



Department of Chemistry

香港城市大學
City University of Hong Kong

Special Departmental Seminar

By

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***Guanine Quadruplexes:
Exploring the Chemical Space for Nucleic Acid Targeting'***

Date: 25 November 2024 (Monday)

Time: 9:30 am - 10:30 am

**Venue: G4702 (Green Zone, 4th Floor)
Yeung Kin Man Academic Building
City University of Hong Kong**

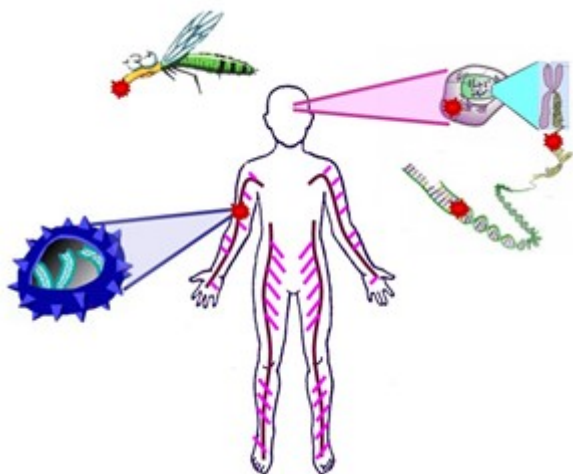
For abstract, please refer to the attached sheet.

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~ All Are Welcome ~

Abstract

The past 20 years have seen a revolution in nucleic acid structure and function. Guanine quadruplexes, an alternate family of structures of nucleic acids which differs from the traditionally recognized B-form double-helix, have revealed themselves from curiosities suspected to occur in obscure fragments of DNA, to a massively present motif in DNA, RNA and DNA-RNA hybrids in a variety of contexts (e.g., mammals, insects, plants, viruses). Evidence is increasingly suggesting that guanine quadruplexes are heavily involved in the regulation of essential processes^[1] that play important roles in conditions as varied as cancers, infectious and parasitic diseases, and neurological disorders.^[2]



This presentation will highlight how the past decades of scientific research have unveiled the prominence of quadruplex motifs in cellular regulation. Coincidentally, we will illustrate lessons that we gathered along our journey, as synthetic chemists, in interfacing with these structures through both bio-organic and bio-inorganic approaches.
[3,4]

References:

[1] Varshney et al., *Nat. Rev. Mol. Cell Biol.* 2020, 21, 459–474
[doi.org/10.1038/s41580-020-0236-x].

[2] Katie Manas, Celena Hoeve, *Queen's Science Undergraduate Research Journal*, 2020, 4, 40–50.
[https://ojs.library.queensu.ca/index.php/qsurj/article/view/13966].

[3] Merle et al., *Mol. Cancer Ther.* 2011, 10, 1784–1795
[doi.org/10.1158/1535-7163.MCT-10-0664].

[4] Miron et al. *Angew. Chem. Int. Ed.* 2021, 60, 2500–2507
[doi.org/10.1002/anie.202012520]

Biography



Originally from France, Dr. Petitjean received her BSc from the École Normale Supérieure (Lyon, France) with a combined specialization in Physical Chemistry and Chemistry Education.

After completing an MSc in Advanced Organic Chemistry at the Université Claude Bernard (Lyon, France) with research under the direction of Prof. André Collet, she moved to Strasbourg (France) to conduct doctoral research at the Université Louis Pasteur under the direction of Nobel Laureate Prof. Jean-Marie Lehn in Supramolecular Chemistry (a field also known as ‘Chemistry beyond the molecule’). She then spent 18 months at California Institute of Technology (Pasadena, USA) as a French Foreign Ministry post-doctoral scholar in the Bio-inorganic Chemistry lab of Prof. Jacqueline K. Barton, targeting duplex DNA with small molecular complexes of Rhodium and Platinum.

Since joining the Chemistry department at Queen’s University (Kingston, Ontario, Canada) as a Queen’s University National Scholar, Dr. Petitjean’s research group has been applying the tools of organic synthesis and weak interactions to create (i) ‘smart’ materials, such as triggered drug delivery systems, and (ii) small bioactive molecules as targeted therapeutics and probes. Recent years have focused on non-canonical nucleic acids structures such as guanine quadruplexes found in DNA and RNA, for which the group has discovered and designed original organic and coordination complexes with promising potential applications to cancers and infections.