ABOUT LEE KONG CHIAN SCHOOL OF MEDICINE

Lee Kong Chian School of Medicine is a partnership between two world-class universities, Nanyang Technological University (NTU) and Imperial College London, to meet Singapore’s 21st century healthcare demands. It will train a generation of doctors who will put patients at the centre of their exemplary medical care. Graduates of the five-year undergraduate medical degree programme that begins in 2013 will have a strong understanding of the scientific basis of medicine, along with interdisciplinary subjects including business management, humanities and technology.

The School’s primary clinical partner is the National Healthcare Group, a leader in public healthcare recognised for the quality of its medical expertise, facilities and teaching. The School, named after local philanthropist Tan Sri Dato Lee Kong Chian, aims to be a future model for innovative medical education. Its first doctors will graduate in 2018 with a Bachelor of Medicine and Bachelor of Surgery (MBBS), awarded jointly by NTU and Imperial College London, and become doctors who will enhance Singapore’s healthcare in the decades to come.

The Best of Both Worlds

“Strengthening the research partnerships that we have with Imperial, NTU and the School’s hospital partners is one of the many areas that we are keen to explore and expand further so as to promote impactful fundamental and translational research.”

Professor Philip Ingham FRS
VICE-DEAN, RESEARCH
TOH KIAN CHUI DISTINGUISHED PROFESSOR
PROFESSOR OF DEVELOPMENTAL BIOLOGY

Bringing the best of Imperial College

Consistently rated among the world’s best universities, Imperial College London is a science-based institution with a reputation for excellence in teaching and research that attracts 14,000 students and 6,000 staff of the highest international quality. Innovative research at the College explores the interface between science, medicine, engineering and business, delivering practical solutions that improve quality of life and the environment – underpinned by a dynamic enterprise culture.

Leveraging the strengths of NTU

Nanyang Technological University is a research-intensive university with globally acknowledged strengths in science, engineering and business, it has 4 colleges with 12 schools and 5 autonomous institutions, with a population of 33,000 students and 3,300 teaching and research staff. NTU’s many academic partners include the Massachusetts Institute of Technology, Stanford University, Cornell University, Carnegie Mellon University, Cambridge University, Technische Universität München, Peking University and Waseda University.
Rapidly ageing societies, such as Singapore’s, face formidable challenges in the coming years, as the increasing prevalence of diseases of the elderly together with escalating medical costs threaten to exceed the capacity of shrinking working populations to support their healthcare systems. Finding solutions to these challenges is the overriding goal of LKCMedicine Research. Fundamental to our approach will be an emphasis on Health Systems and Population Health, underpinned by our growing expertise in four key themes: Metabolic Disorders, Neuroscience and Mental Health, Infection and Immunity, and Dermatology and Skin Biology. Synergising with the wealth of expertise in engineering and technology at NTU are the cross-cutting platforms in Genetics and Genomics, Phenomics, Developmental and Structural Biology, Imaging, Bioengineering, Health Services Outcomes and Global Health.

A key feature of the LKCMedicine research is the recognition of human health as the output of the operation of a highly complex interacting system and disease as a multifaceted process that transcends the classical distinctions between organ systems. We seek to promote synergies between research themes; for instance, interaction between researchers with expertise in metabolism and neuroscience will address the role of the brain-gut axis in metabolic disorders and obesity; similarly, the relationships between mood disorders and infection can be addressed through interaction between neuroscientists and infectious disease researchers. Such a holistic “Systems Medicine” approach is a defining feature of LKCMedicine research and will be the key to its success in maximising impact in a competitive global environment.
**Metabolic Disorders**

Metabolic disorder is one of the biggest health problems facing both post-industrial and emerging economies alike. Indeed there is an epidemic of obesity and related disorders, in particular diabetes which is the single biggest risk factor for the development of cardio-vascular disease. A better understanding of the genetic predisposition and environmental influences as well as the cellular and molecular mechanisms that underlie disease progression will allow the development of targeted therapies and lifestyle strategies that can stem this tide.

Genetic profiling of the Singaporean diabetic patient population will yield insights into the genetic variation underlying predisposition as well as racial differences in disease susceptibility, the so-called Asian phenotype. A key feature of this approach will be the comprehensive phenotyping of patient cohorts, made possible by the establishment of the Singapore Phenome Centre as well as the Diabetes Biobank. This effort will be spearheaded by Prof Bernhard Boehm, a leading expert in metabolic genomics. Together, these resources will facilitate analysis of the link between genetic and phenotypic variation at the level of the metabolome as well as interaction with microbiome. Significant expertise in microbiome analysis has been established by Prof Sven Pettersson and Prof Walter Wahli.

These clinically based studies will be complemented by approaches using model organisms by Prof Walter Wahli and Asst Prof Guillaume Thibault whose research focus on the relationship between food, nutrients and microbiota, and the molecular basis of fatty acid and lipid metabolism respectively; by Visiting Prof Per-Olof Berggren and Asst Prof Yusuf Ali on the analysis of the molecular control of pancreatic islet cell biology and pathology. Notably, Prof Berggren’s group has developed a unique in vivo imaging approach whereby islet cell function and survival can be studied non-invasively, longitudinally and at single-cell resolution.

Asst Prof Dinesh Kumar Srinivasan, a clinician scientist, performs research on cellular and molecular epigenetics, in the context of maternal diabetes and the molecular mechanisms that influence the health of unborn fetuses; Asst Prof Wang Xiaomeng studies the chronic effects of diabetes on vascular complications; and Dr Sreenivasulu Reddy Mogali studies on the impact of diabetes on arterial wall diseases.

