

## MEDIA RELEASE

### **A\*STAR AND NUS LAUNCH JOINT CENTRE TO ADVANCE RESEARCH ON NUTRITION, EARLY DEVELOPMENT AND METABOLIC DISEASES**

#### ***S\$148 million centre to study the role of nutrition and early development in health and disease in Asia***

1. The National University of Singapore (NUS) and A\*STAR will be jointly establishing the S\$148 million Singapore Centre for Nutritional Sciences, Metabolic Diseases, and Human Development (SiNMeD). This collaboration between the NUS's Yong Loo Lin School of Medicine (YLLSoM) and A\*STAR's Singapore Institute for Clinical Sciences (SICS) is set to become the leading centre in Asia for research in the nexus between nutritional sciences, metabolic diseases and human development.

2. SiNMeD will focus on fundamental, clinical and translational research to understand the role of nutrition and early development in the onset and progression of obesity and metabolic diseases like diabetes. Research on the nutritional needs of Asians is lacking and this will be a special focus of the programme. The key research programmes are in early development which will focus on mother and infant nutrition, growth and developmental epigenetics<sup>1</sup>; nutritional sciences which aim to develop strategies for optimal nutrition; and metabolic diseases which will study obesity and insulin resistance in Asians (*Refer to Annex A for details on these research programmes*). This is significant to Singapore as it addresses the rising incidence of obesity and diabetes in an Asian context, with up to 25% of the Singapore adult population projected to have type 2 diabetes by 2025.

3. These research programmes build on existing collaborations, which have already attracted significant investments from major food and nutrition companies who recognise the value of research to develop innovative products for their consumers. SiNMeD's research programmes will expand on the success of the unique and internationally recognised GUSTO birth cohort study, as well as the

---

<sup>1</sup> Epigenetics is the study of changes in gene expression or cellular phenotype, caused by mechanisms other than changes in the underlying DNA sequence. The new field of epigenetics is showing how your environment and your choices can influence your genetic code — and that of your children.

EpiGen consortium – an international alliance of the world’s leading epigenetics researchers<sup>2</sup> (*Refer to Annex B for more details on the outcomes of past collaborations*).

4. SiNMeD will be the focal point in Singapore for clinicians, scientists and companies to explore research collaborations in nutritional sciences, epigenetics, developmental determinants of chronic diseases and metabolic disease. “This is the time to bring these multidisciplinary and complementary programmes with NUS together under one umbrella. The SiNMeD investigators have demonstrated the ability to work together to garner both peer-reviewed academic support and to partner with industry in collaborative research programmes” says Professor Judith Swain, MD, Executive Director of A\*STAR’s SICS and Lien Ying Chow Professor of Medicine at NUS’ YLLSoM.

5. There is growing interest in how the incidence, progression, and treatment of diseases may be different in Asia, and how Asian preferences and culture influence human development and the maintenance of health throughout life, especially the burning topic of “healthy ageing”. As Singapore has excellent healthcare and research capabilities, and is well positioned to study health and disease in Asian populations, it provides a strong value proposition for companies seeking to develop products for Asia’s diverse populations. Leading nutrition companies like Danone and Abbott have already established research units in Biopolis in Singapore, while others like Nestlé have a strong history of research collaborations with A\*STAR.

6. Dr Benjamin Seet, Executive Director of A\*STAR’s Biomedical Research Council said, “SiNMeD’s research will help us to understand how the food we eat can lead to epigenetic changes in our DNA, which will in turn, either protect or predispose us to diseases like obesity and diabetes. This opens up new approaches to prevent and treat these diseases.” He added, “This area of research represents a strategic research thrust for A\*STAR and Singapore. If we do this well, it will provide a unique and very competitive platform that will conduct cutting-edge research, as well as serve to strengthen our partnerships with some of the world’s largest nutrition companies.”

7. SiNMeD will also serve as a focal point for talent development of all levels from undergraduate and graduate students, to post-doctoral and clinical fellows, both locally as well as internationally. SiNMeD will be a magnet for attracting the best young trainees and faculty who are interested in human development, metabolic diseases and nutritional science.

