

Research *for* **life**
annual report **08/09**



NMRC MISSION STATEMENT

**TO PROMOTE EXCELLENCE IN
TRANSLATIONAL AND CLINICAL RESEARCH,
NURTURE A VIBRANT RESEARCH COMMUNITY
OF CLINICIANS AND SCIENTISTS IN
SINGAPORE, AND ENHANCE KNOWLEDGE
EXCHANGE TO IMPROVE HUMAN HEALTH.**

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EXECUTIVE CHAIRMAN'S MESSAGE



PROFESSOR EDWARD HOLMES

"NMRC'S EFFORTS IN THREE KEY AREAS: HUMAN CAPITAL, RESEARCH GRANT PROGRAMMES AND INFRASTRUCTURE."

TAKING STOCK

Singapore's Biomedical Sciences (BMS) initiative was launched in 2000 with the objective of fostering the development of a world-class biomedical sciences sector in Singapore to improve the health of Singaporeans and to contribute to the economic well being of the country. As we approach the end of BMS Phase II, it is timely for NMRC and its stakeholders to take a step back and assess what progress has been made and what lies ahead.

The National Research Foundation (NRF)—one of the major funders of NMRC along with MOH—conducted a review of NMRC's Translational and Clinical Research (TCR) initiatives in November 2009. Acknowledging that the initiative is still in its early days, the review nonetheless gave a positive endorsement of NMRC's efforts to date in three key areas:

Human Capital

NRF's review panel lauded Singapore's efforts to build up human resources in terms of clinician scientists and clinician investigators. The panel pointed out that these individuals are the thought leaders who guide the TCR research programmes, educate the next generation of academic physicians, attract biomedical companies to invest here and, ultimately, help to improve the quality of healthcare within the country and across the region. These individuals are the lifeblood of our translational and clinical research programmes.

The panel noted the significant progress that has been made to develop local talent and recruit judiciously from overseas in building the pool of clinician scientists and clinician investigators. The panel commented on the exceptional quality of individuals supported through the STaR and CSA awards. While it was noted that Singapore has not yet built up the cohort of clinician scientists and clinician investigators to a critical mass, it is well on its way, and the panel strongly recommended that the national effort to build human capital in these areas should continue and be expanded to reach a size comparable to that in well established academic medical centres abroad.

Research Grant Programmes

Focusing primarily on the TCR Flagship Programmes, the NRF review panel noted that the disease areas being addressed by these programmes are positioned to address important health care needs of Singaporeans and they are focused on specific disorders where Singapore can assume a world leadership role in TCR. While the TCR Flagship Programmes are still quite new, the panel found that all are making good progress and are showing real promise for delivering concrete healthcare benefits. The NRF report also noted that the TCR Flagship Programmes play a critical role in attracting pharmaceutical, biotech, and medical device companies to Singapore. These programmes were recognised to have impact well beyond Singapore due to their focus on Asia-centric diseases, with Singapore serving as a window into the rest of the region.

The panel recognised the efforts that NMRC has made to ensure rigorous competitive peer review of all its grant programmes and recommended that NMRC continue this policy to provide its funders with the needed confidence to sustain support for these programmes in the future.

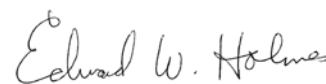
Infrastructure

In assessing NMRC's support for infrastructure that is critical to the TCR mission, the NRF review panel highlighted two areas as particularly successful and critical for the future, namely the two investigational medicine units (IMUs) and the Singapore Clinical Research Institute (SCRI). These programmes make important contributions to Singapore's ability to do investigational medicine and clinical trials. In addition to assessing which new therapies or devices are safe and effective in man, this infrastructure allows researchers in Singapore to study the basic biology underpinning human disease, develop new therapeutic strategies, and generate new knowledge that improves health care delivery and in partnership with the private sector provides good economic returns on Singapore's investment in TCR.

The combination of the two IMUs at the Kent Ridge and Outram campuses, together with the SCRI, provides capabilities that are unique in this region, and this has given Singapore a head-start over other countries in the region that are attempting to build a biomedical research ecosystem.

LOOKING AHEAD

NMRC is heartened by the positive feedback from the NRF report, and we hope that it will provide assurance to the various government agencies that had the vision, confidence and commitment to launch the TCR initiative in 2006. Looking ahead to BMS Phase III, there is a major opportunity to realise even greater returns in improved health care and economic impact through further integration between the basic biomedical research community and the translational and clinical research community. While Singapore has made excellent progress in building an internationally respected biomedical ecosystem spanning from basic to translational and clinical research in a short period of time, the commitments made in BMS phases I and II will need to be sustained and the programs which were launched allowed to reach their potential for Singapore to realise the fullest return on the investments that have already been made. With the benefit of the long term vision which is characteristic of the Singapore government and a highly collaborative, strong biomedical sciences community, this potential can be a reality in the not too distant future.



PROF EDWARD HOLMES
Executive Chairman



EXECUTIVE DIRECTOR'S MESSAGE



DR EDWIN LOW

"ON THE RIGHT COURSE FOR THE CONTINUED EVOLUTION OF SINGAPORE'S MEDICAL RESEARCH SECTOR TOWARDS A BRIGHT FUTURE FULL OF OPPORTUNITY."

The 2008–2009 financial year paired challenging circumstances with exciting opportunities as we continued to push ahead with our mandate to lead, coordinate and fund medical research in Singapore. The emergence of the H1N1 pandemic in 2009 created quite a challenging situation that required a rapid response and grant call on our part. While unexpected, this bump in the road did not push us off course, and we successfully pushed ahead with a number of important projects as part of our strategy to foster a comprehensive and integrated national approach to medical research in Singapore.

BUILDING A SOLID FOUNDATION

Talent development has been and remains one of our key priorities. As of the end of 2009, we have had seven awardees under our Singapore Translational Research (STaR) Investigator Awards programme, which enables us to recruit and nurture world-class clinician scientists to undertake cutting-edge translational and clinical research here. Another 15 clinician scientists have benefited from our Clinician Scientist Award (CSA) programme, which provides funding to give local researchers protected time to focus on their research.

Overall, we have made good progress to date, with approximately 85 clinician scientists working in Singapore as of end-2009, and we are committed to significantly increasing this number over the next five years as we continue to invest in the development of a strong research community.

We also made good advances in our efforts to boost the infrastructure for clinical research and clinical trials in Singapore. The launch of the Singapore Clinical Research Institute (SCRI) in September 2008 and the opening of two Investigational Medicine Units (IMUs) under SingHealth and the National University Health System in June 2009 and October 2009, respectively, represent significant headway in building up capabilities for early stage (Phase 1 to 2a at the IMUs) and late stage (Phase 2b to 3 at SCRI) clinical trials.

ENGAGING THE PUBLIC

One of our key projects launched over the past financial year is a public engagement initiative aimed at raising awareness about clinical trials within Singapore, which dovetails with our infrastructure development in this area. This initiative was driven in part by the results of two major surveys that we conducted in December 2008 and January 2009, both of which found quite low levels of awareness regarding clinical trials, and even lower participation rates.

As part of our strategy to further develop Singapore as a regional hub for clinical trials—since they are a critical component of the medical research process and they go hand-in-hand with the other areas of our growing medical research industry—it is important that we educate people about them and encourage higher participation rates. To support our public engagement efforts, Mrs Carmee Lim was appointed as the first non-medical member of the NMRC Board in 2009 to represent the views of the layperson and ensure that our messages are getting across in a manner and language that is widely accessible.

TAKING IT TO THE NEXT LEVEL

Having made good headway in laying a foundation for medical research in Singapore in terms of infrastructure, human capital and research programmes, our focus moving forward will be on greater integration of these elements. Keeping in mind that some projects remain very much in their early stages, we will place more emphasis on research that can generate both tangible improvements in healthcare and positive economic results. In line with this objective, we have already phased out our non-competitive institutional block grants (IBGs) and replaced them with competitive centre grants (CGs) and programme project grants (PPGs). With this transition, more than 90% of our grants are now competitive, and we are confident that this will help ensure that we are supporting the best possible research.

Highlighted in this annual report are some of the many exciting projects and initiatives that we are driving with the continued support of our partners in the research and medical communities. While there will always be more work to be done, we believe that we are on the right course for the continued evolution of Singapore's medical research sector towards a bright future full of opportunity.



DR EDWIN LOW
Executive Director

ABOUT US



MINISTRY OF HEALTH
SINGAPORE

NMRC *National Medical
Research Council*
Singapore

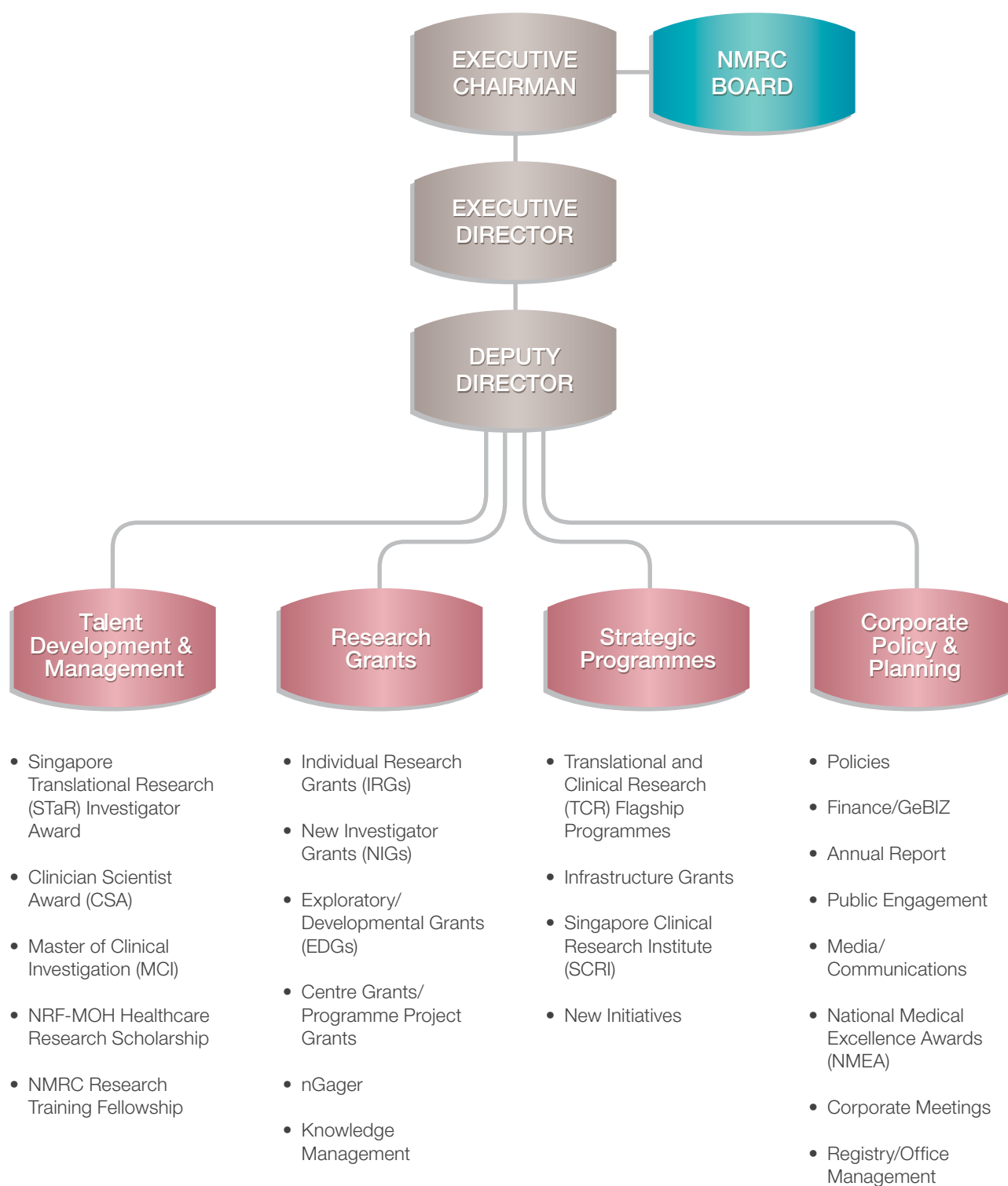
The National Medical Research Council, established in 1994, oversees the development and advancement of translational and clinical research in Singapore. It provides competitive research funds to publicly funded healthcare institutions, awards competitive research funds for programmes and projects, provides support for critical infrastructure for clinical research, and is responsible for the development of clinician-scientists through awards and fellowships.

In 2006, the Ministry of Health established a new mandate to support translational and clinical research in areas where Singapore has great potential. With this in mind, NMRC's role is ever more important in the leading, promotion, co-ordinating and funding of translational and clinical research in Singapore.

NMRC-funded research has led to inter-disciplinary partnerships and international collaborations. The Council also evaluates the outcomes of the research projects and facilitates the commercialisation of research findings.

Since its inception, it has built up the translational and clinical research capabilities in Singapore through the funding of more than 1,500 competitive research projects and five Translational and Clinical Research Flagship Programmes. NMRC has also supported over 200 clinicians with scholarships, fellowships and various talent development awards, and is highly involved in building critical clinical research infrastructure and developing a conducive environment for the industry's continued growth.

ORGANISATION CHART



NMRC PORTFOLIO IN A SNAPSHOT



TALENT DEVELOPMENT PROGRAMMES

In order to grow and anchor the pool of clinician scientists in Singapore, NMRC offers a range of talent development programmes aimed at supporting individuals in their research and career progression. These programmes include:

- Singapore Translational Research (STaR) Investigator Award
- Clinician Scientist Award (CSA)
- Master of Clinical Investigation (MCI)
- NRF-MOH Healthcare Research Scholarship
- NMRC Research Training Fellowship

RESEARCH GRANTS

NMRC directly supports research initiatives through a series of competitive grants. These grants are defined as either strategic/thematic or investigator-led, allowing NMRC to support both specific areas of research, as well as promising individual researchers. The grants include:

- Strategic/Thematic
 - Translational & Clinical Research Flagship Programme
 - Centre Grant
 - Programme Project Grant
- Investigator-led
 - Individual Research Grant (IRG)
 - Exploratory/Developmental Grant (EDG)
 - New Investigator Grant (NIG)



Artist's Impression of Pathology Building at Outram Campus



INFRASTRUCTURE GRANTS

To ensure that Singapore has the hard and soft infrastructure needed to support a thriving translational and clinical research sector, NMRC provides grants to develop the institutions that will form the backbone of Singapore's future medical research success. Recipients of these grants include:

- Singapore Clinical Research Institute (SCRI)
- Investigational Medicine Units (IMUs) at SingHealth Services (SHS) and National University Hospital System (NUHS)
- Research Buildings at Outram and Kent Ridge Campuses
- Centre for Biomedical Ethics (CBmE)

Artist's Impression of Centre for Translational Medicine at Kent Ridge Campus



NMRC BOARD



PROF EDWARD HOLMES
Executive Chairman
National Medical Research Council



DR EDWIN LOW
Executive Director
National Medical Research Council
(Ex-Officio)



PROF DONALD TAN
Singapore National Eye Centre/
Singapore Eye Research Institute



PROF IVY NG
SingHealth Services/
KK Women's and
Children's Hospital



PROF JOHN WONG
National University
Health System/ National University
of Singapore



PROF EDISON LIU
Genome Institute of Singapore



DR MABEL YAP
Ministry of Health



**A/PROF CHONG
SIOW ANN**
Institute of Mental Health



PROF LEE ENG HIN
Biomedical Research Council



PROF WONG TIEN YIN
Singapore National Eye Centre/
Singapore Eye Research Institute



A/PROF ALLEN YEOH
National University of Singapore



**PROF RANGA
KRISHNAN**
Duke-NUS Graduate
Medical School



MRS CARMEE LIM
MindChamps



**PROF ALASTAIR
CAMPBELL**
National University of Singapore



DR ALEX MATTER
Experimental Therapeutics Centre



**PROF JAN
CARLSTEDT-DUKE**
Nanyang Technological University



**PROF PATRICK
SISSONS**
Cambridge University



**PROF ROBERT
SANDERS WILLIAMS**
Duke University



DR JOHN POTTER
Fred Hutchinson
Cancer Research Centre

PROFESSOR BARRY COLLER (Rockefeller University) – served on NMRC Board with distinction from Nov 2006 – Sep 2009.