Assoc Prof Fabian Lim conducts translational research to bridge the gap between basic and applied science research to promote exercise prescription as a complement to drug prescription for the treatment of chronic diseases. He investigates the mechanisms and interventions influencing the interaction between habitual physical exercise, health and aging. Assoc Prof Lim is also interested in studying the physiological mechanisms mediating physical work tolerance in sport and occupational settings. With the understanding that diabetes is the single biggest risk factor for the development of cardio-vascular disease, Prof Michael Ferenczi’s laboratory investigates the behaviour of cardiac molecular motors to elucidate the essential molecular mechanisms. His work will contribute to the development of therapeutic strategies to reduce the occurrence and alleviate the symptoms of cardiac disease.

**Infection and Immunity**

Increasing microbial resistance to commonly used drugs and the emergence of novel viral strains pose a growing threat to global health that requires urgent solutions. At the same time, systemic sepsis remains a global problem with rates of mortality ranging as high as 30-50%. Although there is an improvement in standard care procedures, there is an unmet need for novel effective therapies targeting the disease.

As with the other disease themes, a key approach will be to elucidate the genetic basis of disease susceptibility, taking advantage of Singapore’s unique population structure and its exposure to specific pathogens such as dengue virus. In a complementary approach, the genetic factors that mediate pathogen translocation within host populations, as well as the role of interaction between invading pathogens and the host microbiota in the progression of infection, will be identified. Another important approach will be the epidemiological analysis and transmission surveillance of infectious agents, such as dengue virus and *Plasmodium*, as well as the design and implementation of vaccine trials.

The other focus of this theme will be on the identification and development of small-molecule inhibitors for the treatment of drug-resistant tuberculosis and hospital-acquired infections due to gram-negative bacteria. High-throughput screening technologies based on automated confocal fluorescence microscopy will be used to identify bacterial features, host cell factors and compounds that affect the trafficking and growth of *Mycobacterium tuberculosis* inside macrophages; and develop high-content, image-based assays for drug-resistant gram-negative bacteria as a prerequisite for the discovery and development of new sterilising drugs. Structural biology approaches will be used to analyse the mechanisms of dengue virus replication and to support novel druggable pocket identification and validation. These studies will also contribute to vaccine development.

Prof Annelies Wilder-Smith and Asst Prof Yeo Tsin Wen are both clinician scientists specialising in the epidemiology of both established and emerging infectious diseases. Prof Wilder-Smith is renowned for her work on the epidemiological analysis and transmission surveillance of dengue virus and other infectious agents as well as in the design and implementation of vaccine trials. Asst Prof Yeo focusses principally on the epidemiology of malaria as well as on the pathogenic mechanisms of *Plasmodium*.

Visiting Prof Eric Harvill investigates the genetic factors that mediate pathogen transmission within host populations as well as the role of interaction between invading pathogens and the host microbiota in the progression of infection. Assoc Prof Kevin Pethe focuses on the identification and development of small-molecule inhibitors for the treatment of drug-resistant tuberculosis and hospital-acquired infections due to gram-negative bacteria. Prof Artur Schmidtchen is pursuing a complementary strategy of interferring with bacterial pathogenesis by utilising endogeneous antimicrobial peptides as novel modulators of bacterial levels as well as inflammation to target the complex disease progression seen in infectious disease and sepsis.

The development of novel therapeutic approaches to viral infection is a key aim of Nanyang Asst Prof Luo Dahai who uses structural biology approaches to analyse the innate immune response, in particular the molecular mechanism of the activation of intracellular pathogen recognition receptors such as the RIG-I like receptors, and to dissect the dengue virus replication complex to support novel druggable pocket identification and validation.
**Neuroscience and Mental Health**

Neuropsychiatric disorders such as psychosis, mood disorders, autism and Alzheimer’s disease exact a tremendous toll in terms of personal disability and societal cost. This toll is set to increase further as the Singapore population ages.

Although our understanding of the human brain and its dysfunction is still in its relative infancy, new discoveries in developmental neurobiology and genetics have positioned psychiatry on the threshold of a revolution in research that has immense implications for public health. The success of this genetic approach will be underpinned by capabilities in the clinical and neurocognitive characterisation of psychiatric symptoms and disorders at the Institute of Mental Health, as well by the expertise in functional magnetic resonance imaging of Prof Balázs Gulyás and Prof Daniela Rhodes. These approaches will be established by Prof Dean Nizetic with a particular focus on events linking abnormal mitosis in cells to processes leading to diseases, with the long-term aim of identifying novel targets and developing combinatorial therapies.

An important focus of this theme is on wound healing and especially non-healing leg ulcers, a major complication of diabetes. Prof David Becker has already developed a novel therapy for wound healing that is currently being evaluated in clinical trials and there are plans to develop a second generation of the drug and its delivery system. These approaches will be developed in collaboration with Nanyang Asst Prof Juliana Chan and Assoc Prof Chiew Sing Yian. Prof Arthur Schmidtchen focuses on human innate immunity systems, and their role in wound healing, skin responses to microbes, as well as roles in infectious and inflammatory diseases of skin and wounds. Asst Prof Navin Kumar Verma focuses on lymphoma, inflammatory and immune skin disorders such as atopic dermatitis and psoriasis. Expertise in this area is augmented by the expertise of Visiting Prof Paul Martin, an internationally recognised authority on the role of inflammation in wound healing and cancer.

Asst Prof Woo Wei Meng investigates the role of the Hedgehog (Hh) signalling pathway regulation in the hair follicle dermal microenvironment and in non-melanoma skin cancers. This work will leverage on the world leading expertise in Hh signal transduction mechanisms of Prof Philip Ingham and has the potential to lead to the development of new therapeutic approaches.