8. “Our knowledge of how optimal nutrition and lifestyle can delay or prevent disease onset in Asians is sadly lacking. SiNMeD will pool the expertise of NUS and A\*STAR to greatly improve our knowledge of this area, to the betterment of society”,

---

<sup>2</sup> A\*STAR’s SICS, NUS, University of Southampton, Medical Research Council, Auckland UniServices Limited

said Prof Barry Halliwell, NUS' Deputy President (Research and Technology) and Tan Chin Tuan Centennial Professor.

9. SiNMeD will be headed by its Founding Director Associate Professor Chong Yap Seng of NUS, who also serves as the Deputy Executive Director of SICS. SiNMeD will be made up of a strong team of clinical and basic scientists from A\*STAR and NUS, leveraging on the key capabilities of both institutions (*Refer to Annex C for information on SiNMeD's leadership*).

10. Associate Professor Chong Yap Seng explained how international and local researchers have been brought together to work on this important area in Singapore. He said, "The S\$25 million Metabolic Translational and Clinical Research (TCR) Flagship Programme grant awarded by the National Research Foundation in 2008 brought clinical investigators from NUHS, KKH, SGH and TTSH together with researchers from SICS and other A\*STAR research institutes. With our partners from the UK and New Zealand in EpiGen, we had the critical mass of talent and resources to compete on the world stage. We have never looked back since."

---

For media queries and clarifications, please contact:

**Ms Vithya Selvam**

Senior Officer

Corporate Communications Department

Agency for Science, Technology and Research (A\*STAR)

Tel: 6826 6291/ 9451 8941

Email: [vithya\\_selvam@a-star.edu.sg](mailto:vithya_selvam@a-star.edu.sg)

**Ms Dawn Sim**

Assistant Director

NUHS Communications & Development Office

Yong Loo Lin School of Medicine

National University of Singapore

Tel: 6772 3989 / 9230 6006

Email: [dawn\\_sim@nuhs.edu.sg](mailto:dawn_sim@nuhs.edu.sg)

**Ms Moira Khaw**

Communications Manager (DevOS)

Department of Obstetrics & Gynaecology

Yong Loo Lin School of Medicine

National University of Singapore

Tel: 6601 1954 / 9672 4127

Email: [obgmkkc@nus.edu.sg](mailto:obgmkkc@nus.edu.sg)

---

### **About the Agency for Science, Technology and Research (A\*STAR)**

The Agency for Science, Technology and Research (A\*STAR) is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A\*STAR oversees 14 biomedical sciences and physical sciences and engineering research institutes, and six consortia & centres, located in Biopolis and Fusionopolis as well as their immediate vicinity.

A\*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, and with other local and international partners.

For more information about A\*STAR, please visit: [www.a-star.edu.sg](http://www.a-star.edu.sg).

### **About the Singapore Institute for Clinical Sciences (SICS)**

Established in 2007, the Singapore Institute for Clinical Sciences (SICS) is a research institute within the Agency for Science, Technology and Research (A\*STAR), and its mission is to develop clinical and translational research programmes in key disease areas.

SICS is distinguished by its focus on clinical sciences and the use of innovative approaches and technologies that enable the efficient and effective study of human health and diseases. The clinical scientists in SICS conduct the full spectrum of “bench to bedside” research activities in metabolic diseases (including diabetes, obesity and insulin resistance), pathways to normal growth and development (including cognitive and behavioural development), and nutritional sciences. The institute aims to attract, train and nurture clinician-scientists and to develop joint programmes with universities, academic medical centres, government hospitals and research institutes.

For more information on SICS, please visit: [www.sics.a-star.edu.sg](http://www.sics.a-star.edu.sg).

### **About National University of Singapore (NUS)**

A leading global university centred in Asia, the National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education and research, with a focus on Asian perspectives and expertise.

NUS has 16 faculties and schools across three campuses. Its transformative education includes a broad-based curriculum underscored by multi-disciplinary courses and cross-faculty enrichment. Over 37,000 students from 100 countries enrich the community with their diverse social and cultural perspectives.