NMRC would like to congratulate Professor Coller on his new appointment to the Advisory Council of the National Heart, Lung and Blood Institute (NHLBI), and thank Professor Coller for his many contributions and guidance over the three years.

OUR NEW BOARD MEMBERS SPEAK



MRS CARMEE LIM

As one of the newest members of the NMRC Board, Mrs Carmee Lim also stands out for being the only member without a medical background. Brought in specifically to provide a layperson's perspective, Mrs Lim also contributes her extensive knowledge in public education. *"When the Permanent Secretary for Health asked me to join the NMRC Board, she said that she just wanted me to ask questions and provide an outsider's view,"* she says. Mrs Lim plans to put her experience to work in making Singaporeans more aware of the importance and value of participating in clinical trials. *"We're working on a strategy to make Singaporeans more aware of and interested in joining clinical trials. This will be an important step in establishing Singapore as a centre for medical research and testing."*



A/PROF ALLEN YEOH

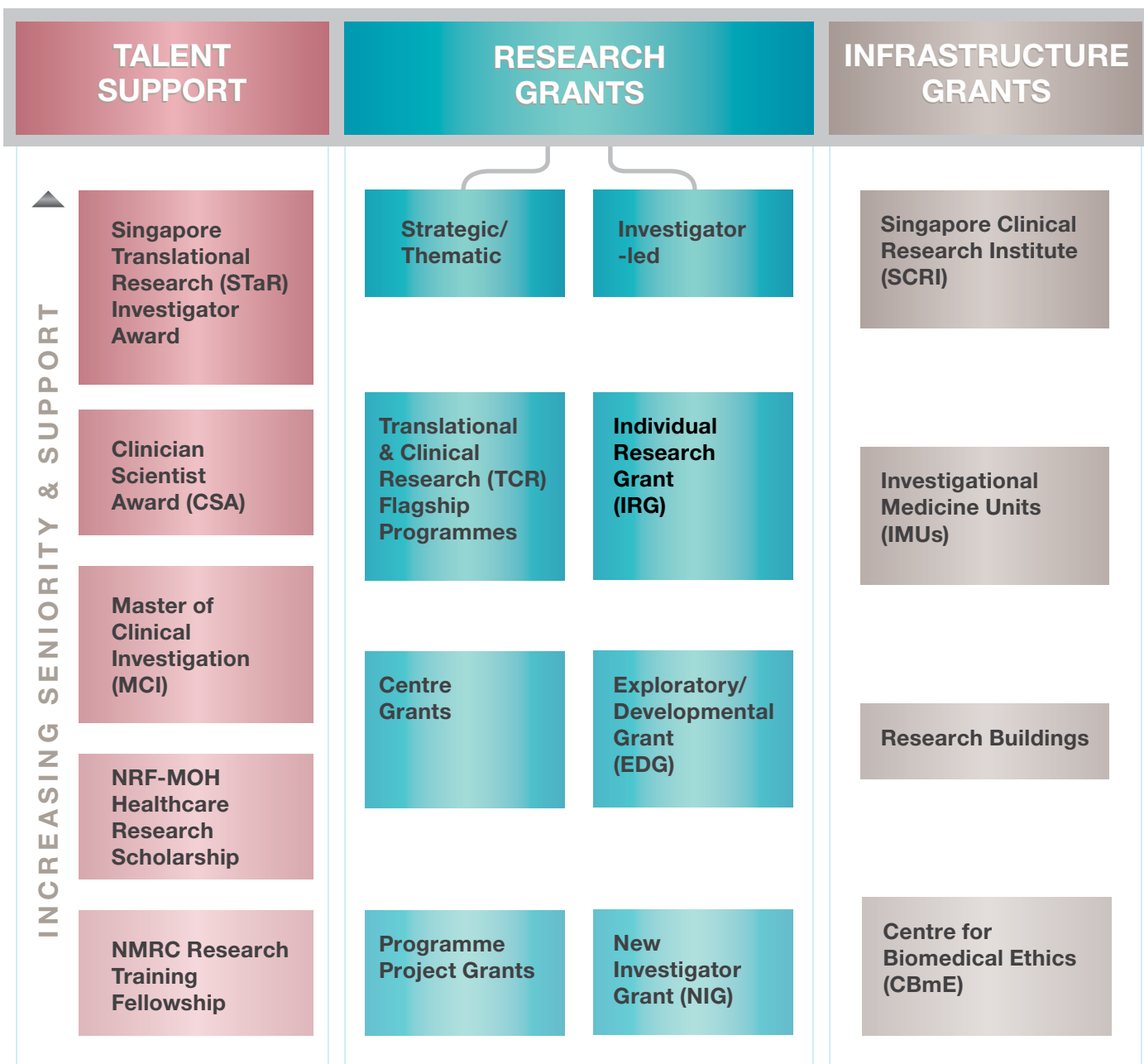
A product of the NMRC system, A/Prof Allen Yeoh has a special appreciation for the assistance that the Council provides to clinician scientists in Singapore. He brings this experience and perspective to his activities as a Board member, where he hopes to highlight ways that NMRC can help young doctors become good researchers, as well as assisting NMRC in improving the public awareness of and support for clinical research and clinical trials. *"A passion for research is insufficient by itself,"* says A/Prof Yeoh. *"A supportive environment is needed to nurture high-level research, including the availability of funding and a critical mass of researchers to provide peer review, mentoring and a competitive funding environment."* That said, A/Prof Yeoh points out that the improvements over the past 10 years have been huge, and that Singapore is much more supportive of clinical research than in the past. However, there is much more to be done, and he hopes to play his part in pushing things forward in the coming years as a member of the NMRC Board.



PROF RANGA KRISHNAN

"As we and others train more clinician scientists and develop programmes to encourage and foster them with mentors, career planning and other types of support, the training environment will become very positive," says Prof Ranga Krishnan, Dean of the Duke-NUS Graduate Medical School and one of the newest members of NMRC Board. Indeed, Prof Krishnan sees the development of a clear and rewarding career pathway for clinician scientists as a crucial element to building up the research environment in Singapore—part and parcel of which is finding ways to make more time and funding available for research. Prof Krishnan hopes to use his background and membership on the Board to provide a hands-on perspective of how to balance clinical and research efforts, while also making the resources of the Duke-NUS Graduate Medical School available to support the growth of Singapore's pool of clinician scientists.

NMRC GRANT SUPPORT FRAMEWORK



TIMELINE OF ACTIVITIES

May 2008

Research Grants Individual Research Grants

- 24 grants totalling \$16.67m

Exploratory/ Developmental Grants

- 15 grants totalling \$2.7m

New Investigator Grants

- 17 grants totalling \$2.8m

Talent Development Awards

NMRC Research Training Fellowships
- 5 awarded

Master of Clinical Investigation (MCI)
- 7 awarded

July 2008

Talent Development Awards

NRF-MOH Healthcare Research Scholarship
- 1 awarded

November 2008

Research Grants Individual Research Grants

- 23 grants totalling \$16.45m

Exploratory/ Developmental Grants

- 14 grants totalling \$2.7m

New Investigator Grants

- 12 grants totalling \$2.3m

January 2008

Infrastructure Grants

Centre for Biomedical Ethics (CBmE)

June 2008

Infrastructure Grants

Singapore Clinical Research Institute (SCRI)

September 2008

Infrastructure Grants

- Two **research buildings**; one at Kent Ridge (NUHS) and one at Outram (SingHealth)

- Two **Investigational Medicine Units**; one at Kent Ridge (NUHS) and one at Outram (SingHealth)

December 2008

Research Grants Translational and Clinical Research Flagship Programmes

- A/Prof Chong Yap Seng, National University of Singapore
- **Metabolic Diseases**

- A/Prof Leo Yee Sin, Tan Tock Seng Hospital
- **Infectious Diseases**

Talent Development Awards

NRF-MOH Healthcare Research Scholarship
- 1 awarded



F R O M 2 0 0 8

February 2009

Talent Development Awards
NMRC Research Training Fellowships
 - 1 awarded

April 2009

Talent Development Awards
NMRC Research Training Fellowships
 - 1 awarded

June 2009

Talent Development Awards
CSA (Senior Investigator)
 - Dr Joseph Wee Tien Seng, National Cancer Centre
 - A/Prof Tai E Shyong, National University Health System
 - A/Prof Mahesh Choolani, National University Health System
CSA (Investigator)
 - Dr Ling Khoon Lin, Singapore General Hospital
 - Dr Dan Yock Young, National University Health System
 - Dr Chen I-Cheng Mark, Tan Tock Seng Hospital

August 2009

Talent Development Awards
NMRC Research Training Fellowships
 - 1 awarded
NRF-MOH Healthcare Research Scholarship
 - 1 awarded

March 2009

Talent Development Awards
NMRC Research Training Fellowships
 - 6 awarded
NRF-MOH Healthcare Research Scholarship
 - 1 awarded

May 2009

Research Grants
Individual Research Grants
 - 19 grants totalling \$17.7m
Exploratory/Developmental Grants
 - 16 grants totalling \$2.8m
New Investigator Grants
 - 16 grants totalling \$2.8m
Talent Development Awards
NRF-MOH Healthcare Research Scholarship
 - 1 awarded
Master of Clinical Investigation (MCI)
 - 6 awarded

July 2009

Talent Development Awards
NRF-MOH Healthcare Research Scholarship
 - 1 awarded

October 2009

Talent Development Awards
STaR (Investigator)
 Prof H. Phillip Koeffler, National University of Singapore
 Prof David Bruce Matchar, Duke-NUS Graduate Medical School Singapore
 Prof Teh Bin Tean, National Cancer Centre Singapore
CSA (Senior Investigator)
 - Dr Lee Soo Chin, National University Health System
CSA (Investigator)
 - Dr Jerry Chan Kok Yen, National University Health System
 - Dr Toh Han Chong, National Cancer Centre
 - Dr Louis Tong, Singapore National Eye Centre



TALENT DEVELOPMENT PROGRAMMES



With biomedical sciences identified as one of the key pillars of Singapore's economy, the development of a critical mass of world-class clinical and translational research scientists has become a priority. Clinician scientists provide not only the critical intellectual inputs for clinical and translational research programmes, but also the knowledge and innovation to support the academic community, biomedical companies and pharmaceutical research and development programmes.

To meet this need and with funding support from the National Research Foundation, NMRC has implemented a range of talent development programmes aimed at nurturing clinician scientists in Singapore. Together with good research infrastructure and institutional support, these programmes form the foundation upon which Singapore's biomedical sciences sector will flourish.

Comprising programmes to address the various stages of a clinician scientist's career, NMRC's talent development efforts include the STaR Investigator Award, which aims to draw leading researchers from around the world to Singapore, through to the MCI and research training fellowship programmes, which support the training of clinician scientists.

NMRC AWARDS CEREMONY 2008 & 2009

The NMRC Awards Ceremony is held annually to celebrate the recipients of NMRC's awards for that year, including STaR Investigator, CSA, scholarship and fellowship awardees. Hosted by the Permanent Secretary for Health and A*STAR's Chairman, the event is an opportunity for the medical research community in Singapore to come together and recognise its efforts and achievements, as well as reaffirm the importance of clinical research to Singapore's biomedical and healthcare sectors.



SINGAPORE TRANSLATIONAL RESEARCH (STaR) INVESTIGATOR AWARD

The prestigious STaR Investigator Award is designed to recruit and nurture world-class clinician scientists to undertake cutting-edge translational and clinical research in Singapore. The STaR award includes funding for the researcher's salary, an annual budget for research support, and a one-time start-up grant. The funding of a STaR award runs for five years.

There were three STaR awards given out in 2009, adding to the inaugural batch of four awardees from 2008. The seven STaR awardees are conducting research in such diverse fields as cancer treatment and stem cells, optimising health services and systems, and retinal diseases.



PROF. H. PHILLIP KOEFFLER

*Professor, Department of Medicine, National University of Singapore (NUS)
Deputy Director (Research), National University Cancer Institute, Singapore (NCIS)
Senior Consultant, Department of Haematology-Oncology, NCIS
Senior Principal Investigator, Cancer Science Institute of Singapore, NUS*

Area of Work:

RESEARCH AND EDUCATION – CANCER FOR THE 21ST CENTURY

Before coming to Singapore, Prof. H. Phillip Koeffler was the Director of the Division of Hematology/Oncology at Cedars-Sinai Medical Centre and holder of the Mark Goodson Chair in Oncology Research at Cedars-Sinai.

Prof. Koeffler aims to foster the development of cancer research and education for young investigators in Singapore. He will also mentor post-doctorates and students by encouraging the formation of multidisciplinary tumour boards, cancer-related focus groups, and a weekly lecture series by various laboratories in order to discuss basic science and translational science related to cancer. Prof. Koeffler will also look into providing a laboratory framework to allow post-doctorates and students to gain exposure to the latest technologies for analysing cancer-related issues.

Prof. Koeffler's research endeavours to identify unique genomic abnormalities of selected Asian cancers, and to explore the biologic and clinical significance of PAX5 deletions, mutations and fusion products in acute leukaemia. He will continue to interact with various pharmaceutical companies and academic institutions around the world to test both old and new drugs for new purposes and for their potential anti-cancer activity by taking advantage of a large array of cancer cell lines and xenograft models, as well as appropriate knock-in and knock-out mice.

PROF DAVID BRUCE MATCHAR

Inaugural Director and Professor of the Programme in Health Services and Systems Research, Duke-NUS Graduate Medical School Singapore

Area of Work:

OPTIMISING HEALTH SERVICES AND SYSTEMS TO PROMOTE HUMANE, EFFECTIVE, SUSTAINABLE HEALTHCARE

Prof David Matchar is currently the Inaugural Director and Professor of the Programme in Health Services and Systems Research, which is one of the five Signature Research Programmes of the Duke-NUS Graduate Medical School. Prior to arriving in Singapore in August 2008, Prof Matchar was a Professor in the Department of Internal Medicine (General Internal Medicine) at Duke University Medical Centre. He is a practicing internist and has extensive experience in health services research, as director of the Centre for Clinical Health Policy Research, and the Evidence-based Practice Centre at Duke University Medical Centre.