**Genetics and Genomics**

Basic research in chromosome biology has direct relevance to medical science as the disruption of genome integrity has multiple consequences, giving rise to a variety of human diseases, including those of the central nervous system, skin and musculoskeletal system as well as premature ageing and cancer. Nanyang Assoc Prof Karen Crasta studies events linking abnormal mitosis in cells to processes leading to diseases, with the long-term aim of identifying novel targets and developing combinatorial therapies. Prof Daniela Rhodes focuses on providing an understanding of the function of telomeres and telomerase at the molecular level. Her research is underpinned by Nanyang Institute of Structural Biology, a partnership between School of Biological Sciences and LKCMedicine that brings together expertise in methods such as nuclear magnetic resonance, X-ray crystallography and cryo-Electron Microscopy. Nanyang Asst Prof Amartya Sanyal’s research focuses on the understanding of the 3D genome organisation and its impact on transcriptional regulatory code during mammalian development, differentiation and disease.

**Dermatology and Skin Biology**

The skin is our largest organ, and skin diseases are among the most prevalent conditions requiring medical intervention. During the last decade, we have seen a rapid expansion of our knowledge of skin physiology and disease mechanisms. This, in turn, has enabled us to selectively target skin diseases, leading to improved treatments for conditions such as atopic dermatitis, psoriasis, and cancer. Discoveries within regenerative medicine and biotechnology have also enabled the development of novel products and concepts for treating skin wounds, such as burns and non-healing ulcers.
**Developmental and Regenerative Biology**

Developmental biology has revolutionised biomedical science over the past three decades, identifying the genes and unveiling the molecular and cellular mechanisms that regulate animal development and that underlie the pathogenesis of many human diseases. Prof Philip Ingham has world leading strength in the analysis of key intercellular signalling systems, particularly the Hedgehog (Hh) pathway, modulation of which has already been used in the directed differentiation of embryonic stem cells into a variety of cell types, including dopaminergic neurons and oligodendrocytes. Such approaches have significant potential for the treatment of a variety of diseases including diabetes and Parkinson's disease.

**Health Systems and Population Health**

Between our current healthcare and the healthcare we aspire to lies not just a gap, but a chasm. While medical science and technology have advanced at an unprecedented rate, the health care delivery systems have fallen far short in their ability to translate new knowledge into practice. The Population Health theme led by Assoc Prof Josip Car aims to build a world-class research programme that will help innovate health systems not only in Singapore but around the world, based on the three forces of healthcare change: personalisation, integration, and industrialisation. Areas of focus include population health measurement, quality and cost-effectiveness of care and innovative models of healthcare delivery.

**TALENT DEVELOPMENT**

The LKCMedicine Clinician Scientist Fellowship, established with its healthcare partner, aims to develop the next generation of clinician scientists by providing an integrated pathway that allows seamless transition from clinical residency to PhD and postdoctoral training. Subsequently, they will be considered for a joint appointment at LKCMedicine and its main healthcare partner, the National Health Group. Young promising clinicians aspiring to become the next generation research leader in his/her field are welcomed to apply.

The LKCMedicine Postdoctoral Fellowship aims to nurture talented young scientists by providing them with a postdoctoral experience that prepares them for a LKCMedicine tenure-track faculty position. PhD graduates who have received their PhD from a reputable university and possess strong scientific track record are welcomed to apply. The candidates’ research interests should be well-aligned with the research themes of LKCMedicine.

For more information on the application period and process, please visit the school’s website.
Professor Philip Ingham FRS

The co-discovery of the vertebrate Sonic Hedgehog gene is one of Prof Ingham’s many scientific achievements. His analyses of intercellular signalling have provided fundamental insights into human development and disease, paving the way for the novel cell-based therapies of regenerative medicine.

The overarching principle of Prof Ingham’s approach is that complex biological processes are best studied in the context of the whole organism. This philosophy underpins research in Prof Ingham’s laboratory at LKCMedicine, which exploits the unique attributes of the zebrafish Danio rerio to model human disease-related processes such as the inflammatory response, metabolic imbalance and autophagy. The laboratory employs a range of techniques including transgenesis, in vivo imaging and targeted mutagenesis to analyse the molecular basis of complex cellular behaviour in the living animal.

Prof Ingham is the Vice Dean Research, Toh Kian Chui Distinguished Professor and Professor of Developmental Biology of LKCMedicine. Prior to his appointment in LKCMedicine, Prof Ingham was the Deputy Director at the Institute of Molecular and Cell Biology, A*STAR. He is world-renowned in the field of developmental genetics for his pioneering analyses of the Hedgehog signalling pathway, which laid the foundation for the development of novel anti-cancer drugs.

Professor Daniela Rhodes FRS

Prof Rhodes is internationally renowned for her contributions to the area of chromosome biology. Her structural investigations on DNA packaging; telomeres structure; protein and protein-DNA complexes involved in transcriptional regulation and telomere function; and chromatin compaction and remodelling have provided fundamental insights into the field. Her work is highly medically relevant as telomeres and telomerase are intimately linked to cancer progression and human ageing.

Prof Rhodes is a Professor at the School of Biological Sciences and LKCMedicine, and Director of the newly formed Nanyang Institute of Structural Biology, NTU. Her research at NTU focuses on telomere dynamics and genome function as well as the structure and function of human telomerase.