NUS has three Research Centres of Excellence (RCE) and 23 university-level research institutes and centres. It is also a partner in Singapore's fifth RCE. NUS shares a close affiliation with 16 national-level research institutes and centres. Research activities are strategic and robust, and NUS is well-known for its research strengths in engineering, life sciences and biomedicine, social sciences and natural

sciences. It also strives to create a supportive and innovative environment to promote creative enterprise within its community.

For more information, please visit: [www.nus.edu.sg](http://www.nus.edu.sg).

### **About the NUS Yong Loo Lin School of Medicine (YLLSoM)**

Established in 1905, the NUS Yong Loo Lin School of Medicine was the first institution of higher learning in Singapore and the genesis of what would become the National University of Singapore. The School offers one of the finest undergraduate medical programs in the Asia Pacific region and commands international recognition and respect. The latest university rankings from Quacquarelli Symonds (QS) have again rated the School as Asia's best for the third consecutive year. Globally, it is now ranked 20<sup>th</sup>, up one spot from its 2012 ranking.

The School admits 300 students to its medical undergraduate degree programme annually. It strives to fulfill its tripartite mission of providing excellent clinical care, training the next generation of healthcare professionals, and fostering research that will transform the practice of medicine. It plays a pivotal role in producing future leaders in healthcare delivery, discovery and public service as well as in Singapore's Biomedical Sciences Initiative and Singapore Medicine, an initiative to further develop as a regional medical center.

The School's 16 departments in the basic sciences and clinical specialties work closely with the Alice Lee Centre for Nursing Studies and the Centre for Biomedical Ethics to ensure that teaching and research are aligned and relevant to Singapore's healthcare needs.

For more information about the Yong Loo Lin School of Medicine, please visit: <http://medicine.nus.edu.sg/corporate/>

## **Annex A: SiNMeD Research Programmes**

### Human Development

The human development programme will focus on mother and infant nutrition and childhood development by developing cutting-edge developmental epigenetics and developmental origins research. The aim is to develop innovative nutritional approaches to optimise maternal and infant nutrition and partner industry in product development for women of reproductive age, pregnant and lactating women, infants and children.

The importance of this programme is underscored by very high rates of gestational diabetes mellitus (GDM)<sup>3</sup> in Asian populations and a marked difference between ethnicities in maternal body composition, propensity for GDM and birth size. There is also increasing evidence that environmental and, particularly, nutritional conditions at the beginning of life influence not only pregnancy and infant outcomes, but also later childhood development and the risk of adult life-style associated diseases. These effects are largely mediated through epigenetic and neurodevelopmental processes. Hence there is a major shift in focus to optimise health outcome through nutrition prior to and throughout pregnancy to effect good long-term outcomes.

The programme will expand on the success of the unique and internationally recognised GUSTO longitudinal birth cohort and SiNMeD's extensive metabolic and neurodevelopment phenotyping capabilities in children. Ongoing research has already attracted partnerships from major food and nutrition companies to collaborate on new market categories – maternal nutritional supplements preconception, during early and late pregnancy and during lactation. This programme will strengthen and cement Singapore's growing reputation as the “go-to” place for maternal and infant nutritional translational research.

### Nutritional Sciences

The nutritional sciences research programme will carry out comprehensive yet focused research in human nutritional sciences. It will study human nutritional physiology, maternal and pediatric nutrition, sensory perception and appetite as well as nutritional biochemistry. The programme aims to develop strategies for optimal nutrition and a range of foods that will impact energy regulation, body composition and weight maintenance (satiety or increased diet-induced thermogenesis<sup>4</sup>). It is extremely relevant with the shift in focus of nutritional research – from simple curing of nutritional deficits to one focused on using foods and food-derived products for prevention and therapies.

---

<sup>3</sup> Gestational diabetes mellitus (GDM) is a condition in which women without previously diagnosed diabetes exhibit high blood glucose levels during pregnancy (especially during their third trimester).

