Chemistry 3719 - Organic Chemistry I

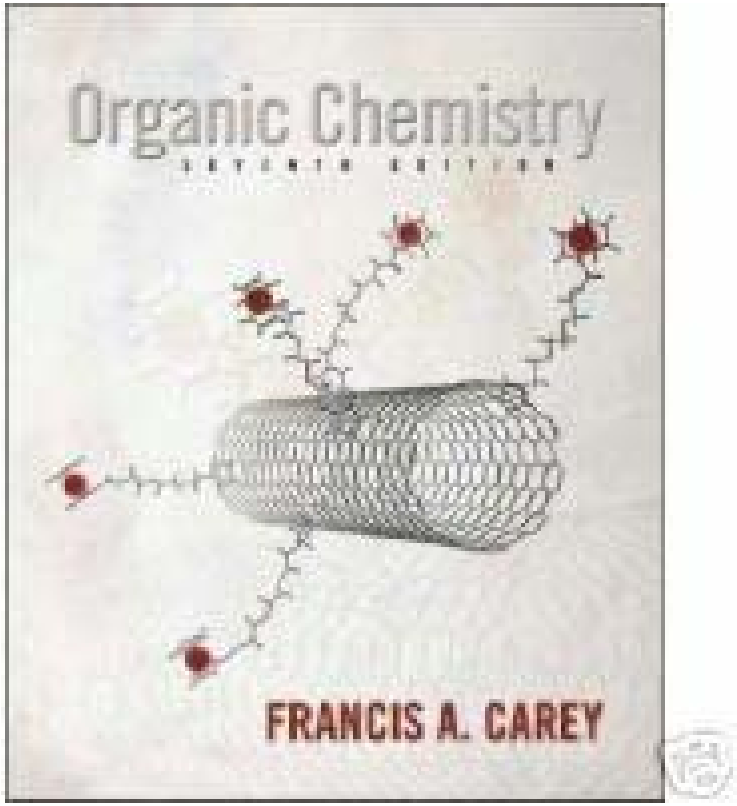
Professor :	Dr. Peter Norris
Office :	6014 Ward Beecher
Telephone :	(330) 941-1553
Email :	pnorris@ysu.edu
Websites :	

http://www.as.ysu.edu/~pnorris/public_html

www.chemfinder.com

Lecture needs:

- **Carey**
- **Molecular models**
- **Adobe Acrobat Reader**
- **Web access**



Molecular Models – www.darlingmodels.com

May be used on exams, will be used in lecture

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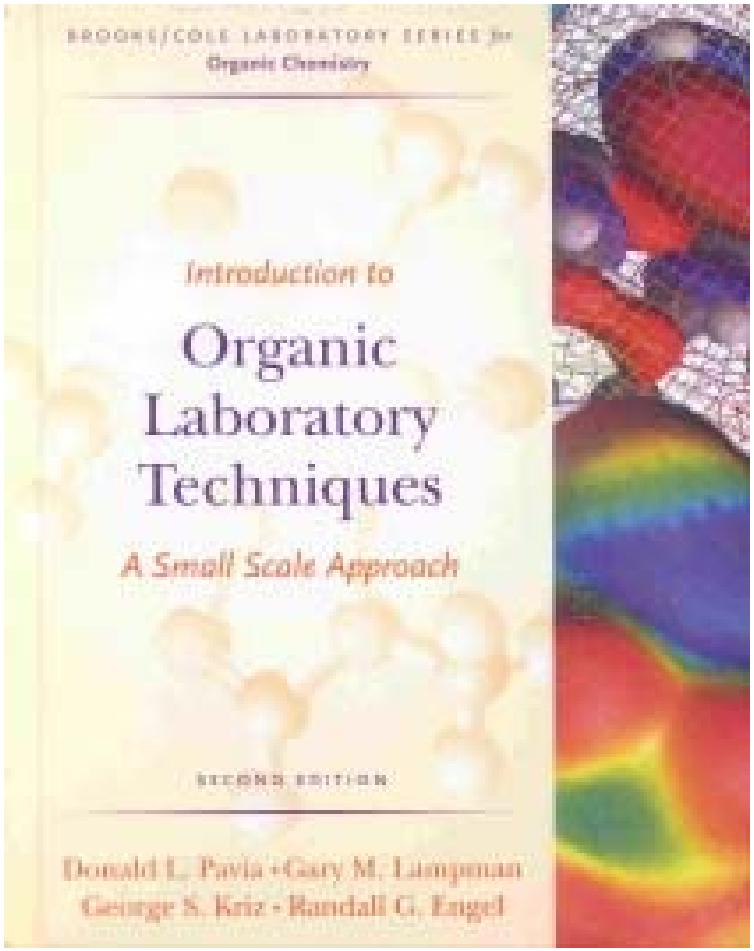
Lab needs:

- **Pavia, Lampman, Kriz and Engel**
- **Goggles**
- **Lab coat**
- **Bound notebook**



Chemistry 3719 and 3720 (and labs)

Lectures

- Structure and nomenclature of compounds and groups
- Physical properties and analysis of materials
- **Reactivity and transformations with reagents**
- Importance of organic compounds in other subjects

Labs

- Glassware and equipment used to prepare organics
- Instrumentation used to analyze compounds
- Keeping a good notebook of lab preparations

Chemistry 3719R and 3720R (Recitation)

