

N2CR INSIGHTS

THE QUARTERLY NEWSLETTER OF N2CR

LATEST NEWS

School-Industry Partnership Appreciation – Nov 24



Cancer Researchers' Stories

N2CR's series is back with an interview with our esteemed and talented member, A/Prof Deng Lih Wen from the Dept of Biochemistry.




MBBS undergraduates

Are you passionate about medical research and eager to make a difference in the field of cancer research? Join us at the N2CR booth to explore exciting research opportunities that can shape your future career!

HERE'S WHAT'S UP!

- Latest News
Page 1
- Research News
Pages 1-3
- Highlights of 2024
Pages 3-4
- Upcoming Events & Announcements
Page 4

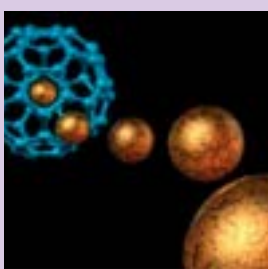
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RESEARCH NEWS (OCT - DEC 2024)

Revolutionising Nanomedicine: DNA Barcodes for Gold Nanoparticles

(Advanced Functional Materials; Xingyue Huang, Zhicheng Le ... Xuehao Tian, Andy Tay)



Gold nanoparticles (NPs) are promising for cancer therapy due to their versatile properties. However, their interactions with cells vary, affecting reproducibility and application. To optimise this, Dr Andy Tay Kah Ping from N2CR and his team, implemented a DNA barcoding system to label NPs of different shapes (sphere, rod, triangle) and sizes (40 nm, 80 nm). Barcodes remained attached and didn't interfere with cell interactions. Results showed that sphere NPs had poor in vitro uptake but good in vivo targeting, while the 80 nm nanotriangles worked well in both lab tests and in living organisms. These NPs were effective in siRNA delivery and photothermal therapy in a breast tumour model, highlighting their potential to enhance cancer treatment.

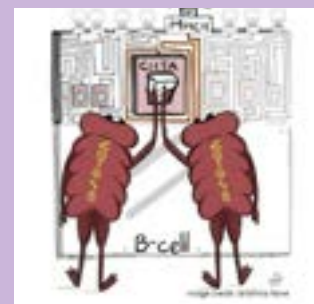
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RESEARCH NEWS (OCT - DEC 2024)

ZBTB48: A New On-Switch for the Immune Response

(The EMBO Journal; Grisma Rane, Vivian Li Siew Kuan, ... Fudong Li, Dennis Kappei)

CIITA is the master regulator of MHC class-II immune genes that are important for defense mechanism against infections and cancer development. CIITA is controlled by three specific switches used in a cell-type specific manner and can be turned on by a signal called IFN- γ . In recent work, research fellow Dr Grishma Rane and colleagues from the lab of N2CR member Dr Dennis Kappei found that a protein called ZBTB48 binds to the B-cell switch and activates CIITA in this type of white blood cells. When ZBTB48 is missing, CIITA and MHC-II gene activity are reduced and cannot be turned on even after signaling by IFN- γ . The team will next apply this fundamental science discovery to B-cell malignancies. Watch this space!

[Read More](#)**Magnetic Field Therapy Improves Breast Cancer Treatment with Fewer Side Effects**

(Cancers; Viresh Krishnan Sukumar, Yee Kit Tai, ... Joline Si Jing Lim, Alfredo Franco-Obregon)

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Chemotherapy, although the first line of defense in cancer treatment, is indiscriminate and is damaging to the entire body, which, ironically, worsens a patient's chances of getting better from cancer. Doxorubicin is a widely used chemotherapy drug for breast cancer but has significant side effects due to its systemic delivery.

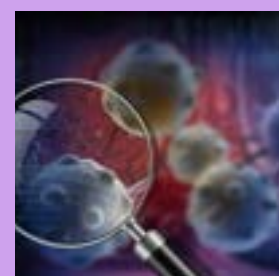
This study led by N2CR member A/Prof Alfredo Franco-Obregon with co-first authors, Viresh Krishnan Sukumar (N2CR PhD Scholarship student) and Dr Alex Tai Yee Kit, found that a 10-minute magnetic exposure increases doxorubicin uptake in breast cancer cells without harming the surrounding healthy cells. The study suggests a localised, non-invasive magnetic therapy to enhance doxorubicin efficacy with fewer side effects. This may ultimately allow for the lowering of systemic doxorubicin administration that could improve a patient's outcome against cancer. This would be a potential game changer in cancer treatment.

