

Postgraduate Research



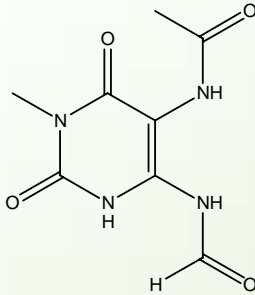
*Mayo Clinic Jacksonville
Organic Synthesis Core Facility
Jacksonville, FL*

*Diagnostic Tools and Therapeutic Candidates for
Muscular and Neurodegenerative Diseases*

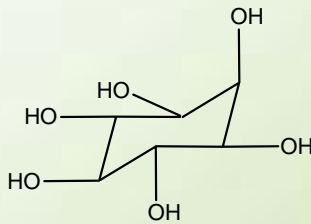
Sean Owen Clancy, Ph.D.

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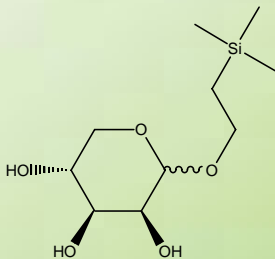
Medicinal Chemistry



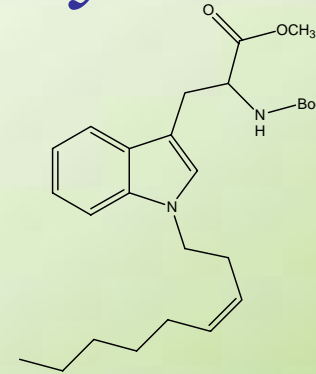
- Caffeine Precursors & Derivatives for HPLC Standards



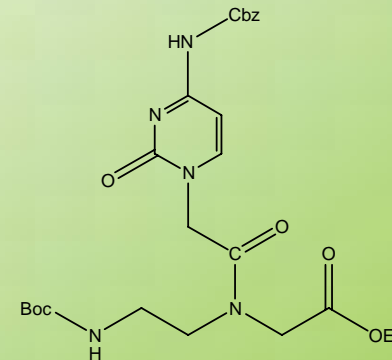
- Inositol, Muscle and Nerve Research Tools



- D-Lyxose & Other Carbohydrate Derivatives



- Modified Tryptophan



- Cytosine, Peptide Nucleic Acid tBoc-Protected Monomers
- 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

