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national medical research council **annual** report 07/08

NMRC National Medical Research Council
Singapore

symbiosis

Connecting Research to Life

annualreport07/08

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.

“Symbiosis: Connecting Research to Life”

highlights the important interaction between clinicians and scientists in Singapore’s medical research sector. In this symbiotic relationship, the two sides work hand in hand, and each side benefits from the insights and experience of the other. The result is a vibrant translational research sector that brings findings from bench to bedside, and insights from bedside to bench; ultimately improving patients' outcomes.

This report covers NMRC’s 2007 financial year, which ran from 1 April 2007 to 31 March 2008.

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Executive Chairman's Message

Great progress, optimistic outlook

Singapore’s translational research landscape has made tremendous progress since the start of Phase 1 of the Biomedical Sciences (BMS) Initiatives in 2000, and NMRC has played a key role in this development. The early years focused on major investments and capacity-building in basic research, which has laid the foundation on which NMRC is now building up translational research capabilities.

As of 2007—more than two years into BMS Phase 2—NMRC has made considerable strides in setting up new programmes and planting the seeds for future achievements. But we are still only in the beginning stages of the process. Translational research tends to require a lengthy time frame to see results, so a measuring stick longer than two years is required to assess the success of our efforts thus far. Singapore has committed to making translational research and biomedical science a strategic component of the country’s economy, and this long-term view, and the stability that it entails, will enable the translational research initiatives to bear fruit.

World-class research, Asian emphasis

With its excellent infrastructure and resources and a rapidly growing community of experienced clinical researchers, Singapore is building up its capabilities as a world-class translational research centre. One area in which Singapore is particularly well-positioned to carve out a niche for itself on the world stage—due to the combination of a predominantly Asian population, an advanced and efficient scientific environment, and a superb healthcare system—is in the study of diseases affecting Asian populations. From infectious diseases prevalent in the region to specific types of eye diseases and cancers that are particularly common among Asians, researchers in Singapore are taking the lead in tackling these problems.

Bright future, abundant opportunities

As we look to 2008 and beyond, we are optimistic about what the future holds for translational research in Singapore. Having implemented various programmes and funded many studies, the challenge going forward will be to remain nimble as we start to see what is working and what is not, and to adapt how we channel our resources accordingly.

The ultimate achievement that we strive for is the day when we can say that investigators in Singapore have conceptualised, researched, developed and tested a novel solution to a disease that improves the way medical professionals worldwide treat their patients. As the investigators funded by NMRC and our many other stakeholders take steps every day towards reaching this goal, we will make many other contributions along the way that will be smaller in scale but no less important. In the end, every new insight, development and innovation resulting from these research efforts will benefit patients, thus fulfilling the primary objective of our “bench to bedside” translational research activities.

Edward W. Holmes

Prof Edward Holmes
Executive Chairman

“Working in close collaboration with other agencies, we aim to fulfil our role in driving translational research in Singapore, both now and in the future.”

A catalyst for innovation

Translational and clinical research was added to the Ministry of Health’s mandate in 2006, and since then NMRC has embraced its expanded role in leading, coordinating and funding medical research in Singapore. With a newly minted mission and additional funding, we have actively expanded our activities in the two key areas that form the pillars of NMRC’s function: grant and talent development. In both areas we serve as a catalyst for translational research, either by selecting and funding specific research initiatives or by identifying and supporting the growth of talented researchers. Working in close collaboration with other agencies, we aim to fulfil our role in driving translational research in Singapore, both now and in the future.

A year of achievement

We had a busy 2007 financial year, with NMRC launching several major initiatives. One of our key achievements of the past year was the awarding of the inaugural Translational & Clinical Research (TCR) Flagship Programme for gastric cancer research. Awarded in July 2007, this landmark initiative will see NMRC provide S$25 million in funding over five years to the Singapore Gastric Cancer Consortium for research aimed at improving early detection of gastric cancer. This project was the first of five TCR grants to be given out by NMRC. Two more, one for neuroscience and one for eye diseases, were subsequently awarded in early 2008.

Another important first was the inaugural National Medical Excellence Awards (NMEA), an initiative by the Ministry of Health launched in March 2008. Aimed at recognising individuals and teams in Singapore’s medical sector for their achievements in clinical work, research and mentoring of young clinicians, the NMEA will help to focus the spotlight on the groundbreaking work being done here. NMEA 2008 saw six awards given out to four individuals and two teams in fields ranging from paediatric nephrology and ophthalmology research to mental health and perinatal care.

While less glamorous than the TCR programme and the NMEA, another important NMRC milestone for 2007 was the revamping of our grants' terms and conditions. Aiming to create a smoother process for grant applicants and awardees while maintaining strong governance, we implemented changes such as simplifying the grant extension procedure. Previously, awardees wishing to extend their grant had to submit detailed documentation in support of their request; now, as long as their funding requirements do not increase, awardees can automatically renew their grant for one year by simply notifying NMRC of their desire to do so. Ultimately, we want to ensure that scientists and clinicians spend as little time as possible on administrative work and as much time as possible conducting research.

Plans for the future

We have done well to successfully launch and support various grant and talent programmes over the past few years—no small feat as we were essentially building the road while already driving on it. NMRC is constantly working to enhance existing programmes and develop new initiatives to facilitate translational research in Singapore. We continue to undertake study trips to see how other countries support their translational research sectors, but we are mindful of the need to adapt international best practices to our uniquely Singaporean environment.

Looking ahead, we have plans to launch a new programme in 2008 that will facilitate dialogue and networking between members of the scientific community and industry in specific fields, with the aim of encouraging greater collaboration. The coming year will also see work continue on the development of an electronic grant-management system. This is a massive undertaking—involving collaboration with sister funding agencies such as the National Research Foundation and the Ministry of Education—that aims to streamline the management of grant applications and awards by developing common interfaces and data fields that will be harmonised across various agencies.

In this annual report we have highlighted a handful of the many exciting projects and talented investigators that NMRC funds to give our stakeholders a better insight into the work that we support. These profiles provide just a hint of what’s to come as Singapore’s translational research sector gains momentum, and we look forward to writing that future together with our partners in the research and medical community.

Dr Edwin Low
Executive Director

NMRC National Medical Research Council
Singapore

About NMRC

The **National Medical Research Council** was established in 1994 as an agency under the Ministry of Health. It was tasked with overseeing the development and advancement of medical research in Singapore. Its responsibilities now include the provision of research funds to healthcare institutions, the awarding of competitive research funds for individual projects, and the development of clinician scientists through awards and fellowships.

Grant applications to NMRC are evaluated by multi-disciplinary review panels consisting of specialists from a variety of fields. This peer review process ensures rigorous screening so that funding is distributed in a consistent and effective manner. Since its inception, NMRC has funded more than 1,100 individual research projects and 13 national research programmes.

NMRC's activities also extend beyond the distribution of funds to include initiatives to promote closer collaboration between various stakeholders in Singapore's medical sector, attract and develop new research talent, and assist with the commercialisation of research findings.

Key Milestones

1994

- Founding of NMRC
- Dr Charles Toh assumes Chair of First Council
- Launch of NMRC Fellowships
- Launch of Institutional Block Grant (IBG)
- Launch of Individual Research Grant (IRG)

2000

- Professor Lim Yean Leng assumes Chair of Second Council
- Launch of Singapore Biomedical Sciences Initiatives Phase 1

2003

- Professor Woo Keng Thye assumes Chair of Third Council
- New focus and direction is mapped out in NMRC Strategic Document
- Launch of Enabling Grant (EG)
- Joint NMRC–BMRC (Biomedical Research Council) Grant Call for IRG
- Launch of joint NMRC–BMRC Clinician Scientist Investigator (CSI) Award

2006

- Professor Edward Holmes assumes Chair of Fourth Council
- Expanded mandate and increased funding from Ministry of Health
- Launch of Singapore Biomedical Sciences Initiatives Phase 2
- NMRC appointed as Programme Office for Singapore's Biomedical Sciences Research by the National Research Foundation

2007

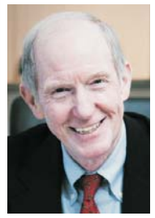
- NMRC moves to new office at Helios @ Biopolis
- Award of the first Translational and Clinical Research (TCR) Flagship Programme for cancer
- Launch of NRF-MOH Healthcare Research Scholarship (PhD)

2008

- Award of two TCR Flagship Programmes in neuroscience and eye diseases
- Inaugural National Medical Excellence Awards (NMEA)
- Award of first batch of STaR awardees and launch of revamped Clinician Scientist Award
- Launch of revamped NMRC Research Training Fellowship
- Launch of NRF-MOH Healthcare Research Scholarship (Master of Clinical Investigation)

National Medical Research Council Board Members

From 1 December 2006 to 30 November 2008



Prof Edward Holmes
Executive Chairman
National Medical Research Council

Dr Edwin Low
Executive Director
National Medical Research Council
(Ex-Officio)

Prof Soo Khee Chee
Director
National Cancer Centre Singapore

Prof Donald Tan
Director
Singapore National Eye Centre

Prof Ivy Ng
Chief Executive Officer
KK Women's & Children's Hospital

Group Deputy CEO, SingHealth

Prof Yap Hui Kim
Head and Senior Consultant of Paediatric Nephrology at the University Children's Medical Institute, National University Health System

Prof John Wong Eu Li
Dean
Yong Loo Lin School of Medicine
National University of Singapore

Prof Robert Sanders Williams
Founding Dean,
Duke-NUS Graduate Medical School Singapore

Prof Edison Liu
Executive Director
Genome Institute of Singapore

Dr Mabel Yap
Director
Health Services Research & Evaluation Division
Ministry of Health

Assoc Prof Chong Siow Ann
Vice Chairman, Medical Board (Research)
Institute of Mental Health

Prof Lee Eng Hin
Executive Director
Biomedical Research Council
(Ex-Officio)

Prof Alex Matter
Director
Novartis Institute for Tropical Diseases

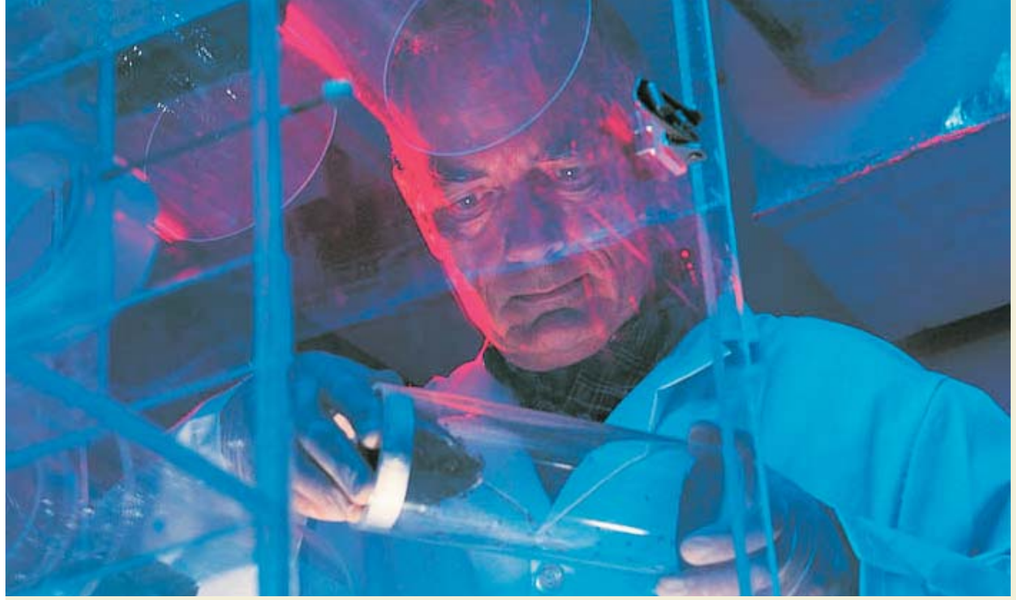
Prof Barry Coller
David Rockefeller Professor of Medicine
Laboratory of Blood and Vascular Biology
Rockefeller University, USA

Dr John Potter
Senior Vice President & Director
Public Health Sciences
Fred Hutchinson Cancer Research Center, USA

Prof Patrick Sissons
Regius Professor of Physics
School of Clinical Medicine
Cambridge University Hospitals NHS Foundation Trust, UK

Overall Grant Framework

TALENT DEVELOPMENT PROGRAMMES	RESEARCH GRANTS	
	STRATEGIC / PROGRAMMATIC	INVESTIGATOR-LED RESEARCH
SINGAPORE TRANSLATIONAL RESEARCH INVESTIGATOR AWARD (STaR)	TRANSLATIONAL AND CLINICAL RESEARCH (TCR) FLAGSHIP PROGRAMME	INDIVIDUAL RESEARCH GRANT (IRG)
CLINICIAN SCIENTIST AWARD (CSA)	BLOCK GRANTS (INSTITUTIONAL BLOCK GRANT AND ENABLING GRANT)	EXPLORATORY / DEVELOPMENTAL GRANT (EDG)
NMRC FELLOWSHIP / NRF - MOH RESEARCH SCHOLARSHIPS		NEW INVESTIGATOR GRANT (NIG)



NMRC Talent Development Programmes

Singapore Translational Research (STaR) Investigator Award

The prestigious STaR award is designed to recruit and nurture world-class clinician scientists to undertake cutting edge translational and clinical research in Singapore. The STaR programme comprises three award levels—Distinguished Senior Investigator, Senior Investigator and Investigator. Each 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 between three and five years.

Clinician Scientist Award (CSA)

The CSA is structured to develop local research talent and give clinician scientists protected time to focus on their research. The Senior Investigator level of the CSA offers funding for five years, while the Investigator level runs for three years. The award provides funding for full salary support, together with a competitive research grant.

National Research Foundation-Ministry of Health Healthcare Research Scholarship (PhD)

This 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.

