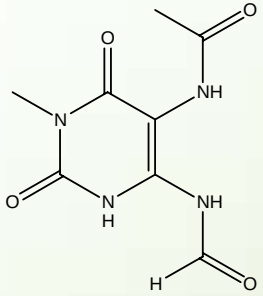
Postgraduate Research

Mayo Clinic Jacksonville
Organic Synthesis Core Facility
Jacksonville, FL

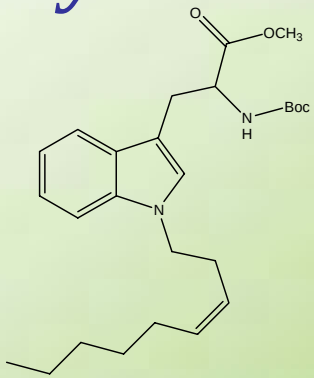
Diagnostic Tools and Therapeutic Candidates for Muscular and Neurodegenerative Diseases

Sean Owen Clancy, Ph.D.

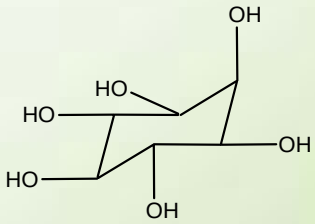
Medicinal Chemistry



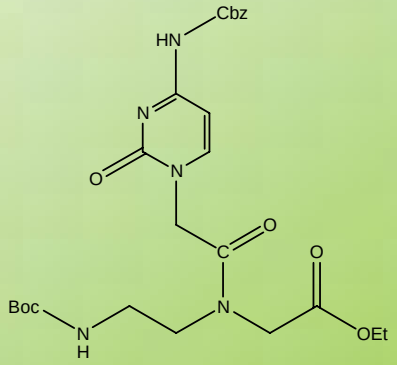
• Caffeine Precursors & Derivatives for HPLC Standards



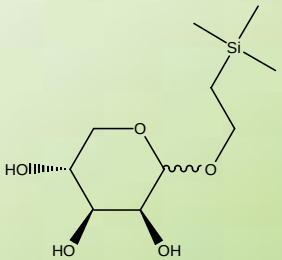
• Modified Tryptophan



• Inositol, Muscle and Nerve Research Tools



• Cytosine, Peptide Nucleic Acid tBoc-Protected Monomers



• D-Lyxose & Other Carbohydrate Derivatives

• tBoc and Fmoc Chemistry with Peptides and Peptide Nucleic Acids

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Organic Synthesis

- Carbohydrate and inositol chemistry
- Peptide nucleic acid (PNA) monomer synthesis and oligomer synthesis
- Synthetic amino acids and proteins

Characterization

- NMR (proton and carbon)
- FT-IR
- GC/MS
- Polarimetry

Applications

- Drug candidates for neurodegenerative and other diseases

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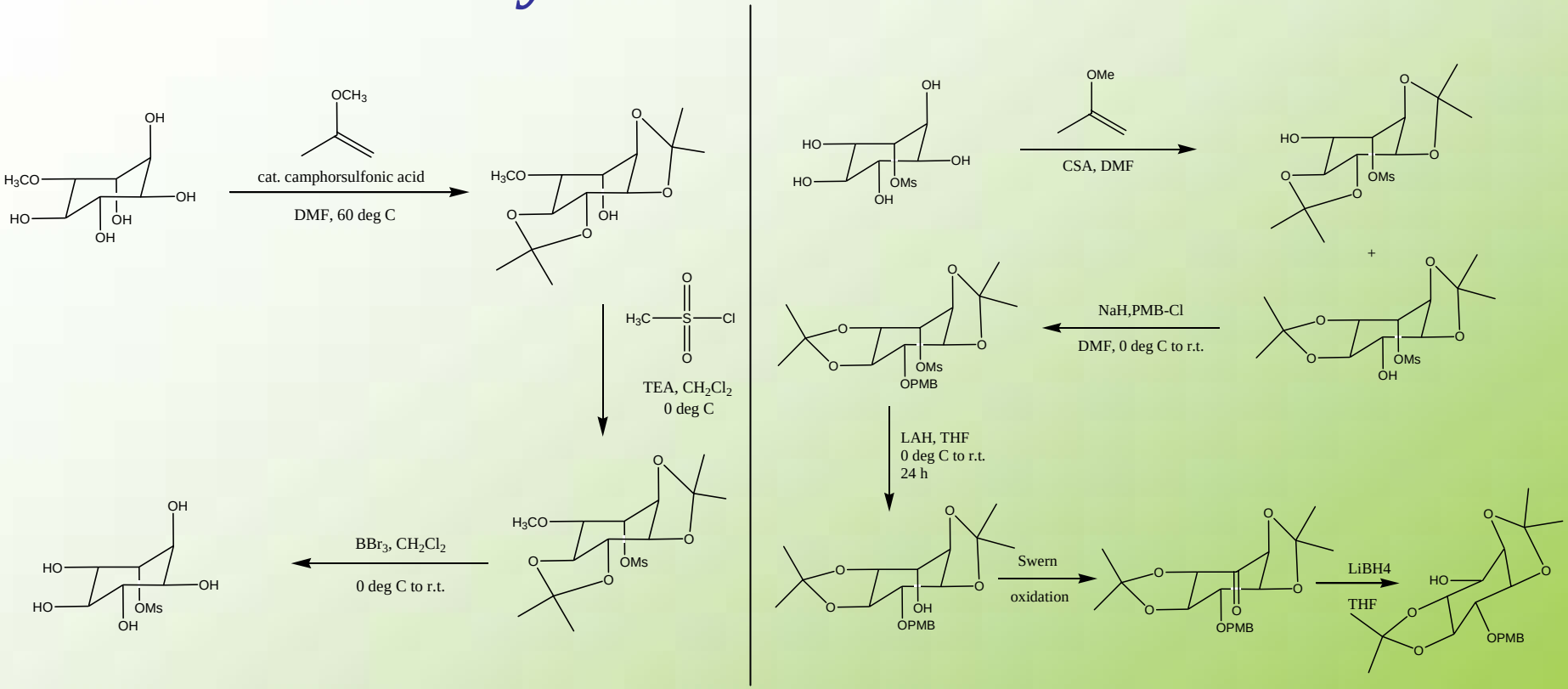