Prior to her appointment in NTU, Prof Rhodes spent all of her scientific career at the world-renowned Medical Research Council Laboratory of Molecular Biology in Cambridge, UK. Her professional experience includes evaluating research grants and fellowships for international funding bodies including the UK Royal Society, the US National Institute of Health, the Human Frontiers Science Programme and the European Molecular Biology Organisation (EMBO). She is a member of EMBO, the Academia Europaea and is a Fellow of the Royal Society.
**Professor Bernhard Boehm**

Prof Boehm is internationally renowned in the field of clinical and experimental diabetes immunology. He founded the Graduate School in Molecular Diabetology and Endocrinology and established an International Graduate School in Molecular Medicine at Ulm University, both of which facilitated the formation of interdisciplinary research teams with participations from the pharmaceutical companies.

In his programme at the LKCMedicine, Prof Boehm focuses on interdisciplinary, innovative and pioneering investigations to study the basis of the diabetes epidemic in Asia. The translational research approach undertaken would accelerate the discovery of new and individualised treatments for diabetes and metabolic problems, directed at the basic mechanisms of the disorders and metabolic diseases.

Prof Boehm is a Professor and Scientific Director of the Metabolic Disease Research Programme at LKCMedicine; and Deputy Director (Clinical) of the Nanyang Institute of Technology in Health and Medicine. He is well-known for his extensive experience in clinical care, academic teaching and clinical-experimental research.

---

**Professor George Augustine**

Prof Augustine founded the Center for Functional Connectomics at Korea Institute of Science and Technology (KIST), Korea, where he currently serves as Director. He also is a member of the Program in Neuroscience and Behavioral Disorders at the Duke-NUS Graduate Medical School and is a former member of the Department of Neurobiology at the Duke Medical School in the US, where he was the G.B. Geller Professor of Neurobiology.

Prof Augustine’s laboratory in LKCMedicine is interested in the function of synaptic connections between nerve cells. The laboratory studies (1) the molecular basis of neurotransmitter release from neurons, (2) the signal transduction pathways underlying long-lasting synaptic plasticity and (3) the spatial organisation of circuits that form the “wiring” of the brain. His laboratory has shown that neurotransmitter release is triggered by a remarkably local calcium signal; have identified the roles of many proteins involved in neurotransmitter release; and have identified the role of calcium ions and other chemical signals in transducing brief neuronal activity into long-lasting change in brain function. His group also has developed novel optogenetic technologies and is applying these to study brain circuit function.

Prof Augustine is a Professor at LKCMedicine and Director of the Center for Functional Connectomics at KIST. He is a leader in the field of synaptic signalling and is the co-author of the highly popular Neuroscience textbook.
Professor David Becker

Prof Becker’s studies on gap-junctional communication and the regulation of the different members of the connexin family in the dermis and epidermis of wounded skin have led to the discovery of a unique way of speeding up wound healing in a variety of tissues, while reducing inflammation and scar formation.

Tapping into his expertise on skin biology, LKCMedicine will establish a large-scale translational platform on the study of skin biology and healing of chronic wounds. Prof Becker plans to investigate the formation and progression of pressure ulcers with the aim of finding ways to halt the progression and promote their healing. Pressure ulcer is a serious problem in the elderly population and form over 50% of all chronic ulcers. They are typically developed in >12% of the elderly entering long term nursing homes and in 25% of patients in long term geriatric wards. As the elderly population grows in Singapore, with a predicted 18.4% of the population being over 65 by 2030, this problem is destined to increase dramatically.

Prof Becker led a team of researchers in University College London, Department of Cell and Developmental Biology prior to his joining as a Professor at LKCMedicine. His translational research in the field of tissue injury has resulted in a series of patents relating to connexins and wound healing; and awards for his business plans appertaining to the development of tissue injury and repair technology.

Professor Michael Ferenczi

Prof Ferenczi has a lifelong interest in the development of biophysics, bringing quantitative methodologies to biological applications. He is a long-standing member of the British Biophysical Society’s Executive Committee (BBS), and of the Executive Committee of the European Biophysical Societies’ Association (EBSA).

In his Laboratory of Cardiac Biophysics in LKCMedicine, Prof Ferenczi will investigate the molecular mechanisms that underlie the Frank-Starling Law of the Heart to explain the mechanisms by which genetic defects in sarcomeric proteins result in cardiac conditions such as hypertrophic cardiomyopathies and to understand how protein phosphorylation affects cardiac performance, the signalling pathways and disease progression. His investigations will hasten the development of therapeutic strategies that reduce the occurrence and alleviate the symptoms of cardiac disease.

Prior to his joining as a Professor, Assistant Dean and Head of Phase 1 at LKCMedicine, Prof Ferenczi was the Head of the Molecular Medicine Section in the National Heart and Lung Institute at Imperial College London and within the section he headed the Muscle Biophysics Laboratory. His research in LKCMedicine will continue to contribute to the understanding of the molecular mechanisms of movement in biological systems.
Professor Balázs Gulyás

Prof Gulyás’s former research activities during the past three decades included, among others, the exploration of basic neurobiological mechanisms in the visual cortex underpinning visual perception, the functional mapping of the human brain with positron emission tomography, with special regard to the localisation of perceptual and higher mental functions, and the search for molecular imaging markers of neurological and psychiatric disorders.

His recent research activity focuses on translational neuroscience, with special regard to applications of translational molecular neuroimaging in basic and clinical neuroscience research. The main objectives of his research endeavours are related to the exploration of early disease mechanisms in neurological and psychiatric diseases and the search for, and testing of, early molecular imaging biomarkers indicating the early disease conditions or predicting the future appearance of a disorder. Prof Gulyás’s past and present activities at LKCMedicine include a strong collaboration with Prof Christer Halldin, Lead of the LKCMedicine Translational Imaging Platform as well as collaborations with the National Neuroscience Institute, the Defence Medical and Environmental Research Institute, DSO National Laboratories and the Institute of Mental Health.

