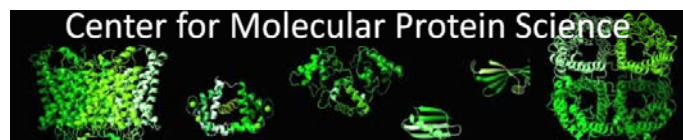


CMPS seminar



Metal ions and RNA biology

Friday 23 Sept. 14.15 Lecture hall B, Chemical Center

Christine S. Chow

Wayne State University, USA

Targeting Ribosomal RNA Sites with Platinum Analogues

Recently, there has been considerable interest in regions of ribosomal RNA that reside at the subunit interface, contain modified nucleotides, and participate in biomolecular interactions. Such regions include helix 69 of 23S rRNA and the 790 loop of 16S rRNA. These RNA helices play key roles in protein biosynthesis by the ribosome machinery. A synthetic chemistry approach was used to produce RNA constructs containing all of the natural modified nucleotides. Platinum complexes that bind to these regions were identified, and their adduct types and binding locations were characterized in RNA model systems as well as on complete, intact ribosomes. These bioinorganic chemistry approaches have been used to identify unique drug-binding sites on bacterial ribosomes, and to understand the role of electrostatics in RNA targeting by small molecules. These results will contribute to future drug development, with emphasis on targeting accessible and charged regions of the ribosome.

Roland K.O. Sigel

University of Zürich, Switzerland

Riboswitches and Ribozymes: Metal Ions and the RNA World on the NMR and Single Molecule Level

RNAs fulfill many roles in Nature, including RNA processing, protein synthesis, gene regulation, and the life cycle of a cell. Metal ions are inextricably involved in folding, structure and function of any RNA. Here we describe the role of metal ions in folding and catalysis of a catalytic group II intron ribozyme from yeast mitochondria. The group II introns splicing reaction is promoted by Mg^{2+} , but severely hampered by small amounts of Ca^{2+} . By a combination of NMR spectroscopy, biochemical experiments, and single molecule FRET we are elucidating, how Ca^{2+} influences local structures of the catalytic core as well as the global folding pathway. Such, we could show for example that two distinct subpopulations are formed that do not interchange. In a second part of the talk, we will focus on the interaction between coenzyme B12 and its cognate *btuB* riboswitch from *E. coli*, a regulatory element found almost exclusively in bacteria. Single atom changes on the B12 lead to either an incomplete structural change or a totally different change in structure of this 200 nucleotide long RNA.

Welcome!