Prof Matchar's research relates to clinical practice improvement—from the development of clinical policies to their implementation in real-world clinical settings. His major content focus has been on cerebrovascular disease and other disabling neurological conditions. His work also covers a broad range of clinical issues including cardiovascular disease, mental health, and oncology. His work bridges biomedical research and technical analysis, including simulation modelling, to inform public policy and clinical practice in Singapore—and in doing so provides models for healthcare systems in other countries.

Another part of Prof Matchar's role will be to oversee the Lien Centre for Palliative Care—a collaborative entity jointly formed by Duke-NUS, the Lien Foundation, the National Cancer Centre Singapore and the SingHealth Group to promote better practices in the care for the dying.



PROF TEH BIN TEAN

Director, NCCS-Van Ander Research Institute

Area of Work:

TRANSLATIONAL CANCER RESEARCH

Prior to his arrival in Singapore, Prof Teh was a Distinguished Scientific Investigator at the Van Andel Research Institute (VARI) in the US, the highest academic ranking at the institute. In 2007, he established a joint translational research laboratory at the National Cancer Centre Singapore (NCCS) with VARI.

Prof Teh is one of the world's leading kidney cancer research scientists and a pioneer in molecular profiling of kidney cancer. He will be helping to establish a hereditary cancer clinic and a molecular diagnostics laboratory at NCCS. With the identification of the genes responsible for all major hereditary cancer syndromes and the increasing awareness of local physicians and patients concerning the hereditary nature of cancers, there is a strong need for such a clinic in the region. Genetic testing, coupled with proper genetic counselling, will provide both psychological and physical benefits to patients and their family members.

In research, Prof Teh will focus on cancer drug resistance studies and assist in other ongoing translational research programmes such as the one on pancreaticobiliary cancer. He will also mentor clinician scientists, bench scientists and medical students (through appointment with Duke-NUS Graduate Medical School), and help establish key regional and international collaborations in translational cancer research that will enhance the status of Singapore as the regional hub for translational cancer research.



CLINICIAN SCIENTIST AWARD (CSA)

The CSA is structured to develop local research talent and give clinician scientists valuable protected time to focus on their research. The Senior Investigator (SI) level of the CSA offers funding for up to five years and caters to senior doctors who are already actively involved in highly productive research. The Investigator (Inv) level offers funding for three years and targets younger doctors with the potential to become independent investigators. The CSA provides funding for full salary support, together with a competitive research grant.

In 2009, 10 CSAs (four at the SI level) were awarded, adding to Singapore's growing pool of clinician scientists.

DR JOSEPH WEE – CSA (SI)

*Senior Consultant, Department of Radiation Oncology, National Cancer Centre Singapore (NCCS)
Adjunct Associate Professor, Duke-NUS Graduate Medical School Singapore*

Area of Research:

NASOPHARYNGEAL CANCER

Nasopharyngeal cancer, or NPC, affects about 400 Singaporeans each year. It ranks sixth in cancer incidences among all male Singaporeans, and is endemic in southern China and Southeast Asia. Dr Wee and his team are embarking on a Phase III clinical trial, which will test the effectiveness of treating locally advanced Stage 3 and 4 NPC patients using a combination of three new chemotherapy drugs administered before chemo-radiotherapy.

This research builds on previous trials on incurable NPC patients conducted at NCCS. The results of these trials using these three new drug combinations showed an improvement in median survival from 12 months previously to 18.5 to 24 months currently for this incurable cohort of patients. Dr Wee's study hopes to increase the cure rate and overall survival by about 15% for those with locally advanced but potentially curable NPC.



A/PROF TAI E SHYONG – CSA (SI)

*Associate Professor, Department of Medicine, NUS Yong Loo Lin School of Medicine
Senior Consultant, Division of Endocrinology, University Medicine Cluster, National University Health System*

Area of Research:

CAUSES AND EFFECTS OF OBESITY, HIGH BLOOD PRESSURE, DIABETES AND HIGH CHOLESTEROL IN SINGAPORE

Heart disease is the second most common cause of death in Singapore, yet it has been estimated that about 90% of heart attacks can be prevented by altering the levels of risk factors such as smoking, high blood pressure, diabetes and high cholesterol.

A/Prof Tai will carry out a study to look for new genes involved in high cholesterol, obesity, blood pressure and abnormalities of blood vessels. This information will be combined with that from other studies to try to better understand some of the biological processes leading to the development of these disorders. It is expected that knowledge of these pathways will contribute to the development of novel treatments for these disorders.

In the second project, the team will look at how high density lipoprotein (HDL) protects individuals from heart disease. By studying the role and functions of these proteins, the research team hopes to be able to assess the risk of heart disease for an individual more precisely than by measuring HDL cholesterol alone, which is the current standard practice.





A/PROF MAHESH CHOOLANI – CSA (SI)

*Associate Professor, Department of Obstetrics and Gynaecology, NUS Yong Loo Lin School of Medicine
Senior Consultant, Department of Obstetrics and Gynaecology, National University Hospital, National University Health System*

Area of Research:

PRENATAL DIAGNOSIS

Currently, prenatal diagnosis for fetal abnormalities such as Down syndrome and thalassaemia usually require invasive testing by amniocentesis (taking fluid from the womb) and chorionic villus sampling (sampling a small segment of the placenta). As both tests are invasive, they carry a small but significant risk of fetal miscarriage. This risk causes considerable parental anxiety and in many cases parents choose not to opt for the test based on this fear.

Dr Choolani's team has identified the ideal fetal cell type for non-invasive prenatal diagnosis (NIPD)—the [MC] epsilon-globin-positive fetal [MC] primitive erythroblast ([MC] nucleated red blood cell). The team plans to take their work further by determining the accuracy of new methods they have developed to harvest these cells from maternal blood. In addition, the team plans to develop novel ways to multiply these cells by special culture methods, and to multiply this material many fold. This will enable doctors to use advanced technology to diagnose fetal abnormalities while still in the mother's uterus without an invasive procedure that carries the risk of miscarriage.

DR LEE SOO CHIN – CSA (SI)

*Senior Consultant, Department of Haematology-Oncology, National University Cancer Institute, Singapore (NCIS), National University Health System
Adjunct Research Fellow, Cancer Science Institute of Singapore (CSI), National University of Singapore*

Area of Research:

BREAST CANCER

Most breast cancer patients require drug treatment, but inter-individual differences in treatment response and toxicities exist, and there are currently no reliable tests to select the best drug to individualise therapy. Development of predictive markers to guide treatment is therefore critical to improve treatment outcome, reduce unnecessary side effects, and limit health costs. In addition, there is pressing need for novel treatments to improve outcomes.

The main themes of Dr Lee's breast cancer programme are to (1) develop biomarkers to predict response and toxicity to anti-cancer agents and (2) develop novel approaches to therapy. Building on previous work by the team, the current research programme will continue to design and conduct clinical trials, along with systematic collection of biological samples from patients. Dr Lee and her research team intend to distinguish their programme from others internationally through development of less expensive therapies that focus on academic drug development in areas of non-commercial interest to pharmaceutical companies.





DR LING KHOON LIN – CSA (INV)

Consultant, Department of Gastroenterology & Hepatology, Singapore General Hospital

Area of Research:

HELICOBACTER PYLORI GASTRITIS AND GASTRIC CANCER

Gastric cancer is a common cause of cancer death in Singapore and globally. It is thought that about 90% of all gastric cancers are caused by the bacterium *Helicobacter pylori*. About 50% of the world's population and about 30% of all Singaporeans have an active *H. Pylori* infection, but only 2% to 3% of them will go on to develop gastric cancer. It is thought that the exact composition of immune cells and proteins that contribute to this inflammation varies from one person to another and it is this which determines a person's risk of developing gastric cancer.

Dr Ling's research will study the patient's immune response to *H. Pylori* and if certain immune cells or proteins can be used to identify patients at risk of developing pre-malignant or malignant gastric lesions. This would then identify high-risk patients who may benefit from surveillance endoscopy. The research also aims to identify immune pathways that could be targeted by therapeutic agents to reduce patients' cancer risk.

DR DAN YOCK YOUNG – CSA (INV)

*Assistant Professor, Department of Medicine, NUS Yong Loo Lin School of Medicine
Consultant, Department of Gastroenterology and Hepatology, University Medicine Cluster, National University Health System*

Area of Research:

HARNESSING LIVER CELLS FOR THE TREATMENT OF LIVER DISEASES

Liver disease as a whole, including liver cancer, is among the top 10 causes of death in Singapore. To date, the only cure for progressive severe liver failure is liver transplantation. However, liver transplantation in Singapore is limited by the availability of donors.

Dr Dan's team hopes to harness liver "stem" cells isolated and grown in the laboratory from various sources such as placenta, bone marrow and fetal liver. These cells can then be expanded to meaningful numbers and induced to work as useful functional liver cells that can replace part of an injured liver. In addition, they may also be incorporated in an artificial liver dialysis device to take over the functions of the liver, while waiting for the injured liver to recover or stabilise.

More importantly, the availability of these cells will allow researchers to better understand diseases such as Hepatitis B and C infections, drug-induced liver diseases, and even liver cancer. It will also assist in drug development to treat many of these conditions.





DR CHEN I-CHENG MARK – CSA (INV)

*Registrar, Communicable Disease Centre, Tan Tock Seng Hospital
Duke-NUS Graduate Medical School Singapore*

Area of Research:

EPIDEMIOLOGY AND MODELLING THE TRANSMISSION OF INFECTIOUS DISEASES SUCH AS SARS AND INFLUENZA WITHIN THE HOSPITAL ENVIRONMENT

Infectious diseases can cause explosive outbreaks, such as the rapid spread of SARS in 2003 and, more recently, the emergence of the new H1N1 influenza strain in 2009. This underscores the need to be constantly improving our understanding of infectious disease threats and the best way to deal with them.

In this study, Dr Chen's research team aims to develop simulation models that promote an understanding of how an infectious disease like SARS or pandemic influenza might spread within a hospital. By exploring various intervention strategies such as vaccination, drug treatment, and use of protective measures, these simulation models will help to design strategies that best protect the staff and patients of the hospital as well as the wider community in the event of another outbreak.

The team's efforts can also be extended and combined with other work that models transmission in the community to look in totality at how best to protect Singapore and reduce the impact of new and existing infectious disease threats. In the long run, this will translate to better understanding of infectious diseases and the options available for protecting public health.

DR JERRY CHAN – CSA (INV)

*Associate Consultant, Department of Reproductive Medicine, KKH
Assistant Professor, Programme of Cancer and Stem Cell Biology,
Duke-NUS GMS
Adjunct Assistant Professor, Department of Obstetrics and Gynaecology, NUHS*

Area of Research:

INTRA-UTERINE GENE THERAPY

Monogenic diseases are single-gene defects characterised by the absence of critical proteins. Certain conditions damage the developing fetus in utero. Intra-uterine gene therapy (IUGT) aims to correct the genetic defect, permitting the production of the missing protein, early enough to avoid irreversible organ damage, fetal loss, and rejection of the gene-delivery vehicle by the recipient's immune system.

Dr Chan's research team is focused on developing a clinically relevant model of IUGT for monogenic diseases. Proof-of-concept evidence has largely resulted from rodent, canine or ovine disease models thus far. The objective is to assess the safety and effectiveness of this paradigm in a non-human primate model that bears strong physiological and immunological resemblance to humans.

This work, in the broader context of the group's ongoing research into fetal gene and cellular therapy, will over the next few years generate important data relevant not only for the clinical management of congenital Factor X deficiency, but also for other monogenic diseases that will benefit from IUGT, particularly where postnatal therapeutic options are severely limited.



DR TOH HAN CHONG – CSA (INV)

*Head & Senior Consultant, Medical Oncology, National Cancer Centre Singapore
Visiting Consultant, Changi General Hospital*

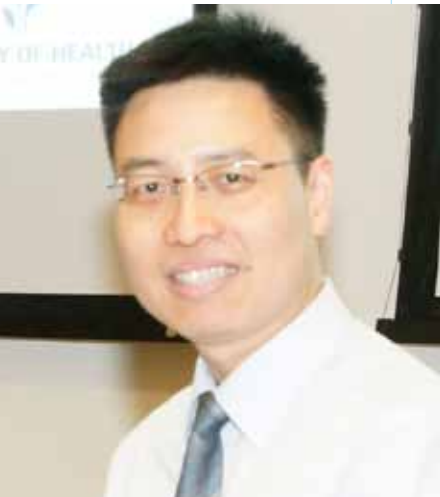
Area of Research:

NASOPHARYNGEAL CANCER

Years of clinical trial studies have shown that patients with advanced nasopharyngeal cancer (NPC) require more than chemotherapy to further enhance responses and survival rate. Improved treatment will likely have to include other forms of therapy, either new platforms or in combination with conventional therapies.

Dr Toh's research involves a clinical trial to treat newly diagnosed patients with advanced NPC, and will examine how to leverage the immune system, or the killer T-cells that it contains, to fight the NPC cells that contain Epstein-Barr Virus (EBV) proteins. Apart from administering chemotherapy, patients undergoing the clinical trials will have T-cells extracted from their own blood. The T-cells will be expanded in large numbers in the lab and re-infused back into patients to fight the cancer.

The T-cells will thus be trained to specifically recognise EBV proteins on the NPC, and potentially seek them out in the cancer cells and destroy them, while sparing the normal cells.

**DR LOUIS TONG – CSA (INV)**

*Consultant and Clinician Scientist, Singapore National Eye Centre
Assistant Director (Training and Education) & Head, Ocular Wound Healing and Therapeutics Laboratory, Singapore Eye Research Institute
Adjunct Associate Professor, Duke-NUS Graduate Medical School Singapore*

Area of Research:

MOLECULES IN PTERYGIUM – FROM CELL DYSFUNCTION TO OCULAR SURFACE PATHOLOGY

Pterygium is a human ocular surface disease characterised by a proliferative, chronic inflammatory, wedge-shaped lesion extending progressively from the conjunctiva onto the cornea surface. The exact mechanism and the initiating event in pterygium formation and recurrence are unknown. Pterygium is prevalent in Singapore, with pterygium excision being the third most common ophthalmic surgical procedure after cataract surgery and corneal refractive surgery.

Dr Tong's research will investigate the fundamental processes that initiate inflammation and propagate this condition. Through greater understanding, it is hoped that it may become possible to use a targeted molecular approach to prevent surgical recurrence, and additionally explore the potential of a primary treatment to halt the progress of pterygium. The use of a panel of biomarkers that are associated with pterygium recurrence may also be able to predict the post-surgical prognosis of patients after resection.

Dr Tong hopes that the knowledge generated from this research will serve as a catalyst for the development of enhanced treatments for ocular surface diseases, with specific emphasis on pterygium.

NRF-MOH HEALTHCARE RESEARCH SCHOLARSHIP

The scholarship provides support to Advanced Specialty Trainee (AST) doctors who wish to enrol in a PhD programme locally or overseas. It is targeted at clinicians intending to pursue a career in research. The scholarship provides a salary, tuition fees, and a maintenance allowance (for overseas PhDs), as well as protected time for research during the clinical training period. Funding for post-doctoral research is also available.

