NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Physical and Mathematical Sciences
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ORAL DEFENCE ANNOUNCEMENT

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Nucleic Acid Structure and Conjugation for Drug Design

Nucleic acids can adopt diverse secondary structures, one of which is the four-stranded G-quadruplex (G4). The G4s have been widely studied as an anticancer target where their stabilization by ligands were shown to impact downstream biological processes. Recent discovery of G4 sub-types such as quadruplex-duplex hybrid (QDH) and G4 with vacant sites provides additional structural features exploitable by ligands to improve their selectivity. This thesis investigates the structural features of QDHs found in *PIM1* oncogene. In addition, strategies for targeting of G4 with vacant sites were also developed. The results provide insights for future design of ligand and targeting these structures. Nucleic acids can also act as therapeutic agents where conjugation with various peptides can improve their pharmacokinetic properties. However, the conflicting synthetic methods of the two oligomers often limit the generation of such chimeric molecules. A novel method has been developed for regioselective generation of peptide/protein-oligonucleotide conjugates.

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Supervisor: Prof Phan Anh Tuan