Objectives

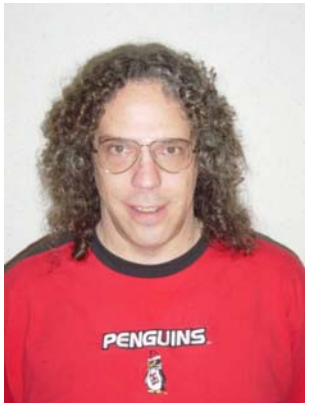
- Practice the problems sets, old exams
- Practice the problems from the book
- Ask ?? of a professional chemist (other than lecture Prof)
- To encourage students to keep up with material (quizzes)

When: 12-12.50 or 1-1.50 on Mondays

(1 Semester hour, Separate grade to 3719/3719L)

Chemistry 3719 Personnel

Dr. Peter Norris
3719 lecture



Dr. John Jackson
3719 recitation

Calvin Austin
3719 lab

Lucas Beagle
3719 lab

Lemuel Carlisle
3719 lab

Brian Dobosh
3719 lab

Mike Evans
3719 lab

Ashley Malich
3719 lab

Kevin White
3719 lab

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Some does and don'ts for 3719 and 3720

Does

- Prepare for lecture and lab; **read ahead**
- Ask questions at any time; lecture, recitation, office hours
- Use all of your resources; email, website, tutors
- If you struggled in General Chemistry, seek help soon

Don'ts

- **Don’t get behind**, blow off class, ignore the available help
- Don’t wait until October to say “dude, I thought I knew the stuff.”
- Don’t complain when you get 20/100 if you ignore the above

Get help : pnorris@ysu.edu

Peter Norris B.Sc., Ph.D.

Born :	**1965, Liverpool, England**
B.Sc. Chemistry :	**1986, Salford University, England**
Ph.D. Organic Chemistry:	**1992, The Ohio State University**
Post-doctoral :	**1993-96, American University, Wash'n DC**
Assistant Professor :	**1996-2000 YSU Chemistry**
Associate Professor :	**2000-2004 YSU Chemistry**
Full Professor :	**2004 – present YSU Chemistry**

40 publications, graduated 23 Masters degree students since 1998

~ $1,000,000 in grant money since 1999

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Research and Publication

"Crystal and molecular structure of 6,7-dideoxy-1,2;3,4;9,10-tris-*O*-(1-methylethylidene)-D-*erythro*-alpha-D-*galacto*-undecopyranosid-8-ulose," **T. D. Weaver**, M. Zeller, and P. Norris, *J. Chem. Cryst*., **2006**.

"*N*-Glycoside neoglycotrimers from 2,3,4,6-tetra-*O*-acetyl-beta-D-glucopyranosyl azide," **D. P. Temelkoff**, M. Zeller, and P. Norris, *Carbohydrate Research* **2006**, *341*, 1081-1090.

"Application of Bis(diphenylphosphino)ethane in Staudinger-type *N*-Glycosyl Amide Synthesis," **D. P. Temelkoff**, **C. R. Smith**, **D. A. Kibler**, S. McKee, **S. Duncan**, M. Zeller, M. Hunsen, and P. Norris, *Carbohydrate Research*, **2006**, *341*, 1645-1656.

"Crystal structure of 1-(2,3:5,6-di-*O*-isopropylidene-beta-D-mannofuranosyl)-1*H*-[1,2,3]triazol-4,5-dicarboxylic acid diethyl ester," H. Seibel, **P.L. Miner**, P. Norris, and T.R. Wagner, *J. Chem. Cryst*., **2006**.

"Cu(I)-Catalyzed formation of D-mannofuranosyl 1,4-disubstituted 1,2,3-triazole carbohybrids," **P.L. Miner**, T.R. Wagner, and P. Norris, *Heterocycles* **2005**, *65*, 1035-1049.

>40 total, most with YSU undergrad or MS students as coauthors

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http://www.as.ysu.edu/~pnorris/

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- NMR Unknowns
- Structure Unknowns
- Monosaccharide NMR

Peter Norris, Ph.D.

Organic Chemistry

Professor

Youngstown State University, 2004-present

Associate Professor

Youngstown State University, 2000-2004

Assistant Professor

Youngstown State University, 1996-2000

Post-doctoral

American University, Washington, DC, 1993-1996

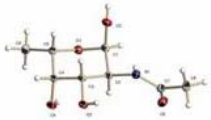
Ph.D., Organic Chemistry

The Ohio State University, Columbus, OH, 1992

B.Sc. (Hons.), Chemistry

Salford University, Salford, England, 1986

We have a general interest in the synthesis of small molecules to serve as inhibitors of biological processes. Group projects are currently funded by the National Institutes of Health (AREA) and the American Chemical Society (Petroleum Research Fund).



The X-Ray crystal structure of bacterial aminosugar *N*-acetyl-L-fucosamine recently solved at YSU (A-B Alhassan, M Zeller and P. Norris **2006**).

Contact:

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Youngstown, OH 44555

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Fax: 330-941-1579
E-mail: pnorris@ysu.edu

News:

Ryan Conway (2nd year MS student) has accepted a position in Process Chemistry with Roche Pharmaceuticals in Florence, SC, and **Adam Cox** (2nd year MS student) is moving to the Ph.D. program in Organic Chemistry at The Ohio State University. Both will graduate with their MS degrees in August 2007.

Graduate students from the Norris group at YSU presented posters on their work at the 2007 Central Regional Meeting of the American Chemical Society, held in Covington, Kentucky May 20-23 2007.