Inositol chemistry

- Used in muscle and nerve research.

- Inositol starting material is a side product of rubber industry, so it can be acquired at a cheaper price from Malaysia.

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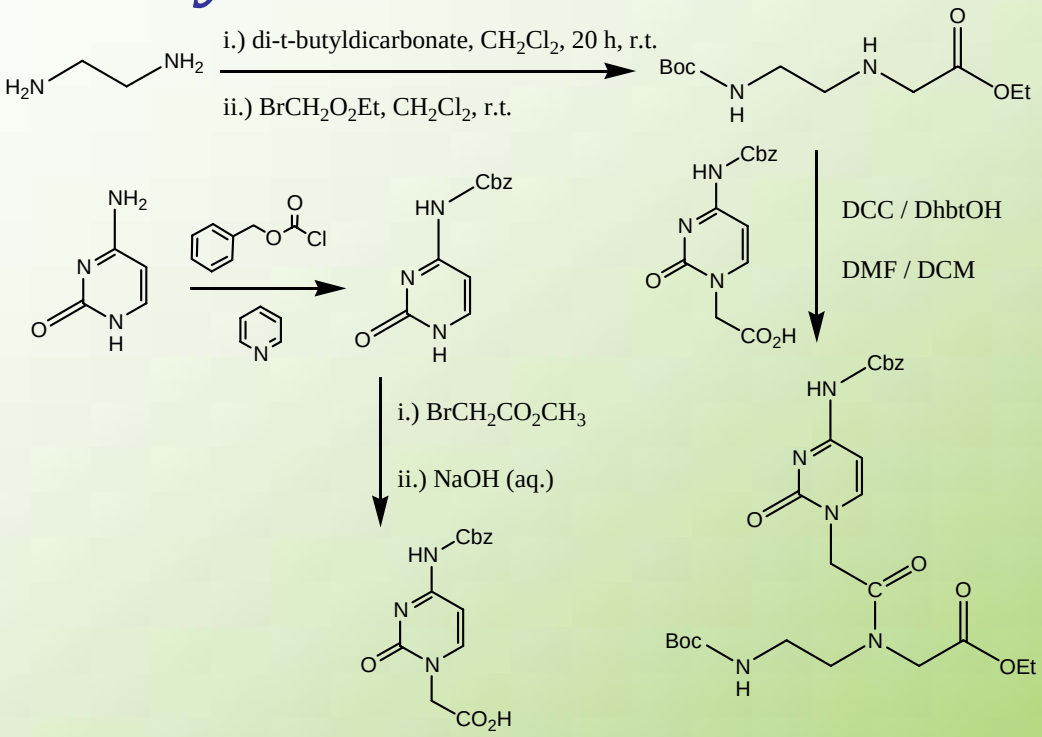

Peptide nucleic acid monomer synthesis

• Peptide nucleic acid monomers were commercially available, but it was determined that it would be more cost effective if I made them.

We had to change the solid-state synthesis a little to accommodate a different protective group chemistry.

• I wrote a protocol that was used to aid grant and patent progress for primary investigator, Elliott Richelson, M.D..

Knowledge, Skills, and Abilities Enhanced or Obtained via this Research

• Design and synthesis of: small molecule organics, in the form of carbohydrates, peptides, peptide nucleic acid monomers and oligomers, inositols, synthetic amino acids, etc..

• Characterization of materials through a variety of techniques: NMR, gas chromatography-mass spectrometry, elemental analysis, absorption spectroscopy, Fourier transform infrared spectroscopy, etc..

• Purification of materials via: column chromatography, preparative thin layer chromatography, preparative high pressure chromatography, ambient pressure and vacuum distillation, reprecipitation, and recrystallization.

• Structure-property / structure-function relationship studies.

Acknowledgements

Mayo Clinic Jacksonville

Supervisor

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Research Group

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Feng Hong, Ph.D.

Collaborators

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Terrone L. Rosenberry, Ph.D.

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