MASTER OF CLINICAL INVESTIGATION

The programme aims to encourage more clinicians to pursue advanced clinical research training through the Master of Clinical Investigation (MCI) at the Yong Loo Lin School of Medicine at National University of Singapore. The scholarship covers the tuition fees for the MCI programme.

NMRC RESEARCH TRAINING FELLOWSHIP

The NMRC Fellowship aims to provide doctors with the training necessary to become clinician scientists. This can include overseas research training or pursuing a PhD in research at a local institution. The award is available to medical doctors and dental surgeons registered with the Singapore Medical Council or Singapore Dental Board. Recipients of the fellowship receive salary and tuition fees for local PhD programmes, or allowances and other benefits in line with the host institution's policies for overseas research attachments.



LIST OF AWARDEES & RECIPIENTS FOR 2008 & 2009

NMRC MEDICAL RESEARCH FELLOWSHIP/SCIENTIST AWARD

Name	Institution	Area of Research/Projects
Medical Research Fellowship Award		
A total of 14 doctors were awarded the NMRC Research Training Fellowship in 2008 and 2009; including four who were training for a degree and eight who were in training not leading to a degree.		
Dr Leong Hoe Nam	SGH <i>Fellowship (Overseas Attachment) at Columbia University, New York, USA</i>	Infectious disease "Identification and detection of emerging pathogens"
Dr Daniel Tan Shao Weng	NCC <i>Fellowship (Overseas Attachment) at Drug Development Unit, Royal Marsden Hospital, Sutton, UK</i>	Drug development – early clinical trials "Accelerating molecularly targeted drug development through rational design of hypothesis-testing early clinical trials"
Dr Yeo Wee Lee	NUH <i>Fellowship (Overseas Attachment) at Brigham and Woman's Hospital, Harvard, Boston, USA</i>	Nasopharyngeal cancer "Study of nasopharyngeal cancer tumour specimens for potential predictive and prognostic markers"
Dr Teo Wan Yee	KKH <i>Fellowship (Overseas Attachment) at Texas Children's Cancer Centre, Baylor College of Medicine, Houston, USA</i>	Paediatric brain tumours "Molecular taxonomy of paediatric brain tumours based on molecular profiling"
Dr Melissa Teo Ching Ching	NCC <i>Fellowship (part-time distance learning, MPH) at Johns Hopkins, Baltimore, USA, and Singapore</i>	Study of two cancer care systems: Ontario and Singapore "A study of two cancer care systems: Ontario and Singapore"
Dr Richard Quek Hong Hui	NCC <i>Fellowship (Overseas Attachment) at Dana-Faber Cancer Institute, Boston, USA</i>	Translational therapeutics (sarcoma) "Translational therapeutics: application of novel insights from basic molecular and biochemical research to the rationale development of molecularly-targeted anti-cancer therapy"
Dr Mandeep Singh Hardeep Singh	NUH <i>Fellowship (PhD) at University of Oxford, John Radcliffe Hospital, UK</i>	Ophthalmology "Neuroprotection gene therapy for retinal disease"
Dr Marcus Lim Chung Ching (Deceased)	SNEC <i>Fellowship (Overseas Attachment) at Washington University in St Louis School of Medicine, USA</i>	Health services research with respect to ophthalmology
Dr Wong Nan Soon	NCC <i>Fellowship (Overseas Attachment) at Duke University Medical Centre, USA</i>	Medical oncology – phase I clinical trial (breast cancer) "Phase I clinical trial design and implementation/ investigational new drug development in oncology"
Dr Ng Oon Tek	TTSH <i>Fellowship (MPH) at Johns Hopkins Bloomberg School of Public Health, Baltimore, USA</i>	Molecular epidemiology of HIV "Using serological and molecular techniques to better understand the HIV epidemic in Singapore"
Dr Teo Boon Wee	NUS <i>Fellowship (Overseas Attachment) at Mayo Clinic, USA</i>	Nephrology "Assessing the accuracy of the Mayo quadratic equation in the estimation of glomerular filtration rates in a multi-ethnic Asian population"
Dr Tan Boon Yew	NHC <i>Fellowship (Overseas Attachment) at Johns Hopkins Medicine, Baltimore, USA</i>	Cardiology "Molecular genetics and pathogenesis of arrhythmogenic right ventricular dysplasia"

NMRC MEDICAL RESEARCH FELLOWSHIP/SCIENTIST AWARD

Name	Institution	Area of Research/Projects
Dr Gerald Koh Choon Huat	NUS <i>Fellowship (part-time distance learning, PhD) at University of Western Ontario, Canada, and Singapore</i>	Inpatient geriatric rehabilitation "Inpatient rehabilitation efficiency and effectiveness: retrospective analysis of a national database of admissions to community hospitals in Singapore from 1996 to 2005"
Dr Citra Nurfarah Zaini Mattar	NUHS <i>Fellowship (Overseas Attachment) at Dept of Haematology and UCL Cancer Institute, University College London, UK</i>	Intrauterine gene transfer "Intrauterine gene therapy for Haemophilia B in a non-human primate model"

TRAINING COMPLETED IN 2008 AND 2009

A total of 26 doctors completed their training under the Medical Research Fellowship/Scientist Award in 2008 and 2009.

Name	Institution	Area of Research/Projects
Dr Chen I-Cheng Mark	TTSH <i>Fellowship (PhD) at London School of Hygiene and Tropical Medicine, UK</i>	Infectious disease "Gonorrhoea and resistant gonorrhoea in England and Wales: epidemiological modelling for insight and control"
Dr Lee Pyng	SGH <i>Fellowship (PhD) at Free University Medical Centre Amsterdam, the Netherlands, and SGH</i>	Respiratory and critical care medicine "Chemoprevention of pulmonary carcinogenesis, expression profiles and molecular markers of premalignant lesions, field carcinogenesis, and smoking patterns"
Dr Lim Su Chi	AH <i>Fellowship (PhD) at NUS</i>	Medicine/Endocrinology "Molecular epidemiology of diabetic nephropathy"
Dr Edmund Chiong	NUS <i>Fellowship at University of Texas MD Anderson Cancer Centre, USA</i>	Immuno-gene therapy for bladder cancer "mTOR targeted therapy for bladder cancer" and "DNA fingerprinting for bladder cancer cells"
Dr Lee Guan Huei	NUS <i>Fellowship (PhD) at NUS</i>	Gastroenterology and Hepatology – Hepatitis B virus "Hepatitis B splice variants and pathogenesis of chronic hepatitis B infection"
Dr Irwani Binte Ibrahim	NUH <i>Fellowship (MSc) at University of Western Australia</i>	Emergency Medicine – Sepsis "Characteristics and outcomes of patients presenting to the emergency department with sepsis"
Dr Chan Yan Yee Mark	NUH <i>Fellowship (MSc) at Duke Clinical Research Institute, USA</i>	Cardiology "Long-term survival after cardiac catheterization in ST elevation vs non-ST elevation myocardial infarction"
Dr Lai Chooi Mun Deborah	NCC <i>Fellowship (PhD) at NUS</i>	Radiation oncology "Studying the expression patterns and signalling pathways utilized by human papillomaviral protein E2 in causing cervical cancer"
Dr Ng Kar Hui	NUS <i>Fellowship at Children's Hospital, Boston, USA</i>	Paediatrics – Nephrology "The molecular pathogenesis of glomerulosclerosis"
Dr De Silva Deidre Anne	NNI <i>Fellowship at Georgetown University, Washington, DC, USA</i>	Neurology – Stroke "Stroke clinical research"

TRAINING COMPLETED IN 2008 AND 2009

Name	Institution	Area of Research/Projects
Dr Stanley Chia	NHC <i>Fellowship at Massachusetts General Hospital, USA</i>	Cardiology "In vivo characterization of coronary atherosclerotic plaques in patients: a comparative study using optical coherence tomography, multi-detector computed tomography and intravascular ultrasound"
Dr Lee Shermin	NDC <i>Fellowship (PhD) at University of Nijmegen, the Netherlands, and Singapore</i>	Oral and maxillofacial surgery "Molecular endoprosthetic replacement of mandibular defects – a soft tissue analysis"
Dr Gerald Tan Yau Min	TTSH <i>Fellowship at Weill Medical College, Cornell University, USA</i>	Urology "Novel use of monoclonal antibodies to prostate-specific membrane antigen in intra-operative assessment of remnant microscopic disease during robotic prostatectomy for prostate cancer"
Dr Tan Hui Hui	SGH <i>Fellowship at Mount Sinai School of Medicine, USA</i>	Gastroenterology and hepatology "Kupffer cell activation by circulating air particulate matter exacerbates non-alcoholic fatty liver disease (NAFLD) in a TLR4 dependent manner"
Dr Leong Sieu-Hon Benjamin	NUH <i>Fellowship at Virginia Commonwealth University, USA</i>	Emergency medicine "Low volume resuscitation and repayment of oxygen debt from traumatic shock" and "Oxygen transport in post cardiac arrest syndrome with goal directed hemodynamic optimization"
Dr Leong Hoe Nam	SGH <i>Fellowship at Columbia University, USA</i>	Infectious disease "Identification and detection of emerging pathogens"
Dr Daniel Tan Shao Weng	NCC <i>Fellowship (Overseas Attachment) at Drug Development Unit, Royal Marsden Hospital, Sutton, UK</i>	Drug development – early clinical trials "Accelerating molecularly targeted drug development through rational design of hypothesis-testing early clinical trials"
Dr Teo Ching Ching Melissa	NCC <i>Fellowship (MPH) at Johns Hopkins, Baltimore, USA, and Singapore</i>	Study of two cancer care systems: Ontario and Singapore "A study of two cancer care systems: Ontario and Singapore"
Dr Teo Boon Wee	NUS <i>Fellowship at Mayo Clinic, USA</i>	Nephrology "Assessing the accuracy of the Mayo quadratic equation in the estimation of glomerular filtration rates (GFR) in a multi-ethnic Asian population"
Ms Tay Yin Chih Cheryl	NCC <i>Fellowship (PhD) at Monash University, Australia</i>	Stem cell biology "Investigating the roles of SoxB1 and FezF2 transcription factors in neural differentiation from human embryonic stem cells"
Ms Tan Ai Lin Shawna	NCC <i>Scientist Award (PhD) at University of Sydney, Australia</i>	Stem cell biology and micro RNA technologies "The role of micro RNAs in normal and neoplastic cellular physiology"
Ms Chua Li Ming Constance	NUH <i>Scientist Award (PhD) at NUS</i>	Cancer biology "Cancer stem cells in the brain: mechanisms of chemoresistance"
Mr Chong Yok Rue Desmond	IMRE <i>Scientist Award (PhD) at Imperial College London, UK</i>	Biomechanics "Biomechanical analysis of fixation and bone remodelling of total knee replacement"
Ms Wong Hwee Bee	CTERU ▶ MOH HQ <i>Scientist Award (PhD) at NUS</i>	Biostatistics "Changes in refraction and biometry in emmetropic and myopic children: the SCORM study"
Mr Loo Liat Hui	KKH <i>Scientist Award (PhD) at NUS</i>	Lab microbiology "Isolation and genetic characterisation of Metapneumovirus isolated from paediatric patients in Singapore"
Ms Cheng Shi Yuan	NCC ▶ SGH <i>Scientist Award (PhD) at NUS</i>	Medical sciences – Cancer "BRCT protein Ect2 is a mediator of the DNA damage-induced S phase checkpoint"

NRF-MOH HEALTHCARE RESEARCH SCHOLARSHIP (PHD)

Name	Institution	Area of Research/Projects
NRF-MOH Healthcare Research Scholarship (PhD) A total of six doctors were awarded the NRF-MOH Healthcare Research Scholarship (PhD) in 2008 and 2009.		
Dr Thomas Chan Kong Ngai	NHC Scholarship (PhD) at University of Oxford, UK	Cardiothoracic surgery "Immunobiology of regulatory T-lymphocytes and their novel application in clinical transplantation"
Dr Yeo Joo Guan	KKH Scholarship (PhD) at NUS	Paediatric medicine "Investigation of C1q gene polymorphism and association with chronic inflammation and autoimmunity"
Dr Catherine Ong Wei Min	NUS Scholarship (PhD) at Imperial College London, UK	Infectious disease – Central nervous system tuberculosis "Neutrophils and the regulation of matrix metalloproteinases in tuberculosis"
Dr Kumar Samintharaj	NDC Scholarship (PhD) at University of Oxford, UK	Craniofacial molecular genetics "High density array technologies and new insights into the genetics of craniosynostosis"
Dr Johnny Ong Chin-Ann	SGH Scholarship (PhD) at University of Cambridge, UK	General surgery "Generation and validation of a revised clinical classification and molecular prognostic signature for oesophageal adenocarcinoma"
Dr Iain Tan Bee Huat	NCC Scholarship (PhD) at NUS	Medical oncology – Gastric cancer "Predictive and prognostic biomarkers in gastric cancers – towards individualised therapy"

NRF-MOH HEALTHCARE RESEARCH SCHOLARSHIP (MCI)

Name	Institution	Area of Research/Projects
NRF-MOH Healthcare Research Scholarship (MCI) A total of 13 doctors were awarded the NRF-MOH Healthcare Research Scholarship (MCI) in 2008 and 2009.		
Dr Chin Woon Loong Calvin	Dept. of Cardiology NHC	Population sciences and clinical trials "Ethnic Differences in Subclinical Atherosclerosis in Patients with Type 2 Diabetes Mellitus"
Dr Lee Chee Keong Jimmy	Dept. of Early Psychosis IMH	Psychiatry "A case-control study comparing liposome profiles in untreated first episode Schizophrenia and healthy controls"
Dr Masitah Binte Ibrahim	Dept. of Neonatal and Developmental Medicine SGH	Paediatric medicine "Intestinal and liver-fatty acid binding proteins as predictive markers for necrotizing enterocolitis in neonates"
Dr Ooi Oon Cheong	Dept. of Cardiac, Thoracic & Vascular Surgery NUH	Molecular biology and clinical trials "Novel, enhanced myocardial revascularisation using laser and proteoma"
Dr Pan Jiun Yit	Dept. of Dermatology NSC	Population sciences "Prevalence and characteristics of contact allergy in spa workers, masseuses and foot reflexologists"
Dr Quah Hui Min Joanne	SingHealth Polyclinics – Outram	Family medicine "Qualitative study on patients' and doctors' perception of the role of family medicine and right siting of medical care"
Dr Tan Ngiap Chuan	SingHealth Polyclinics – Pasir Ris	Family medicine research – Management of chronic diseases in primary care "Design and validate tool to screen asthmatic patients who are capable of self management of asthma"
Dr Andrea Low Hsiu Ling	Dept of Rheumatology & Immunology SGH	Health-related quality of life outcome measures/ Systemic Lupus erythematosus "Survival and outcome of patients with systemic sclerosis in Asia"

NRF-MOH HEALTHCARE RESEARCH SCHOLARSHIP (MCI)

Name

Institution

Area of Research/Projects

NRF-MOH Healthcare Research Scholarship (MCI)

A total of 13 doctors were awarded the NRF-MOH Healthcare Research Scholarship (MCI) in 2008 and 2009.