Extracellular Vesicles: Key Players in Tumour Microenvironment and Drug Resistance

(Theranostics; Jayshree Hirpara, Win Lwin Thuya, ... Shazib Pervaiz, Boon Cher Goh)

This research, led by N2CR members Prof Goh Boon Cher and Prof Shazib Pervaiz with Dr Jayshree Hirpara as the first author, investigates the role of extracellular vesicles (EVs) in the tumour microenvironment and its contribution to drug resistance. By isolating and analysing EVs from drug-resistant cells and plasma, the study revealed high levels of metabolic transporters like SLC1A5 which are associated with resistance to Tyrosine Kinase Inhibitors (TKIs), a class of targeted cancer therapy.

The results demonstrated that EVs from resistant cells can induce resistance in sensitive cells and transform fibroblasts into tumour-associated fibroblasts, thereby enhancing their invasive capabilities. These findings highlight the significance of EVs in promoting therapy resistance and suggest potential diagnostic and therapeutic targets.

[Read More](#)**Understanding RNA Changes and Cancer Development**

(Proceedings of the National Academy of Sciences of the United States of America; Jian Han ... Sze Jing Tang, Leilei Chen)

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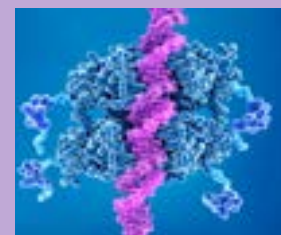
Led by N2CR member A/Prof Polly Chen, this research highlights the crucial role of 'death associated protein 3' (DAP3) in regulating N6-methyladenosine (m6A) RNA methylation, a process often disrupted in cancers. DAP3 is frequently overexpressed in cancer cells to promote tumour growth. It maintains m6A levels by helping methyltransferase-like 3 (METTL3) bind to RNA and promoting the splicing of a protein called MAT2A, which increases S-adenosylmethionine (SAM) levels. This study enhances our understanding of how m6A dysregulation contributes to cancer, highlighting a potential new target for cancer treatment.

RESEARCH NEWS (OCT - DEC 2024)

Unveiling p53's Role in DNA Protection: New Cancer Insights

(Nucleic Acids Research; Gamal Ahmed Elfar, Obed Aning ... Ying Swan Ho, Chit Fang Cheok)

Research led by N2CR member Dr. Cheok Chit Fang found that the tumour suppressor protein p53 protects DNA during replication by preventing the hyperactivation of PARP1 caused by oxidative stress. In the absence of p53, cells experience increased replication stress and DNA damage. The study revealed that p53 collaborates with the RRM2B gene to prevent this damage. Without both p53 and RRM2B, cells activate an antioxidant stress response involving NRF2, leading to PARP1 activation and degradation of newly replicated DNA. The enzyme G6PD was also identified as a key player in this process. This deeper understanding of the interactions between p53, PARP1, and redox metabolism could provide valuable insights for cancer treatments.



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HIGHLIGHTS OF 2024

N2CR Educational Outreach Programme

Our inaugural outreach programme for Secondary Two students on 27 May 2024, was well received. Students enjoyed guided tours of the Anatomy Museum, research lab and the various treatment rooms at NCIS.

We look forward to our next outreach event on 29 Oct 2025.

ECI Symposium

ECI held its first symposium from 13 to 14 May 2024, featuring Guest of Honour Prof Tan Chorh Chuan, who delivered an inspiring address, keynote speakers, and numerous local & international experts.

Speakers

Pierce CHOW National Cancer Centre Singapore	SHAO Hai Lin NUS, Singapore
Jeffrey HALTER University of Michigan, USA	TAM Wai Leong GIS, A*STAR, Singapore
George HANNA Imperial College London, UK	TAN Bee Huat Iain National Cancer Centre Singapore
Mikael HARTMAN National University Hospital, Singapore	TAN Ker Kan National University Hospital, Singapore
LI Jingmei GIS, A*STAR, Singapore	Cristian TOMASETTI Center for Cancer Prevention and Early Detection, USA
LEM Chwee Teck NUS, Singapore	TOO Heng-Phon NUS, Singapore
Robert SCHARPF Johns Hopkins Bloomberg School of Public Health, USA	Abek VENKITARAMAN NUS, Singapore

Early Cancer Intervention from Laboratory Discoveries to the Community

13 - 14 May 2024
NUS MD6 Lecture Theatre 35

 TAN Chorh Chuan Prime Minister's Office, Singapore Guest of Honour	 YEOH Khay Guan NUS, Singapore Keynote Speaker	 Joseph SUNG NTU, Singapore Keynote Speaker	 Nitza ROSENFELD University of Cambridge, UK Keynote Speaker
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N2CR Retreat

Our retreat at Mount Faber on 8 March 2024 was a blast!

We kicked things off with a scenic cable car ride, enjoyed stunning views, delicious food, and had some very lively discussions.

Can't wait for the next one later this year with more camaraderie and scientific synergies!