<sup>4</sup> Diet-induced thermogenesis is the energy required to digest and assimilate the food; measured as an increase in body heat production after eating. It typically represents only about 10% of total daily energy expenditure and is related to the type and amount of food ingested. Fats have relatively little thermic effect and proteins the most.

## Annex A: SiNMeD Research Programmes

The purpose-built Clinical Nutrition Research Centre (CNRC)<sup>5</sup>, arguably the best in Asia with its state-of-the art facilities, will bring together the domains of nutrition research and food science and be the bridge between research and product development. Its research speciality lies in understanding the impact of micro- and macronutrient intake on human physiology, the role of food structure on human nutrition and obesity research and type 2 diabetes. It is intimately linked to the other programmes of SiNMeD – human development and metabolic diseases research programmes – integrating capabilities in advanced imaging, epigenetics and metabolic and energetic physiology. This integration will allow SiNMeD to develop insights not possible in many nutrition research centres and to give the work an academic depth not often seen in nutritional research.

The CNRC also aims to build up expertise in sensory perception, a relatively new field in Singapore, which is crucial in investigating the cognitive and perceptual dynamics underlying individual responses to better measure and understand the drivers of consumer choices. With research and clinical activities from the early exploratory science of foods to the assessment of the nutritional impact of developed food products, the CNRC will be crucial to growing the Asian food industry.

### Metabolic Diseases

The metabolic diseases research programme will study obesity and insulin resistance in Asians, and examine the cellular basis of insulin resistance in different ethnicities. The programme will also study the biology of brown adipose tissue (BAT) which has been identified in recent years as “good fat” as it burns white fat (“bad fat”) as its fuel source. SiNMeD’s research will help to mitigate the risk of developing metabolic disease via nutrition and/or pharmaceutical interventions. This research is expected to trigger significant interest from the food and pharmaceutical industry sectors.

The programme will focus on two specific areas related to metabolic disease – skeletal muscle and adipose tissue – and aim for SiNMeD to be the leading centre in Asia for studying the Asian phenotype in metabolic diseases, which is distinctly different from that of Caucasians. This is highly significant to Singapore as the burden of metabolic disease in Asia is at crisis levels with more than 120 million type 2 diabetics in both China and India. 25% of Singapore adult population may have type 2 diabetes by 2025.

Earlier research collaborations between SICS/NUS have observed and demonstrated distinct ethnic differences in the predisposition of diabetes in Asia – GUSTO shows differences even from birth; adult Indians have a primary muscle-based problem, while Chinese and Malays have adipose-driven insulin resistance.

---

<sup>5</sup> A joint initiative between the Singapore Institute for Clinical Sciences, A\*STAR, and the National University Health System.

## **Annex A: SiNMeD Research Programmes**

The distinct relationships between BMI, fat resistance and insulin resistance in the three Singapore ethnicities means that the research, when integrated with the nutrition sciences research programme, is of major relevance to public health. The programme is expected to influence the care of Singaporean patients susceptible to metabolic diseases, a significant and growing population in Singapore and Asia in general.

## **Annex B: A rich history of collaborations**

NUS and SICS have been working hand in hand for over 6 years. The partnership and intent for SICS to forge strong ties with the clinical community and NUS researchers to bring discoveries from bench to bedside and attract industry was planned from the conception of SICS, and is reflected in the location of SICS in the Brenner Centre for Molecular Medicine – in the NUS campus, with the National University Hospital (NUH) just a stone's throw away.

Both SICS and NUS joined the international EpiGen Consortium in 2007 and began planning for the TCR Flagship Programme in Metabolic Diseases together. They were awarded a grant of \$25 million for the TCR “Developmental Origins: Singapore” (DevOS) programme in October 2008 and launched the GUSTO birth cohort programme and SAMS study in June 2009 and January 2009 respectively to research the developmental origins of health and disease. This has given rise to many successful research outcomes, improving healthcare and attracting industry.