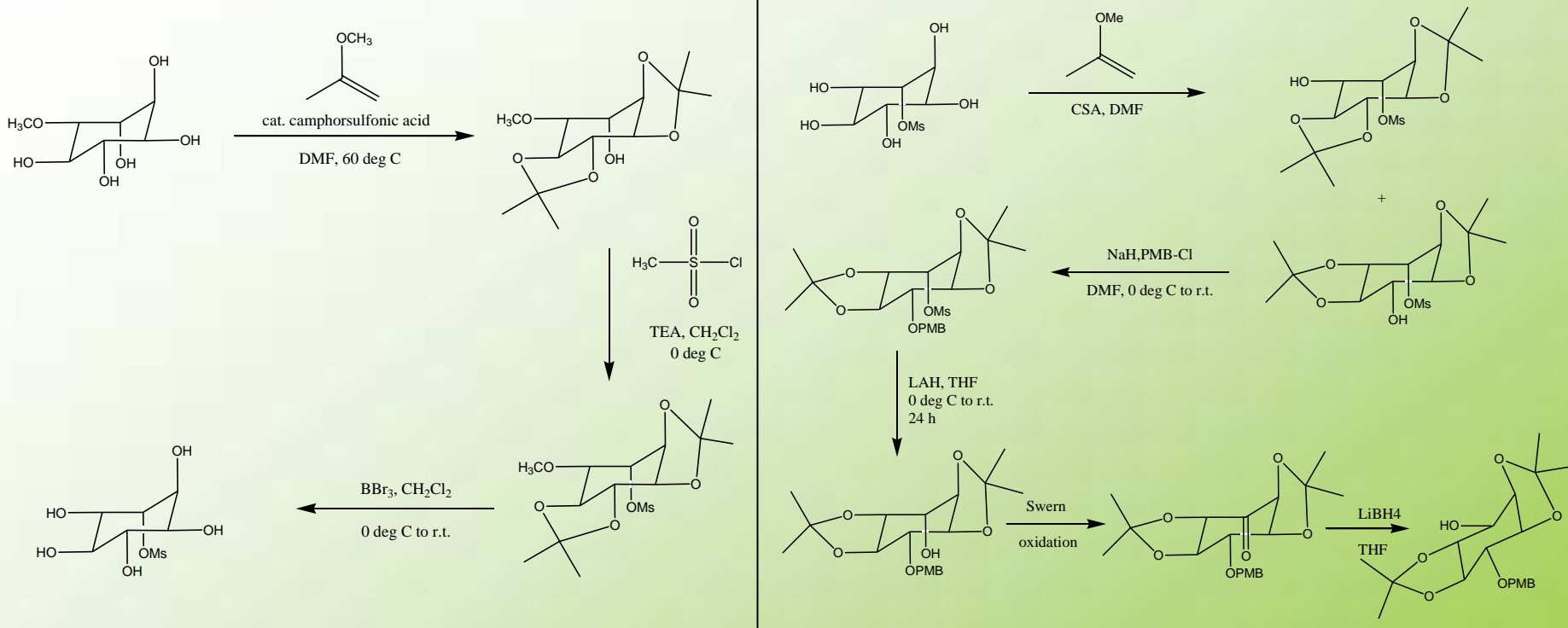
Characterization

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

Applications

- Drug candidates for neurodegenerative and other diseases

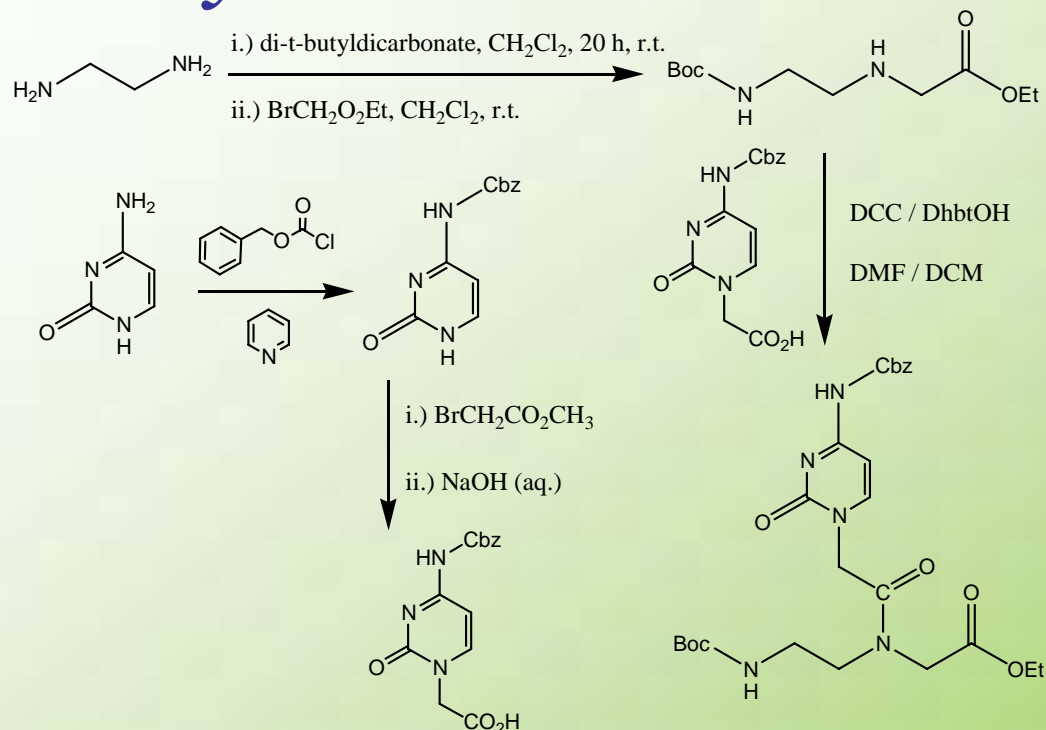
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Inositol chemistry

- 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

Abdul H. Fauq, Ph.D.

Collaborators

Elliott Richelson, M.D.

Terrone L. Rosenberry, Ph.D.

Funding was provided by:

- Mayo Foundation
- National Institutes of Health
- U.S. Public Health Service

Research Group

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