National Research Foundation-Ministry of Health Research Scholarship (MCI)

The NRF-MOH Research Scholarship aims to encourage more clinicians to pursue advanced clinical research training through the Master of Clinical Investigation (MCI) programme 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.

Note: The STaR, CSA and NRF-MOH scholarships are funded by the National Research Foundation.

NMRC Research Grants

Strategic/Programmatic

Translational & Clinical Research (TCR) Flagship Programme

The TCR programme provides a significant level of funding, with the aim of establishing Singapore as a global leader in the study of key strategic medical research fields. The programme is designed to help build up a critical mass of experienced high-level researchers, facilitating a broader research platform and increased collaboration both locally and internationally. Each TCR recipient is awarded S$25 million over five years, with the funding provided by the National Research Foundation. The five key areas targeted by the TCR programme are selected for their relevance to Singapore and the existence of strong local expertise. The five key areas are cancer, cardiovascular/metabolic disorders, neurosciences, infectious diseases and eye diseases.

Block Grant

The two types of block grants, Institutional Block Grants (IBGs) and Enabling Grants (EGs), are awarded to institutions to further the development of their research capabilities and expertise. IBGs focus on developing core manpower and core research facilities in restructured hospitals and public research institutions. EGs aim to nurture a research culture through grants for clinical trials and pilot studies.

Investigator-led Research

Individual Research Grant

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.

Exploratory/Developmental Grant

These grants support the development of innovative and new areas of research. They are applicable to research on untested and novel ideas, original research fields, and the application of new expertise or approaches to established research topics. Funding is available for a two-year period, with the possibility of a one-year extension.

New Investigator Grant

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. Each investigator will work with a mentor for guidance in their research. This mentorship will provide support for a period of supervised research leading eventually to the clinician researcher conducting larger-scale research projects independently.

Note: The TCR Flagship Programme and the EDG are funded by the National Research Foundation.

Pushing the Limits

How one doctor driven by passion has improved the lives of thousands of children suffering from kidney failure

Professor Yap Hui Kim

Professor Yap Hui Kim

Position & Institution

- Head and Senior Consultant, Department of Paediatric Nephrology, University Children's Medical Institute, National University Health System
- Professor, the Department of Paediatrics, National University of Singapore
- Recipient of the National Medical Excellence Award – National Outstanding Clinician
- NMRC Board Member and NMRC grants recipient

Overview of NMRC-Supported Research

With over 25 years of experience as a clinician scientist, Professor Yap is one of Singapore's pioneers in translational research. She was the key player involved in setting up Singapore's first paediatric nephrology department, which conducted the country's first paediatric dialysis and kidney transplant. Never willing to take no for an answer, Prof Yap has continually broken new ground throughout her career, and she shows no signs of slowing down.

From a young doctor in the early 1980s to Head of the Paediatric Nephrology Division at the University Children's Medical Institute, National University Health System today, Professor Yap Hui Kim has consistently been driven by her passion to make a difference in the lives of her patients.

"Back when I started out, the outlook for children diagnosed with kidney failure in Singapore was very bleak due to the lack of specialised equipment and expertise to treat them," explains Prof Yap. Appalled by the dismal prospects facing these sick children, Prof Yap went to the US to learn about paediatric nephrology, in particular dialysis and transplantation, in order to bring this knowledge—and hope for young patients with kidney failure—back to Singapore. Over the course of two years, she carried out extensive research and gained practical experience, persevering through challenging conditions along the way.

The ten minutes that made a difference

Back in Singapore and armed with experience gained in the US, Professor Yap questioned why the same treatment given to children suffering from kidney failure there could not be administered here. As the biggest obstacle was a lack of funding, she decided to take matters into her own hands, despite the naysayers. "I called up a large company for an appointment and was told that I would have only ten minutes. I took along two slides illustrating the dialysis procedure in one of the child patients and explained that I was seeking funding to provide him with dialysis," reminisces Prof Yap. "I walked out of that first meeting with a commitment for S$30,000 in funding, and that's how our paediatric nephrology programme was born."

Encouraged by this early success, Prof Yap pushed on, approaching more sponsors and raising more funding one child at a time. After two years of dialysis for the programme's first patient, Prof Yap and her team achieved another major milestone by carrying out Singapore's first paediatric kidney transplant on the 3-year-old child.

Bigger, better and still innovating

Today, the Shaw-NKF Children's Kidney Centre at the University Children's Medical Institute, National University Hospital—which evolved from the paediatric nephrology programme started by Prof Yap more than 20 years ago—treats more than 2,000 patients annually. Funded primarily by sponsors and donations, the centre operates on the principle that no child suffering from kidney failure should be denied access to treatment due to a lack of financial means.

Establishing the programme was a challenging process involving years of hard work, but giving up was never an option for Professor Yap: "If you put a limit on what you think you can achieve, then you will be limited. This applies in research just as much as it does in other areas of life. People may say that something cannot be done, but you just need to keep trying different ways and sometimes you will succeed."

For Prof Yap, helping her patients means more than providing basic medical treatment. Through the Children's Kidney Centre, she organises an annual camp for her patients to give them a chance not only to enjoy activities that they normally can't take part in, but also to learn independence and develop leadership qualities. "Our patients are usually unable to take part in regular school camps due to concerns about access to medical care. So each year we run a three-day, two-night camp for them—we've taken them to Pulau Ubin, Sentosa, and even once on a Star Cruise. We bring along a full team of doctors and nurses and all of the necessary equipment to administer treatment on-site," says Prof Yap. Although it is a major undertaking and requires extensive planning and funding from sponsors, she feels it is well worth the effort to give the children this special experience.

Ongoing research and learning

Always on the go, Prof Yap maintains a busy schedule of teaching and clinical duties. However, research continues to play an important role in her activities as she strives to improve the treatment options for children with kidney failure. Over the past 10 years, Prof Yap has been awarded more than 12 grants by NMRC, making her one of the council's top researchers.

Prof Yap's paediatric nephrology department is recognised as a centre of excellence throughout the region, attracting doctors from across Asia who come to Singapore to develop expertise in this field. "We now have international fellows coming to Singapore from other countries to learn," explains Prof Yap. "Their studies here involve training in all aspects of paediatric nephrology, including dialysis training by our specialised nurses so that they can then train others when they return home. So far we have trained about 15 foreign doctors and two nurses from the region."

Advice for the next generation

While it is difficult to imagine this dynamic doctor ever slowing down, Prof Yap notes that one of the things on her to-do list is to identify and develop others to carry on the programmes that she has started. Describing the ideal candidate, she notes: "You need to have passion and you must be prepared to continue even when you don't succeed the first time." Indeed, spoken from experience.

> **"If you put a limit on what you think you can achieve, then you will be limited. This applies in research just as much as it does in other areas of life."**

> “Research is to see what everybody else has seen, and to think what nobody else has thought.”
>
> - Albert Szent-Gyorgyi, winner of the 1937 Nobel Prize for Medicine

TALENT Development Programmes

Investing in People

Talent development plays a primary role in NMRC’s efforts to nurture a vibrant research community of clinician scientists in Singapore.

STaR Attraction

Singapore's focus on and funding of translational research is starting to attract global talent

Professor David Virshup

Position & Institution

- Director, Cancer and Stem Cell Biology Programme, Duke-NUS Graduate Medical School Singapore
- Recipient of Singapore Translational Research Investigator Award (STaR)

Overview of NMRC-Supported Research

Professor Virshup leads a team of researchers investigating the role of stem cells in various types of cancer. He is focusing his research on Wnt signalling, which involves a complex network of proteins that plays a role in the maintenance and proliferation of cancer stem cells. The team will be looking to develop molecular inhibitors of Wnt signalling that may allow for the regulation of cancer stem cells, and eventually lead to an effective therapy for cancer.

Professor David Virshup was attracted to Singapore by the opportunities that it presented—from the relatively new but enthusiastic focus on translational research to the association with a pair of leading universities. "I was attracted to the idea that it is a pioneering graduate medical school in Asia," he explains. As the director of the Cancer and Stem Cell Biology Programme at the Duke-NUS Graduate Medical School, Prof Virshup is now intimately involved in helping to nurture first-rate medical research in Singapore and training clinician scientists like himself.

Prior to joining the Duke-NUS Graduate Medical School, Prof Virshup had a distinguished career at various institutions in the United States. He completed his clinical training in Paediatrics and Paediatric Haematology/Oncology at Johns Hopkins University School of Medicine in Baltimore, where his research training was in the departments of paediatrics, cell biology and anatomy, and molecular biology and genetics. Following his research training, Prof Virshup held a post as an investigator at the Huntsman Cancer Institute at the University of Utah, which he left to take up his current post in Singapore.

Awarding innovative research

Professor Virshup's many years of research experience and considerable expertise in his field garnered him a newly introduced Singapore Translational Research Investigator Award (STaR). Given out to top-level researchers who have attained a high level of international recognition and competitiveness, the STaR award enables recipients to perform exploratory research, particularly on novel or pioneering ideas.

Keenly aware of the importance of a significant and stable source of funding for medical research, NMRC has developed a framework of grants that provides funding to not only institutions, but also individual researchers and teams. Its focus on providing an environment conducive to world-class research has not gone unnoticed, and has started to attract promising research talents from around the world to Singapore.

Focus on research

Prof Virshup points out that receiving the award has removed a major source of worry and will allow him and his team to focus much more effectively on the task at hand—namely, research. "The funding gives a lot of freedom to stop worrying about grants … and concentrate on just doing the best research you can."

As part of the STaR award, Prof Virshup will receive a S$5 million grant over five years to continue to develop his innovative research on cancer treatment. Prior to arriving in Singapore, he was involved in research targeting the proliferation of cancer stem cells as a potential treatment for many common cancers such as colon, liver and breast cancers, and leukaemias. Research in this area is still very new and there is much more work to be done before reaching the stage at which new drugs will become available to patients.

For his research under STaR, Prof Virshup will be working on developing small molecule inhibitors of Wnt signalling, a complex network of proteins known to have a role in the development of cancer stem cells. It is hoped that by controlling Wnt signalling, it will be possible to regulate stem cell maintenance and proliferation, resulting in a therapy treatment for certain kinds of cancer.

With talented researchers like Prof Virshup and the exciting work that he and his team are undertaking, the future of translational research in Singapore holds much promise.

The Accidental Researcher

How a combination of passion and chance has led to a successful career as a clinician scientist

A/Prof Tan Eng King

A/Prof Tan Eng King

Position & Institution

- Senior Consultant, Department of Neurology, National Neuroscience Institute
- Senior Consultant, Department of Neurology, Singapore General Hospital
- A/Prof, Duke-NUS Graduate Medical School
- Recipient of Clinician Scientist Award (CSA)

Overview of NMRC-Supported Research

A/Prof Tan heads a research team working to identify genetic risk factors for essential tremor (ET) and related neurodegenerative diseases. In doing so, the team aims to facilitate better diagnosis and improve the management of drug-related complications related to these disorders.

For Associate Professor Tan Eng King, a chance invitation to work in a lab grew into a passion for research—and set this young doctor on an unexpected but ultimately rewarding career path.

A twist of fate

As a clinical neurologist, A/Prof Tan went to the US on a fellowship for specialised training in disorders of movement, his sub-specialty. He originally planned to return to Singapore after one year in the US, but a chance encounter in a corridor with Professor Tetsuo Ashizawa one evening changed everything. “Professor Ashizawa said that I must be very hardworking as I always seemed to be at the hospital, so he asked whether I was interested in gaining some experience in his neuro-genetics lab,” recalls A/Prof Tan. “I went to have a look at his lab and found it quite interesting, with people working there from around the world. So I applied and was approved for an NMRC fellowship to stay on in the US to work with Professor Ashizawa and Professor Joseph Jankovic. It was that chance meeting that started my career in lab research.”

That first foray into research has helped to shape much of A/Prof Tan’s career to date. His current research work focuses on understanding the genetics behind neurodegenerative diseases—an important field given the age-related nature of these illnesses and Singapore’s aging population—in order to better identify those at risk. He was part of a team that discovered two common risk variants likely to cause Parkinson’s disease. As the risk variants are carried by a proportion of the population that may otherwise be healthy, the aim of the research is now to determine whether there are specific biomarkers related to these risk variants that indicate a higher probability of developing the disease.

Other serendipitous events over the years have helped to further A/Prof Tan’s career as a clinician scientist. For instance, when he returned to Singapore from the US he was enthusiastic and full of ambition to continue his research work here, but he lacked the resources to start a lab. It was only when Dr Aw Swee Eng, chair of the Clinical Research Department at Singapore General Hospital, decided to take a chance on A/Prof Tan that he got a break. Dr Aw provided the funding that enabled him to hire a post-doc and start building up a lab.

Another important boost in his translational research career path came in 2002, when SingHealth introduced a clinician scientist scheme at Singapore General Hospital. Although he had only recently returned to Singapore and was only just starting to establish himself, A/Prof Tan was persuaded by colleagues to apply for the programme and ended up being chosen as one of the four doctors in the scheme’s pioneer batch. Being chosen for the programme gave his research work a boost in terms of access to resources, and he hasn’t looked back since.