Dr Chan Wei Shih Derrick	Dept. of Paediatric Medicine <i>KKH</i>	Clinical epilepsy and EEG "Focal epilepsy in childhood: differentiation of benign and severe course based on clinical presentation and EEG correlates"
Dr How Choon How	SingHealth Polyclinics – Sengkang	Population sciences (Epidemiology) "Obesity and quality of life in Singapore"
Dr Subramaniam Tavintharan	Dept. of Medicine <i>AH</i>	Endocrinology – Diabetes mellitus and lipidology "Riboregulators and their roles in common metabolic diseases"
Dr Thia Teck Joo Kelvin	Dept. of Gastroenterology & Hepatology <i>SGH</i>	Gastroenterology – Inflammatory Bowel Disease, Crohn's disease "Epidemiology of inflammatory bowel disease in Singapore – assessing incidence and prevalence of Crohn's disease and ulcerative colitis"
Dr Dharmaraj Rajesh Babu	Dept. of Cardiac, Thoracic & Vascular Surgery <i>NUH</i>	Population sciences – Vascular surgery "To study the importance of pre-operative vascular imaging prior to AVF operation and predictors of fistula outcome in Asian population"

RESEARCH GRANTS

The funding of biomedical research is one of the core pillars of NMRC's mandate. To carry out this function, NMRC offers several grant programmes that support small-scale and large-scale Singapore-based research initiatives covering a broad spectrum of biomedical sciences.

NMRC's grant programmes are divided into two main categories: (1) strategic/thematic research and (2) investigator-led research. The first category includes the Translational and Clinical Research Flagship Programmes, which provide significant levels of funding to large-scale strategic studies, as well as Centre Grants and Programme Project Grants, which offer two different types of institution/group-based funding. The second category includes Individual Research Grants, Exploratory/Developmental Grants and New Investigator Grants, all three of which provide funding for investigator-led studies, but with different research focuses.

To ensure that its limited funds are put to the best possible use by funding the best science, NMRC awards more than 90% of its research grants on a competitive, peer-reviewed basis.



1 X LB

pH 7.5

Store at 2 to 8°C

Date Prepared:

02 MAR 2005

Expiry Date:

Six months from date prepared.

1 X LB

pH 7.5

Store at 2 to 8°C

Date Prepared:

01 MAR 2005

Expiry Date:

Six months from date prepared.

1 X LB

pH 7.5

Store at 2 to 8°C

Date Prepared:

01 MAR 2005

Expiry Date:

Six months from date prepared.

TRANSLATIONAL AND CLINICAL RESEARCH (TCR) FLAGSHIP PROGRAMMES

TCR Flagship Programmes provide significant levels of funding to build up a critical mass of experienced high-level researchers, facilitate a broader research platform and increase collaboration both locally and internationally. The programme aims to establish Singapore as a global leader in the study of key strategic medical research fields.

Each TCR recipient is awarded \$25 million over five years, with the funding provided by the National Research Foundation. The five key areas targeted by the TCR programme have been selected for their relevance to Singapore and the existence of strong local expertise. The five key areas are cancer, eye diseases, neurosciences, infectious diseases, and cardiovascular/metabolic disorders.

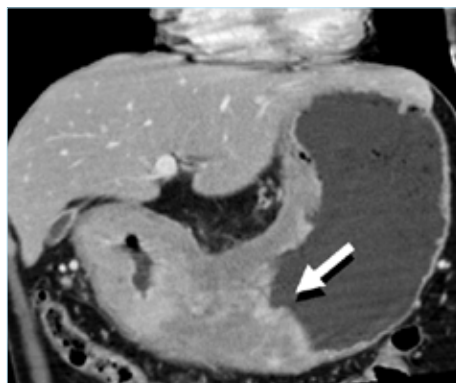
GASTRIC CANCER TCR PROGRAMME

Launched in August 2007, this was the first of NMRC's five TCR Flagship Programmes. It is led by the Singapore Gastric Cancer Consortium, a collaborative team of leading clinicians and basic scientists working on gastric cancer research in Singapore. The programme aims to improve the outcomes for gastric cancer—a leading killer in Singapore—via research focused on three key themes:

1. Early detection by screening of high-risk groups
2. Improving biologic understanding of gastric carcinogenesis
3. Improving treatment by molecular profiling of tumours

Almost two and a half years into the five-year funding period, the programme has achieved some notable results thus far. In the first 1,629 patient-years of surveillance, the screening programme has resulted in the detection of 10 cases of early gastric cancer, thereby providing proof-of-concept that the screening of high-risk groups in Singapore can lead to successful early-stage detection. The early detection of these 10 cases also has tangible health and economic benefits due to the opportunity for early intervention.

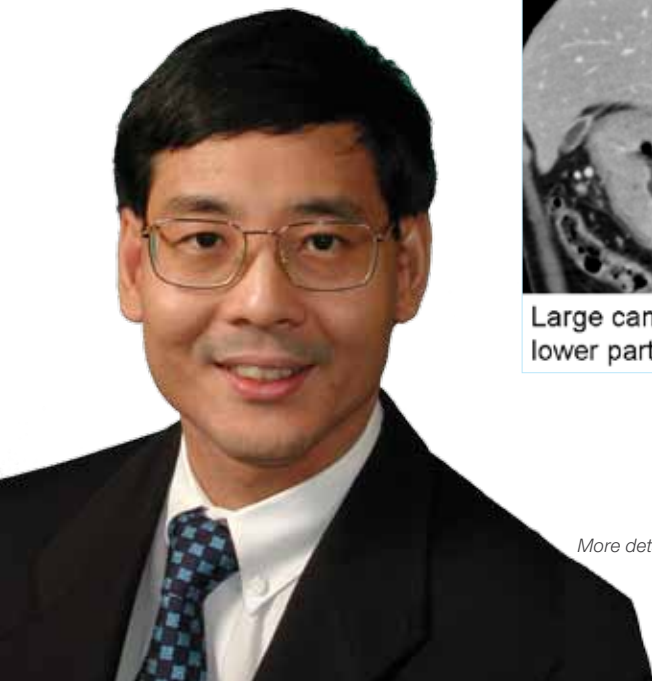
The team has also developed the first-in-vivo Raman endoscopic system that is being used live in endoscopies on human patients. This novel technique is currently being tested in clinical trials to determine whether it can be used to improve early detection of gastric cancer.



Large cancer (arrow) involving the lower part of the stomach

Principal Investigator

A/Prof Yeoh Khay Guan,
Department of Medicine,
National University of Singapore



EYE DISEASES TCR PROGRAMME

Launched in July 2008, this TCR programme encompasses ophthalmic research focused on corneal disorders and glaucoma—two of the main causes of blindness globally, particularly in Asia. Through several interlinked projects carried out by collaborative teams of clinician scientists, basic scientists and bioengineers, the overall objective is to develop novel solutions to challenges facing medical and surgical therapies for these disorders.

The programme has a strong focus on new therapeutics and technology development, and as of the end of 2009 it has delivered many inventions even though it is still at an early stage. One of its achievements to date is the identification of structural parameters that will allow for more rapid design of future anti-infectives. Another achievement is the development of a new technique of enzymatic wound closure that may potentially replace the need for surgical sutures in many ocular surgeries, thus achieving a better standard of ocular tissue repair for the patients.

The project team has also invented a new donor insertion device, known as the Tan EndoGlide, for the current form of EK surgery (DSAEK – Descemets Stripping Endothelial Keratoplasty). The device, which has been patented, out-licensed and manufactured by Network Medical Products, UK, is now commercially available worldwide.



Principal Investigator

Prof Donald Tan,
Medical Director,
Singapore National Eye Centre



NEUROSCIENCE TCR PROGRAMME

Launched in July 2008, this TCR programme aims to identify key genetic, biological, cognitive, clinical and social risk factors for psychotic disorders, and to establish the efficacy and safety of a neurocognitive-enhancing agent for patients with schizophrenia. In doing so, the project team hopes to make significant contributions to the basic understanding of the disease process and enable earlier intervention through the development of better means of identifying individuals in imminent danger of developing psychosis.

The programme has established core competencies in clinical phenotyping and research-related human capital. Intensive training programmes have been conducted by overseas experts and collaborators to equip the project team's clinicians and psychologists with skills needed to administer various neurocognitive and clinical assessments.

For the programme's comprehensive genetic study of schizophrenia and neurocognitive impairments, the team has established collaborations with institutions in the US and China, and it is mid-way in the recruitment of subjects. Overall, recruitment and data analysis for the programme is on track and large-scale sequencing analysis of candidate genes is currently ongoing.



Principal Investigator

A/Prof Chong Siow Ann,
Research Division,
Department of Early Psychosis Intervention,
Institute of Mental Health



INFECTIOUS DISEASES TCR PROGRAMME



Principal Investigator

A/Prof Leo Yee Sin,
Communicable Disease Centre,
Tan Tock Seng Hospital



Photo courtesy of Environmental Health Institute, National Environment Agency, Singapore

Launched in December 2008, this TCR programme has a simple objective—to stop dengue—which it aims to achieve through the following:

- S**cientific exploration of disease pathogenesis
- T**ranslational research for improved clinical management
- O**perational evaluation for the introduction of intelligent vector control measures and
- P**reventive measure through engaging in finding new treatment strategies for dengue

Overall, the goal of this programme is to study the major gaps in treatment and management of dengue diseases through translation of bench-to-bedside research activities. Specifically, the programme aims to:

- Create a global centre of excellence for the clinical study and management of dengue diseases
- Establish a centre for clinical trials of small molecules and therapeutic antibodies to all four serotypes of the dengue virus
- Elucidate pathogenesis of adult dengue disease and identify new biomarkers for prognostication of dengue diseases for therapeutic monitoring
- Develop a new strategy to disease control using state-of-the-art epidemiology and full-genome analysis

Together, these objectives will bring benefits to dengue patients in Singapore and throughout the world. The programme also positions Singapore as a global leader in dengue research and adds value to the national research efforts by conducting studies that will reduce the burden to the hospital network and bring new preventative vaccines and medicines to patients as they become available.

Commenting on the programme's objectives, principal investigator A/Prof Leo Yee Sin notes: "Singapore is unique in having predominantly adults infected with dengue. This could be a result of lower herd immunity and low incidence of dengue infection. Of note, there is a noticeable trend of an increasing age shift over the years, with more elderly infected with dengue. Dengue mortality occurs more commonly in the older age group with higher prevalence of other concomitant chronic illnesses. There is a great need to continuously build up a body of evidence on best management."

At the end of its first year, the programme is on track and has achieved several milestones. Much of the progress thus far has focused on building infrastructure supporting clinical research, obtaining ethics approvals, recruiting manpower and establishing collaborative research agreements for the various groups involved in the studies. Examples include the establishment of the Dengue Research Office and the Infectious Disease Research Clinic at Singapore's Communicable Disease Centre, as well as commencing a retrospective case record review study that will capture clinical information about close to 2,000 hospitalised dengue PCR-positive subjects.

The H1N1 pandemic in May–July 2009 delayed the study's progress—for example, recruitment of patients for the studies was not possible during the outbreak. Nevertheless, sufficient numbers of samples have been obtained for the various projects to conduct their studies in dengue pathogenesis, epidemiology, and vaccine and drug discovery.

METABOLIC DISEASES TCR PROGRAMME

Launched in June 2009, this TCR programme aims to provide a scientific base to design prevention and intervention strategies to reduce the burden of chronic diseases such as diabetes and obesity.

This is an area of particular interest for Singapore and the rest of Asia, where the sharply rising incidence of Type 2 diabetes mellitus and obesity is coinciding with rapid nutritional and socioeconomic transitions. There are significant ethnic and individual differences in predisposition to these diseases, and thus one of the objectives of this programme is to examine the causal pathways and, particularly, the developmental factors that contribute to these differences.

The programme consists of three main sub-studies:

- A birth-cohort study named 'GUSTO' (Growing Up in Singapore Towards Healthy Outcomes); as of end 2009, 415 study participants have been recruited for the birth cohort. More details about GUSTO are available on its website: www.gusto.sg
- An adult metabolism study named 'SAMS' (Singapore Adult Metabolism Study)
- An experimental physiological study named 'GRACE' (Growth Regulation in Animals and Cellular Epigenetics)

The area of science covered in this TCR programme has considerable public health, diagnostic and pharmaceutical potential, and these studies will provide translational opportunities for targeted intervention and prevention. In addition, by carrying out world-class research in this field, the programme creates opportunities for the development of human capital for translational research in Singapore, both within the project team and within the programme's industrial and academic partner institutions.

Although less than one year old, the programme has already leveraged major commercial partnership funds to extend the study beyond its original scope. As of end-2009, the programme has secured multiple industrial collaborations, and negotiations are ongoing with other industrial players that have expressed interest in the biomarkers study and early cognitive development.



Principal Investigator

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National University Health System



NMRC PLEXUS SERIES

The NMRC Plexus Series is a platform for researchers to interact, foster collaboration and exchange ideas in their respective fields of research and clinical studies. Through symposia, networking sessions and informal gatherings, the Plexus Series creates opportunities for like-minded researchers, clinicians and industry players to come together to discuss the successes and challenges faced in their research.

In 2008 and 2009, NMRC hosted four symposia as part of the Plexus Series:

- Cancer Symposium: Translational and Clinical Research in Oncology (May 2008)
- Singapore Epidemiology of Eye Diseases (SEED) Symposium (October 2008)
- Neuroscience Symposium (February 2009)
- Infectious Disease Symposium: Adult Dengue Diseases (October 2009)

These events brought together investigators from the Translational and Clinical Research (TCR) Flagship Programmes with the Singapore Translational Research (STaR) Investigator Award and Clinician Scientist Award (CSA) awardees to share and discuss the development of translational and clinical research in Singapore.

A Metabolic Diseases Symposium entitled DevOS Symposium: Untangling the Mysteries of Metabolic Diseases will be held as part of the Plexus Series in March 2010. The event will bring together investigators from the Metabolic Diseases TCR Flagship Programme with other researchers and clinicians interested in this field of study.

INDIVIDUAL RESEARCH GRANTS

Individual Research Grants (IRGs) are awarded for up to three years to individual researchers for translational or clinical studies on a specific topic. The proposed projects must be based in Singapore, and the Principal Investigator should reside in Singapore and work in one of the local health clusters or a local academic institution.

IRGs play a critical role in funding investigator-led studies that are deemed to be both important and innovative, and which have the potential to make a significant impact in their respective field. The quantum supported for IRGs is up to \$1.5 million over a period of three years.