RESEARCH HIGHLIGHTS 2024



‘New CAR T-Cell Therapy Offers Hope for Relapsed or Refractory T-cell Leukaemia’
Nature Medicine, 3 Sep 2024

A new CAR T-cell therapy, led by N2CR members, shows promise in treating treatment resistant T-cell acute lymphoblastic leukaemia (T-ALL), with most patients achieving remission and acceptable side effects.

Prof Allen Yeoh and Prof Dario Campana

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‘Clinical Trial Shows Promise in Treating Advanced Gastric Cancer’
ESMO Open, 17 Sept 2024

A recent clinical trial found that combining aerosol chemotherapy (PIPAC-OX) with an immunotherapy drug (nivolumab) was safe and effective for treating advanced gastric cancer, reducing cancer and boosting the immune response.

Prof Jimmy So

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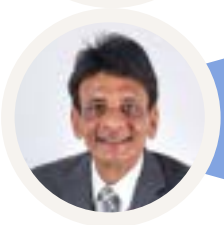


‘Missing link between poor diet and higher cancer risk uncovered’
Cell, 25 April 2024

Research has unearthed new findings which may help explain the connection between cancer risk and poor diet. The insights gained from this study hold promise for advancing cancer prevention strategies aimed at promoting healthy ageing.

Prof Ashok Venkitaraman and Dr Kong Li Ren

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‘A New Pathway in Colorectal Cancer Cells Triggered by Drug-Activated Mutant KRAS’
Autophagy, 25 Feb 2024

Researchers exploited cancer cells’ addiction to mutant KRAS oncoprotein by demonstrating hyperactivation-induced mitochondrial damage and cell death, which provides a novel therapeutic strategy against KRAS-driven cancers.

Prof Shazib Pervaiz

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UPCOMING EVENTS & ANNOUNCEMENTS

31ST INTERNATIONAL CELL DEATH SOCIETY MEETING
"Cell Fate and Its Regulation In Health and Disease"
MAY 28 - 30, 2025
MD11, CRC Auditorium, YLLSOM, NUS, Singapore

AWARD LECTURES

Jerry CHENK Icahn School of Medicine at Mount Sinai, New York, NY, USA	Alessandra CARRIER Fondazione Istituto per Memorie Mediche, Padova, Italy	Hick LEE Cancer Research Research Institute, National University of Singapore, Singapore
Shazib PERVAIZ YLL School of Medicine, National University of Singapore, Singapore	Chit Fang CHEOK YLL School of Medicine, National University of Singapore, Singapore	Yinghui LI Nanyang Technological University, Singapore
INVITED SPEAKERS	Stephen CHONG YLL School of Medicine, National University of Singapore, Singapore	Ying Yu LIANG Institute of Molecular & Cell Biology, A*STAR, Singapore
Yunus AKKOC Koc University, Istanbul, Turkey	Johu CHUA YLL School of Medicine, National University of Singapore, Singapore	Seamus MARTIN Trinity College, Dublin, Ireland
Ladislav ANDERA Czech Academy of Sciences, Prague, Czech Republic	Hans DIEDERICH Seoul National University, Seoul, South Korea	Derrick Sak Tang ONG YLL School of Medicine, National University of Singapore, Singapore
EI ABARHA Weizmann Institute of Science, Rehovot, Israel	Heliyong FU Walker and Eliza Hall Institute of Medical Research, Melbourne, Australia	Frank OURY Institut Necker Enfants Malades, Paris, France
Anna-Sophie ARMAND Institut Necker Enfants Malades, Paris, France	Boon Cher GOH YLL School of Medicine, National University of Singapore, Singapore	Kanaga SABAPATHY Nanyang Technological University, Singapore
Marie ARSENIAN-HENRIKSSON Karolinska Institutet, Stockholm, Sweden	Caifeng HUANG Sichuan University, Chengdu, China	Ali SHAZBI Highpoint University, Highpoint, FL, USA
Shruti BHATT School of Pharmacy, National University of Singapore, Singapore	Samuel KATZ Yale School of Medicine, New Haven, CT, USA	Vinay TERGAONKAR Institute of Molecular & Cell Biology, A*STAR, Singapore
Raymond BIGGE State University of New Jersey, NJ, USA	Brian KENNEDY YLL School of Medicine, National University of Singapore, Singapore	Shih-Yin TSAI YLL School of Medicine, National University of Singapore, Singapore
	Dimitri KRYVISO Ghent University, Ghent, Belgium	Hengge YU Duke-NUS Medical School, Singapore

Scan the QR code to register or find out more at www.celldeath-society.org

Let's Welcome our Primary Members (from 1 Jan 2025)

Dr Tan Kar Tong
Dept of Pharmacy & Pharmaceutical Sciences, NUS

Dr Tan Yong Zi
Dept of Biological Sciences, NUS

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