Professor Diana Fagan, YSU Department of Biological Sciences, presented the paper Carbohydrate Mimetics for *S. aureus* capsule at the 2007 Experimental Biology meeting held in Washington, DC, April 28 to May 2 2007 (Link to abstract). The work represents initial biological assessment of some of the glycomimetic molecules created in the Norris lab at YSU.

NSF awards $475,000 for Chemistry - the YSU Department of Chemistry was awarded $475,000 from the National Science Foundation for the purchase of a new remotely accessible 400 MHz Nuclear Magnetic Resonance Spectrometer (CRIF:MU: CAMRA-YSU - Cyber-Accessible Magnetic Resonance at YSU - Purchase of a 400 MHz NMR Spectrometer). The new NMR will be installed in 2007 (Link to article).

Done

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Youngstown State University
Chem 3719 - Organic Chemistry I

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3719 Lecture Syllabus (PDF)
3719R Recitation Material
3719L Laboratory Material
Message Board

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Lecture Notes	Old Exams	Exam Keys
Chapter 1	Fall 2006 Exam 1	Fall 2006 Exam 1 key
Chapter 2	Fall 2005 Exam 1	Fall 2005 Exam 1 key
Chapter 3	Fall 2003 Exam 1	Fall 2003 Exam 1 key
Chapter 4		
Chapter 5	Fall 2006 Exam 2	Fall 2006 Exam 2 key
Chapter 6	Fall 2005 Exam 2	Fall 2005 Exam 2 key
Chapter 7	Fall 2003 Exam 2	Fall 2003 Exam 2 key
Chapter 8		
Chapter 9	Fall 2006 Exam 3	Fall 2006 Exam 3 key
Chapter 10	Fall 2005 Exam 3	Fall 2005 Exam 3 key
Chapter 11	Fall 2003 Exam 3	Fall 2003 Exam 3 key
Chapter 12		
	Acid-Base Worksheet	Acid-Base Answers
	Stereochem Problems	Stereochem Answers

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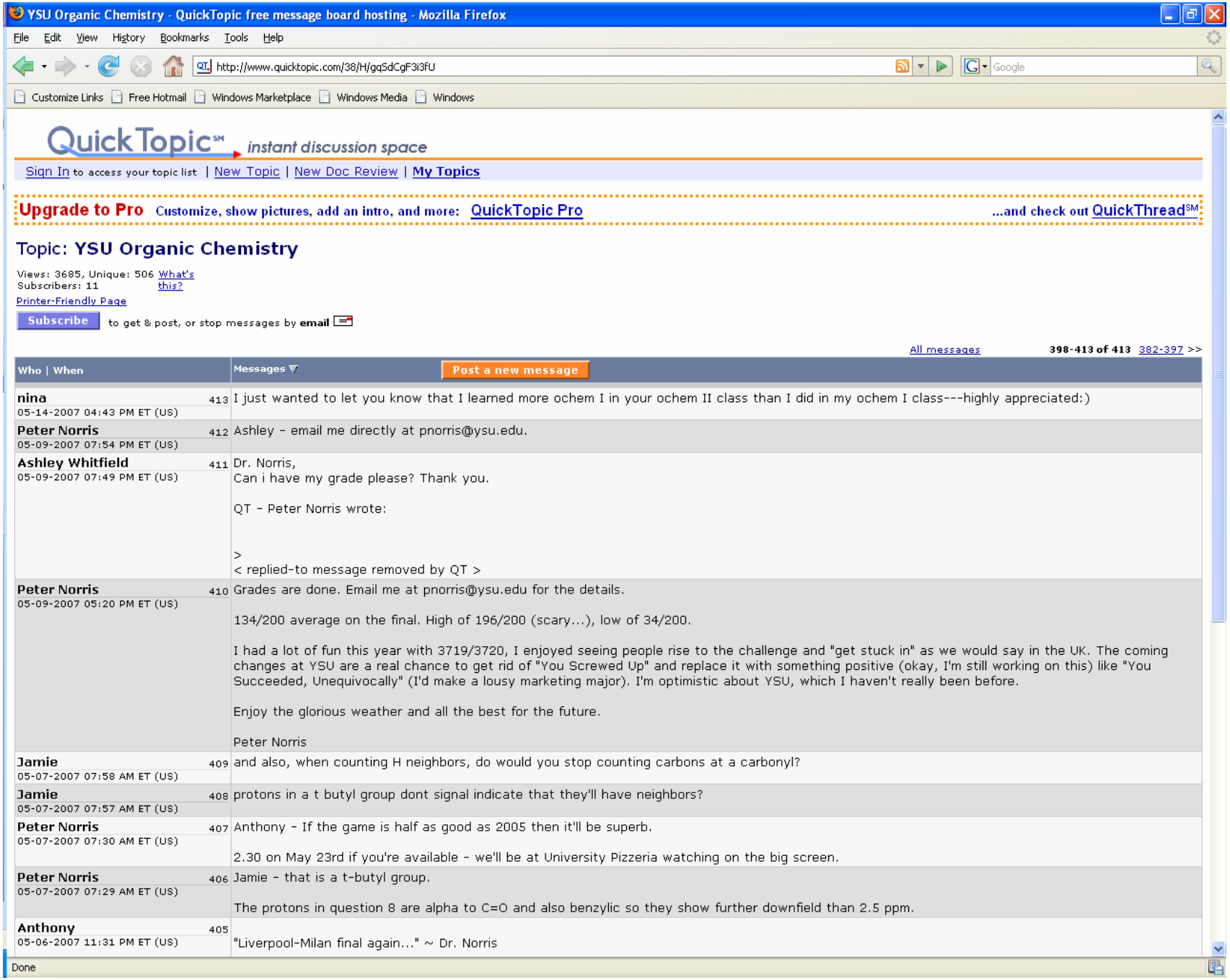
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nina 413
05-14-2007 04:43 PM ET (US)
I just wanted to let you know that I learned more ochem I in your ochem II class than I did in my ochem I class---highly appreciated:)
Peter Norris 412
05-09-2007 07:54 PM ET (US)
Ashley - email me directly at pnorris@ysu.edu.
Ashley Whitfield 411
05-09-2007 07:49 PM ET (US)
Dr. Norris,
Can i have my grade please? Thank you.
QT - Peter Norris wrote:
>
< replied-to message removed by QT >
Peter Norris 410
05-09-2007 05:20 PM ET (US)
Grades are done. Email me at pnorris@ysu.edu for the details.
134/200 average on the final. High of 196/200 (scary...), low of 34/200.
I had a lot of fun this year with 3719/3720, I enjoyed seeing people rise to the challenge and "get stuck in" as we would say in the UK. The coming changes at YSU are a real chance to get rid of "You Screwed Up" and replace it with something positive (okay, I'm still working on this) like "You Succeeded, Unequivocally" (I'd make a lousy marketing major). I'm optimistic about YSU, which I haven't really been before.
Enjoy the glorious weather and all the best for the future.
Peter Norris
Jamie 409
05-07-2007 07:58 AM ET (US)
and also, when counting H neighbors, do would you stop counting carbons at a carbonyl?
Jamie 408
05-07-2007 07:57 AM ET (US)
protons in a t butyl group dont signal indicate that they'll have neighbors?
Peter Norris 407
05-07-2007 07:30 AM ET (US)
Anthony - If the game is half as good as 2005 then it'll be superb.
2.30 on May 23rd if you're available - we'll be at University Pizzeria watching on the big screen.
Peter Norris 406
05-07-2007 07:29 AM ET (US)
Jamie - that is a t-butyl group.
The protons in question 8 are alpha to C=O and also benzylic so they show further downfield than 2.5 ppm.
Anthony 405
05-06-2007 11:31 PM ET (US)
"Liverpool-Milan final again..." ~ Dr. Norris
Done