There are two IRG grant calls per year, with roadshows typically held in April and October to brief potential applicants about the application process. The calls open in May and November each year, with submission deadlines of 1 June and 1 December. The table below indicates the number of IRG applications and awards since May 2006, as well as the total sum of the IRGs awarded in each grant call:

Period	Proposals Reviewed	Grants Awarded	Success Rate	Total Sum Awarded (S\$)
May 2006	142	30	21.1%	10.15 million
November 2006	188	27	14.4%	10.23 million
May 2007	129	22	17.1%	13.59 million
November 2007	139	27	19.4%	17.99 million
May 2008	115	24	20.9%	16.67 million
November 2008	92	23	25.0%	16.45 million
May 2009	94	19	20.2%	17.77 million
Total	899	172	19.1%	102.85 million

IRG proposals undergo a two-stage peer review process:

1. Stage One: International Review Process
 - a. Applications are assessed in an international review process by external reviewers who score each proposal according to review guidelines and a scoring index that take into account the following factors:
 - i. Originality
 - ii. Importance
 - iii. Feasibility (in terms of scientific/technical competency and budgets)
 - iv. Primary impact
 - b. Shortlisted applicants are invited to provide written rebuttal to international reviewers' comments before the proposals are sent to the Local Review Panel (LRP) for further evaluation.
2. Stage Two: Local Review Panel
 - a. All shortlisted proposals are reviewed and subsequently presented by local reviewers at an LRP meeting and discussed by the panel.
 - b. The list of proposals recommended for funding based on the results of an e-vote is sent to the NMRC Board for final approval.

EXPLORATORY/ DEVELOPMENTAL GRANTS

Exploratory/Developmental Grants (EDGs) support the development of innovative and new areas of research. They are applicable to investigator-led studies involving untested and novel ideas, original research fields, and the application of new expertise or approaches to established research topics. EDGs play an important role in supporting research that might have difficulty competing for funding with more conventional studies.

EDG funding is available for a two-year period, with the possibility of a one-year extension. The quantum supported for EDGs is up to \$200,000 over a period of two years.

There are two EDG grant calls per year, with roadshows typically held in April and October to brief potential applicants about the application process ahead of the deadlines of 1 June and 1 December. The table below indicates the number of EDG applications and awards since May 2007, as well as the total sum of the EDGs awarded in each grant call:

Period	Proposals Reviewed	Grants Awarded	Success Rate	Total Sum Awarded (S\$)
May 2007	55	17	30.9%	2.70 million
November 2007	42	15	35.7%	2.62 million
May 2008	34	15	44.1%	2.65 million
November 2008	48	14	29.2%	2.68 million
May 2009	71	16	22.5%	2.84 million
Total	250	78	30.8%	13.5 million

EDG proposals undergo a peer review process similar to the second stage of the IRG review process (i.e. excluding international peer reviewing). A Scientific Review Panel 2, consisting of Singapore-based members, assigns a primary and secondary reviewer for each proposal. Shortlisted proposals are then voted on by the review panel, which sends its list of recommended awardees to the NMRC Board for final approval.

NEW INVESTIGATOR GRANTS

A sub-category under the Exploratory/Developmental Grant, the New Investigator Grant (NIG) is open to investigators who have not held a reputable national or international grant previously. Structured as a mentorship in which awardees work with a mentor for guidance in their research, NIGs represent an attractive opportunity for researchers who might otherwise lack the experience necessary to compete for grants with more seasoned investigators.

This mentorship provides support for a period of supervised research leading eventually to the clinician researcher conducting larger-scale research projects independently. The quantum supported for NIGs is up to \$200,000 for two years.

There are two NIG grant calls per year, with roadshows typically held in April and October to brief potential applicants about the application process ahead of the deadlines of 1 June and 1 December. The table below indicates the number of NIG applications and awards since May 2007, as well as the total sum of the NIGs awarded in each grant call:

Period	Proposals Reviewed	Grants Awarded	Success Rate	Total Sum Awarded (S\$)
May 2007	57	16	28.1%	2.64 million
November 2007	55	16	29.1%	2.89 million
May 2008	36	17	47.2%	2.86 million
November 2008	33	12	36.4%	2.33 million
May 2009	33	16	48.5%	2.78 million
Total	214	78	36.0%	13.5 million

NIG proposals undergo a peer review process similar to the second stage of the IRG review process (i.e. excluding international peer reviewing). A Scientific Review Panel 1, consisting of Singapore-based members, assigns a primary and secondary reviewer for each proposal. Shortlisted proposals are then voted on by the review panel, which sends its list of recommended awardees to the NMRC Board for final approval.

COMPETITIVE CENTRE GRANTS, PROGRAMME PROJECT GRANTS AND INSTITUTIONAL BLOCK GRANTS

CENTRE GRANTS

Centre Grants (CGs) are institution-centric grants intended to support a research programme in which a team of investigators works on a clearly defined central theme of mutual scientific interest. Encouraging a stable, long-term institutional focus on a complex set of problems, CGs foster collaborative and mission-driven environments that bring together multidisciplinary teams with the diverse expertise needed to capture and rapidly translate new and emerging ideas into clinical benefits. This team approach stimulates scientific creativity and speeds new developments in ways that would not be possible with individual investigators working in relative isolation. CGs are awarded in an annual quantum of either \$3 million or \$1.5 million for a period of three to five years.

PROGRAMME PROJECT GRANTS

Programme Project Grants (PPGs) support broad-based research programmes with a translational or clinical research focus involving a number of established investigators who share knowledge and resources. PPGs focus on projects based on a ground-up approach, rather than those that are strategically directed. PPGs are awarded in an annual quantum of \$1 million for a period of three to five years.

The main difference between CGs and PPGs is that CGs include pilot grants and provide funding for education and training of both research professionals and the public. This allows CG institutions to link together their strategies for disease treatment, research (seed funding) and education.

All CG and PPG applications undergo a two-stage review process similar to that of IRGs. The first stage consists of international peer review. The second stage review is conducted by the Programmatic Grant Review Panel (PGRP), whose members are renowned Singapore-based researchers. The PGRP takes into consideration the views of the overseas reviewers when making its recommendations for funding.

The first grant call for CGs and PPGs was launched in January 2009, with five \$3 million per year CGs, one \$1.5 million per year CG and one PPG being awarded. Their funding will start in FY2010.

PHASING OUT OF INSTITUTIONAL BLOCK GRANTS

Block Grants, which have been phased out as of the end of the 2008–2009 financial year, were awarded to institutions to further the development of their research capabilities and expertise. They were divided into two categories—Institutional Block Grants (IBGs) and Enabling Grants (EGs)—and provided annual funding without a peer review process. IBGs focused on developing core manpower and core research facilities in restructured hospitals and public research institutions. EGs aimed to nurture a research culture through grants for clinical trials and pilot studies.

Over the years, NMRC provided more than \$432 million for Block Grants, which played a critical role in building up substantial research capabilities within local institutions. In the 2008–2009 financial year there were 21 recipients of either IBGs or EGs.

Block Grants served their purpose and were instrumental in enabling the rapid growth of Singapore's biomedical research sector. Now that a strong foundation has been laid, it is time to progress to a new competitive grant system in order to ensure that NMRC funding is used to support the best possible science. To make this possible, NMRC phased out its Block Grants as of the end of 2009, replacing the IBGs and EGs with two new grants—Centre Grants (CGs) and Programme Project Grants (PPGs)—awarded via a competitive peer-reviewed process.

INFRASTRUCTURE GRANTS



Artist's Impression of Pathology Building at Outram Campus

Artist's Impression of Centre for Translational Medicine at Kent Ridge Campus



Biomedical sciences are a key pillar of Singapore's economy, and over the past decade impressive progress has been made in developing this sector. Home to a growing population of leading clinician scientists and researchers, both local and foreign, Singapore is actively investing in its infrastructure to continue its development as a leading regional and global hub for biomedical sciences. To promote the development of world-class facilities to support cutting-edge medical research, NMRC funds various projects through its infrastructure grants programme.

SINGAPORE CLINICAL RESEARCH INSTITUTE

Awarded an NMRC infrastructure grant in May 2008 and officially launched in June 2008, the Singapore Clinical Research Institute (SCRI) evolved from the Clinical Trials and Epidemiology Research Unit (CTERU), which had been active since 1997. SCRI provides core services (clinical, bio-statistical, data and project management expertise, as well as medical informatics solutions) and infrastructure at a national level for later phase clinical research, as well as selected epidemiology and outcome research studies.

Since the commencement of its funding in 2008, SCRI has been extremely active in carrying out studies and building up its infrastructure and capabilities. The institute's achievements over the 2008–2009 financial year included:

- Hosting 26 ongoing clinical research projects as of November 2009
- Producing 28 publications (as of November 2009), five of which had an impact factor of >5
- Collaborating on nine applications as part of NMRC's May 2009 grant exercise
- Conducting two Grant Enhancement Training workshops
- Hosting 650 delegates from over 40 countries at the 17th Cochrane Colloquium in October 2009

While these achievements are a good start, SCRI has ambitious plans for further growth in the pipeline according to Professor John Rush, Chief Executive Officer of SCRI: "The broader vision for SCRI is to develop into the hub of an Asia-wide, academically orientated clinical research effort. In working towards this vision, SCRI continues to strengthen its expertise in executing multi-site research, developing harmonised ASEAN regional study management capabilities, training and education capabilities and continuing its development of clinical research networks."

More details about SCRI are available on its website:

www.scri.edu.sg

INVESTIGATIONAL MEDICINE UNITS

In October 2007, NMRC approved a five-year infrastructure grant for the establishment of two Investigational Medicine Units (IMUs) under the auspices of the National University Health System (NUHS) and SingHealth healthcare clusters. The IMUs' mandate is to provide supporting infrastructure for clinician investigators—including dedicated space and beds for in-patient research, computer hardware and software systems for data management and analysis, and human resources such as clinical pharmacologists, specialised research nurses and biostatisticians—for early stage (Phase 1 to 2a) clinical trials.

The NUHS IMU, a 16-bed facility with full monitoring capability and synchronisation for Pharmacokinetics/Pharmacodynamics study, as well as outpatient consultation rooms, was completed in June 2009. As of November 2009, the NUHS IMU had completed 11 studies, including three early phase pharma-sponsored studies and one early phase PI-initiated study. The IMU has formed an in-house Clinical Pharmacology group to provide specific clinical pharmacology expertise and advice, and it is currently in talks with international research groups regarding potential collaborative studies.

The SingHealth IMU, a 32-bed facility with a state-of-the-art chronobiology laboratory featuring two suites and an instrumentation room that provide a controlled environment for the study of circadian rhythms, was completed in June 2009. As of November 2009, the SingHealth IMU has completed seven studies, including three early phase pharma-sponsored studies. The IMU is focusing on innovative clinical trials such as microdosing and chronobiology, which represent distinct skills sets and competitive assets attractive to industry.

CENTRE FOR BIOMEDICAL ETHICS

Established in 2006 in National University of Singapore's Yong Loo Lin School of Medicine, the Centre for Biomedical Ethics (CBmE) is Southeast Asia's first academic centre for biomedical ethics in a medical school. In January 2008, CBmE was awarded a four-year NMRC infrastructure grant for capacity development in biomedical ethics in Singapore. Specifically, the funding is intended to support CBmE's efforts in the following areas:

- Training Singapore's biomedical science community in research ethics
- Strengthening clinical ethics training and support
- Educating the public to improve understanding of biomedical ethics issues and encourage greater involvement in biomedical research
- Creating a regional and international centre of excellence for bioethics
- Carrying out research of relevance to Singapore and the Bioethics Advisory Committee

CBmE provides Singapore with essential infrastructure related to biomedical research, especially with regard to controversial ethical issues related to translational and clinical research. Since being awarded the grant in January 2008, CBmE had conducted 24 seminars and workshops targeting a variety of audiences as of November 2009. In addition, CBmE organised the International Conference on Clinical Research Ethics in collaboration with the US National Institutes of Health and the World Health Organization on 22–24 April 2009. In 2009, the centre also published four issues of the *Asian Bioethics Review* (ABR)—a scholarly journal launched by CBmE in collaboration with the Hastings Center in New York. The publication has been endorsed and supported by major centres in China, India, Iran, Japan, Pakistan, the Philippines and Taiwan.

More details about CBmE are available on its website:

<http://cbme.nus.edu.sg/>

RESEARCH BUILDINGS

Following a recommendation by the BMS ExCo Infrastructure Capital Working Group (IWG) in 2007 to support the development of infrastructure to drive translational and clinical research in the Kent Ridge and Outram Campuses, NMRC launched a grant call in January 2008 to co-fund the development of two research buildings. In September 2008, two infrastructure grants of \$40 million each were recommended for the development of one new research building on each campus. The buildings will house wet and dry laboratories, as well as large shared equipment; in future, they may also house clinical research units and other research facilities.

The new research buildings will provide additional space to support new researchers (clinician-scientists, clinician investigators and PhD scientists) recruited internationally or from the local population under the BMS Phase II Translational and Clinical Research Initiative. The new facilities will also allow local institutions' existing research programmes to develop the scale necessary to be competitive internationally.

Located at the Kent Ridge and Outram Campuses, this new research infrastructure will establish these sites as two main centres of excellence for translational and clinical research. The new research infrastructure will be co-located and integrated with the two national tertiary hospitals (NUH at Kent Ridge; SGH and the various national centres at Outram), as well as the two medical schools (NUS Yong Loo Lin School of Medicine and Duke-NUS Graduate Medical School). The new buildings will also dovetail with the current plans to strengthen academic medicine at these two campuses.

Construction of both buildings is under way and on track, with the Centre for Translational Medicine (CeTM) at NUHS's Kent Ridge Campus expected to be completed by the third quarter of 2011 and the Pathology Building at SingHealth's Outram Campus expected to be completed by the first quarter of 2012. Following the construction phase, at least one year will be required to get the research labs up and running.

NATIONAL MEDICAL EXCELLENCE AWARDS

The push to improve clinical research and medicine in Singapore continues. Indeed, while much has been achieved, resting on its laurels is not an option for Singapore. There are new diseases, such as H1N1 in 2009, that necessitate quick and decisive action by clinical researchers to understand and then formulate responses to outbreaks. At the same time, the rest of the world is not standing still, and competing centres of medical research are working to get ahead. Therefore, Singapore must work not just to maintain its place amongst the elite centres for clinical research and medicine, but also to raise its achievements to continually higher levels of excellence.

With this in mind, the National Medical Excellence Awards are held annually to recognise those who achieve excellence in clinical research and medicine in Singapore. In 2009, the NMEA recognised five outstanding individuals for their work as mentors, clinical researchers and scientists, celebrating their work and the example they have set for rest of the research community here.



NATIONAL MEDICAL EXCELLENCE AWARDS

The 2009 NMEA winners were:

NATIONAL OUTSTANDING CLINICIAN AWARD 2009



Professor **John Wong Eu Li**

NATIONAL OUTSTANDING CLINICIAN SCIENTIST AWARD 2009



Professor **Michael Chee Wei Liang**

NATIONAL OUTSTANDING CLINICIAN MENTOR AWARD 2009



Professor **Ng Han Seong**



Professor **Low Poh Sim**



Professor **Chew Chong Lin**

There were no awardees for the National Clinical Excellence Team Award in 2009.



**PROFESSOR
JOHN WONG EU LI**

Deputy Chief Executive,
National University Health System

Dean,
NUS Yong Loo Lin School of Medicine

Director,
National University Cancer Institute, Singapore

Professor Wong is a true champion of research and education for improving patient care. A strong advocate of multidisciplinary teams involving healthcare professionals and scientists working together on problems seen in daily clinical practice, he appreciates the benefits of bringing observations gained in patient care to developing safer, more cost-effective, and more efficacious treatment through world-class research.

