NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

ON-SITE BIOLOGY COLLOQUIUM

Friday, 6 Oct 2023 | 4 pm | LT32

Hosted by Assoc Prof Liou Yih-Cherng

Map to Block S1A

Anti-PEG antibodies: The Good, the Bad, and the Ugly

By **Steve Roffler**

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Polyethylene glycol (PEG) is a flexible, hydrophilic simple polymer that is physically attached to peptides, proteins, nucleic acids, liposomes and nanoparticles to reduce renal clearance, block antibody and protein binding sites, and enhance the half-life and efficacy of therapeutic molecules. Some naïve individuals have pre-existing antibodies that can bind to PEG and some PEG-modified compounds induce additional antibodies against PEG which can adversely impact drug efficacy and safety. Here I describe the development and use of monoclonal and engineered antibodies against PEG to accelerate drug development and create bispecific molecules to target nanomedicines to cancer cells. I discuss the immunogenicity of COVID-19 mRNA vaccines and how the presence of anti-PEG antibodies can affect pegylated drugs, including accelerating clearance from the blood, destabilizing nanoliposome formulations, and generating hypersensitivity type reactions to pegylated therapeutics.

About the Speaker

Dr. Steve Roffler received his B.S. degree from the University of Washington and Ph.D. in Chemical Engineering from the University of California, Berkeley. He is currently a Distinguished Research Fellow and the Cancer Division Chief in the Institute of Biomedical Sciences at Academia Sinica in Taipei, Taiwan. Steve has published more than 165 papers and been awarded over forty patents. His lab developed the first monoclonal antibodies that specifically bind to polyethylene glycol, which changed the way that pegylated medicines are developed in the clinic. A range of anti-PEG monoclonal antibodies and humanized antibodies developed in his lab have been used by nearly 300 companies and labs to accelerate the development of new pegylated medicines. Steve has received several awards in Taiwan including the Ministry of Science and Technology Outstanding Research Award, the Ministry of Economic Affairs Innovation Award and the Ministry of Education Annual Academic Award. Steve's major areas of research include anti-PEG antibodies, antibody engineering, targeted nanomedicines, and cancer prodrug therapy.