SICS was founded on 20 April 2007 with handprints of the following cast, to commemorate the event: Dr Sydney Brenner - Nobel Laureate, Mr Philip Yeo, Mr Lim Chuan Poh, Prof Tan Chorh Chuan, Prof John Wong, Prof Judith Swain.

### The GUSTO Study: Growing Up in Singapore Towards healthy Outcomes

GUSTO is a major, long-term study of pregnant Singaporean mothers and their fetuses, till GUSTO children reach at least 3 years of age - aimed at finding ways of preventing the onset of diseases in later years. Backed by mounting evidence that the environment in which a baby is conceived, born and grows up, determines the child's growth and development, KK Women's and Children's Hospital (KKH), and the National University Hospital (NUH) partnered SICS, A\*STAR to study and better understand just how profoundly environmental factors affect the development of diseases like diabetes.

The GUSTO birth cohort programme was launched in June 2009. This seminal effort was led by Associate Professor Chong Yap Seng, Associate Professor of Medicine, Department of Obstetrics & Gynaecology, Yong Loo Lin School of Medicine, National University of Singapore; Senior Consultant, Department of Obstetrics &

## **Annex B: A rich history of collaborations**

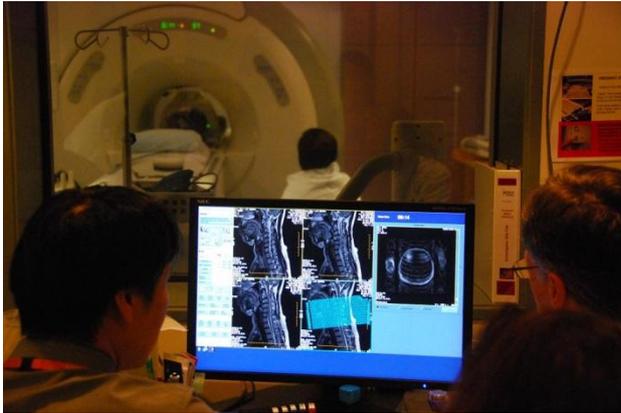
Gynaecology, National University Hospital, and Deputy Executive Director, Singapore Institute for Clinical Sciences (SICS), A\*STAR. The team recruited 1,247 expectant mothers in their 11<sup>th</sup> – 14<sup>th</sup> week of pregnancy over a period of 15 months for GUSTO. Altogether 1,176 GUSTO babies were safely delivered, with the youngest and last GUSTO baby born, very aptly, on Labour Day, 1 May 2011.

### *Successes & Outcomes*

- Over the past 4 years, GUSTO has come to establish a state-of-the-art cohort study with detailed protocol and high compliance. It is one of the most intensively studied cohorts in Asia of mothers and children, growing in strength in epigenetic analysis, and involves over 100 investigators in Singapore, the United Kingdom, New Zealand and Canada.
- GUSTO research has established techniques for performing MRI scans on infants without any need for sedation. With techniques for MRI assessments developed in GUSTO, NUH and KKH now use the same techniques in their routine clinical management, such that even very ill babies may be safely sent for MRI scans without any need for sedation. This has achieved a broader objective of changing clinical practice.
- GUSTO data shows a much higher incidence of gestational diabetes mellitus (GDM) than previously expected and informs clinical studies aimed at reducing rates of gestational diabetes, late preterm births, childhood obesity, allergies in children, neurodevelopment, and improved capacity for early school performance. We have found that higher glucose levels in expectant mothers - even in the absence of GDM – can still affect infant adiposity.
- GUSTO data also showed that changes in gene expression relating to mild prematurity are more important than those related to birth size, and this has major implications for future disease risk.
- By creating unifying research and an integrated basic and clinical disciplines platform, GUSTO has attracted considerable partnership with industry without compromising its academic objectives, and energised Singapore's thrust in nutritional sciences. The extent of industry funding, local and inter-department collaborations has made it possible to create jobs and develop human capital to build capabilities to conduct competitive translational and clinical research, and has attracted companies to Singapore as a hub for research and development.
- GUSTO researchers are proud to have contributed to the understanding that led to the United Nations Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable

## Annex B: A rich history of collaborations

Diseases (NCDs) in 2011 to focus on the developmental dimension (Clause 26).



