NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Physical and Mathematical Sciences
College of Science

ORAL DEFENCE ANNOUNCEMENT

SHIVAKUMAR KRISHNA MANCHUGONDANAHALLI

Sequence- And Structure-Specific Targeting of RNAs by Short Nucleobase-Modified dsRNA-Binding PNAs Incorporating A-U Pair-Recognizing Fluorescent Light-up Benzothiophene Uracil and G-C Pair-Recognizing Guanidinium

The structures of RNAs determine their functions including protein coding, catalysis, and gene regulation. RNAs are emerging as important therapeutic targets and diagnosis biomarkers. Compared to targeting RNAs through duplex formation, targeting the pre-formed dsRNA regions through structure-specific triplex formation provides a complementary RNA probing/targeting strategy. However, triplex formation through Hoogsteen hydrogen bonding for all base pairs at near-physiological conditions is relatively challenging. We have developed a second-generation modified ^{bt}U PNA monomer derived from uracil, which recognizes the Watson–Crick A-U base pair and shows fluorescence light-up effect upon binding to dsRNAs. In addition, we developed a novel PNA R monomer for the sequence and structure specific recognition of Watson–Crick G-C base pairs in dsRNAs under physiological pH conditions. Our work provides a modular PNA-based platform for the recognition of biomedically important RNAs for applications in diagnosis and therapeutics.

Date:	**28 February 2020**
Time:	**3:00 PM**
Venue:	**Conference Room, Research & Graduate Studies Office, Level 2, SPMS**
Supervisor:	**Asst Prof Chen Gang**