Prior to his appointment, Prof Gulyás has been a full professor at the Karolinska Institute, Stockholm, Sweden, where he still keeps his position at the Department of Clinical Neuroscience.

Professor Dean Nizetic

Prof Nizetic is one of the leading researchers and opinion-makers in molecular research into Down’s syndrome (DS), in particular its relation to stem cell pathology and cancer. Several results from Prof Nizetic’s research have produced paradigm shifts in the definition of key pathogenic molecules and therapeutic targets in DS-associated childhood leukaemia.

The objective of Prof Nizetic’s research in LKCMedicine is to form an interdisciplinary consortium with the participation of clinicians and basic scientists to focus on specific aspects of DS and understand basic mechanisms of developmental defects. Prof Nizetic’s research also aims to identify individuals with DS that are characterised for presence/absence of frequent DS disease components (with the help of local DS associations), with the aim of using cellular models to understand basic mechanisms and inform new therapeutic strategies.

Prof Nizetic was a Professor of Cellular and Molecular Biology at the Centre for Paediatrics, Blizard Institute prior to his joining as a Professor at LKCMedicine. Prof Nizetic recently generated isogenic induced-pluripotent-stem-cells (iPSC) by re-programming the skin fibroblasts from an adult individual with mosaic DS, and then cloning separately the genetically identical T21 and euploid (D21) iPSC lines. He is leading the iPSC–cellular modelling stream within the LonDownS consortium, the strategic award project funded by The Wellcome Trust.
**Professor Sven Pettersson**

Prof Pettersson’s work on host-microbe interactions and host physiology is highly recognised internationally and he is considered as one of the front drivers on this rapidly expanding field of research. His innovative work has led to the discovery that gut microbiota possesses the capacity to influence brain development and behaviour in animal models. Ongoing research has shown that gut microbes also regulate Blood-Brain-Barrier permeability further establishing the importance of gut to brain communication in mammals. Prof Pettersson is interested in how microbes influence biochemical physiological processes that are relevant for developmental programming as well as organ maturation in early life. His work focusses on the influence of gut microbiota on brain development in prenatal and early postnatal life. Being affiliated with the National Cancer Centre at SGH, he is also pursuing some work on microbiome mediated mechanisms that regulate tumor growth.

To perform these studies, Prof Pettersson set up the first Germ Free mice facility in Singapore, which is also the first of such in South East Asia. The use of germ free mice is a powerful way to understand microbe host interaction, and it is clinically relevant as it is now possible to perform microbiome transfer from human clinical isolates into the germ free mice. Prof Pettersson’s laboratory also uses molecular and cellular biology, ex vivo cell systems, behavioural studies, advanced metabonomics, in vivo imaging and characterisation of the functional microbiome.

Prof Pettersson is a Professor at LKCMedicine, NTU and a Senior Principal Investigator at National Cancer Centre Singapore, SingHealth. He has published nearly 145 articles in top-ranking journals, book chapters and editorials.

---

**Professor Artur Schmidtchen**

Prof Schmidtchen heads a translational research group that focuses on human innate immunity, inflammation, and infection. Conceptually novel mechanisms have been discovered, where proteolytic cascades active during wounding and infection generate novel multifunctional host defence molecules with antimicrobial and immunomodulatory activities. Efforts are now undertaken in order to utilise this new knowledge of our body’s own defence mechanisms in the development of conceptually novel anti-infective and anti-inflammatory therapies.

At LKCMedicine, Prof Schmidtchen will build up a platform within skin biology, wounding, infection-inflammation, and innate immunity, with the aim of creating a strong collaborative environment facilitating translation of basic discoveries to the clinic and industry.

Prof Schmidtchen has a background as senior consultant, Professor and Head of Dermatology at Lund University, Sweden. He has extensive experience within biotech and development of peptide-based therapeutics.
Professor Walter Wahli

Prof Wahli is one of the pioneers who discovered the medically relevant Peroxisome Proliferator-Activated Receptors (PPARs) and has demonstrated the central physiological significance of these regulatory proteins in metabolism, inflammation, and wound healing.

Prof Wahli has developed a programme that concentrates on late pregnancy and all stages of life, which aims to identify molecular mechanisms and molecules, emanating from the interplay between nutrients and microbiota in relation to obesity and associated metabolic diseases. Presently, his team in LKCMedicine investigates the way in which PPARs act as ‘molecular switches’ in the embryo, in early postnatal life and adulthood, to control energy homeostasis. In this context, it explores how PPARs respond to the circadian signals in peripheral organs and the way nutrients affect the circadian clock of these organs. The communication between the metabolic organs in response to food intake or food restriction is part of this programme, with the goal to identify endogenous signals responsible for activating PPARs with impact on diseases, such as fatty liver, diabetes and hyperlipidemia.

Prof Wahli is Professor Emeritus of Biology and Founding Director of the Center for Integrative Genomics, University of Lausanne and currently holds a Professor appointment with LKCMedicine. He is a member of the European Molecular Biology Organisation (EMBO).

Professor Annelies Wilder-Smith

Prof Wilder-Smith’s expertise is in travel medicine and international health, with a focus on vaccine preventable diseases and emerging infectious diseases. In LKCMedicine, the issues in these topics will drive her research and she would investigate infectious diseases such as dengue, influenza, meningococcal disease, malaria, HIV, tuberculosis, SARS, and other emerging diseases.