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What is Organic Chemistry?

The study of the compounds that contain carbon and the reactions of those materials (millions known)

Why a whole year of Organic?

Carbon can bond in multiple ways to form a huge number of different molecules, and these compounds form the basis of many different disciplines, e.g.:

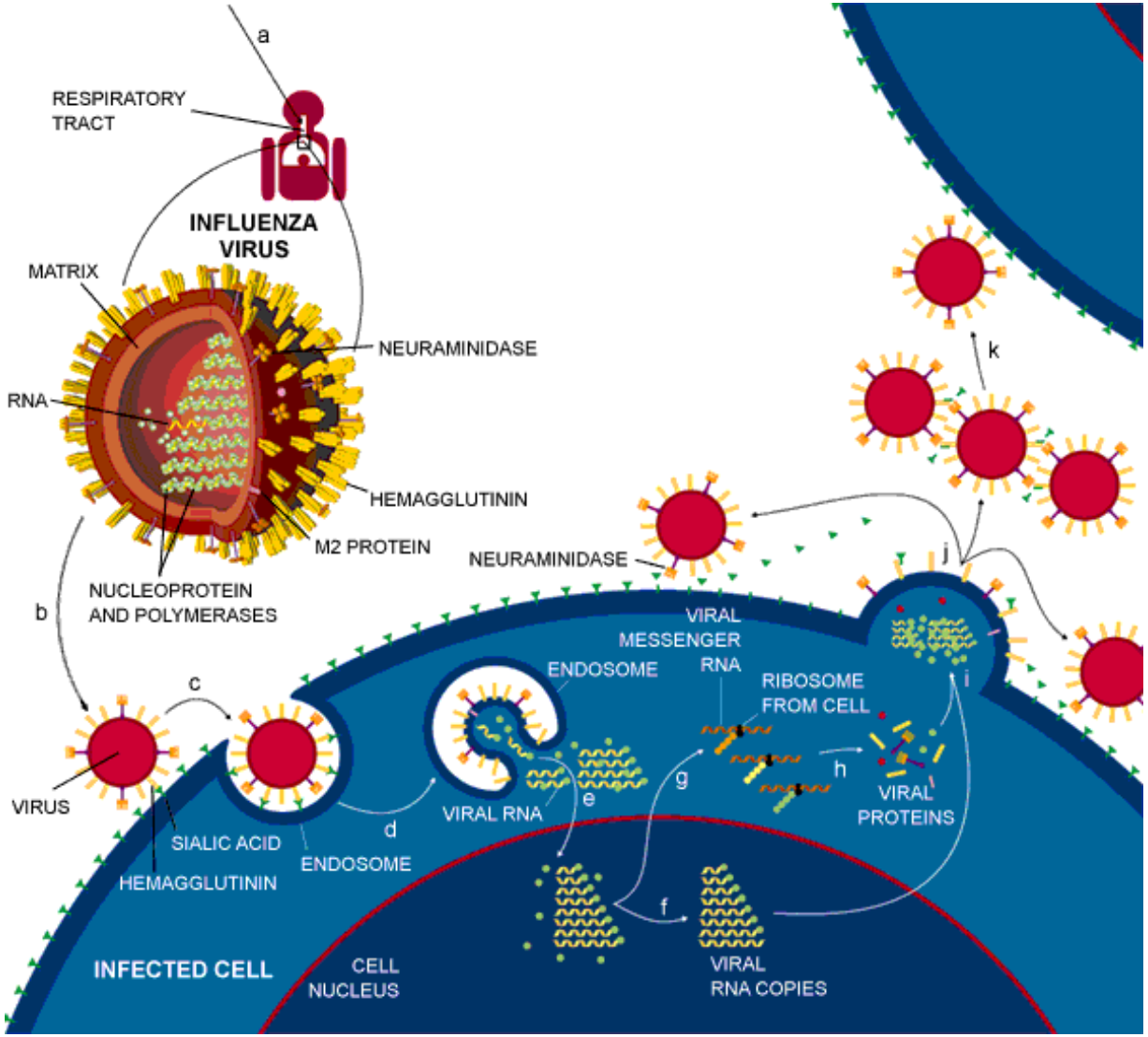
Biology (DNA, proteins, carbohydrates)