After several years at the Cornell Medical Centre in the US, Prof Wong returned to Singapore in 1992 as he felt he could contribute more meaningfully here. To say that he has succeeded in this is an understatement. As Prof Lim Pin from the Yong Loo Lin School of Medicine at NUS puts it, "Through the years, Professor Wong has developed into a visionary and dedicated leader and continues to impress me with his drive to excel in patient care, medical education and research."

From 1994 to 2000, Professor Wong headed the Department of Medical Oncology and contributed to the expansion of adult Haematology-Oncology as a specialty at the National University Hospital (NUH). During this time, he also assisted in the development of the Radiation Oncology facility at NUH and, in 1997, the Cancer Therapeutics Research Group (CTRG), involving multiple institutions in Singapore and around the world.

When SARS hit in 2003, Prof Wong integrated clinical epidemiology and research to stem the spread of the disease. He was appointed to the chair of the Singapore SARS consortium, a grouping of local laboratories and researchers from various fields, which eventually developed and validated SARS diagnostic kits.

Professor Wong has been a passionate advocate of teaching of undergraduate students and training of postgraduate doctors, believing in the importance of investing in the next generation of healthcare providers. As Dean of the Yong Loo Lin School of Medicine since 2003, his philanthropic efforts have focused on needy medical students and ensuring that all deserving students at the Yong Loo Lin School of Medicine will be able to pursue and realise their dreams of becoming doctors.

In recent years, Professor Wong has played a leading role in the integration of NUS' medical and dental schools, together with NUH, into an academic health system, combining excellence in clinical practice, education and research to deliver the best possible healthcare to Singaporeans.



**PROFESSOR MICHAEL
CHEE WEI LIANG**

Principal Investigator,
Duke-NUS Graduate Medical School Singapore

As a Principal Investigator at the Cognitive Neuroscience Lab, and a member of the Neuroscience and Behavioral Disorders Programme at the Duke-NUS Graduate Medical School Singapore, Prof Chee has built up a formidable research programme and, in the process, contributed significantly to the training of many graduate students and junior researchers. A firm believer in lifelong learning, he makes a concerted effort to ensure that researchers involved with his projects are continually learning and developing new skills and knowledge.

Prof Chee is also one of Singapore's pioneer recipients of the prestigious Singapore Translational Research Investigator Award. Showing uncommon versatility, he made the transition from full-time clinical neurologist to becoming a cognitive neuroscientist who runs a human brain-imaging research programme. His research concerning the sleep-deprived brain has gained international recognition, and he is known for his ability to combine asking "good scientific questions" with the ability to integrate knowledge across engineering, neuroscience and psychology.

With a focus on cognition in the context of sleep deprivation and healthy ageing, Prof Chee's functional brain imaging work on the sleep-deprived brain seeks to discover vulnerable points in the brain that lose function when we are sleep deprived. He is keen to determine why some people are more vulnerable to sleep deprivation and to use sleep deprivation as a "cognitive stress test" that might prove useful in the evaluation of cognitive modulators.

Despite being heavily involved in his own cognitive neuroscience research, Prof Chee still finds the time to build up a strong supporting infrastructure to facilitate his work. This has included mentoring graduate students, of which several have gone on to work in leading overseas laboratories such as Duke, the University of Pennsylvania, Cambridge, UIUC and two Max Planck Institutes. Furthermore, Prof Chee's lab strongly supports junior local researchers investigating topics ranging from learning algebra and irritable bowel syndrome to early onset schizophrenia.



**PROFESSOR
NG HAN SEONG**

Chairman Medical Board and Emeritus Consultant,
Department of Gastroenterology & Hepatology,
Singapore General Hospital

As a leader and educator at Singapore General Hospital (SGH), the National University of Singapore (NUS), and the Duke-NUS Graduate Medical School, Prof Ng Han Seong has made a deep impression, not just on the students and doctors that he has mentored, but also at an institutional level, instilling a culture of teaching and sharing that continues to grow. He has trained countless specialists over the years, as well as helping to establish and develop a number of medical departments in the Division of Medicine at SGH that have gone on to produce significant work independently and made outstanding contributions to patient care delivery, medical education and research in Health Sciences. Many of the staff in the departments, who were once his mentees, have gone on to assume leadership positions at SGH and other institutions in Singapore. Prof Ng was also instrumental in the development of the Department of Internal Medicine, where he first joined SGH, into a full-fledged Specialty Department of Gastroenterology that is well-recognised nationally and regionally. He also later set up and grew the Department of Family Medicine and Continuing Care to ensure the delivery of comprehensive and holistic care to patients.

Voted the Best SGH Teacher in 1995, Prof Ng has also served as an examiner for undergraduate and postgraduate medical examinations in Singapore, as well as in Malaysia and at the Royal College. As the Chairman of the Division of Medicine at SGH, he instituted a regular lecture series that spanned the entire Medical Office posting, and established an MRCP PACES course and mock examination to provide more comprehensive post-graduate education for Internal Medicine Basic Specialty Trainees.

In addition to his tireless commitment to teaching, Prof Ng is well-recognised as an accomplished clinician and hepatologist. He was the President of the Gastroenterological Society of Singapore and founding member of the Asia Pacific Association for the Study of Liver Diseases (APASL). He has edited and co-edited books for internists and gastroenterologists, authored many peer-reviewed scientific papers and delivered numerous lectures locally, regionally and internationally.



**PROFESSOR
LOW POH SIM**

Chair,
University Children's Medical Institute,
National University Hospital,
National University Health System

Associate Dean,
National University Hospital

Head and Senior Consultant,
Division of Paediatric Neurology and Developmental Paediatrics,
Department of Paediatrics,
National University Hospital

Prof Low is a passionate and dedicated teacher and mentor who has, over her 35-year career, taught many young paediatricians who have gone on to lead illustrious careers. She continues to play an important role in the development of the curriculum for both undergraduate and post-graduate studies at the NUS Yong Loo Lin School of Medicine.

Driven by her desire to help children with neurological and developmental problems, Prof Low has spearheaded the development of new and essential clinical services and programmes in this area. As Head of the NUH Division of Paediatric Neurology and Development Paediatrics, she has also led the paediatric neurology team to develop greater capabilities in clinical services. As a result of her efforts, the Division now has greater ability to investigate and diagnose a larger spectrum of genetic neuromuscular and neurodegenerative disorders.

As Chairman, Committee of Paediatrics, Division of Graduate Medical Studies, National University of Singapore for 14 years and Chairperson of the Specialist Training Committee for Paediatric Medicine for a period of 8 years, Prof Low exercised a major role in the training and assessment of a new generation of young paediatricians for Singapore. "Professor Low is a very meticulous mentor and she demands high standard from her mentees. She would always ensure that her students get the best training and teaching," says Prof Quak Seng Hock, Senior Consultant, University Children's Medical Institute, National University Hospital, National University Health System.

In addition to the professional training of paediatricians, Prof Low has, during her leadership of the Department of Paediatrics, built a capable and competent team of paediatric sub-specialists at the University Children's Medical Institute. In mentoring, nurturing and inspiring many young doctors, she has challenged, encouraged and helped them to achieve their potential to meet the health needs of children in Singapore and the region. Her efforts will indeed leave a lasting legacy to paediatric medical care in Singapore.



**PROFESSOR
CHEW CHONG LIN**

Director,
Division of Graduate Dental Studies,
NUS Faculty of Dentistry,
National University Health System

Senior Consultant,
Department of Restorative Dentistry,
University of Dental Cluster,
National University Health System

Over his 35-year career, Prof Chew Chong Lin has been a true champion of dentistry in Singapore. As a dental surgeon, teacher, mentor and researcher he has achieved multiple milestones in teaching, clinical work and research, many of which have seen him collaborating with engineers to develop new, innovative biomaterials for use in clinical treatment.

Prof Chew's talent and passion for bringing out the best in others has led to his appointment as the Dean, Faculty of Dentistry, Head of Prosthetic Dentistry, Head and Chief of Department of Restorative Dentistry, Deputy Director of Medical Services (Dental) and Chief Dental Officer. His tireless dedication and effort have raised the standard of dentistry in Singapore and the reputation of the NUS Faculty of Dentistry, National University Health System (NUHS).

In his role as Chief Dental Officer from 2001 to 2006, Professor Chew introduced important policies to align the practice of dentistry for all graduates, including the groundwork for the Specialist Register, a new Dental Act and Continuing Dental Education. A strong advocate of continuing dental education, Professor Chew set an example by being the first dentist in Singapore to be awarded a PhD degree in Dentistry by NUS. During his tenure at NUS, Prof Chew also introduced a compulsory research programme for all undergraduates, further enhancing the research culture in the Faculty of Dentistry.

Professor Chew is also the first Director of the Centre for Advanced Dental Education, set up in 2007 to formalise the Graduate Diploma and continuing dental education programmes, which enjoy a strong following from the profession, including dentists in the private sector. Through the years, Professor Chew has nurtured and mentored a number of students, many of whom are now established dentists and leaders in the profession. He continues to supervise the research work of graduate students. A dedicated mentor, Professor Chew often conducts weekly classes after office hours on his own time for final-year dental students.

Apart from his focus on dental education and clinical care, Professor Chew is also an innovative researcher, having initiated and worked with collaborators from the engineering sector to develop biomaterials to improve the properties of dental resins and extend their usage in dentistry. This venture has been highly successful and has resulted in a number of patents. Since 2001, he has been an active member of the Faculty Research Committee.

NMEA 2010

In recognition of the importance of advancing the clinical quality and safety of patient care in Singapore's healthcare system, the 2010 edition of the NMEA will include two new categories:

- (1) National Outstanding Clinical Quality Activist Award
- (2) National Clinical Quality Improvement Team Award

The National Outstanding Clinical Quality Activist Award will recognise medical doctors, nurses, pharmacists and allied health professionals in the public and private healthcare sectors who have contributed significantly to clinical quality improvement and patient safety, and have inspired others to do the same. This is the only NMEA category open to non-doctors.

The National Clinical Quality Improvement Team Award recognises multidisciplinary teams that have injected novel ideas, processes or technologies that improved clinical quality processes in a local healthcare institution. The improvement efforts should be sustained for at least two years and should be shared and adopted by other departments or institutions. Qualifying projects must have been completed within the most recent two years from the year of award.

NMRC Grant Application and Grant Evaluation for Research (nGager) System



In an effort to streamline research grant application and management activities, NMRC initiated a project in May 2008 to develop an online grant system. The result is the NMRC Grant Application and Grant Evaluation for Research (nGager) system, which brings together the processes for grant application, peer review, grant award and post-award activities in a single online interface.

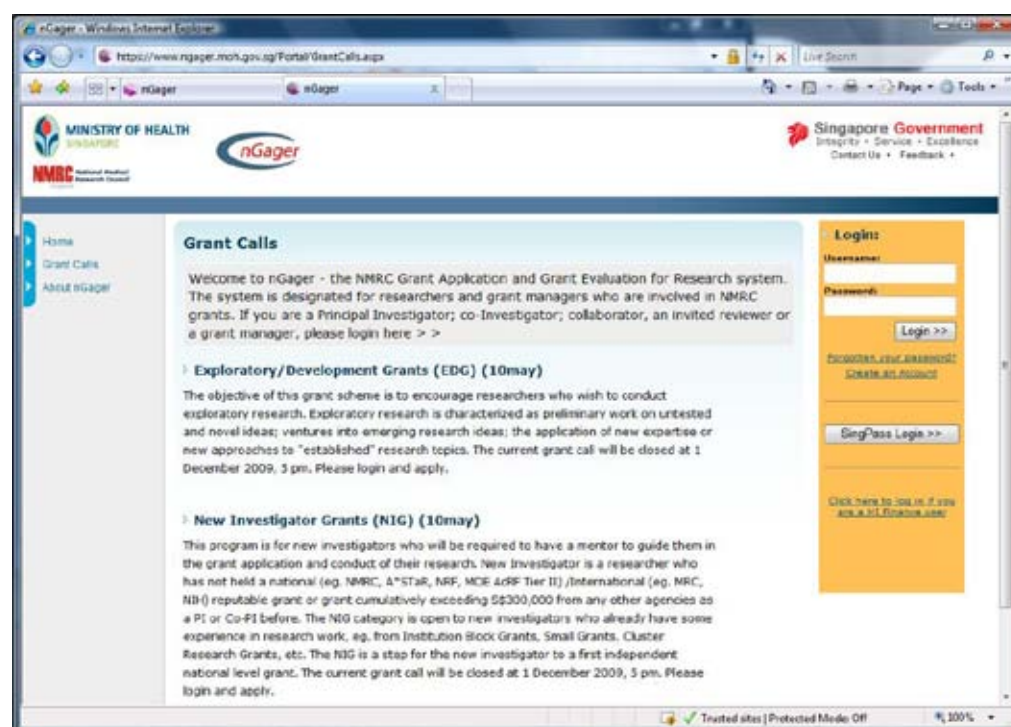
nGager was tested throughout 2009, and will be commissioned for IRG, EDG and NIG programmes in May 2010, and thereafter with MOH grants (HSR, HQIF). Integrated with the NMRC grant processing workflow, nGager provides the following functions:

- Receives grant proposals
- Provides a reviewer matching platform
- Receives reviewers' scores and reports
- Facilitates proposal ranking and panel discussion
- Supports grant administration for both the grantor and the grantee

In addition, the system assists researchers in:

- Developing their research proposals through online interaction with the funding agency, reviewer and host institution;
- Managing their research projects funded by NMRC; and
- Exchanging viewpoints between researchers in the peer review and rebuttal process.

The next phase of nGager development will increase the system's functionality to include a finance interface, greater research management capabilities, and integration with databases and additional agencies and institutions.



The nGager website is located at <https://www.ngager.moh.gov.sg/>

PUBLIC ENGAGEMENT PROGRAMME

As Singapore continues to develop into a hub for translational and clinical research, the need for a ready pool of participants for clinical trials will grow. It will become increasingly important for the public to not just be aware of the clinical research activities taking place here, but also to actively support them. To this end, the NMRC formed a Public Engagement (PE) Advisory Committee in August 2009 to lead the efforts to increase the awareness of clinical research amongst the public in Singapore.

While public support for Singapore's push for biomedical sciences excellence has been, if not positive, then at least neutral, NMRC has recognised that it will take more than this to ensure buy-in and active participation. In particular, the public needs to be made aware of the value and importance of participating in clinical trials.

Co-chaired by NMRC Board member Mrs Carmee Lim and Prof Ong Yong Yau, the PE Advisory Committee aims to create a more active, informed and engaged partnership between the research community and the public. The PE initiative will be a sustained, coordinated and active effort by the NMRC to ensure the long-term impact and effectiveness of the programme. The PE communication plans for 2010 will involve reaching out to the public through various media to provide several levels of engagement with the public and various interest groups, such as patients and patient advocates.



NMRC INTERNSHIP PROGRAMME

NMRC's internship programme is aimed at introducing pre-tertiary and tertiary Singapore Government scholars to the field of biomedical research. By bringing together scholars with diverse backgrounds and involving them in our various projects, we are able to tap into their creativity. This adds value to the projects, while at the same time providing a working experience and challenging learning opportunities for the scholars that expand their awareness of biomedical research in Singapore.

Five interns participated in this programme in 2008 and 2009, two of whom share their experience at NMRC below.