Prof Wilder-Smith currently holds a European Commission grant for Euro 5.6 million to lead an international consortium of researchers to develop new tools and strategies for dengue surveillance and control. She also won a grant for an academic scientific exchange with two universities in Ethiopia, and a Thai-German grant with the German Federal Ministry of Education and Research. She is in the process of obtaining grant support to develop a controlled human infections platform in Singapore.

Prof Wilder-Smith is also President-Elect of the International Society of Travel Medicine, Past-President of the Asia Pacific Society of Travel Medicine, Editorial Consultant to The Lancet, on the editorial board for the Journal of Travel Medicine and several other journals, Special Advisor to GeoSentinel, consultant to the WHO on issues related to international travel and health, and co-editor of the annual WHO publication ‘International travel and health’, and member of the Singapore committee on dengue case management.
Nanyang Associate Professor
Karen Crasta

Nanyang Assoc Prof Crasta is the Associate Professor of Molecular and Cellular Biology and National Research Foundation Fellow at LKCMedicine. She has extensive expertise in the area of fundamental mechanisms governing molecular circuits that control accurate mitotic spindle assembly and chromosome segregation. Her work has shed light on how failure in chromosome segregation during cell division could directly contribute to tumourigenesis. At LKCMedicine, Assoc Prof Crasta’s research lies in the area of genomic instability and cancer. She leads a team that investigates the molecular determinants controlling decisions of cell fate upon treatment with anti-mitotic drugs. This is in the hope of identifying novel cellular targets that could be of relevance to the development of combination therapies to improve sensitisation of tumour cells, as well as provide insights into chemoresistance, a major setback in oncology. In addition, since the single biggest risk factor for developing cancer today is aging, her research also aims to better understand the genetic roots of increased incidences of cancer in older individuals. In collaboration with geriatricians at Tan Tock Seng Hospital and other groups within NTU and A*STAR, her team will examine structural chromosomal aberrations and other genetic abnormalities, aneuploidy and micronuclei frequencies using state-of-the-art techniques.

Associate Professor
Katharine Boursicot

Assoc Prof Boursicot is a Reader in Medical Education at St George’s, University of London, where she is the Head of Assessment. After 20 years as an obstetrician/gynaecologist, she became the Head of Assessment at Barts and the London, Queen Mary’s School of Medicine and Dentistry where she led OSCE developments from 1998 to 2007. From 2002 to 2005, she led the introduction of modern assessment methods at the School of Clinical Medicine at the University of Cambridge. Assoc Prof Boursicot is the author of a number of papers on assessment and standard setting as well as several book chapters in key medical education textbooks. She is the Series Editor of the Oxford University Press volumes of Oxford Assess and Progress. She has advised nationally and internationally on the development and implementation of OSCEs in undergraduate medicine, dentistry and veterinary medicine. She has been a consultant on assessment to a number of Royal Medical Colleges in the UK as well as the General Medical Council’s Performance Procedures and PLAB (Professional and Linguistic Assessment Board). She was the Treasurer of the Association for the Study of Medical Education (ASME) and chaired the Board of Management of the journals Medical Education and The Clinical Teacher. Assoc Prof Boursicot will establish a programme of research and scholarship in medical education at LKCMedicine, taking in the innovative developments in the new medical school and collaborating with Imperial College London. Major streams of research will focus on the development of professional identity across different cultural contexts, professional judgement of clinical competence, technology enhanced learning and assessment, and Team-Based Learning.
Associate Professor Josip Car

Assoc Prof Car is an executive physician scientist. He is the Founding Director of the Global eHealth Unit at Imperial College London, Director of Public Health and Primary Care at Imperial College Healthcare and a practicing physician. He serves in a number of other roles including as an adviser to the World Health Organization, World Bank (supporting development of national health systems) and others. Assoc Prof Car has an outstanding record of blending research, policy, management and clinical work. He has published over 120 scientific articles and attracted multi-million research funds from a wide range of funding bodies. He works closely with industry, for example, Intel and Phillips and has received for his work prestigious awards, such as the BMJ’s top ten reviewer and the UK Department of Health award for preventive health checks. Assoc Prof Car’s mission at LKCMedicine is to build a world-class research programme in health services and outcomes research that will help innovate Singapore’s and health systems around the world based on the three forces of healthcare change: personalisation, integration, and industrialisation. He will develop a centre of methodological expertise in eHealth, modern epidemiology of chronic diseases, public health, trials methodology, statistics and multi-method approaches.

Associate Professor Fabian Lim

Assoc Prof Lim is known for developing the translational research capabilities on soldier health and performance in DSO National Labs, which is aimed at creating solutions to extend the limits of homeostasis regulation under stressful conditions. He has vast experience in studying the physiology of human stress response and homeostasis regulation in research domains such as gut and immune disturbances, thermoregulation, sleep regulation, nutrition, obesity, and physiological status monitoring. Prior to joining LKCMedicine, Assoc Prof Lim was given the opportunity to set up the Singapore Sport Institute, where he led in the development of Sport Science and Medicine capabilities to support Singapore’s sport talent pool. Assoc Prof Lim was also an Adjunct Associate Professor in the Department of Physiology at the Yong Loo Lin School of Medicine, National University of Singapore (2007 – 2014). In LKCMedicine, Assoc Prof Lim will investigate the influence of host-environment complex on metabolic disease, with the aging process as an underlying disease-promoter pathway, and the possible roles of habitual exercise in reversing the disease processes. Intrigued by recent evidence showing the therapeutic and protective effects of exercise against metabolic disease, he will investigate the physiological mechanisms governing the effects of habitual exercise on the aging process, and the combined effects of aging and habitual exercise on metabolic disease development. These studies will contribute to the broader aim of the Exercise Physiology research programme, which is to promote exercise prescription as a partial to whole replacement for the prescription of medication for chronic disease treatments.
Associate Professor Kevin Pethe