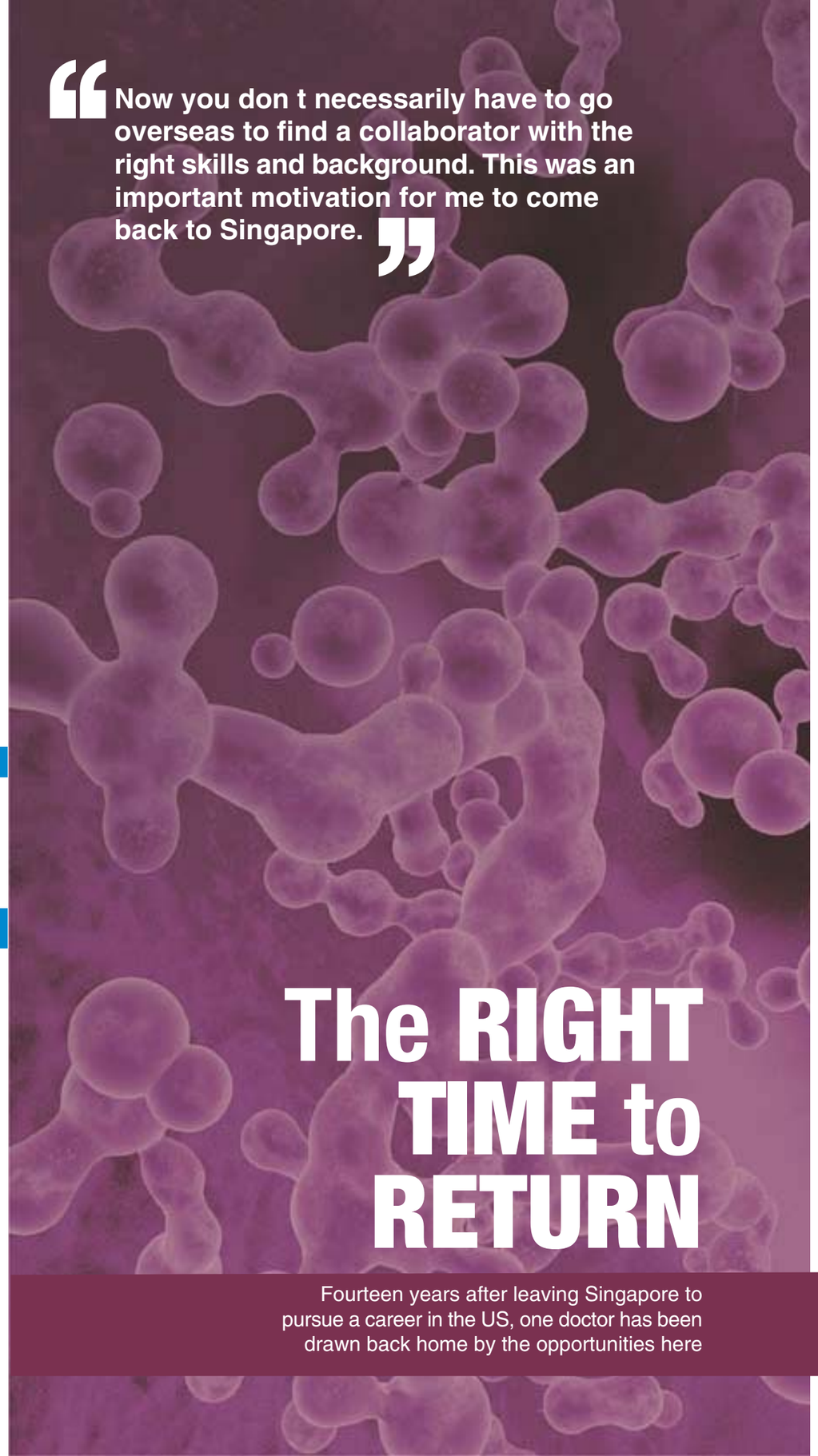
A driving force

The research that A/Prof Tan carries out has evolved over the years, growing in complexity and depth along with his understanding of the field. His research is now moving increasingly from applied science into basic science. His group is now trying to elucidate functions of proteins encoded by disease-causing genes. Growth as a scientist is the main reason for this shift, he explains with enthusiasm: “The work becomes more and more complicated—and thus more interesting—as I move further into basic science. It is a learning process for me. At the end of the day, doing basic research while also carrying out clinical duties gives my work a competitive advantage in terms of my overall understanding of the issues.”

A/Prof Tan’s passion and achievements in the field of neuroscience have brought him international recognition and led him to wear many professional hats. In addition to his already heavy workload as a clinician scientist, he is currently an associate editor for two leading neurological journals (European Journal of Neurology and Parkinsonism & Related Disorders)—positions for which he was selected and appointed based on his international reputation. In addition, he is also an associate editor for Annals Academy of Medicine, the leading medical journal in Singapore. “Being a researcher while also maintaining a career as a clinician has led to opportunities for me to teach and share my research overseas. This is all thanks to a few fateful turning points in my career,” adds A/Prof Tan.

On occasion, A/Prof Tan’s enthusiasm for research has gotten him into a spot of trouble. “While living in the US, I came home one evening at midnight to find that my wife had locked me out of our condo,” relates A/Prof Tan. “It was a four-day long weekend—a time when most people would be enjoying a break with family and friends—and this was the fourth night in a row that I had come home late from the lab, so my wife had had enough! This is the passion I have for my work and my research—I get so engrossed in it.”

> **“At the end of the day, doing basic research while also carrying out clinical duties gives my work a competitive advantage in terms of my overall understanding of the issues.”**



The RIGHT TIME to RETURN

Fourteen years after leaving Singapore to pursue a career in the US, one doctor has been drawn back home by the opportunities here

A/Prof Ong Sin Tiong

A/Prof Ong Sin Tiong

Position & Institution

- Associate Professor and Senior Investigator, Duke-NUS Graduate Medical School Singapore
- Recipient of Clinician Scientist Award (CSA)

Overview of NMRC-Supported Research

A/Prof Ong leads a research team working to improve the understanding of the mechanisms that fuel the uncontrolled growth of Chronic Myelogenous Leukaemia (CML) cells in patients with this form of cancer. Currently, the team is leading an international clinical study to test a novel two-drug combination in patients with CML.

After fourteen years abroad, Ong Sin Tiong found himself coming full circle when he accepted a position as Associate Professor at the Duke-NUS Graduate Medical School in 2007. For A/Prof Ong, the intervening years were a period of professional development during which he built up extensive experience in the study and treatment of haematologic malignancies. Over the same period, Singapore saw a massive boost in the infrastructure, resources and intellectual capital available to support medical research—and the blossoming of a nascent translational research sector.

In 1993, A/Prof Ong left Singapore for the US to pursue his ambitions to work as a clinician scientist, a career for which the prospects here were limited at the time. As a young doctor with an interest in medical research, he was attracted to the opportunities available overseas to pursue further specialised training and get involved in groundbreaking research. Starting out with four years of haematology/oncology fellowship training at the University of Chicago, he then moved to the University of California at Irvine, where he worked for 10 years.

Timing is everything

"Ten to fifteen years ago, there was not a critical mass of translational research work being done in Singapore," says A/Prof Ong. "I had always wanted to come back here, but only if there was a solid professional reason for doing so. It was only in the past two years or so, with the launch of Phase 2 of Singapore's Biomedical Sciences Initiatives, that I felt that there was a real push in this area that allowed me to come back and expand my research horizons. It was also an exciting opportunity to come back and be part of a new medical school."

At Duke-NUS Graduate Medical School, A/Prof Ong now leads a research team working to improve the understanding of the mechanisms that fuel the uncontrolled growth of Chronic Myelogenous Leukaemia (CML) cells in patients with this form of cancer. Currently, the team is leading an international clinical study to test a novel two-drug combination in patients with CML.

Collaboration plays a critical role in this research. A/Prof Ong's team works closely with members of the Department of Haematology at the Singapore General Hospital, and it is starting to collaborate with doctors at the National Cancer Centre Singapore on work related to solid tumours. Within Duke-NUS Graduate Medical School, the team works with scientists in the cancer stem cell biology programme, and it also has ongoing studies with collaborators at National University Hospital and various local and overseas research institutes.

One of the benefits of Singapore's expanding translational research scene is the diversification of scientific expertise available here. Lauding the growing research community, A/Prof Ong notes, "Now you don't necessarily have to go overseas to find a collaborator with the right skills and background. This was an important motivation for me to come back to Singapore."

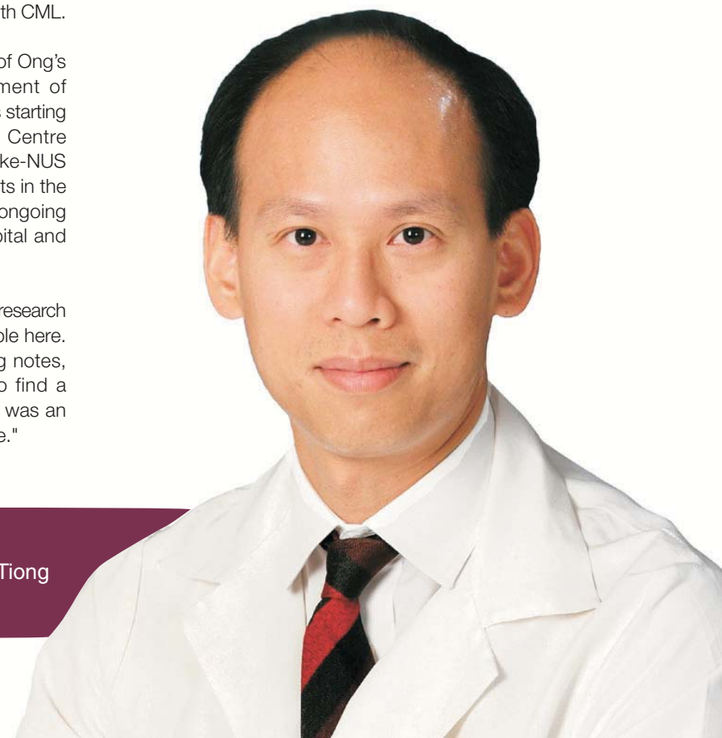
A/Prof Ong with STaR and CSA awardees

Singapore's strengths

Comparing his experiences in the US to the translational research sector here, A/Prof Ong is encouraged by several aspects of the local scene in Singapore. Securing stable and sufficient funding is an ongoing concern for most researchers, and while Singapore is no exception, A/Prof Ong finds the situation here to be quite good, with ample funding available for applicants with solid research proposals.

In terms of access to equipment and other scientific resources needed for lab work, A/Prof Ong feels that Singapore is on par with the US, although some materials such as reagents can take longer to obtain and can be more costly here. When it comes to human resources, he feels that it is now easier to attract talented graduates and post-docs in Singapore who are excited to pursue laboratory-based translational projects. He notes, "Some of the people that we have coming through our labs are as good if not better than the people who would apply to work in the labs back where I worked previously in the US."

Given the rapid growth of opportunities, these are indeed exciting times for the local translational research sector. As A/Prof Ong's example shows, there is no time like the present for researchers from around the world to follow suit and join Singapore's burgeoning scientific community.



Passion for Research

Dr Leong Hoe Nam doesn't disguise his feelings about the freedom to explore that he felt during his studies for a PhD at University College of London in the UK. "It was fantastic, and very different from clinical work," he explains. "You get the opportunity to phrase questions for a problem, and then form experiments to answer those questions."

The chance to be a student again and let his mind run free gave Dr Leong the opportunity to explore problems of specific interest to his area of research. "There were fewer restrictions on experimental work, and I was not limited by a syllabus. I was answering questions because I wanted to—and to be able to do this while surrounded by students and professors from various disciplines made it a truly special environment for learning and research," he points out.

The desire to explore new areas and have a broader impact on medical advances drives one doctor's interest in research

Dr Leong Hoe Nam

Dr Leong Hoe Nam

Position & Institution

- Consultant, Department of Internal Medicine, Singapore General Hospital
- Recipient of NMRC Medical Research Fellowship

Overview of NMRC-Supported Research

Dr Leong's research focus is in the area of infectious diseases and novo-pathogens. He is the recipient of two NMRC fellowships: one to study for his PhD in the United Kingdom, and another to take up a research attachment at Columbia University in the US. He currently splits his time between clinical work and lab research at Singapore General Hospital.

NMRC support

Dr Leong's three years of study, from 2004 to 2007, were made possible in part by an NMRC Medical Research Fellowship. He received further support from NMRC following his PhD studies in the form of funding for an overseas research attachment at Columbia University in New York. There, he was able to immerse himself in some of the cutting-edge research being done in novo-pathogens and infectious diseases.

He now puts the knowledge gained in the UK and US to good use back in Singapore, where he works as a consultant in the Department of Internal Medicine at Singapore General Hospital—splitting his time between clinical work and lab research. As part of the funding for his overseas research attachment, Dr Leong also received S$30,000 as seed funding to allow him to undertake translational research when he returned. This allowed him to hit the ground running upon his return and gave him some time to get started on the process of further grant writing.

Making an impact

Dr Leong's enthusiasm for research is driven in part by a desire to help as many people as possible. He points out that as a clinician you can see only a certain number of patients per day, but the developments coming from science and research have the potential to help countless number of people. " New scientific or medical developments can have an impact across borders and time," he adds.

In this light, Dr Leong sees doing a PhD as something of an altruistic act. "You need to have a passion to find answers to help mankind," he explains. "And the reward for your hard work is the possibility to add an important brick to the foundation of understanding."

Novo-pathogen niche

Dr Leong's sees a bright outlook for his area of research, which involves novo-pathogens and infectious diseases. He believes that Singapore is well placed to create a special niche for itself, as it has a number of factors in its favour. First, the study of novo-pathogens requires samples (from clinics and hospitals), and Singapore's position as a medical hub means it sees many regional cases. There are also a lot of transplants done in Singapore, which can often lead to interesting and novel infections. Another important factor is the need for lab facilities, which Singapore has, and the fact that no other country in Asia-Pacific has a specific focus on novo-pathogens, leaving the door open for Singapore to establish itself as a regional, if not global, leader in the field.

Of course, any significant development of the translational research sector will require a pool of trained and capable scientists and researchers. To this end, Dr Leong sees the need for more doctors with entrepreneurial minds who are willing to think outside the box. "Doing a PhD requires you to be a maverick in some ways. You're trying something new and taking more risks," he explains.

If more doctors take their cue from Dr Leong and explore the rewarding possibilities that a PhD and career in research offer, there's no doubt Singapore will be well on its way to developing a vibrant research community.