MARK NG ZHENGPING

Prior to his internship, Mark was an undergraduate student at the University of Michigan, Ann Arbor, in the US, where he majored in financial mathematics and statistics.

Mark worked on two different projects during his internship: one related to Health Research Classification System (HRCS) coding and the other related to NMRC's public engagement project. For the first project, his work focused primarily on the coding of NMRC's Institutional Block Grants according to HRCS codes, which is important because it provides a standardised basis for classifying and analysing biomedical and health research funding. For the public engagement project, Mark was involved in assessing the awareness of the public regarding clinical trials in Singapore—an important first step for understanding what NMRC can do to boost awareness and participation in such trials.

Commenting on how his efforts in the HRCS coding project contributed to NMRC's work, Mark notes: "What I contributed was largely a basic framework for coding IBGs that can hopefully reduce bias introduced by future coders' opinions."

Having completed his internship, Mark is now back at university pursuing a Master's degree in accounting.

LIM XUAN HONG

Lim Xuan Hong joined NMRC for an internship after completing his studies at Raffles Junior College. During his two-month internship, Xuan Hong focused on engaging the public and raising their awareness of clinical trials, allowing people to make an informed choice when participating in such trials. Specifically, he helped in the development of the communications plan and the content of the educational materials to be used in NMRC's public engagement project, as well as helping with the development of the web portal to be made available to the general public.

During his internship, Xuan Hong contributed to NMRC's efforts to translate laboratory research into practical applications and improved outcomes in the healthcare domain. Clinical research is an essential component of biomedical research, and thus any improvements in the awareness of and participation in clinical trials provides a boost to Singapore's overall healthcare system.

Noting that his experience at NMRC was a very positive one, Xuan Hong adds: "My objective in taking part in an internship at MOH and NMRC was to find out more about the work in the public service and, more specifically, experience how NMRC handles research grants and promoting medical research in Singapore. I felt that these objectives were met as I was able to work first-hand on a project independently and contribute to Singapore's developing medical research initiatives. Through the internship, I also got an opportunity to experience how creative discussions between professionals of different backgrounds pave the way for a well-developed policy of public engagement."

Xuan Hong will be starting his Bachelor's degree in Environmental Science at Duke University in August 2010.

NEWS HIGHLIGHTS

The Business Times, Thursday, July 23, 2009

5 doctors receive National Medical Excellence awards

There was no winner for National Clinical Excellence Team Award though

Awards by CMR MEMBERS
NANYANG new awarding as a new way to reward excellence in the health sector.

Five men, being a winner in a 16-way competition while he has much to gain, his efforts may have a thing of his to teach his, thanks to their research and work on other related areas.

Prof Ng, who is also chairman of NCI's medical board, has many things to say about the award.



Party of five (from left) Prof Lee Pak Nam, Prof Chew Chung Lin, Prof Ng Han Young are awarded for being outstanding doctors at Prof Ng Han Young who the National Outstanding Clinician Award and Prof Richard Chew who the National Outstanding Clinician Scientist Award

Prof Ng, who is also chairman of NCI's medical board, has many things to say about the award.

The other winners of this year's National Outstanding Clinician Scientist Award are from National University Health System.

Prof Ng, who is also chairman of NCI's medical board, has many things to say about the award.

H1N1 research gets \$10m shot-in-the-arm

The Ministry of Health has set aside \$10 million to fund projects on H1N1 research and prevention.

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六名本地医生获临床科学研究员奖

六位本地医生获临床科学研究员奖，这是由新加坡医学研究理事会颁发的最高荣誉。

六位本地医生获临床科学研究员奖，这是由新加坡医学研究理事会颁发的最高荣誉。获奖医生包括：李汉永、李汉明、李汉强、李汉伟、李汉雄、李汉杰。

六位本地医生获临床科学研究员奖，这是由新加坡医学研究理事会颁发的最高荣誉。

science. THE STRAITS TIMES NATIONAL, DECEMBER 10, 2008 PAGE 18

Funding for four doctor-scientists

Four doctor-scientists are the latest to receive the Clinician Scientist Awards, and will be given \$25,000 in \$300,000 annually for three to five years.



DR JERRY CHAN, Professor of Obstetrics and Gynaecology, NCI, Yong Loo Lin School of Medicine, Department of Obstetrics and Gynaecology, National University Health System



DR TAN HAN CHONG, Senior Lecturer, Medical Director, National Cancer Centre Singapore



DR LOUIS HONG HUI TIN, Consultant, Singapore National Eye Centre, Department of Ophthalmology and Therapeutic Laboratory, Singapore Eye Research Institute, Nanyang Technological University



DR LEE SOOK CHIN, Senior Lecturer, Department of Neurology, National University Health System, National University of Singapore

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全国医学卓越奖

卫生部医药总监：本地医学界人才流失不严重

卫生部医药总监表示，本地医学界人才流失并不严重，许多医生在本地继续工作。

卫生部医药总监表示，本地医学界人才流失并不严重，许多医生在本地继续工作。他提到，许多医生在本地工作是因为他们喜欢这里的生活。

卫生部医药总监表示，本地医学界人才流失并不严重，许多医生在本地继续工作。

卓越临床医生导师奖得主 刘宝婵教授关爱病人至深

刘宝婵教授在临床工作中表现出色，深受患者和同事的尊敬。她关爱病人至深，为患者提供了高质量的医疗服务。

卓越临床医生奖得主 黄聿立教授不向失败低头

黄聿立教授在科研和临床工作中取得了显著成就，他不向失败低头，坚持不懈地追求科学真理。



FIGHTING OUTBREAKS

Building a 'simulation model'

Some doctor-researchers here are gathering data to study the spread of diseases

HO CHAI CHEE
(chee@nmrc.org.sg)

SHOULD an influenza A (H1N1) outbreak occur in Singapore, Dr Mark Chen (right) will be busy collecting data to better understand how it can spread in a hospital.

Singapore is currently "taking a laissez approach", but when a simulation model on infectious diseases spread is developed, there could be "breakers to adjust" certain measures, he said.

For example, would restricting hospital visitors from Day One make a difference in curbing its spread? How far should patient movement among wards be allowed?

Over the next three years, Dr Chen — a registrar at Tan Tock Seng Hospital's Communicable Disease Centre — hopes to develop a computer simulation model using data from the Sars outbreak in 2003 and also from seasonal flu.

"Outbreaks are what we call rare events," said Dr Chen.

"That's why we do simulations — to collect data on an outbreak, then go backwards and ask, 'if we had done something



Outbreaks are what we call rare events. That's why we do simulations — to collect data on an outbreak, then go backwards and ask, 'if we had done something different, would we have had a smaller outbreak?'

(Dr Mark Chen, left; photo by Terence Tan)

different, would we have had a smaller outbreak?"

Dr Chen is one of six doctors awarded the Clinician Scientist Awards this year. Investigators like him receive \$225,000 annually for three years, while senior investigators receive \$350,000 per year for five years.

The awards are funded by the National Research Foundation, and administered by the Ministry of Health.

Elaborating on his project, Dr Chen said there's currently little room for hospitals to "playthrough" decisions. After reviewing the best literature available, decision-makers

come up with measures best suited to a particular hospital or disease.

With a simulation model, different scenarios can be played out, enabling intervention strategies such as drug treatment and vaccination to be virtually experimented with.

Doctors would also be able to better explain certain decisions to patients. If the simulation model shows that visitor restriction is necessary, "then we can explain why we have to do this", said Dr Chen.

Anxiety about infectious disease fades after an outbreak passes, "but even as everyday flags, preparations have to be made for the next one", said Dr Chen.

"This is something that the H1N1 situation has emphasised to us."

GOOD VERSUS BAD

"Good cholesterol" is associated with lower risk of heart disease, but this is not always the case. This is because the good cholesterol — also called high density lipoprotein (HDL) — may not function well. To better predict patients' risk of developing heart disease, Associate Professor Tai E Shyong is studying the function of proteins present in HDL. The senior consultant at the National University Health System's division of endocrinology is one of three senior investigators awarded the Clinician Scientist Awards 2009. These proteins will give a better risk indicator than measuring the cholesterol in HDL, which is currently the standard practice, he said. Drop that currently lower "bad cholesterol" — or low density lipoprotein — only prevent 30 to 40 per cent of heart attacks, if HDL is better understood, doctors would be "able to have a go" at helping the remaining 60 to 70 per cent of those heart patients, said Assoc Prof Tai.

STUDYING STOMACH CANCER

Stomach cancer is one of the top 10 causes of cancer deaths in Singapore, said Dr Ling Khoo Lin of Singapore General Hospital, who is one of the recipients of this year's Clinician Scientist Awards. He will study patients' immune response to the Helicobacter pylori bacterium — thought to cause more than 90 per cent of stomach cancer — over the next three years. Through his research project, he hopes to identify immune cells that will indicate which patients are at higher risk of the cancer. "The 'junkies' would be identifying cancer drugs that interfere with certain proteins or cells to lower patients' risk of stomach cancer, but that's much further away," said Dr Ling, a consultant at SGH's department of gastroenterology and hepatology.

EXCELLENCE IN THEIR OWN FIELDS

Four doctors and a clinician scientist have been commended in the Ministry of Health's annual National Medical Excellence Awards — among them a professor who worked for free in America as a young doctor just to get more training.

Professor John Wong (top), the director of the National University Cancer Institute, was about to become a specialist in 1985 when he decided to head to the United States.

He applied to about 40 top academic medical facilities there but only managed to secure an interview with Cornell Medical Centre in New York — which was already fully staffed. But Professor Wong struck a deal by offering to work for free for a year.

He stuck it out "living in Manhattan on food coupons" and "two dollars a day" and became the centre's first Asian Chief Resident in Medicine in 1991. He received the National Outstanding Clinician Award yesterday.

Professor Michael Chee (bottom), the Principal Investigator at the Duke-NUS Graduate Medical School, was awarded the National Outstanding Clinician Award for his research in short-term total sleep deprivation.

The only woman, Professor Low Fun Sim, the Head of Paediatric Neurology at the National University Hospital, received the National Outstanding Clinician Mentor Award for helping children with special needs.

The National Outstanding Clinician Mentor Awards went to Professor Chew Chong Lin, a dental surgeon from the National University Health System, and Professor Ng Han Seong, a digestive system specialist from the Singapore General Hospital. They each received a plaque and \$10,000. nmrc.org.sg



PHOTOS COURTESY DUKE-NUS GRADUATE MEDICAL SCHOOL

home.

THE STRAITS TIMES THURSDAY, JUNE 11 2009 PAGE 09

Doc-scientists get grants to do research

Award supports 6 who do investigative work while seeing patients

By GRACE CHUA

WHEN severe acute respiratory syndrome (Sars) hit in 2003, epidemiologist Mark Chen was a young doctor at the Communicable Disease Centre at Tan Tock Seng Hospital.

As the new virus took its hold on Singapore, the then 31-year-old watched his colleagues fall prey to the deadly disease.

To add insight into such phenomena, Dr Chen has been given a research grant to study how infectious diseases like Sars and influenza are spread within a hospital

environment.

He is among six recipients of this year's Clinician Scientist Award, which supports doctors doing cutting-edge research while still seeing patients.

"We knew from the time that we were hit with Sars that we had to be better prepared for the next epidemic," Dr Chen said.

He will develop computer simulations that model the transmission of such diseases inside hospitals, and hopes to study local transmission of influenza A (H1N1) if or when it occurs.

The annual award has been given out by the Agency for Science, Technology and Research and the Ministry of Health since 2004.

About 30 projects have been awarded grants so far.

They are given to Singaporeans or per-



Epidemiologist Mark Chen will use his research grant of up to \$225,000 a year for three years to study how infectious diseases like Sars are spread within hospitals. ST PHOTO: TERENCE TAN

manent residents doing work based here, and recipients are assessed first by international scientists in the same field, then selected by a panel of medical and scientific experts.

This year's grants, announced yesterday, will give the six recipients up to \$350,000 each year for three to five years.

They will spend up to 70 per cent of

their time doing research, and the rest of the time attending to their patients.

Besides funding research, the sum helps make up for what each doctor would have earned from seeing patients full-time.

Associate Professor Tai E Shyong, 42, is a repeat grant recipient. In 2005, he received the award to study factors that contribute to diabetes, high cholesterol

The winners

THIS year's Clinician Scientist Award recipients:

Senior investigators, who receive up to \$350,000 annually for five years:

■ Oncologist Joseph Wee of the National Cancer Centre Singapore

■ Endocrinologist Tai E Shyong of the National University Health System (NUHS)

■ Obstetrician and gynaecologist Mahesh Choolani of the NUHS

Investigators, who receive up to \$225,000 a year for three years:

■ Gastroenterologist Ling Khoo Lin of the Singapore General Hospital

■ Liver specialist Dan Yock Young of NUHS

■ Epidemiologist Mark Chen of Tan Tock Seng Hospital

and obesity, and this year's award allows him to continue his work.

Clinician-scientists can contribute a valuable perspective to research, he said.

"For clinician-scientists, it's easier to contextualise what you're doing for science, as (seeing patients) helps you identify key problems you may want to focus on in your work," Dr Tai added.

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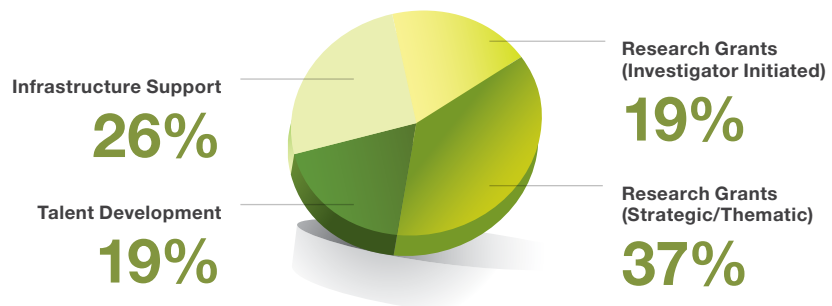
NMRC COMMITMENTS IN 2008 AND 2009

A total of S\$416.67M was committed to the various programmes in 2008 and 2009. The breakdown is shown in the table below:

NMRC 2008 AND 2009 COMMITMENTS

	Committed Amount (S\$m)
Talent Development Awards	
Singapore Translational Research (STaR) Investigator Award*	28.50
Clinician Scientist Award (CSA)*	22.76
NRF-MOH Healthcare Research Scholarship*	4.20
NMRC Research Training Fellowship	6.40
Masters of Clinical Investigation (MCI) Scholarship*	2.77
Research Grants (Strategic/Investigator-initiated)	
Translational and Clinical Research (TCR) Flagship Programme*	100.00
Individual Research Grant (IRG)	50.89
Exploratory/Developmental Grant (EDG)* & New Investigator Grant (NIG)*	16.15
Institutional Block Grant (IBG)/Enabling Grant (EG)/ Centre Grant (CG)/Programme Project Grant (PPG)	59.41
Infrastructure Support	
Singapore Clinical Research Institute (SCRI)*	21.00
Investigational Medicine Units (IMUs)*	20.00
Centre for Biomedical Ethics (CBmE)*	4.60
Research Buildings*	80.00
	416.67

BMS PHASE II TOTAL COMMITMENTS TO DATE (2006 – 2009) – S\$664.71M



* Programmes funded by the National Research Foundation

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