GUSTO investigators excited to see some of the first MRI scans coming through clearly, while GUSTO mother patiently sits next to the MRI scanner – watching over her child – just 1 week old, and snugly sleeping through the procedure – without any need for sedation.



Facial imitation test on the *day of birth*, recorded on video for neurocognitive analysis

## Annex B: A rich history of collaborations

### SAMS: Singapore Adult Metabolism Study

#### **What is SAMS?**

SAMS is a set of studies – the first of which is an adult metabolism study of about 260 men to assess ethnic differences in the predisposition to metabolic diseases like diabetes and obesity. Led by Associate Professor Tai E Shyong<sup>6</sup>, SAMS studies adults with diabetes and/or obesity to evaluate the relative importance of developmental and genetic pathways in contributing to individual risk and the efficacy of weight loss interventions. It also examines the mechanism underlying insulin resistance on metabolic disease risk.

With the increased prevalence of obesity and diabetes in Singapore, there is a need to study the Asian phenotype as much information about these diseases originates from studies conducted in the west. Research however indicates that that Asians seem more prone to metabolic diseases at lower Body Mass Index (BMI), and also that different ethnic groups seem to be at different risk levels.

#### *Successes & Outcomes*

SAMS 1 is a cross-sectional study in all three ethnic groups (100 Chinese, 80 Malays and 78 Indian males, BMI 18-30 kg/m<sup>2</sup>) to examine associations between ethnicity, obesity and insulin resistance. This portion of the SAMS study has been completed and some discoveries include:

- Ethnic differences in the relationship between BMI (and fat) and insulin sensitivity – increased fat/BMI is more detrimental to insulin sensitivity in Chinese and Malays than Indians . This is replicated in muscle culture specimens, as well.
- Ethnic differences in energy metabolism – Indians and Malays have lower resting energy expenditure compared to Chinese.
- Ethnic differences in bone mineral density – Chinese have lower BMD at lumbar spine and hip compared to their Indian and Malay counterparts.

SAMS 2 is an interventional study in overweight/obese Chinese subjects (target sample size 180) with 16-week weight loss intervention to examine the role that birth weight might play in determining the phenotype associated with obesity. This study is ongoing.

- 
- <sup>6</sup> Associate Professor, Division of Endocrinology, Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore.
  - Head & Senior Consultant, Division of Endocrinology, Department of Medicine, National University Hospital
  - Associate Professor, Saw Swee Hock School of Public Health, National University of Singapore (joint appointment)
  - Associate Professor, Duke-NUS Graduate Medical School Singapore (joint appointment).

## **Annex C: Leadership at SiNMeD**

### **Professor Judith Swain**

- *Executive Director, Singapore Institute for Clinical Sciences (SICS), A\*STAR*
- *Lien Ying Chow Professor of Medicine at the Yong Loo Lin School of Medicine, National University of Singapore.*

Dr Judith L. Swain is currently the Executive Director of the Singapore Institute for Clinical Sciences within A\*STAR, and the Lien Ying Chow Professor of Medicine at the Yong Loo Lin School of Medicine, National University of Singapore. Prior to coming to Singapore she was the Dean for Translational Medicine and the Founding Director of the College of Integrated Life Sciences (COILS) at the University of California, San Diego. Dr Swain previously served as Chair of the Department of Medicine at Stanford University and held the Arthur Bloomfield and George E. Becker Professorships there. While at Stanford she was appointed the faculty representative to the Board of UCSF Stanford Healthcare. Prior to her appointment at Stanford, she was the Herbert C. Rorer Professor of Medical Sciences, Professor of Genetics, and Director of Cardiovascular Medicine at the University of Pennsylvania. Dr Swain received her undergraduate education at the University of California, Los Angeles, and her medical education at the University of California, San Diego. She trained in Internal Medicine and Cardiovascular Medicine at Duke University. She then joined the faculty at Duke where she became widely known in the field of molecular cardiology, and pioneered the use of transgenic animals to understand the genetic basis of cardiovascular development and disease. Her current research interests are centered on assessing and enhancing human performance in extreme environments. She co-founded a center (OptiBrain) with the goal of optimizing brain resources for performance in extreme environments. This center is collaboration between UC San Diego, the Naval Health Research Center (San Diego), and the U.S. Olympic Training Center.