List of Awardees and Recipients for 2007

Singapore Translational Research Investigator Award (STaR)

Name	Institution	Area of Research / Projects
Prof Michael Chee Wei Liang*	Duke-NUS GMS	"Neuroergo: A Multimodality Study of the Effects of Cognitive Workload and Sleep Deprivation on Lapses in Attention and Decision Making"
Prof David M Virshup	Duke-NUS GMS	"Targeting the Wnt signaling pathway to inhibit cancer proliferation"
Prof Daniel G Tenen	NUS	"Targeting hematopoietic and leukemic stem cells"
Prof Wong Tien Yin	SERI & NUS	"Retinal Imaging for Disease Prediction: From Bench to Bedside"

Clinician Scientist Award

Name	Institution	Area of Research / Projects
Senior Investigator – five-year programme		
A/Prof Aung Tin*	SNEC & NUS	"Accurate phenotyping of angle closure glaucoma"
A/Prof Ong Sin Tiong	Duke-NUS GMS	"Overcoming resistance to targeted therapies in blast phase chronic myelogenous leukaemia"
A/Prof Allen Yeoh Eng Juh*	NUH & NUS	"A multi-centre, multi-faceted therapeutic study incorporating whole genome association and candidate pathway studies for pharmacovigilance and toxicogenomics in childhood acute lymphoblastic leukaemia: Malaysia-Singapore ALL 2008 study"
A/Prof Tan Eng King*	NNI & NUS	"Investigating genetic factors in essential tremor"
Investigator – three-year programme		
A/Prof Chng Wee Joo	NUH & NUS	"Using unbiased forward genetic screen and comparative genomics in mice to model progression and transformation of multiple myeloma"

* Pioneer batch of CSI awardees in 2004

NMRC Medical Research Fellowship/Scientist Award

Name	Institution	Area of Research / Projects
Medical Research Fellowship Award Six doctors were awarded the NMRC Medical Research Fellowship in FY2007; two of which were training for a degree whereas the rest were in training not leading to a degree.		
Dr Lee Shermin	NDC Fellowship (PhD) at University of Nijmegen, Netherlands	"Modular endoprosthetic replacement of mandibular defects–a soft tissue analysis"
Dr Tiah Ling	CGH Fellowship (MPH) at Bloomberg School of Public Health, Johns Hopkins University, USA	"Understanding the mindset of health personnel volunteering for humanitarian assignments: A qualitative approach"
Dr Leong Sieu-Hon Benjamin	NUH Fellowship (Overseas Attachment) at North Shore Long Island Jewish Medical Centre, Fire Department of New York, USA	"Evaluate the efficacy on an automated external defibrillator (AED) programmed with ventricular fibrillation (VF) waveform analysis to advise CPR first or shock first in patient with a shockable rhythm"
Dr Tan Hui Hui	SGH Fellowship (Overseas Attachment) at Mount Sinai Hospital, New York, USA	"Air Pollution and Hepatic Fibrogenesis in Non-Alcoholic Steatohepatitis"
Dr Tan Yau Min Gerald	TTSH Fellowship (Overseas Attachment) at Weill Medical College, Cornell University, New York, USA	"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 Subramaniam Tavintharan	AH Fellowship (Local Attachment) at NUS	"Mechanisms of simvastatin-induced hepatoxicity – a study of hepatic gene expression profiles to explain the pathogenesis of hepatopathy" and "Riboregulators as potential biomarkers and therapeutic targets in common metabolic diseases"
Medical Research Scientist Award Four scientists were awarded the NMRC Medical Research Scientist Award in FY2007 for training leading to a degree.		
Ms Vainganker Janhavi Ajit	IMH Scientist Award (MSc) at NUS	"Perceptions and attitudes towards mental health problems in Singapore"
Ms Loo Hooi Yin Jenny	NUH Scientist Award (PhD) at Academic Unit of Audiological Medicine, University College of London, UK	"Management for children with Central Auditory Processing Deficits due to PAX6 mutation"
Mr Wei Heming	NHC Scientist Award (PhD) at NUS	"Stem cells-based cell therapy for post-myocardial infarction myocardial repair and regeneration"
Ms Chan Mei Leng	TTSH Scientist Award (PhD) at School of Health and Rehabilitation Sciences, University of Queensland, Australia	"Improving Outcome for Older Retired Drivers"

NMRC Medical Research Fellowship/Scientist Award

Name	Institution	Area of Research / Projects
Training Completed in FY2007 Nine doctors and one scientist completed their training under the Medical Research Fellowship/Scientist Award in FY2007:		
Dr Pang Su Yin Grace	NCC Fellowship (PhD) at NCC and University of Adelaide, Australia	"To screen for variant SNPs in genes encoding opioid drug receptors in Asian cancer patients and to identify functional SNPs and to determine their influence on the PK/PD of opioids in cancer patients"
Dr Tan Kiat Tee Benita	SGH Fellowship (PhD) at Karolinska Institute, Sweden	"Gene expression profile of breast cancer with site-specific mutations"
Dr Tan Soo Yong	TTSH Fellowship (PhD) at John Radcliffe Hospital, University of Oxford, UK	"Novel cellular subsets in lymphoid tissue and relevance to the pathogenesis of lymphoma subtypes"
Dr Koh Fang Yung Angela	AH Fellowship (Overseas Attachment) at University of Alberta, Canada	"Islet cell transplant: An exciting treatment possibility for diabetes mellitus"
Dr Tan Ern Yu	TTSH Fellowship (MSc) at Weatherall Institute of Molecular Medicine, John Radcliffe Hospital, University of Oxford, UK	"The Role of Vasculogenesis in the Various Stages of Breast Tumour Development"
Dr Wong Ting Hway	SGH Fellowship (MSc) at Bloomberg School of Public Health, Johns Hopkins University, USA	"A critical survey of trauma systems: Comparison of trauma systems in developed and developing countries and conclusions for trauma management in Singapore"
Dr Chung Hsi-Wei	Singhealth Fellowship (MSc) at the Mayo Clinic College of Medicine, Rochester, USA	"Arthroscopic osteocapsular arthroplasty for primary degenerative osteoarthritis of the elbow: Outcome and complications"
Dr Chio Tze-Wei Martin	NSC Fellowship (MSc) at Royal Free & University College London Medical School, UK	"Identifying key social determinants for high-risk behaviour among groups vulnerable to STI and HIV infection in Singapore in order to develop improved prevention and intervention strategies"
Dr Wong Jen San	SGH Fellowship (MSc) at Sarah W. Sedman Nutrition and Metabolism Center, Duke University Medical Center, USA	"The effects of prolonged Nkx6.1 expression in primary islets and its influence on glucose-stimulated insulin secretion and islet proliferation"
Ms Tan Sze Huey	NCC Scientist Award (MSc) at London School of Hygiene & Tropical Medicine, UK	"Sensitivity analysis for an Asthma Trial with Missing Data"

NRF-MOH Healthcare Research Scholarship (PhD)

Name	Institution	Area of Research / Projects
NRF-MOH Healthcare Research Scholarship (PhD) One doctor was awarded the NRF-MOH Healthcare Research Scholarship (PhD) in FY2007.		
Dr Yeo Wee Song	NUH Scholarship (PhD) at NUS	"Polarised innate immune response in MCNS – A systems approach to define the molecular basis of pathogenesis"

"If you think research is expensive, try disease."

- Mary Lasker, philanthropist and medical research advocate

Research GRANT

Investing in Innovation

The awarding of research grants in a variety of categories is one of NMRC's primary functions, reflecting its aim to promote excellence in translational and clinical research in Singapore by investing in innovation.

Mind Over Matter:
Major Funding for Mental Health Research

A landmark translational research study aims to ease the burden of schizophrenia by improving early identification, and treatment of neurocognitive impairments.

For years, mental health has been treated as the poor relation of medicine, receiving less support and attention for research due to a myriad of reasons. However, the consequences of mental illnesses can be just as damaging, and in some cases more so—at times leading to increased mortality and significant morbidity resulting in lifelong suffering at a huge cost to society.

A team led by A/Prof Chong Siow Ann of the Institute of Mental Health (IMH) hopes to change these perceptions about mental health through an ambitious research initiative aimed at tackling schizophrenia and related psychotic disorders. Armed with a S$25 million grant under the Translational and Clinical Research (TCR) Flagship Programme, the team has big plans that will help people suffering from these illnesses, while also showcasing the valuable contributions that are possible through mental health research with a multi-disciplinary approach.

A/Prof Chong Siow Ann

Position & Institution

- Vice Chairman, Medical Board (Research) and Senior Consultant Psychiatrist, Institute of Mental Health (IMH)
- Lead Principal Investigator for the TCR Flagship Programme on Neuroscience
- Recipient of the National Medical Excellence Awards (NMEA) 2008 - National Clinical Excellence Team Award
- NMRC Board Member

Overview of NMRC-Supported Research

A/Prof Chong leads a team of researchers that aims to identify key genetic, biological, clinical, cognitive and social risk factors for schizophrenia and related psychotic disorders. The TCR programme consists of three modules (a genetic study, an observational study of individuals at high risk of developing psychosis, and a clinical trial of a neurocognition enhancing agent) that each tackle the problem from a different angle, with the objective of achieving complementary results that will lead to a deeper understanding of the etiology of the disease process, improved diagnostic tools and and more effective treatments.

Tackling schizophrenia

The purpose of this TCR programme is to study schizophrenia and related psychotic disorders—among the most severe and disabling mental illnesses—by looking specifically at the various factors affecting vulnerability, progression of the illness and protection against these disorders.

"We currently don't have a good enough way to identify people who will likely develop schizophrenia," says A/Prof Chong. "Part of the TCR programme's objective is to enable us to better identify these people, not only based on clinical observations, but also based on biological factors." To tackle this illness and bring hope to those affected by schizophrenia, A/Prof Chong has assembled a team of collaborators spanning multiple institutions and fields both in Singapore and overseas to undertake this five-year research programme.

Many players, one common goal

"Big science these days needs to be collaborative, and that is really one of the aims of this TCR programme. We want to integrate what is available here in Singapore, such as different technological platforms and resources, and create a common platform to tackle a particular disorder," explains A/Prof Chong. "To help people with serious mental illnesses, we really need a multi-disciplinary team. We need to find people at the forefront of their particular area of research and bring them together to work towards a common goal."

Among the many institutions collaborating in the programme are the Genome Institute of Singapore, Singapore Tissue Network, Duke-NUS Graduate Medical School, Yong Loo Lin School of Medicine (National University of Singapore), Clinical Trials and Epidemiology Unit, Singapore Armed Forces, Duke University Medical Centre and University of Melbourne. As the project progresses, more collaborators will likely join the team.

With S$25 million in funding from NMRC over a period of five years, A/Prof Chong's team is equipped with the time and resources needed to delve deeply into this illness. One component of the programme will be a clinical observational study involving more than 2,000 participants over a period of two to three years.

> **"To help people with serious mental illnesses, we really need a multi-disciplinary team. We need to find people at the forefront of their particular area of research and bring them together to work towards a common goal."**
>
> A/Prof Chong Siow Ann

Throughout this study participants will undergo regular reviews including clinical assessments, neurocognitive tests, blood tests and brain scans—all aimed at developing a better understanding of the diverse factors related to schizophrenia.

Leveraging local advantages

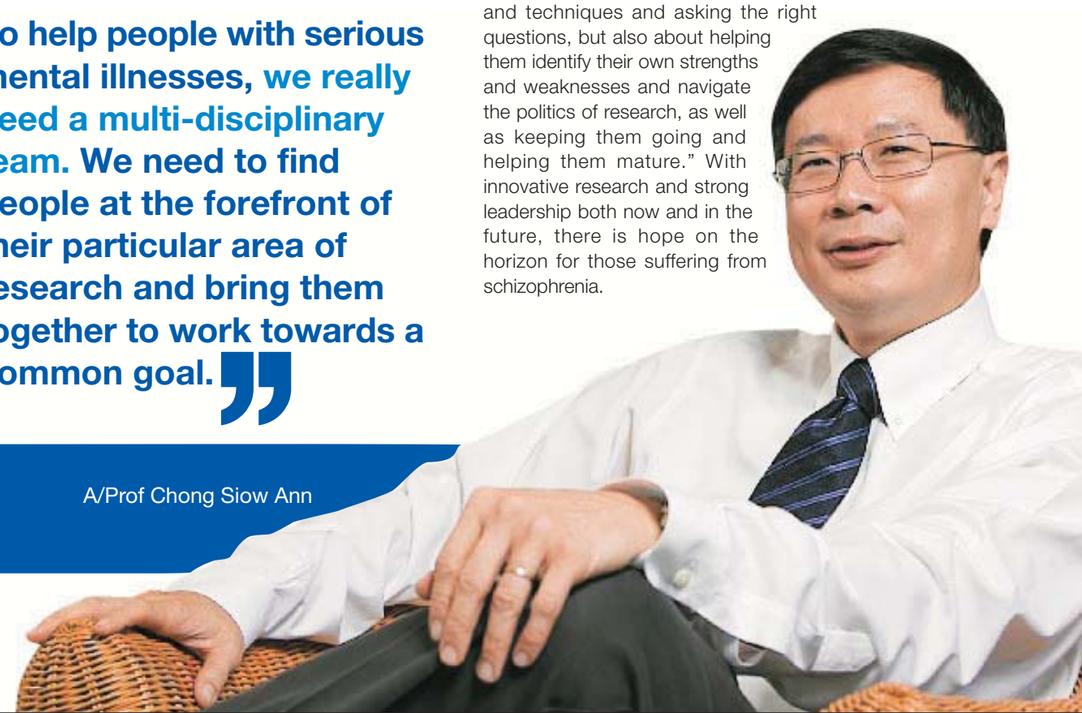
"The research we are doing is not entirely unique, but in Singapore we have an advantage," says A/Prof Chong, explaining why he is optimistic about what the TCR programme will achieve. One important advantage is that Singapore is a small country with a relatively homogeneous population that is largely non-mobile, making it easier to recruit and retain research subjects. Singapore also has a low prevalence of substance abuse—behaviour that can confound studies on mental health.