Medicine and Pharmacy (Aspirin, Taxol, AZT)

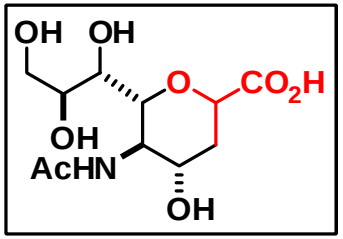
Chemical Engineering (oil, plastics, fine chemicals)

Forensics (Biological materials, chemical tests)

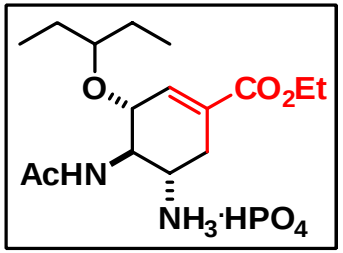
From Organic Chemistry to Biology, Medicine, Pharmacy, etc.



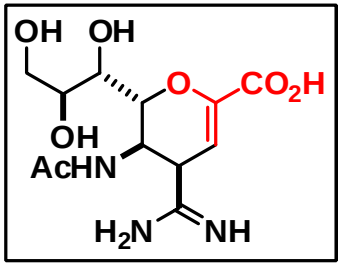
From Scientific American – www.sciam.com



***N*-acetylneuraminic acid**



Tamiflu - Giliad/Roche



Relenza - GSK

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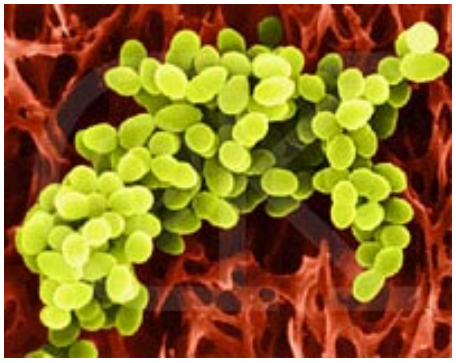
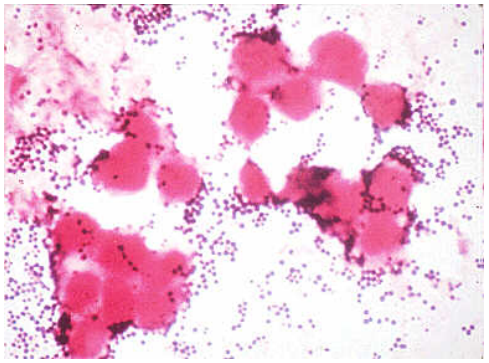
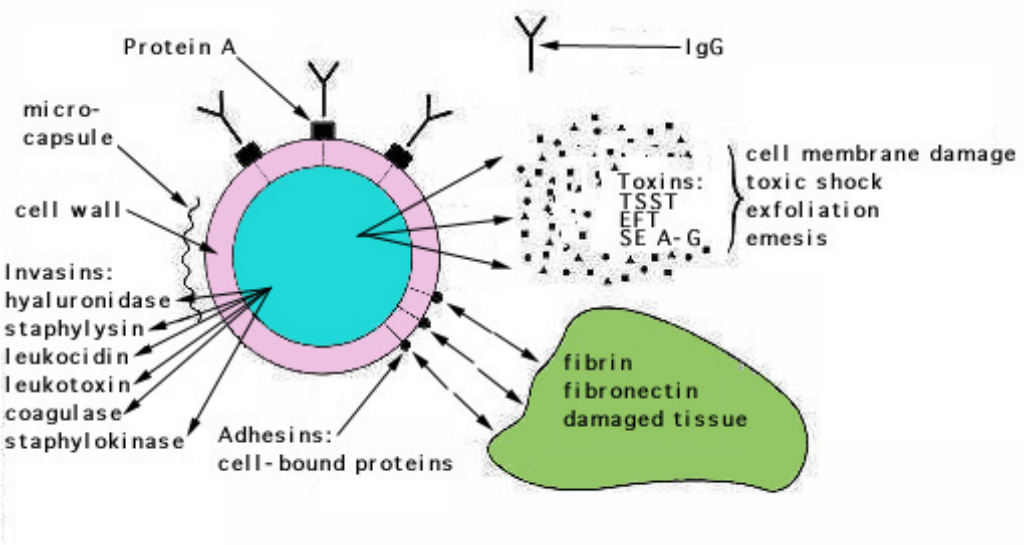
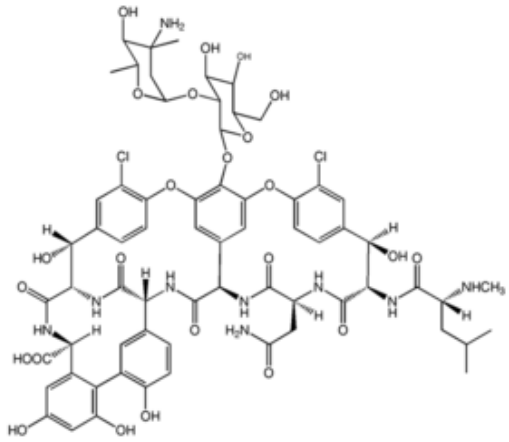
Staphylococcus aureus – Norris/Fagan





