

Time: Thursday 11th January, 2024 12:50-13:40
Place: Room T229 (Troyer Memorial Arts & Science Hall)
Title: Using Recent Nobel Prize-winning Chemistry for Biochemical Materials
Speaker: Prof. Barrett Eichler (Augustana University, SD, USA)
Presentation Language: English

In 2022, Bertozzi, Meldal, and Sharpless won the Chemistry Nobel Prize for work with “click chemistry”. In 2023, Bawendi, Brus, and Yekimov won the same prize for their work with “quantum dots”. What do these two chemistry topics have in common? The work performed in Dr. Eichler’s research lab uses both of them in trying to create new biomaterials.

Dr. Eichler will highlight his research into creating fluorescent probes for such things as cancer and methicillin-resistant *Staphylococcus aureus* (MRSA) using click chemistry to combine quantum dots and DNA strands called aptamers. Aptamers are human-created, antibody-like strands of DNA or RNA that bind tightly and selectively to biological targets, such as extracellular proteins. This quantum dot-aptamer probe is a visibly bright and selective way to identify specific biological targets, such as cancer-related proteins.

Dr. Eichler will also discuss a new project using quaternary ammonium salts (QAS) to create antimicrobial compounds. Antimicrobial resistance is increasing at an alarming pace and new antimicrobial compounds are always needed. These are potential chemicals that could replace antimicrobial QAS, such as benzalkonium chloride and cetylpyridinium chloride, which have been used in antimicrobials for over 100 years and are still used in products such as hand soap. These QAS work by disrupting cell membranes in bacteria and yeast. Current work focuses on incorporating diarylacetylenes into QAS using click chemistry to potentially increase antimicrobial efficacy due to their rigidity and the ability to functionalize both ends into QAS.

*Contact: Prof. Julian Koe, koe@icu.ac.jp