The IMH, the lead institution spearheading the research, is well-positioned to carry out the study given the fact that it is the biggest provider of mental health care in Singapore. IMH also has extensive experience in collaborating with researchers and stakeholders on major projects and enjoys good relationships with these partners. For example, the programme's prospects for success are boosted by the research team's access to cutting-edge technology through partners such as the Genome Institute of Singapore and the research expertise of Duke University, University of Melbourne and its various other collaborators.

Research for a better future

Summing up the impact that this research will have, A/Prof Chong notes: "It is a privilege for us that we are in a position to help people. The outcome of this project will be an important contribution to the identification of schizophrenia and awareness of this illness. It will benefit care providers and mental health professionals by giving them better tools to help people, and, most importantly, it will give new hope to the individuals who suffer from schizophrenia."

To ensure that the research carried out by his team is continued and advanced further in the future, A/Prof Chong is a strong proponent of mentoring the next generation of clinician scientists and researchers: "Mentoring is an essential part of research. All young researchers need mentors to help guide them on the right course. It is not just about imparting knowledge about methods and techniques and asking the right questions, but also about helping them identify their own strengths and weaknesses and navigate the politics of research, as well as keeping them going and helping them mature." With innovative research and strong leadership both now and in the future, there is hope on the horizon for those suffering from schizophrenia.



Thinking Big

The Singapore Gastric Cancer Consortium is mobilising resources on a large scale in its bid to improve early detection of a silent killer

> **“The funding is on a very significant level and makes us a credible programmatic translational research group internationally.”**

A/Prof Yeoh Khay Guan

A/Prof Yeoh Khay Guan

Position & Institution

- Associate Professor, Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore (NUS)
- Senior Consultant, Department of Gastroenterology and Hepatology, National University Hospital
- Lead Principal Investigator for the TCR Flagship Programme on Cancer, the first TCR awarded

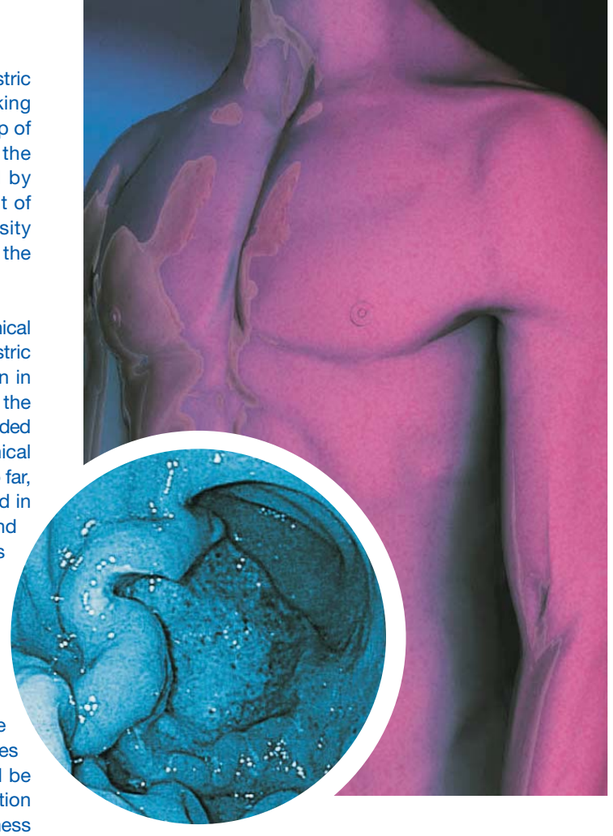
Overview of NMRC-Supported Research

A/Prof Yeoh leads the Singapore Gastric Cancer Consortium (SGCC), which is carrying out research to improve the early detection of gastric cancer. In addition, the consortium also hopes to gain a better understanding of how the disease develops, as well as develop and test new treatments.

While it may lack the notoriety of other major illnesses, gastric cancer is nonetheless a leading killer in Singapore, taking about 400 lives per year. To tackle this silent killer, a group of clinicians and scientists have come together to form the Singapore Gastric Cancer Consortium (SGCC). Led by Associate Professor Yeoh Khay Guan of the Department of Gastroenterology and Hepatology at National University Hospital, the SGCC is carrying out research to improve the early detection of gastric cancer.

The consortium was awarded the first Translational and Clinical Research (TCR) Flagship Programme by NMRC for its gastric cancer research initiative, which will provide S$25 million in funding over five years. This high level of funding allows the SGCC to conduct research on a large scale. Since being awarded the TCR in July 2007, the SGCC has launched a large clinical trial to study gastric cancer risk factors in local patients. So far, screening of the first 1,000 study participants has resulted in six cases of early-stage gastric cancer being detected and successfully removed. Not only has this benefited the patients by preventing the progression of their cancer to a more advanced stage, it has also enabled SGCC team members to study the earliest stages of gastric cancer.

Another part of the consortium’s efforts involves work to identify biomarkers that can help in early detection of the illness. To date, 180 patients with gastric cancer have given permission for their operatively removed cancer tissues and blood specimens to be studied. These samples will be studied in order to find potential biomarkers, while validation studies will be carried out later to verify the clinical usefulness of the biomarkers.



Assembling an all-star team

With ambitious goals for its research, the SGCC has assembled a large team of professionals from a variety of fields and institutions around the world. Locally, the team brings together clinicians from Singapore’s four largest public hospitals to join forces with scientists at the local universities and the Agency for Science, Technology and Research’s (A*STAR) research institutes. Outlining the collaborative process, A/Prof Yeoh says, “First we discuss the research objectives together, which are aimed at tackling important clinical problems. We then discuss the research design and ensure that both the clinical protocols and scientific methodologies are compatible with the aims. This requires frequent and close interaction, open communication and mutual respect.”

While based in Singapore, the SGCC taps the expertise of researchers from across Asia and other parts of the world. The SGCC Annual Scientific Meeting in July 2008 was attended by regional scientists from Japan, Korea, Hong Kong and Taiwan, and there are plans to follow up with them for closer collaboration. “Gastric cancer is more common in Asia, and research to improve outcomes in this disease must be done in Asia,” notes A/Prof Yeoh. Outside of Asia, the SGCC is already collaborating with leading institutions in the US, including the Fred Hutchinson Cancer Center in Seattle and the International Cancer Biomarker Consortium (ICBC).

Making a mark on the international stage

The TCR funding from the National Research Foundation has enabled A/Prof Yeoh and his team to take their research to the next level, elevating it to a major international initiative. “The TCR funding has been transformational. It has enabled our nascent group, which has been working together for the past two years, to make the bold plans that are necessary to tackle the key clinical problems in gastric cancer,” explains A/Prof Yeoh. “The funding is on a very significant level and makes us a credible programmatic translational research group internationally. This has led to multiple collaborations with international research centres and with industry, and it will enable our group to contribute to improving the science and treatment related to gastric cancer.”

According to A/Prof Yeoh, the inclusion of clinical research in the mandate of the Ministry of Health in 2006 was a far-sighted move that has already had a positive impact on Singapore’s medical research sector and the research initiatives of the SGCC. He explains, “On the one hand, it links up clinical research with the basic research being done at the universities and A*STAR research institutes, giving them a translational context. On the other hand, it recognises that the Singapore healthcare system is in the league of developed countries, and that we have to find new ways of improving health and treatment, rather than relying on others to test new approaches for us. In our work, it inspires us to aim for the highest standards for our patients and develop the best solutions that do not exist elsewhere in the world ourselves.”

With big ambitions and a large, well-resourced team of talented clinicians and scientists working together, the SGCC represents a ray of hope on the horizon for gastric cancer patients everywhere. And for Singapore’s medical research community, these efforts are a fine example of what can be achieved by thinking big.

Eyeing Solutions

TCR funding is helping to drive a coordinated effort that is putting Singapore on the map for its ocular disease capabilities

Professor Donald Tan

Professor Donald Tan

Position & Institution

- Director, the Singapore National Eye Centre (SNEC)
- Professor and Head, the Department of Ophthalmology, Yong Loo Lin School of Medicine, NUS
- Chairman, the Singapore Eye Research Institute (SERI)
- Lead Principal Investigator for the TCR Flagship Programme on Eye Diseases
- Recipient of the National Medical Excellence Awards (NMEA) 2008 - National Outstanding Clinician Scientist Award
- NMRC Board Member

Overview of NMRC-Supported Research

Professor Tan heads a team working on the Translational Research Innovations in Ocular Surgery (TRIOS) research programme, funded by the TCR Flagship Programme. TRIOS straddles two of the biggest eye problems, glaucoma and corneal disease, with a special focus on wound healing.

> **“The work is very translational and patient-centric, but also has a strong upstream component centred around healing, imaging and inflammation control-elements that can be applied across other fields.”**

Singapore’s growing reputation as a centre for advanced ocular surgery research received a boost when Professor Donald Tan and his team at the Singapore Eye Research Institute (SERI) were awarded S$25 million for the Translational and Clinical Research Flagship Programme (TCR) on Eye Diseases in May 2008. The research, Translational Research Innovations in Ocular Surgery (TRIOS), focuses on wound healing and anti-scarring treatments associated with two of the major causes of blindness worldwide—glaucoma and corneal diseases.

Prof Tan explains that the research has a broad reach, both medically and geographically: “The work is very translational and patient-centric, but also has a strong upstream component centred around healing, imaging and inflammation control-elements that can be applied across other fields.” At the same time, he points out that his team’s work on glaucoma and corneal disease has global applicability, but also a more specific Asian focus given that many Asians, particularly Chinese and Indians, have a higher incidence of glaucoma, and are more susceptible to scarring and failure after ocular surgery.

With the funding in place, Prof Tan wasted no time in developing his team. He now has lab space and has gathered a team of around 20 people, including seven principal investigators (PIs) and a number of co-PIs. The target is to recruit another 30 staff to round out the team as TRIOS gets into full swing.

Local and global partners

However, TRIOS’s efforts are not limited to the research being done at SERI, they span several collaborations with institutions in Singapore and around the world. Locally, SERI is working together with Nanyang Technological University, several departments at National University of Singapore, Duke-NUS Graduate Medical School, research institutes and eye departments in hospitals across both clusters. For example, a team at NTU is contributing a new drug-delivery system to more effectively administer drugs to the eye.

Further afield, SERI’s collaborations under the TRIOS programme with teams from the US, Europe, Japan, China, Israel and Australia are bringing a decidedly global flavour to the project. For example, a team at Kyoto University in Japan is helping to culture stem cells for the eye. Stressing the value of such diverse partnerships, and the increased efficiency of having multiple teams contributing particular expertise to the overall effort, Prof Tan is quick to point out that “collaboration on this scale would not be possible without the TCR funding.”

SERI’s growing reputation

The global reach of the TRIOS programme has started to put Singapore, and more specifically SERI, on the map as a centre for ocular disease research. People are now starting to come to Singapore for research and training in the field, including two principal investigators on the TRIOS programme team who relocated to Singapore from the UK. “Researchers are attracted to Singapore not just because of its growing reputation in certain research areas, but also because of its processes, such as quick grant turnarounds. The approach here is efficient and practical,” explains Prof Tan.

SERI has come a long way in the 10 years since it was set up with block grant funding from NMRC in 1998. It has stayed true to its initial focus on translational research (then called “clinical applicability”) and built up a strong reputation in the field—to the point that it is now increasingly attracting requests for collaboration from abroad. “SERI is now comparable to some of the leading global institutions, including top centres in the US, the top centre in Europe, and Melbourne University in Australia,” says Prof Tan. “While SERI’s funding is not at the same level as some leading global centres, our impact factor is higher than most,” he explains, referring to SERI’s strong track record of research and publication activity.

A lasting legacy

Collaboration and support at SERI are not limited to external relationships. Within SERI, senior researchers have a role as mentors to newer staff, supporting and advising them in their research efforts and career planning. Prof Tan acts as a mentor to one of his TCR collaborators, Dr Louis Tong, a recent PhD graduate who is working on the cell and molecular basis of wound healing. Such internal “collaborations” play a part in developing the overall capabilities and knowledge within SERI, ensuring that it continues to develop and stay at the cutting edge of ocular research.