Assoc Prof Pethe was a Senior Research Investigator and Project Manager at the Novartis Institute for Tropical Diseases, Singapore, before he took up a position and subsequently got nominated as the acting CEO at the Institut Pasteur Korea. At the Institut Pasteur Korea, he studied the host-pathogen interactions and chemical biology applied to tuberculosis and multidrug resistant bacteria. Recognised for his contribution to the area of chemical genomics and drug discovery for tuberculosis, Assoc Prof Pethe will continue his work in this area in LKCMedicine. His work in LKCMedicine involves the study of the strategies that pathogens use to invade and exploit the hosts, such as the adaption of bacteria’s metabolism and energy production mechanism to exploit the nutritional resources of the host for growth. Motivated by several lines of evidence indicating that a combination of weakly active chemical entities could result in a potent synergistic drug combination against multidrug resistant bacteria, Assoc Prof Pethe is also interested in characterising the synthetic-lethal genetic interactions in bacteria through chemical genomics approach. This work could potentially aid in the development of novel antibacterial therapeutic drug combination. Apart from his scientific contribution, Assoc Pethe’s professional experience includes evaluating research grants for the European Union and the French National Research Agency.

Associate Professor Chew Sing Yian

Assoc Prof Chew is an Associate Professor at the School of Chemical & Biomedical Engineering and LKCMedicine, NTU. Since joining NTU, Assoc Prof Chew has been actively reaching out to local and overseas research institutions for scientific exchanges and among those, she has served as visiting scholar/professor to INSERM(U698 and U791), University of Paris 13, University of Nantes, Jinan University in Guangzhou, China, and Wyss Institute at Harvard. The main areas of study in Assoc Prof Chew’s laboratory could be broadly categorised under regenerative medicine and stem cell engineering, both of which are areas she is recognised for. Her research interests lie in the understanding of the combinatorial effects of nanotopography and biochemical signalling on the fate of the cell, and the use of the combinatorial approach to mediate tissue regeneration and host-implant integration. Specifically, the work in her laboratory involves the engineering of biofunctional micro- and nano-structured scaffolds that could be used to mediate delivery of small non-coding RNAs for long-term gene silencing applications and scaffolds that allow long-term biochemical delivery. Through these work, Assoc Prof Chew aims to provide improved platforms that could lead to better understanding and control over cell fate for regenerative medicine. Apart from her academic and research contribution, Assoc Prof Chew’s professional experience includes being an editorial board member in Drug Delivery and Translational Research, and a grant reviewer on local and international funding review panels.
Professor Per-Olof Berggren

Prof Berggren is a Professor in Experimental Endocrinology, Department of Molecular Medicine and Surgery, and the Director of the Rolf Luft Research Center for Diabetes and Endocrinology, Karolinska Institute. He is a world renowned scientific leader and expert in experimental endocrinology, particularly in diabetes research. His research groups are interested in the physiology and immunobiology of the islets of Langerhans in health and in disease. Prof Berggren will establish a state-of-the-art research programme in islet cell biology using a combination of in vivo imaging, electrophysiology and molecular techniques. To complement the studies of islet cell function, Prof Berggren plans to explore collaborations with A*STAR Singapore Institute for Clinical Sciences, Singapore Eye Research Institute, SingHealth and the Khoo Teck Puat Hospital Clinical Research Unit.

Professor Christer Halldin

Prof Halldin is a Professor of Medicinal Radiochemistry and Director of the Positron Emission Tomography (PET) Centre, Karolinska Institute. He is a scientific leader with an established reputation in running the internationally competitive translational neuroimaging PET centre at Karolinska that spans from small animals to humans, focusing primarily on the development of new tracers for neuroimaging. Today, more than 1/3 of the radioligands used for clinical brain PET imaging throughout the world have been developed by his group. In recent years the primary focus of his research interest is in the development and application of imaging biomarkers for diseases such as Alzheimer’s disease and development of tracers for measuring neurotransmitter release. He is responsible for setting up a strategic programme in translational molecular neuroimaging of the school in collaboration with institutes such as the National Neuroscience Institute and the Institute of Mental Health.

Professor Eric Harvill

Prof Harvill is a Professor of Microbiology and Infectious Disease at the Pennsylvania State University. His research strategy has combined the tools of molecular immunology present only in the mouse with a careful molecular genetic analysis of pathogens. The model pathogens, species of the genus *Bordetella*, provide a uniquely powerful experimental system that combines relevance to human disease with natural infection of mice. With this experimental system Prof Harvill has made important contributions to Immunology, Bacteriology and Evolution. Recently Prof Harvill has expanded efforts to examine the interactions between the resident microbiome and invading pathogens, a topic he hopes to explore further in various interactions with LKCMedicine, SCELSE and healthcare partners in Singapore.
Professor Paul Martin

Prof Martin is a Professor of Cell Biology at the University of Bristol. His laboratory uses animal models such as the *Drosophila*, zebrafish and mice to study the cell and molecular mechanisms that underpin wound healing. Specifically, Prof Martin is interested in the inflammatory responses that is important in normal acute wound healing and that appears to go awry in chronic wounds. He has identified genes that are associated with both re-epithelialisation and wound inflammation. These genes are potential therapeutic targets for chronic wound healing and blockage of inflammation-driven fibrosis. Knocking down one of the inflammation-induced wound genes, osteopontin, has already been shown to reduce the fibrotic response in several damage-repair settings. Prof Martin will also explore the parallels between wound healing and cancer.

