

# N2CR Thematic Seminar



NUS Centre for Cancer Research  
Yong Loo Lin School of Medicine

## Precision Cancer Medicine (PCM)

Monday, May 30, 2022

5.00pm – 6.00 pm

Host: A/Prof Edward Chow

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### BIOSKETCH

Dr. Valerie Chew graduated from National University Singapore and is currently a principal investigator in Translational Immunology Institute (TII) and an Assistant Professor in Duke-NUS Medical School, Singapore. Dr Chew's research focuses primarily on understanding the complexity and diversity of the immune context of the tumor microenvironment and its influence on clinical outcome or response to therapy in patients with hepatocellular carcinoma (HCC). Her current work involves high- and multi-dimensional immunophenotyping and immunomonitoring of HCC microenvironment for holistic profiling of immune landscapes and the identification of clinically relevant immune subsets or biomarkers predictive of tumour progression and response to therapy. Her work has gained recognition with multiple grant awards and high impact publications.

### BIOSKETCH

A/Professor Franco-Obregón approaches tissue engineering and regeneration from a biophysical perspective, as an alternative to conventional pharmacological interventions. He is particularly interested in how electromagnetic and mechanical forces drive homeostasis. A/Professor Franco-Obregón heads the BICEPS (Biolonic Currents Electromagnetic Pulsing Systems) laboratory under the combined auspices of the Department of Surgery and iHealthtech of the National University of Singapore and is actively investigating how magnetic fields promote mitochondrial respiration and downstream developmental and survival adaptations via a process now known as Magnetic Mitohormesis. His key areas of interests are skeletal muscle development, stem cell biology and cancer.

### Dr. Valerie Chew

Assistant Professor  
Translational Immunology Institute  
(TII), SingHealth-DukeNUS

### Trajectory of immune evolution in hepatocellular carcinoma

**ABSTRACT:** Immune invasion is a key event contributing to tumour development and progression. We have identified immune landscape intratumoural heterogeneity (immune-ITH) as a hallmark of tumour evolution in hepatocellular carcinoma (Nguyen and Ma et al. Nat Com 2021) where heterogenous immune landscapes is linked to increased mutation burden, exhausted immune status and tumour progression. Further to this study, our team recently discovered the trajectory of immune evasion along HCC progression (Nguyen & Wasser et al Nat Com 2022). Our findings demonstrate continual immune-tumour co-evolution throughout tumour progression and identify intermediate tumour stage as a potential key interventional point for immunotherapy to prevent widespread HCC.

### Dr Alfredo Franco-Obregón

Research Associate Professor,  
Dept Surgery, NUS  
iHealthTech, NUS

### Magnetic Mitohormesis: A potential paradigm shift in modern clinical medicine

**ABSTRACT:** Life evolved in an electromagnetic realm. In fact, biochemistry is set to threshold at weak magnetic fields on the same order of magnitude as those that naturally envelop the Earth. Our strategy is to exploit this innate biological imperative to modulate tissue homeostasis and health. Deceptively low energy magnetic fields, of amplitudes between 20-50-times that of the Earth's standing field, are exceptionally well suited for this purpose. We have shown that the TRPC1 cation channel is the transducer of magnetic fields into biological responses and is necessary and sufficient *per se* to confer magnetoreception. Tissues expressing TRPC1 are therefore, magnetically modulatable. Many cancers are associated with elevated TRPC1 expression and can be likewise modulated with pulsing magnetic fields. Sensitivity to Doxorubicin is also determined by TRPC1 expression level, offering an opportunity for synergism between chemo- and magnetic therapies. In my talk, I will summarise our initial findings in these areas.