In Singapore, Dr Swain serves on the Board of Directors of the National Healthcare Group, and on the NHG Board Committee overseeing the Institute of Mental Health. She also serves as a Member of the Governing Council of the Lee Kong Chian School of Medicine, Imperial College/NTU, and on the Academic Oversight Committee of that Council. Dr Swain has served in a number of national leadership roles in the U.S., including President of the American Society for Clinical Investigation, and President of the American Association of Physicians. She served on the NIH Director's Standing Committee on Clinical Research, the NIH National Advisory Research Resources Council and the NRC Commission to evaluate the organization of the National Institutes of Health. She served as a member of the Defense Science Research Council of DARPA, on the Board on Army Science and Technology, and as Chair of the Triennial Army Lifesciences and Medical Laboratory Review for the Assistant Secretary of the Army for Science and Technology. Dr Swain has served on international advisory committees including those of the Wellcome Trust, the British Heart Association, the UK Medical Research Council, and the Canadian Foundation for Innovation. She is a Director of Lexicon

## **Annex C: Leadership at SiNMeD**

Pharmaceuticals, and a member of the SAB for the Wyss Institute for Biologically Inspired Engineering at Harvard. She serves or has served as a director or a SAB member for a number of biomedical technology companies, and is co-founder of Synecor, LLC a medical device accelerator company. Dr. Swain has been elected to a number of honorary societies including the Association of American Physicians, the American Society for Clinical Investigation, Fellow of the American Association for the Advancement of Science, and the Institute of Medicine.

### **Associate Professor Yeoh Khay Guan**

- Dean, Yong Loo Lin School of Medicine, National University of Singapore*
- Associate Professor, Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore*
- Senior Consultant, Department of Gastroenterology & Hepatology*

Currently Dean of the School of Medicine at the National University of Singapore, Dr Yeoh practises as a Senior Consultant at the Department of Gastroenterology and Hepatology, National University Hospital (NUH).

Dr Yeoh's research interest is in enhancing the early detection of gastric and colorectal cancers. He is the Lead Principal Investigator of the Singapore Gastric Cancer Consortium, a national flagship research group, which aims to improve the outcomes for gastric cancer by early detection, improving treatment and advancing the understanding of gastric carcinogenesis. He has published over 120 peer-reviewed papers in international journals. He also chairs the National Colorectal Cancer Screening Committee of the Health Promotion Board, Ministry of Health, which recommends guidelines for the national colorectal screening programme in Singapore.

Associate Professor Yeoh received his MBBS (Bachelor of Medicine, Bachelor of Surgery) from NUS in 1987. He trained in internal medicine and gastroenterology at NUH. He is a Fellow of the Academy of Medicine, Singapore, Fellow of the Royal College of Physicians of London and Glasgow, and a member of the American Gastroenterology Association and American Society of Gastrointestinal Endoscopy. He also serves as a reviewer for several journals and grant funding agencies. He has received several international awards for his research work, including the Nishi-Takahashi Lectureship at the 9th International Gastric Cancer Conference in 2011 and the Emerging Leader Lectureship award by the Journal of Gastroenterology & Hepatology Foundation in 2006.