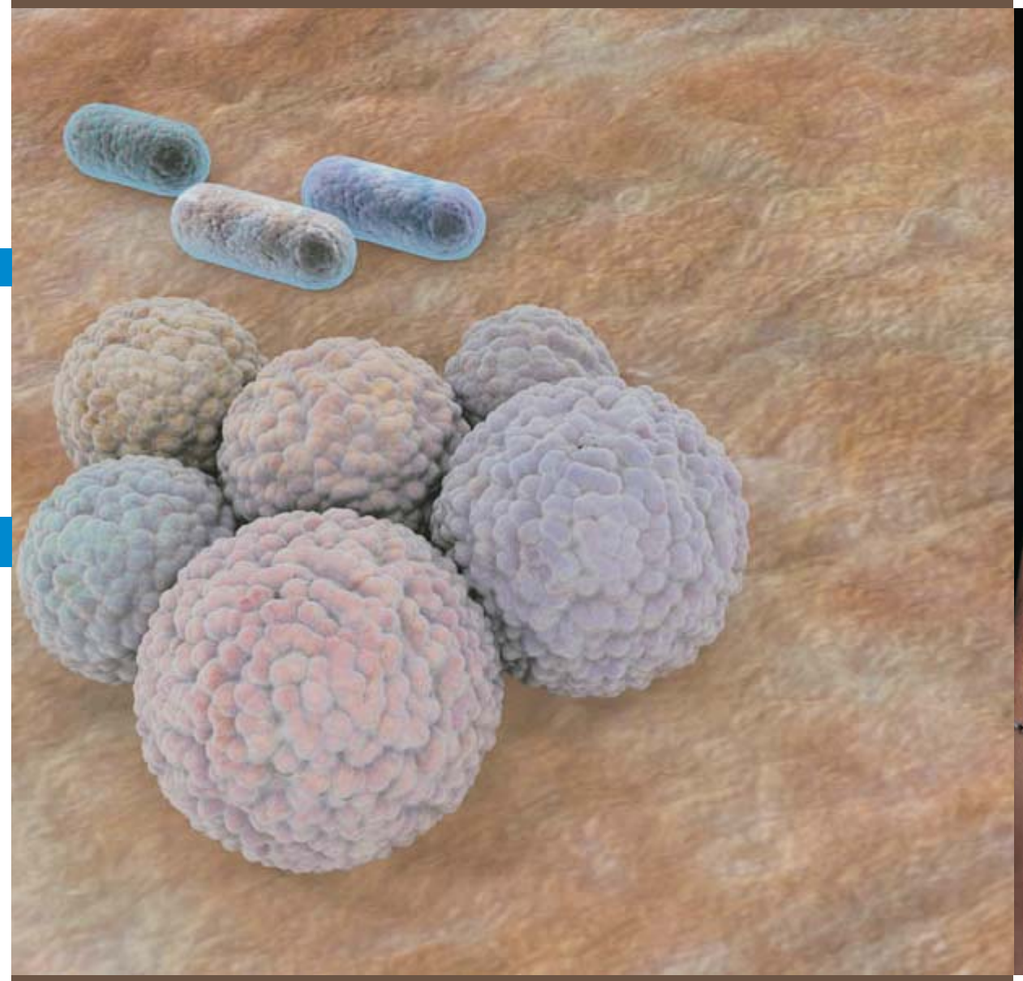
With infrastructure now in place, and strong support from the medical community in Singapore and NMRC, Prof Tan believes that Singapore is well placed to continue to grow its reputation and leading role as a global centre for ocular surgery and research.

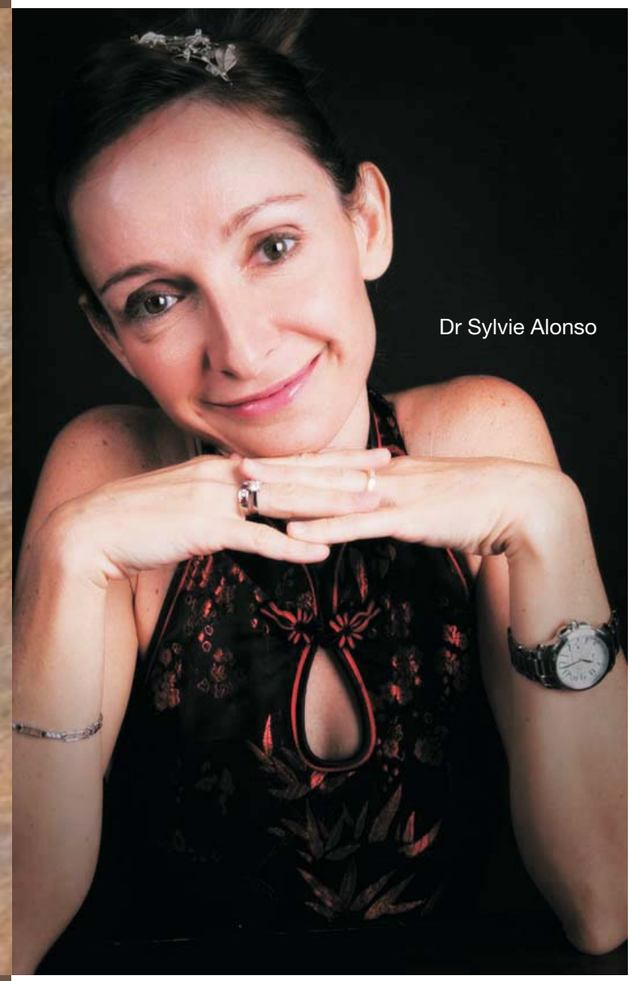
Prof Donald Tan with Dr Louis Tong

Freedom to EXPLORE

Singapore's supportive research environment allows scientists to delve into important medical questions and seek innovative solutions

For scientists like Sylvie Alonso, Assistant Professor in the Department of Microbiology at National University of Singapore, the freedom to explore important questions and test new hypotheses is priceless. And thanks to funding that she has received via individual research grants (IRGs) from NMRC, Dr. Alonso enjoys precisely such freedom.





Dr Sylvie Alonso

Dr Sylvie Alonso

Position & Institution

- Assistant Professor, Department of Microbiology, Immunology Programme, National University of Singapore
- Recipient of four Individual Research Grants (IRGs) from NMRC

Overview of NMRC-Supported Research

Dr Alonso is conducting applied research into host-pathogen interactions and infectious diseases. She is currently working on vaccine development for influenza and dengue viruses, looking specifically at using live bacteria to deliver vaccines.

Individual funding is key

The recipient of four IRGs over the past four years, Dr Alonso has used the funding to conduct applied research into host-pathogen interactions and infectious diseases. She is currently working on vaccine development against influenza and dengue viruses, looking specifically at using live bacteria to deliver the vaccine candidates—an innovative approach to vaccine delivery that she hopes will result in greater efficacy and improved outcomes for patients. Grateful for the independence that the IRGs afford, Dr Alonso feels that part of her success in obtaining the funding lies in the fact that she is working on diseases that are particularly important in the local context.

Originally from France, Dr Alonso appreciates the strengths of Singapore's medical research environment and the opportunities that they present. For example, at NUS she runs her own lab with a team of 10 undergraduate and post-graduate students and research associates working under her supervision, and has independence in her research and funding—an arrangement that she would be unlikely to enjoy in her home country. "In France, the organisational structure of labs is very hierarchical, with one big boss at the top who maintains control over the entire lab. The boss is usually the one who applies for funding and then doles it out to the lab's senior investigators, which means that they have less independence and also a limited amount of money to conduct their research and hire manpower," explains Dr Alonso. "Given my age and level of experience, I would have less freedom and certainly much less money to develop my own research if I were back in France."

Having benefited from NMRC's IRG programme several times, Dr Alonso praises the availability of such grants and the opportunities that they present to individual researchers. She notes, "In France, researchers and individual labs generally apply to the European Community for funding, which is a very competitive process. There are no IRGs, as they tend to focus on programme grants. To successfully apply for funding, you need to be part of a big consortium with many researchers involved."

Good support makes the difference

Since arriving in Singapore in September 2004, Dr Alonso has witnessed the rapid growth of the local translational research sector, which has included improvements in access to funding and an increase in funding quantums in recent years. "Four years ago, the funding awarded to individuals was considerably smaller, and you would not receive the full amount that you requested. Now, as long as you can justify why you need it, you can receive almost all of the funding that you apply for," she says. "Having sufficient funding makes a huge difference, particularly if I require specialised equipment for my research. If I need a high-tech kit, I can afford to purchase it—this really improves the impact of my work."

While funding is certainly a crucial part of the equation, other factors such as mentorship and support from senior researchers also play an important role in giving scientists like Dr Alonso the freedom to explore. When she arrived at NUS to take up a Lee Kuan Yew Post-doctoral Fellowship, Dr Alonso received encouragement to carry out independent research right from the start. "From the moment I arrived, Associate Professor Vincent Chow, then the head of the Department of Microbiology, was very supportive and acted as my mentor. I thought that the fellowship would be more like a post-doc position, but then Associate Professor Chow showed me a lab and told me it was mine to run independently," she recalls.

With the right elements in place, from a variety of accessible funding options to senior researchers who are willing and able to provide mentorship and support, Singapore is well positioned to give medical investigators the freedom to ask challenging questions—and truly make an impact when their innovative research bears fruit.

> **"With the right elements in place, Singapore is well positioned to give medical investigators the freedom to ask challenging questions and truly make an impact when their innovative research bears fruit."**

Getting Started

For Dr Louis Tong, NMRC funding has played an important role in getting his research career on track. Since completing his medical studies in Singapore, the UK and research training in the US, he has received a number of smaller grants from NMRC to support his research on ocular surface diseases and defence mechanisms. However, it was a recent New Investigator Grant (NIG) that has given a valuable boost to his research efforts. "It's important for a researcher to establish a track record, and the NIG is a good way for me to get the ball rolling on this," comments Dr Tong.

NMRC funding can be an important success factor for researchers in the early stages of their careers

Dr Louis Tong

Dr Louis Tong

Position & Institution

- Consultant, Corneal and External Eye Disease Service, the Singapore National Eye Centre (SNEC)
- Clinician Scientist, the Singapore Eye Research Institute (SERI)
- Recipient of New Investigator Grant (NIG)

Overview of NMRC-Supported Research

Dr Louis Tong's research focus is on corneal defence against germs, the death of corneal epithelial cells, and the mechanical defences of the cornea. He is also working as an investigator under the Translational Research Innovations in Ocular Surgery (TRIOS) programme as part of the Translational and Clinical Research (TCR) Flagship Programme awarded to the Singapore Eye Research Institute.

Dr Tong's research interests and abilities have garnered him positions at the Singapore National Eye Centre (SNEC) and the Singapore Eye Research Institute (SERI), where he splits his time between clinical work at the former and research and lab work at the latter. At SERI, part of his time is spent as an investigator looking at ocular wound healing as part of the TRIOS team led by Professor Donald Tan, the lead Principal Investigator for the TCR Flagship Programme on eye diseases.

Challenges

Dr Tong doesn't hide the fact that getting started in research can be difficult at times. He recounts how upon coming back from his studies in the US, there was no funding waiting for him, so he was left without any clear direction until he was able to secure some funding for his research. "As a researcher you were kind of lost," he explains. However, he notes that the situation has improved in recent years, adding: "Now the overseas fellowships provide some funding to get you started while you find your feet and get going with applying for grants."

While some challenges are obstacles in the way of focusing on research, others are the very reason that Dr Tong was drawn to a research career in the first place. "The challenge is what keeps me going. It's a learning experience each time I go into the lab," he explains. "I got into research because the challenges are huge–things are always changing, and it's a very dynamic area to be in. By comparison, clinical work is quite safe, but not nearly as intellectually stimulating."

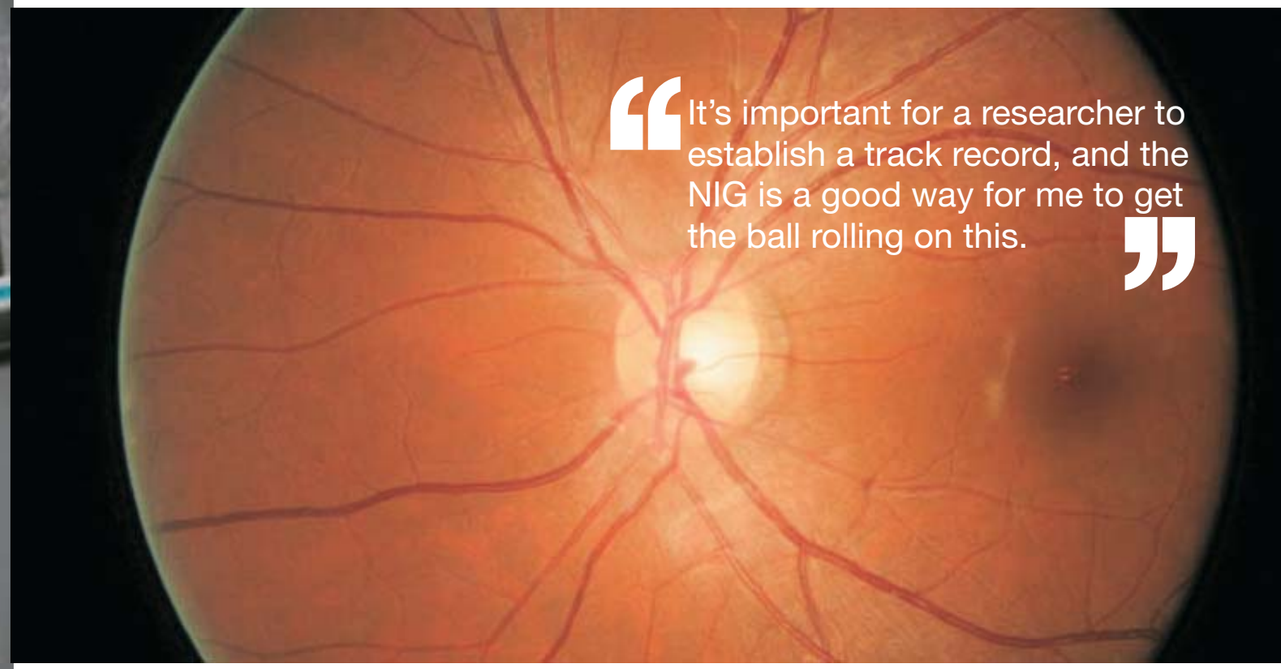
A guiding hand

While funding has been important in developing his research career, Dr Tong is also benefiting from the guidance and support of a number of mentors, including Professor Tan, the Medical Director at SERI, and Professor Roger Beuerman, also of SERI. "Mentorship in a research setting is different from receiving guidance while taking a PhD," Dr Tong notes. "Now, the only people that can assist me are my peers, and Professors Tan and Beuerman provide me with support in a number of forms, including lobbying on my behalf, some assistance with administrative matters, and general guidance in my research."

Being no stranger to the value of a helping hand and an early opportunity to be exposed to research, Dr Tong is happy to be able to engage students to assist him in his research efforts. In the past he has taken on students from Singapore Polytechnic and Nanyang Technological University (NTU) to assist him in various projects. A number of NTU science honours students have previously been engaged to assist him in his research.

Dr Tong's advice to aspiring medical researchers is to develop good negotiation and PR skills. He has found that there can often be a conflict of interest between clinicians and researchers, and that these issues need to be dealt with diplomatically, but also with some PR savvy. At the same time, he points out that researchers need to be fiercely independent and have strong initiative. "It isn't enough just to be a good technician–you need to be able to go out and find solutions," he explains. Dr Tong also highlights the importance of being able to deal with setbacks, such as not being awarded a grant: "It's very useful to collect comments from peers and grant reviewers–especially in cases where you were not awarded a grant–so that you can come back stronger and better prepared each time."

