Fall 9-1-2000

CHEM 581.01: Chemical Biology

Unknown
University of Montana - Missoula

Chem. 581 Chemical Biology Syllabus (Preliminary)

Nucleic Acids

1. Introduction/Overview of nucleic acid structure.
2. Solid state approach to nucleic acid synthesis.
    a. DNA
    b. RNA
3. Solution state synthesis of DNA.
4. Synthesis of modified nucleosides and nucleotides.
    a. Modifications at the sugar i.e. AZT/ddI etc.
    b. Modifications at the base i.e. 8-oxo-dG, base alkylation etc.
5. Synthesis of modified oligonucleotides.
    a. Phosphothioates and dithiophosphates, methylphosphonate synthesis.
    b. Antisense oligonucleotide therapy.

Proteins/Peptides.

1. Introduction/Overview of amino acids and functional groups.
2. Solid state peptide synthesis.
    a. FMOC/TBOC approaches.
3. Unnatural amino acid incorporation into peptides.

    a) Impact on peptide structure and function.

4. Protein-Nucleic acids (PNA's).
    a. Synthesis, structure and potential applications.

Interaction of "small" molecules with biomolecules

1. Interactions with proteins.
    a. Physical parameters for active site binding of organic and inorganic molecules.
    b. Designing organic and inorganic molecules for optimal active site binding.
    c. Impact on protein structure and function.
2. Interactions with nucleic acids.
    a. Organic and inorganic molecule interactions with nucleic acids, binding, intercalation, minor and major groove stacking.
    b. Impact on nucleic acid structure and function.

Software and Web-Based Resources for Protein and Nucleic Acid Structure.

1. Freeware available for Molecular Modeling of Protein and DNA Structure.
    a. Rasmole
    b. Chime

    2) Web-Based resources for structural and comparative chemical biology.