



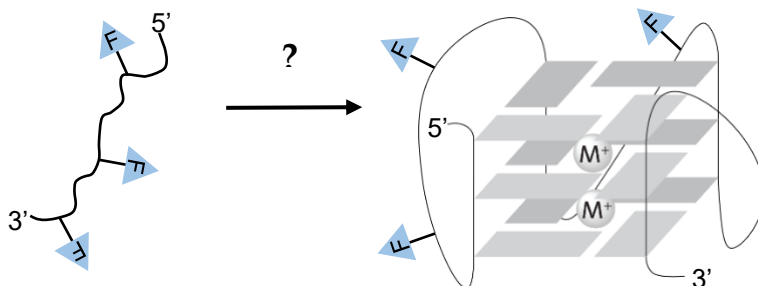
## MSc Thesis in Bioinorganic Chemistry

**Title of Thesis:** Investigation of RNA G-quadruplexes using  $^{19}\text{F}$ -NMR

**Description / Project:**

G-quadruplexes are small, non-canonical nucleic acid structures present in guanine-rich DNA and RNA regions. A G-quadruplex consists of several stacking planes comprising four guanines that are held together through hydrogen bonds. For a G-quadruplex with three stacking planes, twelve guanines are needed. However, most of the sequences contain more guanines resulting in an ensemble of conformations.

Our goal is to understand the structural and dynamic properties of a G-quadruplex in the promoter region of the BCL-2 oncogene, which is fundamental for its application as a drug target. In particular, we want to get insights into the exchange dynamics between different conformers present in the wild-type sequence using nuclear magnetic resonance (NMR) spectroscopy. In this Master project, you will *in vitro* transcribe and purify several RNA G-quadruplex constructs using  $^{19}\text{F}$ -modified nucleotides and determine and compare their stabilities and structural differences using UV, CD, and  $^1\text{H}$  and  $^{19}\text{F}$ -NMR spectroscopy.



**Methods:**

You will be working with spectroscopic methods in the field of structural RNA biology.

**We offer:**

You will be part of an international and truly interdisciplinary team of chemists, biochemists, and physicists. Within the project, you will discover the profound intellectual appeal of using a variety of spectroscopic methods to understand a complex research question.

**Starting date:** as soon as possible or upon agreement.

**Research Group:** Prof. Roland Sigel

**Application / Contact Details:**

If you are interested or have further questions about the project, please contact Carla Ferreira Rodrigues: [carla.ferreirarodrigues@chem.uzh.ch](mailto:carla.ferreirarodrigues@chem.uzh.ch), ++41 44 635 46 40