And with Singapore's research sector continuing to develop, Dr Tong sees a positive outlook for doctors and scientists looking to break into the research field. "The research environment here is quite good, and Singapore and SERI are building up a critical mass of researchers and clinical-related research," he comments. "Ultimately, researchers are coming here, so something is being done right."



> "It's important for a researcher to establish a track record, and the NIG is a good way for me to get the ball rolling on this."

National Medical Excellence Awards

Singapore's medical sector took centre stage during the inaugural National Medical Excellence Awards (NMEA), held in March 2008. Recognising achievements in clinical work, research, and mentoring of young clinicians, the NMEA highlighted some of the exceptional work being done in Singapore.

Six awards were given out to four individuals and two teams.

National Outstanding Clinician Mentor Award

Professor
Lee Eng Hin

Professor
Soo Khee Chee

National Outstanding Clinician Award

Professor
Yap Hui Kim

Professor
Donald Tan

National Clinical Excellence Team Award

EPIP Team from Institute of Mental Health

(Clockwise)
A/Prof **Chong Siow Ann**
Dr **Swapna Verma**
Ms **Poon Lye Yin**
Ms **Helen Lee**

Perinatal Team from KK Women's and Children's Hospital

(Clockwise)
A/Prof **Tan Kok Hian**
A/Prof **Alex Sia**
Sister **Hoon Siew Jong**
Dr **Pratibha Agarwal**

Big winners, big plans

WINNERS: (From left) associate professors Allen Yeoh and Chng Wee Joo, Professor Michael Chee, Associate Professor Ong Sin Tiong, professors David Virshup and Wong Tien Yin, and Associate Professor Tan Eng King.

ST PHOTO: WANG HUIFEN

Research newcomer Duke-NUS Graduate Medical School was a big winner in the latest awards for doctor-scientists. Liaw Wy-Cin and Shobana Kesava find out what the winners plan to do

Singapore Translational Research Investigator Award, the top honour for doctor-scientists here:

Professor Michael Chee
» From Duke-NUS, studying brain processes
» Plans to study how biological systems drive the way the brain processes information. Key questions include the long-run effect of memory-boosting drugs and how different individuals' decision-making abilities are affected by sleep deprivation.

Professor David Virshup
» From Duke-NUS, studying cancer and stem cells
» The research team from the schools's cancer and stem cell biology programme discovered protein signals called Wnt that feed cancerous tumours. It wants to find out how to block these signals.
» Studies on animals are planned, with Dr Ong Sin Tiong's lab to reach a breakthrough in leukaemia.

Professor Daniel Tenen
» From Harvard Medical School and the National University of Singapore (NUS), studying leukaemia and stem cells
» While scientists now better understand how genes become abnormal in diseases involving blood organs and other tissues, they still do not completely know how to control their behaviour. Prof Tenen aims to find a way to introduce genes in certain types of stem cells to treat leukaemia and lymphomas.

Professor Wong Tien Yin
» From the Singapore Eye Research Institute and NUS, studying retinal diseases and how they are linked to heart and blood-vessel diseases
» Prof Wong next wants to find out if there if the correlation between damaged blood vessels in the eye and the risk of heart disease and stroke is present at birth, and if changes in the blood vessels correspond to changes in genes when the disease hits.

The Clinician Scientist Award, for more junior scientists:

Associate Professor Aung Tin
» From the Singapore National Eye Centre and NUS, studying the group of eye diseases known as glaucoma, which occurs when the optic nerve is damaged
» Prof Aung's interest is in primary angle closure glaucoma. He wants to find out how this condition varies in patients, what the sub-types and underlying genes are, and how patients respond to therapy.

Associate Professor Ong Sin Tiong
» From Duke-NUS, studying leukaemia
» Prof Ong wants to find out why late-stage leukaemia patients develop resistance to conventional drugs.

Associate Professor Allen Yeoh
» From the National University Hospital (NUH) and NUS, studying childhood leukaemia
» Prof Yeoh wants to study genetic differences in the immunity systems of patients with childhood leukaemia to find out why some are at higher risk of developing severe infections after chemotherapy.
His aim is to work towards minimising side-effects of treatment. Those with childhood leukaemia here have an 80 per cent chance of being cured.

Associate Professor Tan Eng King
» From the National Neuroscience Institute and NUS, studying Parkinson's disease
» His lab will look at gene variations that give Chinese in Singapore and Taiwan a higher chance of getting Parkinson's disease. He will also research tremors in the body; a disabling feature caused by degenerating nerves, largely due to old age.

Associate Professor Chng Wee Joo
» From NUH and NUS, studying cancer
» His plans include a search for the genetic origins of myeloma, a blood cancer that affects the bone marrow. He aims to find better ways to diagnose, treat and lengthen the life of the 80 new patients identified each year in Singapore.

Doctors, researchers lauded for their work

Health Minister calls on hospitals to support focus on clinical research

REPORTS BY SHOBANA KESAVA

PROFESSOR Yap Hui Kim could have had a plum job in the United States when she finished graduate training in 1985.

But the university don, who specialises in childhood kidney diseases, turned it down and returned to Singapore where her expertise was in dire need. At the time, children with kidney failure here faced almost certain death because of a shortage of specialists and a lack of facilities.

"It was very tempting to stay in the US...with all the facilities set up there rather than come home and start from scratch," the 53-year-old recalled yesterday. "But I went specifically to find out how to fill this void in Singapore."

She returned to set up the country's first programme dedicated to treating children with kidney failure. Now, over 80 per cent of children with the condition survive into adulthood.

Her commitment, along with that of three other doctors and two teams of researchers, has been recognised with the first National Medical Excellence Awards. The accolades honour doctors and medical researchers who have made significant contributions to society.

This year's winners include a doctor who helped blind patients see again and a team of researchers whose work helped catch and combat mental illness early.

The awards, given out last night by Health Minister Khaw Boon Wan, will be an annual affair.

They focused yesterday on doctors who combined caring for patients with research innovations that improved the health-care system. Their recognition follows a recent shift in health policy to encourage more research.

Speaking at the awards, Mr Khaw said: "Hospitals need to grasp the Government's recent health policy shift to pursue clinical research that will reap real benefits in health care for Singaporeans."

In 2006, the Government committed $1.55 billion over five years to help put innovations into practice.

With the investment comes the need for public accountability, said Mr Khaw.

"It is not the mindless pursuit of esoteric discoveries to score a world first. It is to bring real health benefits to our people, to keep health-care standards high, yet affordable," he said.

Asked if she felt her work was done, Prof Yap said: "If I thought that, I may as well retire. We have to keep moving forward.

"There are too many things to do for tomorrow to make our research programmes better."

skesava@sph.com.sg

TIRELESS WORK: IMH researchers (from left) Ms Helen Lee, Dr Swapna Verma, Ms Poon Lye Yin and Prof Chong Siow Ann.

五年有薪事假　每年百万研究经费

我国向顶尖临床科学家招手

@林慧慧

卫生部和新加坡科技研究局推出一个全新奖项，希望吸引海内外顶尖临床科学家在本地领队展开转化医学研究，以培养更多有能力把实验室基础研究成果转化应用在实际医疗的临床科学家。

首批四名获得这个“新加坡转化研究员”奖项（Singapore Translational Research Investigator Award，简称STaR）的包括两名国际知名的癌症研究员、一名专门研究睡眠不足问题的脑神经科研人员，以及一名原本常驻海外、如今将回来本地全职投入研究工作的眼科专家。

他们不单能享有五年有薪事假全心投入临床研究，这期间每年还可获得顶限为100万元的拨款充当研究经费。

卫生部高级政务部长杨莉明仪在日前的颁奖礼上指出，希望这些人脉网络和科研经验丰富的临床科学家能促成更多新加坡和海外研究机构的合作，更希望他们当中有人能带头展开以我国为主导的临床研究计划。

新加坡科技研究局主席林泉宝也出席了颁奖典礼。

在墨尔本大学澳洲眼科研究中心担任处长，同时也任职于新加坡眼科研究所（SERI）、国大杨潞龄医学院的黄天荫教授是其中一名获得这个奖项的临床科学家。

黄天荫教授所领导的研究小组已经成功证实，视网膜血管病变可以是探测人们日后是否会患上糖尿病、中风、心脏病或高血压的重要线索。

他计划通过这项临床试验设计出有助测量视网膜血管病变进程的工具。要是取得成功，日后医生将可以利用这种低入侵性的造影成像方式，评估人们日后患上心血管疾病的风险。

另一名获奖的临床科学家是来自杜克—国大医学研究生院（Duke-NUS Graduate Medical School）认知神经科学实验室徐律良教授。

他计划针对睡眠不足对认知所造成的影响进行研究，与此同时，他也会跟另一名研究员合作，探讨是否能借由脑部造影成像来找出精神分裂症病人发病前的脑部特征。

昨天也共有5名本地医生获颁临床科学家研究员奖项（Clinician Scientist Award）。这个创立自2004年的奖项至今已经资助了20名从事临床研究工作的医生。

当局会在这些医生进行他们的临床研究计划的三到五年期间，对医院做出补偿，以便让医院能聘请另一名医生暂时顶替他的职务。

跟往年不同的是，今年获奖的这批医生所属的医院可以获得这名医生的全数薪金补偿。过去，当局做出的补偿只是相等于该医生的70%薪金。

国大医院血液与肿瘤科顾问庄伟裕（37岁）副教授是今年获奖的医生中最年轻的一个。他计划针对其中一种称为多发性骨髓瘤（multiple myeloma）的血癌展开研究。

本地每年有80人会患上这类血癌，病人大多是60岁以上的年长者，几乎所有患者都无法在病发后活超过5年。

庄伟裕副教授将与美国夫妻档癌症基因学专家柯普兰（Neal Copeland）和詹金斯（Nancy Jenkins）合作研究，确认这类癌细胞的基因，希望能找出及早诊断并可对抗这类癌症方式。

新加坡眼科研究所黄天荫教授（左）和杜克—国大医学研究生院认知神经科学实验室徐律良教授（右），是其中两名获得首届新加坡转化研究员奖项的临床科学家。国大医院血液与肿瘤科顾问庄伟裕副教授（中）则是今年临床科学家研究员得奖者中最年轻的一个。

RESEARCH AWARDS

Research dream come true: $5m for sleep study

Doctor-scientist's work on sleep deprivation has drawn interest from US space agency Nasa

BY SHOBANA KESAVA

IT IS the stuff of nightmares: A surgeon's knife wavering or slipping, or a gambler deciding to pin his life savings on the whims of a roulette wheel.

But both scenarios can come about from just a single night of sleep deprivation.

A home-grown doctor-scientist who has found how one night's bad sleep can hit performance or decision-making has been given a $5 million boost for his research.

Lead researcher Michael Chee, 48 – whose work has drawn interest from United States space agency Nasa because of astronauts' disrupted sleep patterns – has also won a top award, which comes with the funding.

The new award, called the Singapore Translational Research Investigator Award (Star), aims to pull in world-class doctors to do research that will lead to better cures and treatments for patients.

The three other Star winners announced yesterday, all accomplished doctors with significant findings to their names, are working on cancer and heart and eye diseases.

Singapore has been investing heavily in translational research, which is so called because it translates discoveries in the laboratory into usable treatments at the hospital bed.

Such work is being pushed here. Not only will cures for major diseases reap huge profits, but research and trials here will also mean that local patients will have first access to the latest treatments.

But doctor-scientists are a rare breed the world over.

Figures from Singapore's two health-care clusters indicate that there are fewer than 50 doctors who dedicate the bulk of their time to research.

To encourage more to take the plunge, the National Research Foundation has given $180 million to the Health Ministry for such efforts.

Just two weeks ago, $25 million was awarded to each of two large-scale projects to fight schizophrenia and blindness, from a government kitty of $1.55 billion for biomedical research.

For Professor Chee, whose latest findings have been published in the respected Journal Of Neuroscience, the funding will go into fine-tuning his project.

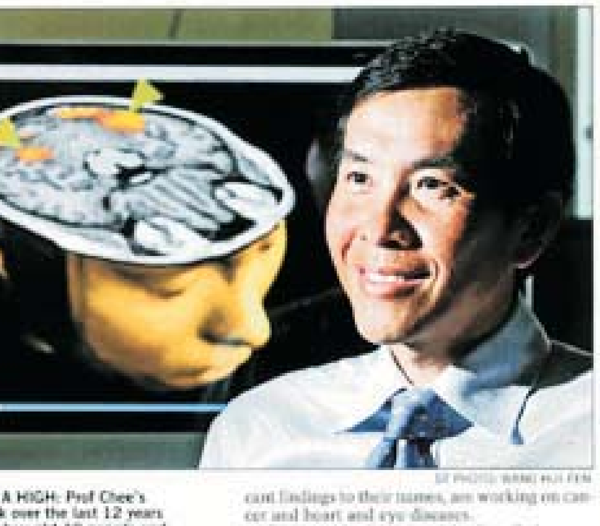
His study will determine, for example, how individuals react differently to sleep deprivation, which could help organisations decide on the best man for a given job.

Prof Chee, who is with the Duke-National University of Singapore Graduate Medical School, said: "What I am most concerned about are the critical decision-makers, those who make life-and-death decisions, such as doctors or those in the military."

His work over the last 12 years has brought 10 awards and numerous grants from local government agencies, philanthropic organisations and the US National Institutes of Health.

Each award still brings a rush of pride and joy to him and his team of 15.

Said Prof Chee: "This hasn't been a cakewalk. Each researcher has been a partner in this work, not merely a worker bee."



ST PHOTO: WANG HUI FEN

ON A HIGH: Prof Chee's work over the last 12 years has brought 10 awards and numerous grants.