Gram-positive, cluster-forming coccus, causes food poisoning, endocarditis, osteomyelitis, septiceamia, infections on implants





Vancomycin

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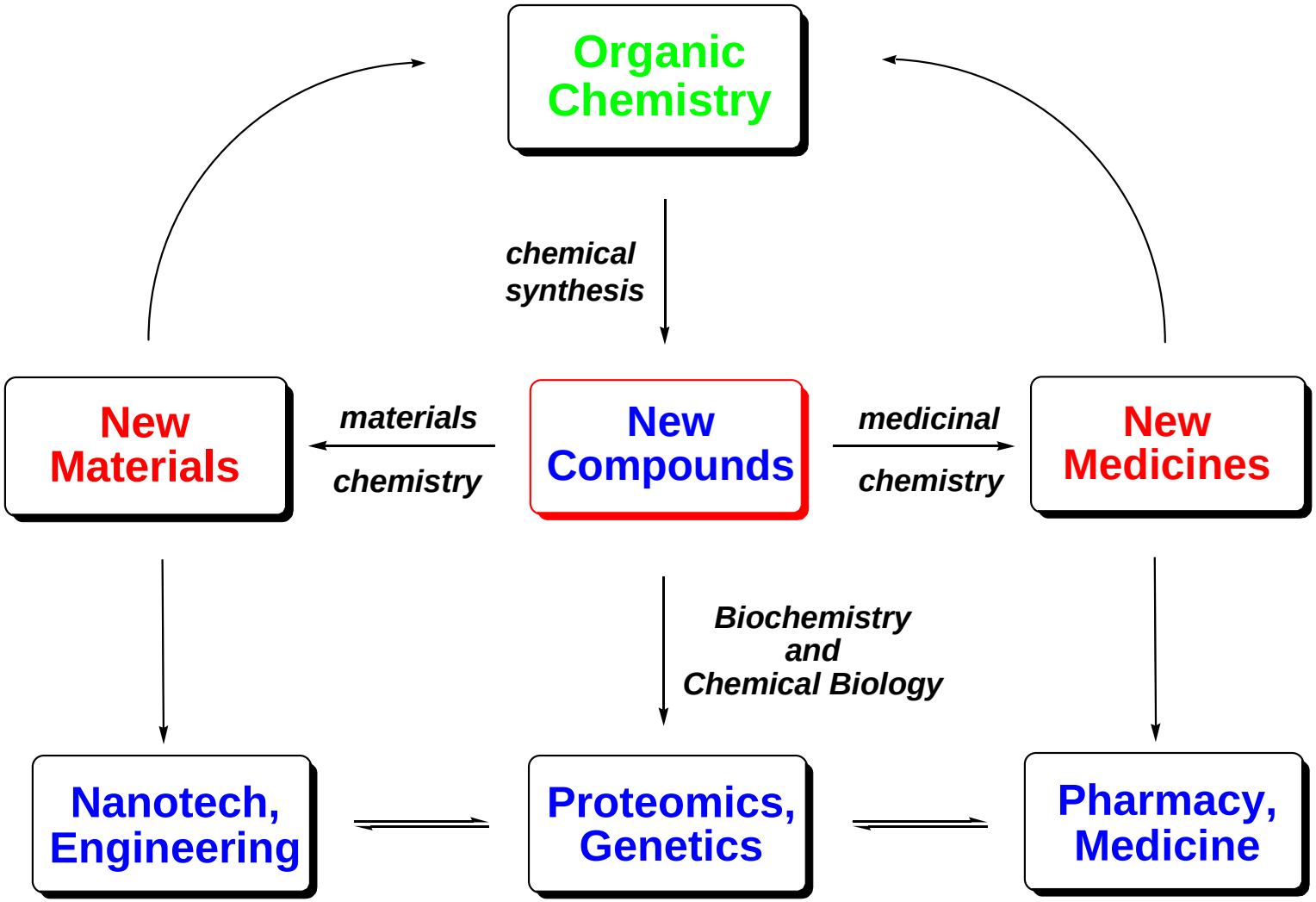
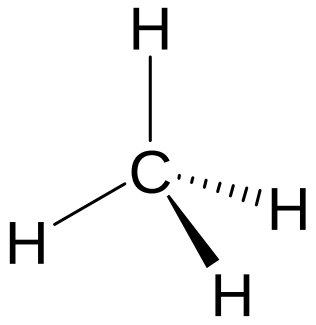
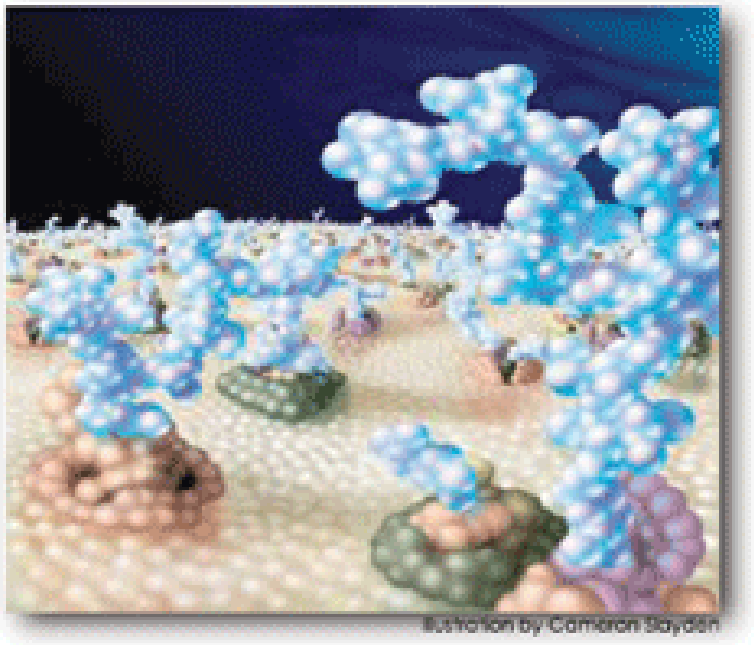
Organic Chemistry – Materials and Uses