## **Annex C: Leadership at SiNMeD**

### **Associate Professor Chong Yap Seng**

- *Founding Director of SiNMeD*
- *Deputy Executive Director of SICS, A\*STAR*
- *Director of TCR Flagship Programme in Metabolic Diseases*
- *Associate Professor of Medicine, Department of Obstetrics & Gynaecology, Yong Loo Lin School of Medicine, National University of Singapore*
- *Senior Consultant, Department of Obstetrics & Gynaecology, National University Hospital.*

Dr Chong Yap Seng is a clinician-investigator with special interest in fetal growth and early development. He is Associate Professor of Medicine in the Department of Obstetrics & Gynaecology, Yong Loo Lin School of Medicine, National University of Singapore; Senior Consultant, Department of Obstetrics & Gynaecology, National University Hospital, and Deputy Executive Director, Singapore Institute for Clinical Sciences (SICS), Agency for Science, Technology and Research (A\*STAR). He is the Lead Principal Investigator of the National Research Foundation Translational and Clinical Research (TCR) Flagship Programme on Metabolic Disease, and the founding Director of the A\*STAR-NUS Singapore Centre for Nutritional Sciences, Metabolic Diseases, and Human Development.

Dr Chong's other research interests include strategies to promote breastfeeding, the molecular epidemiology of pregnancy-related disorders, and intrapartum and postpartum management issues. He has over 100 peer-reviewed publications, including articles in the *The Lancet*, *JAMA*, and *BMJ* and received more than \$25 million in competitive grant funding. He also has numerous collaborations with industry, particularly in the area of early human development and nutrition.

In his administrative role, Dr Chong heads the Medical Education Unit of the Yong Loo Lin School of Medicine and is actively involved in faculty development and mentoring, educational policy, as well as the promotion of academic medicine. His contributions to medical education have been recognized by university and national awards. He is an advisor to the World Health Organisation, and the Nature Publishing Group, and was one of a select panel of international judges (including the 2009 Nobel Laureate for Chemistry, Ada Yonath, and prominent oceanographer, Sylvia Earle) for the 2012 Google Science Fair.

Dr Chong is a Senior Consultant in the Department of Obstetrics & Gynaecology, National University Hospital (NUH). As the Consultant in charge of the Delivery Suite in NUH since 2001, Yap Seng balances interests in high-risk obstetrics with natural childbirth and breastfeeding advocacy.

## **Annex C: Leadership at SiNMeD**

### **Professor Sir Peter Gluckman**

- *Chief Scientific Officer, SICS, A\*STAR*
- *Chief Science Advisor, Office of the Prime Minister's Science Advisory Committee, New Zealand.*

Sir Peter Gluckman is an internationally renowned physician scientist (pediatric endocrinology) in developmental epigenetics and fetal and neonatal influences on the susceptibility to chronic diseases such as diabetes and obesity. He leads the EpiGen Consortium, which comprises six centres in three countries trying to progress developmental epigenetics to improve the human condition, and is also the Chief Scientific Advisor to the Prime Minister of New Zealand. In 2007, Sir Peter Gluckman was appointed Programme Director for Growth, Development and Metabolism at the Singapore Institute for Clinical Sciences. He also holds honorary chairs at National University of Singapore and the University of Southampton.

A University of Auckland Distinguished Professor, Sir Peter Gluckman is Professor of Paediatric and Perinatal Biology and was formerly Head of the Department of Paediatrics and Dean of the Faculty of Medical and Health Sciences, as well as, Director of the National Research Centre for Growth and Development. He was also the Founding Director of the Liggins Institute.

Sir Peter Gluckman's research has won him numerous awards and international recognition including Fellowship of the Commonwealth's most prestigious scientific organisation, The Royal Society (London). He is the only New Zealander elected to the Institute of Medicine of the National Academies of Science (USA) and the Academy of Medical Sciences of Great Britain. He was also made a Companion of the NZ Order of Merit for services to medicine and had received New Zealand's top science award, the Rutherford Medal.

Sir Peter Gluckman is the author of over 500 scientific papers and reviews and editor of eight books, including two influential textbooks in his subject area. He is passionate about communicating a better understanding of science in the community, and has co-authored two books for non-scientific audiences: *The Fetal Matrix* (2004) which summarises his ideas on how events in early life lead to altered disease risk in later life and *Mismatch - why our world no longer fits our bodies* (2006). He also developed Liggins Education Network for Science (LENScience) programme in the Liggins Institute, which is an elaborate programme of experiential involvement of school children in science.