LEADERS IN MEDICINE

"To add value to Singapore medicine, we should not be just followers of Western medicine. We want to innovate and develop medicine on our own terms, to be leaders."

PROF WONG TIEN YIN, 40, an eye specialist at the Singapore Eye Research Institute at the National University of Singapore. He is one of four recipients of the nation's highest honour for doctor-scientists – the inaugural Singapore Translational Research Investigator Award.

RESEARCH AWARDS

Funding draws two scientists home

Two Singaporean returnees among nine who win awards

BY LIAW WY-CIN

ST PHOTO: [illegible]

HOME AGAIN: One of the award winners is blood cancer specialist Ong Sin Tiong, 44, who says that it is much easier to find funding in Singapore if one has good ideas to test.

FOR blood-cancer specialist Ong Sin Tiong, Chinese New Year this year was extra-festive because he was home from the United States to be with his extended family for the first time in 14 years.

Dr Ong, 44, returned with his wife and two daughters last August, having given up his position as attending physician at the University of California to join Duke-NUS Graduate Medical School.

The magnet for Singapore-born scientists like him, as well as foreign ones from the West: funding.

Dr Ong said: "If you have good ideas that you want to test, it is much easier to find funding here."

In other words, the money buys researchers the freedom to concentrate on the science.

Research institutions here do not keep track of the number of Singaporean scientists returning after long stints overseas, but among the nine award winners yesterday, two were returning Singaporeans.

Dr Ong, an associate professor with Duke-NUS' cancer and stem cell biology programme, won the Clinician Scientist Award which brings his team a research grant of $350,000 a year for five years.

The other returnee was Professor Wong Tien Yin, 40, whose work in Melbourne has been on the link between damaged blood vessels in the eye and heart disease and stroke in older patients.

His award, the nation's highest for doctor-scientists, is the Singapore Translational Research Investigator or Star Award. His team will stay funded to the tune of up to $1 million a year for five years.

Both awards are from the Health Ministry and the Agency for Science, Technology and Research (A*Star).

The money will enable Dr Ong to expand on the work he had already done in the US, which is to better understand why some patients in the late stages of a type of blood cancer, chronic myelogenous leukaemia, develop a resistance to standard drugs.

Prof Wong, who has been shuttling between Melbourne and here during the last five years, will now spend nine months of each year here. He will continue his research with the funds. His next target: to find out if people are predisposed from birth to blood vessel damage or develop it later on.

Prof Wong's wife and two sons, aged seven and 11, will come here by this year's end.

Dr Ong and his American-born Chinese wife and US-citizen daughters, aged seven and nine, have settled in nicely. He has also caught up with old friends.

"I'm excited to be home."

wycin@sph.com.sg

The honour roll

The Singapore Translational Research Investigator Award, the top honour for doctor-scientists here:

Professor Michael Chee
» From Duke-NUS Graduate Medical School
» Studying cognitive neuroscience – how biological systems drive the way the brain processes information

Professor David Virshup
» From Duke-NUS
» Studying cancer

Professor Daniel Tenen
» From Harvard Medical School and the National University of Singapore (NUS)
» Studying the blood cancer, leukaemia, and stem cells

Professor Wong Tien Yin
» From the Singapore Eye Research Institute and NUS
» Studying diseases of the eye's retina and how they are linked to heart and blood-vessel diseases

The Clinician Scientist Award, for more junior scientists:

Associate Professor Aung Tin
» From the Singapore National Eye Centre and NUS
» Studying the group of eye diseases known as glaucoma

Associate Professor Ong Sin Tiong
» From Duke-NUS
» Studying leukaemia

Associate Professor Allen Yeoh
» From the National University Hospital (NUH) and NUS
» Studying childhood leukaemia

Associate Professor Tan Eng King
» From the National Neuroscience Institute and NUS
» Studying tremors brought on by degenerating nerves, largely due to old age

Associate Professor Chng Wee Joo
» From NUH and NUS
» Studying a type of bone-marrow cancer known as multiple myeloma

$50m given for research on eye diseases, psychotic disorders

Teams from SERI and IMH get $25m each over five years for their projects

By CHEN HUIFEN

TREATMENT for eye diseases and psychotic disorders got a big boost from the National Medical Research Council yesterday, with $50 million awarded to projects aimed at finding better therapies in the two areas.

Two teams – one led by the Singapore Eye Research Institute (SERI) and the other by the Institute of Mental Health (IMH) – each received $25 million for studies as part of the Translational and Clinical Research Flagship Programme launched last year.

The team led by SERI will study glaucoma and corneal disorders, which result in 1.5 million to 2 million cases of blindness a year worldwide. In Singapore, glaucoma is a leading cause of irreversible blindness, especially among Chinese and Indians. Corneal disease, while less common here, is a major cause of blindness in South-east Asia. Asians also tend to have a high rate of scarring and failure after surgery.

Quoting a 2004 report from the World Health Organisation, SERI director Donald Tan said glaucoma causes 12.3 per cent of blindness worldwide, making it the second major cause of eyesight loss. Corneal diseases are the fifth top cause of blindness, at 5.1 per cent.

"However, recent data now suggests that if you include other forms of scarring diseases, eye infections, mostly in childhood, and Vitamin A deficiency (which affects the cornea), corneal (diseases) actually become No 2 after cataracts," Prof Tan said. "So corneal and glaucoma diseases today are the second and third major causes of world blindness."

His team aims to develop better healing methods and safer techniques over the next five years.

In the same time frame, the team led by IMH wants to identify the key risk factors for schizophrenia and psychotic disorders, and develop a new drug compound for better control of the condition.

"The intention is not really to try to develop drugs ourselves," said Tan Chorh Chuan, co-chairman of the TCR Flagship Programme review committee. "At some stage, we may either out-license it or spin it off so it can be taken further as a commercial activity."

The teams were chosen based on their scientific merit and the potential clinical outcome of their research. The projects also address problems that are of particular significance to Singapore. Eight proposals were received.

The TCR Flagship Programme has a budget of $125 million, funded by the National Research Foundation.

Last year, $25 million was awarded to the Singapore Gastric Cancer Consortium. The review panel will next look at research proposals in two other strategic areas – metabolic medicine and infectious diseases.

首届全国医学卓越奖

得奖者①　叶慧钦教授

她引导病人过有意义生活

叶慧钦教授（右）除了照顾儿童肾病患者的健康，还必须鼓励病人，让他们过着有意义的生活。（海峡时报）

国大医院儿童医疗中心儿童肾病免疫及风湿科主任叶慧钦教授除了照顾小肾脏病人的健康，还得“督促”他们上学。

叶慧钦20多年来努力发展本地的儿童肾病医疗服务，因而荣获卓越临床医生奖。她在受访时强调，医生的任务不仅是维持病人的生命，也应引导病人过着有意义的生活。

叶慧钦说：“我希望肾脏病人不要局限于他们的病情，应该继续受教育。有时，我必须强迫病人，如果他们不上学，就无法享有洗肾津贴。”

耗资400万元建设，位于国大医院的国氏基金—NKF儿童肾病中心，是叶慧钦努力的成果。

中心提供的服务包括儿童洗肾与移植计划、住院病人肾病护疗计划、病人及家人互助小组、儿童肾病研究等，也涉及儿童病人移植手术前后各种康复治疗，是东南亚首间一站式儿童肾病医疗中心。

叶慧钦受访时说，我国如今已经成为本区域的儿童肾病培训中心，协助缅甸、柬埔寨、越南等地的公共医疗机构，设立儿童肾病医疗中心。

儿童肾病中心目前为40名年轻肾脏病人洗肾，年纪最小的只有三个星期。叶慧钦照顾的病人很多，每年求诊人次多达2000个。

她说：“照顾病人的过程中，我会思考如何拟定研究课题，来解决当前面对的难题。其实，医学研究和医疗服务是息息相关的。”

News Highlight

$25m each for blindness, schizophrenia research

2 projects aim to pool expertise and resources, develop treatments fast

BY CHANG AI-LIEN
Science Correspondent

FIGHTING SCHIZOPHRENIA: Prof Chong Siow Ann of the Institute of Mental Health.

FIGHTING BLINDNESS: Prof Donald Tan of the Singapore Eye Research Institute.

A WHOPPING $25 million each has been awarded to two ambitious research projects here to tackle blindness and schizophrenia.

The projects – Singapore's largest – will involve about 50 researchers here and abroad, comprising doctors and scientists from hospitals, tertiary and research institutes and disease centres.

The aim is to get people from different disciplines to pool their expertise and resources and get treatments to patients fast.

The money for the projects comes from the Translational and Clinical Research Flagship Programme.

The programme has a five-year budget of $125 million, and is funded by the high-level National Research Foundation, which steers Singapore's research efforts.

Last year, it also doled out $25 million for research into stomach cancer.

Schizophrenia, the psychotic illness that can cause hallucinations and delusions, will be put under the microscope by a team headed by Associate Professor Chong Siow Ann, vice-chairman of the medical board (research) of the Institute of Mental Health, one of the world's largest mental health facilities.

His team will look at tens of thousands of young people – the illness tends to strike those aged between 15 and 35 – to track down those at risk and see who actually gets the illness.

Singapore's compact size and organised health, education and military systems will make patient tracking and follow-up easier than in larger countries where patients tend to be more mobile, said Prof Chong.

In Singapore, schizophrenia ranks ninth, together with breast cancer, in terms of disease burden, a measure that combines years of life lost through premature death and disability.

"At the end of the day, we hope we will be able to transform the way people perceive the illness, and the way we treat our patients and their families," Prof Chong said.

The eye disease programme, led by Singapore Eye Research Institute director Donald Tan, will delve into the two major causes of blindness: glaucoma, a disease of the optic nerve, and corneal disorders such as eye infections.

The Singapore National Eye Centre alone treats over 34,000 cases of glaucoma and more than 15,000 cases of corneal disease each year.

In many cases, the treatment is surgery, but for some reason, this also affects Asian eyes, leaving many with scars, which also affects vision.

"We want to be able to control scarring and induce wound healing," said Professor Tan, who is also the eye centre's director.

Breakthroughs could be expanded within the field and beyond.

They could help eyes heal after Lasik surgery to correct poor vision, for instance, and also help in healing other parts of the body damaged by disease or operations.

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Focused in approach, wide in scope

BATTLING BLINDNESS

The main aim of the programme is to develop better anti-scarring and wound-healing treatments for glaucoma and corneal diseases, two of the major causes of blindness.

Among the goals:
- New drug treatments to control healing after surgery to treat inflammation and infection, and new ways to deliver drugs to different parts of the eye
- New biological tissue "glue" for surgery as an alternative to sutures
- Developing ultra-high resolution imaging technologies to look at wound-healing at a cellular level
- New corneal transplantation surgeries using special lasers and new stem cell transplantation methods
- Research into the Asian form of glaucoma, imaging devices to screen for glaucoma and preventing nerve damage in the disease
- Identifying Asian genes responsible for it

BATTLING SCHIZOPHRENIA

The programme aims to identify key genetic, biological, cognitive, clinical and social risk factors for psychotic disorders, and test new treatments for schizophrenia.

The work includes:
- A genetic study of schizophrenia and neurocognitive impairments
- Study of young adults at risk of psychotic disorders
- Clinical trial of potential drugs which help treat impairments caused by the disease, including reduced attention span and memory function

NMRC Budget for FY2007

NMRC's annual budget is part of MOH's Operating Expenses Budget and NRF's budget for Singapore Biomedical Sciences Initiatives.

For Financial Year 2007, the amount committed to support NMRC's various grants and talent development programmes was S$204.61m. These were given in the form of grants, awards, scholarships and fellowships; with most of the projects' actual spending commencing from FY2008 onwards.

For the projects that have commenced spending and for ongoing projects and programmes approved in previous years, NMRC incurred a total of S$58.72m in FY2007 to support them.

Commitments in FY2007

A total of S$204.61m was committed to the various programmes by NMRC. The breakdown is shown in the table below.

TABLE A – NMRC FY2007 Commitments

	S$'m	No. of Grants
Strategic Programmes		
Translational and Clinical Research Flagship Programme	75.00	3
Centre of Biomedical Ethics	4.60	
Master of Clinical Investigation (MCI) Programme	2.675	
Block Grants		
Institutional Block Grant	26.29	15
Enabling Grant	1.96	7
Research Grants (Total and by research areas)		
Individual Research Grant	26.32	49
Exploratory / Developmental Grant	5.32	32
New Investigator Grant	5.73	32
	S$'m	**No. of Awardees**
Talent Development Awards		
Singapore Translational Research Investigator – Manpower	12.00	4
Singapore Translational Research Investigator – Research Grants	26.00	
Clinician Scientist Award – Manpower	6.60	5
Clinician Scientist Award – Research Grant	9.21	
NMRC Fellowship	1.24	10
NRF-MOH Research Scholarship	0.50	1

Breakdown of commitment for IRG, EDG and NIG

Sum of Expenditure Approved Budget Proportion	
Grant	Total (S$)
EDG	5,317,170.44
IRG	26,318,889.89
NIG	5,729,735.98
Grand Total	**37,365,796.31**

Commitment for IRG, EDG and NIG by Area of Research

Sum of Expenditure Approved Budget Proportion	
Health Category	Total (S$)
Blood	194,000.00
Cancer	9,343,358.70
Cardiovascular	3,498,264.01
Eye	2,928,271.76
Generic Health Relevance	2,490,310.00
Infection	3,154,238.00
Inflammatory and Immune System	3,061,994.10
Injuries and Accidents	262,938.00
Metabolic and Endocrine	1,256,446.76
Musculoskeletal	2,974,793.64
Neurological	1,941,786.44
Oral and Gastrointestinal	1,675,061.70
Other	889,535.00
Renal and Urogenital	1,554,160.76
Reproductive Health and Childbirth	311,250.00
Respiratory	632,879.80
Stroke	1,196,507.64
Grand Total S$	**37,365,796.31**

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