Chemistry 3719-3720





~1800 – Organic Chemistry : the chemistry of natural products based on carbon

2006 – Organic Chemistry : "molecular engineering"

Timeline

1807 Berzelius introduces the term "Organic Chemistry" to describe the study of compounds isolated from nature

1828 Wöhler makes urea, the first natural organic compound to be synthesized in the laboratory

1890 Fischer studies the chemistry of proteins, carbohydrates and the nucleic acids - Biochemistry

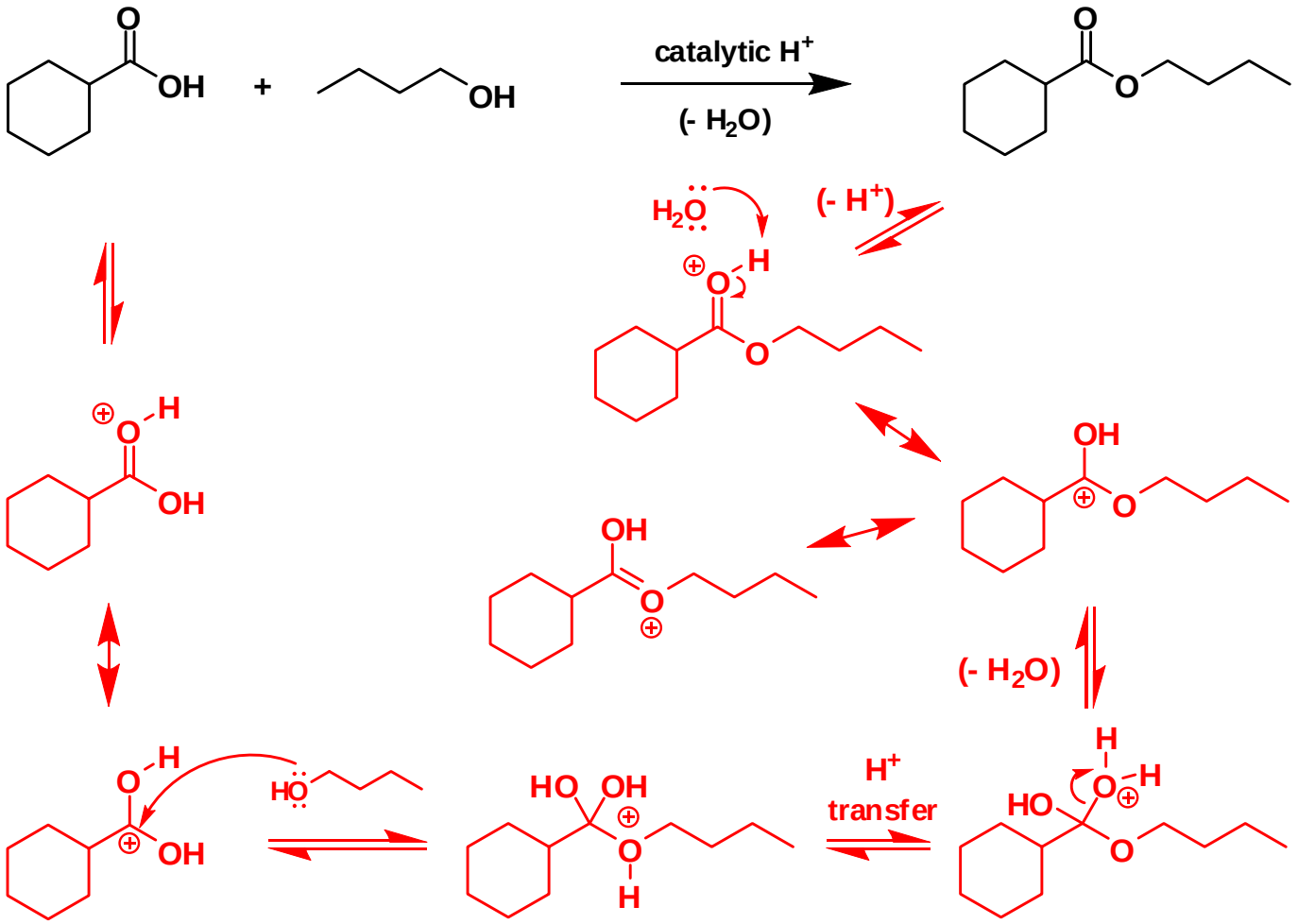
1950 Woodward and Eschenmoser complete the first total synthesis of Vitamin B12. NMR begins to be useful.

