intravital multiphoton microscopy		NUS/NTU/SUTD	
10	Pathogen Immunobiology	Renia Laurent	Executive Director, SIgN, Adj. Prof at YLLSOM, NUS and Adj Prof at SBS, NTU	renia_laurent@immunol.a-star.edu.sg	1. Defining protective immune mechanisms and correlates of protection. 2. Deciphering the immune mechanisms involved in malaria-induced pathologies. 3. Immune responses and antimicrobial resistance		NUS/NTU/SUTD	

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11	Pathogen Immunobiology	Pablo Bifani	Associate Professor, Department of Microbiology ans Immunology, YLLSOM, National University of Singapore; Principal Investigator A*STAR ID Labs	pablo_bifani@immunol.a-start.edu.sg	Deciphering mechanisms pathogenicity and immunity in Klebsiella and Acinetobacter	> Develop in vitro models to evaluate pathogenicity of Klebsiella and Acinetobacter. > Develop murine models to study pathogenicity > Study impact of drug resistance and bacterial fitness	NUS/NTU/SUTD	
12	Ontogeny, Differentiation and Immune Functions of Myeloid cells	Ginhoux Florent	Senior Principal Investigator, Adj. A/Prof at YLLSOM, NUS and LKCSOM, NTU	florent_ginhoux@immunol.a-star.edu.sg	Ontogeny of myeloid cells	Dendritic cells (DCs), monocytes and macrophages play crucial and distinct roles in tissue homeostasis and immunity, but also contribute to a broad spectrum of pathologies and are thus attractive therapeutic targets. Potential intervention strategies aiming at manipulation of these cells will require in-depth insights of their origins and the mechanisms that govern their homeostasis. The focus of the laboratory is to understand the ontogeny of DCs, monocytes and macrophages, their differentiation pathways and how their unique ontogeny dictates their immune functions. Our approach encompasses the integration of high dimensional platforms such as RNAseq, single cell transcriptome analysis using microfluidic RNA sequencing and deep immunophenotypic assessment using state of the art 18 parameters flow cytometry or Cytometry by Time-Of-Flight mass spectrometry (CyTOF). Such high density molecular profiling at the single level and at unprecedented dimensionality and complexity will provide new insights in the biology of DC, monocyte and macrophage cell populations. We are also using induced pluripotent stem cell (IPSC) derived macrophage to generate immuno-competent organoid (brain and tumor) and understand how the addition of tissue-resident macrophage modulate tissue development and physiology. Defining macrophage and DC populations on the criteria of their origin may aid our understanding of their discrete roles in tissue immunity and homeostasis, as ontogeny of DC and macrophage subsets likely underlie their functional specializations.	NUS/NTU/SUTD	https://www.a-star.edu.sg/sign/people/principal-investigators/florent-ginhoux
13	Allergy and Immune Regulation, EBV cancer	Dr Olaf Rotzschke	Principal Investigator, Adj. A/Prof at NUS, NTU	olaf_rotzschke@immunol.a-star.edu.sg	Functional and genetic control of allergy-related pathways		NUS/NTU/SUTD	

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14	Pathogen and Immunometablosim	Dr Singhal Amit	Principal Investigator and Adj Ast/Prof LKC School of Medicine, NTU	amit_singhal@immunol.a-star.edu.sg	1. Investigating crosstalk between immunity and metabolism during bacterial/viral infection. 2. Identifying protective immune pathways that can be harnessed to control infection and drug resistance.	These projects investigate the crosstalk of the host metabolsm with bacterial/viral infection. We intentd to ask: 1. How pathogens reprogram host metabolic / epigentic circuts for its infectivity? 2. Can rewiring these circutis modulate pathogenesis and restrict the spread of drug ressitant pathoges?	NUS/NTU	
15	Immunopathology and Allergy	Dr. Anand Kumar Andiappan	SIgN Fellow/Senior Research Scientist	anand_andiappan@immunol.a-star.edu.sg	Immunopathology of paediatric allergies in an urban Singapore environment	Paediatric allergies such as asthma and eczema have an underlying immune dysregulation along with genetic and environmental risk factors. This project aims at understanding how the underlying pathophysiology of these allergies in children manifest in clinical symptoms and potential intervention opportunities to modify risk and improve treatment. These findings would also help enable targeted treatment of the right therapy for the right patient and also evaluate the efficacy of new biologicals currently available.	NUS/NTU/SUTD	