Associate Professor Tan Hao Yang

Assoc Prof Tan is an Investigator at the Lieber Institute for Brain Development, Johns Hopkins Medical Campus. He obtained his medical degree from the National University of Singapore, trained in psychiatry, and is a Fellow of the Royal College of Physicians of Canada. He further trained in neuroimaging and genetics at the US National Institute of Mental Health. Assoc Prof Tan’s research on cognitive and emotional brain processes in neuropsychiatric disease included the discovery of genetic variation in the protein kinase AKT1, implicated in apoptosis and cancer, but with an opposite relationship on human brain function, psychosis and pharmacogenetics. His current research includes a US NIH funded study of childhood risk environments (e.g. urban versus rural upbringing) on genetic expression of brain function; and in Singapore, the study of genetic and non-genetic determinants of brain circuit dysfunction in late-onset psychosis.
Nanyang Assistant Professor Luo Dahai
Dr Luo studies the molecular basis of virus replication and the host’s counteracting defense mechanisms, with the aim to provide comprehensive understanding of the conflict between host and pathogens and to guide drug and vaccine development. The laboratory applies biochemical, biophysical, structural, and \textit{in vivo} approaches to study the biogenesis of the pathogenic RNA species and the host’s counteracting defense mechanisms.

Assistant Professor Yusuf Ali
Dr Ali’s laboratory is working towards uncovering endocrine/paracrine/autocrine factors that could alter both function and survival of pancreatic islet cells. In collaboration with Prof Per-Olof Berggren, he will leverage on the novel technique of transplanting islets into eye to study signal transduction pathways that mediate pancreatic hormone release in both physiological and pathophysiological states \textit{in vivo}. The overarching goal of his laboratory is to identify novel therapeutic targets for the treatment of diabetes.

Assistant Professor Dinesh Kumar Srinivasan
Dr Srinivasan’s laboratory focuses on the fundamental events involved in cell fate determination, differentiation and organogenesis. Besides basic science, Dr Srinivasan is also interested in medical education tools such as augmented reality for anatomical education and 3D patient model. Dr Srinivasan is the Lead for Anatomy and Head of Examinations (Phase 1) at LKCMedicine, NTU.

Assistant Professor Navin Kumar Verma
Dr Verma’s research is focused on the molecular mechanisms involved in lymphocyte motility. In particular, he investigates biological roles and clinical relevance of the integrin LFA-1-mediated signalling in T-cell migration. Knowledge gained through these studies will be useful in fine-tuning LFA-1 targeted therapies for immunologically-based diseases.
Assistant Professor Wang Xiaomeng

The focus of Dr Wang’s laboratory is to gain novel insights into the molecular and cellular mechanisms that modulate, inhibit and promote blood vessel formation. The goal is to develop novel therapeutic approaches targeting angiogenesis, a key feature shared by over 70 major health conditions affecting more than one billion people worldwide. Dr Wang is the co-inventor of two international patents, treatment of vasculoproliferative conditions and treatment of cancers.

Assistant Professor Woo Wei Meng

Dr Woo studies the epithelial – mesenchymal reciprocal signalling interactions that direct hair follicle tissue development and regeneration. Her current focus is the paracrine Hedgehog signalling regulation on the dermal papilla, a group of mesenchymal cells that controls hair follicle epithelial regeneration. Dr Woo’s research in the mechanisms of hair follicle regeneration could contribute new strategies for regenerating functional tissue after injuries or diseases. Her work will also contribute knowledge for hair loss therapy.

Assistant Professor Yeo Tsin Wen

Asst Prof Yeo is a clinician scientist whose main research areas include the clinical and epidemiological studies of malaria including the three species most prevalent in South East Asia, namely Plasmodium falciparum, Plasmodium vivax and Plasmodium knowlesi. He is also interested in the clinical studies of central nervous system infections, with a focus on the development of improved diagnostic strategies and delineation of the pathogenic mechanisms of tuberculous meningitis.

Nanyang Assistant Professor Guillaume Thibault

Continuing the work during his postdoctoral training which has contributed significantly to the understanding of the cell stress responses that are triggered from endoplasmic reticulum stress and lipid perturbation, Dr Thibault’s research explores stress response mechanisms in the context of lipid disequilibrium to restore cell homeostasis. Dr Thibault has a joint appointment with the School of Biological Sciences, NTU.
Nanyang Assistant Professor Juliana Chan

Dr Chan’s research integrates the fields of nanomedicine and tissue engineering for applications in skin biology and drug delivery. Among her achievements are the 2013 Singapore Youth Award for her scientific research and contributions to the science community in Singapore, and the 2013 Nanyang Assistant Professorship. Dr Chan has a joint appointment with the School of Chemical and Biomedical Engineering, NTU.

Nanyang Assistant Professor Amartya Sanyal

Dr Sanyal’s research focuses on the understanding of the 3D genome organisation and its impact on transcriptional regulatory code during mammalian development, differentiation and disease. In his 3D CATG (Chromatin Architecture, Transcription and Genomics) laboratory, Dr Sanyal studies the structure-function relationship of chromatin through multidisciplinary approach ranging from genomics to bioinformatics and molecular biology to imaging techniques. He has a joint appointment with the School of Biological Sciences, NTU.

Dr Sreenivasulu Reddy Mogali

Dr Mogali aims to further understand the diseases of the arterial wall and the effect of age on the development of the disease. Using diabetic models, Dr Mogali would also study the impact of diabetes on the arterial wall and perivascular nerves.