1990 Kishi, Nicolau, Smith, Schreiber, etc. complete total syntheses of compounds such as Brevetoxin B, Taxol, etc.

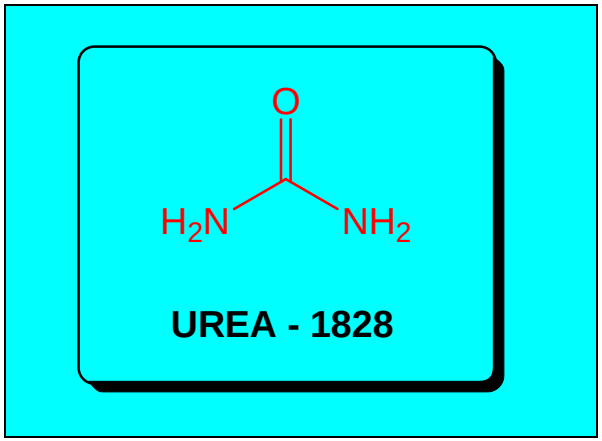
2000 Chemical Biology, Molecular Engineering

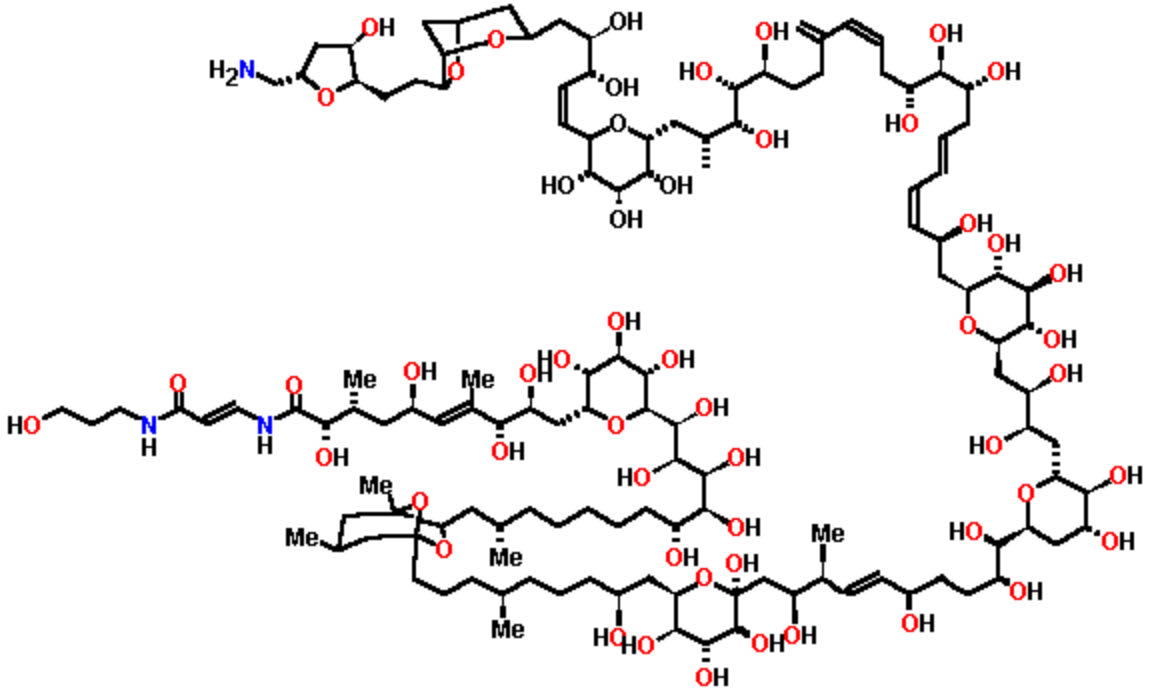
Teaching Philosophy: Organic Chemistry as a Language

모든 인간은 태어날 때부 터 자유로우며 그 존엄과 권리에 있어 동등하다. 인간은 천부적 으로 이성과 양심을 부여받았으며 서로 형제애의 정신으로 행동하여야한다.



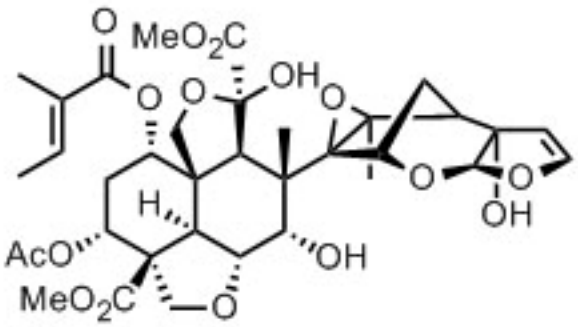
Natural Products Chemistry





Palytoxin

Synthesis: Kishi *et al* J. Amer. Chem. Soc., *111*, *7525*, **1989**



Azadirachtin

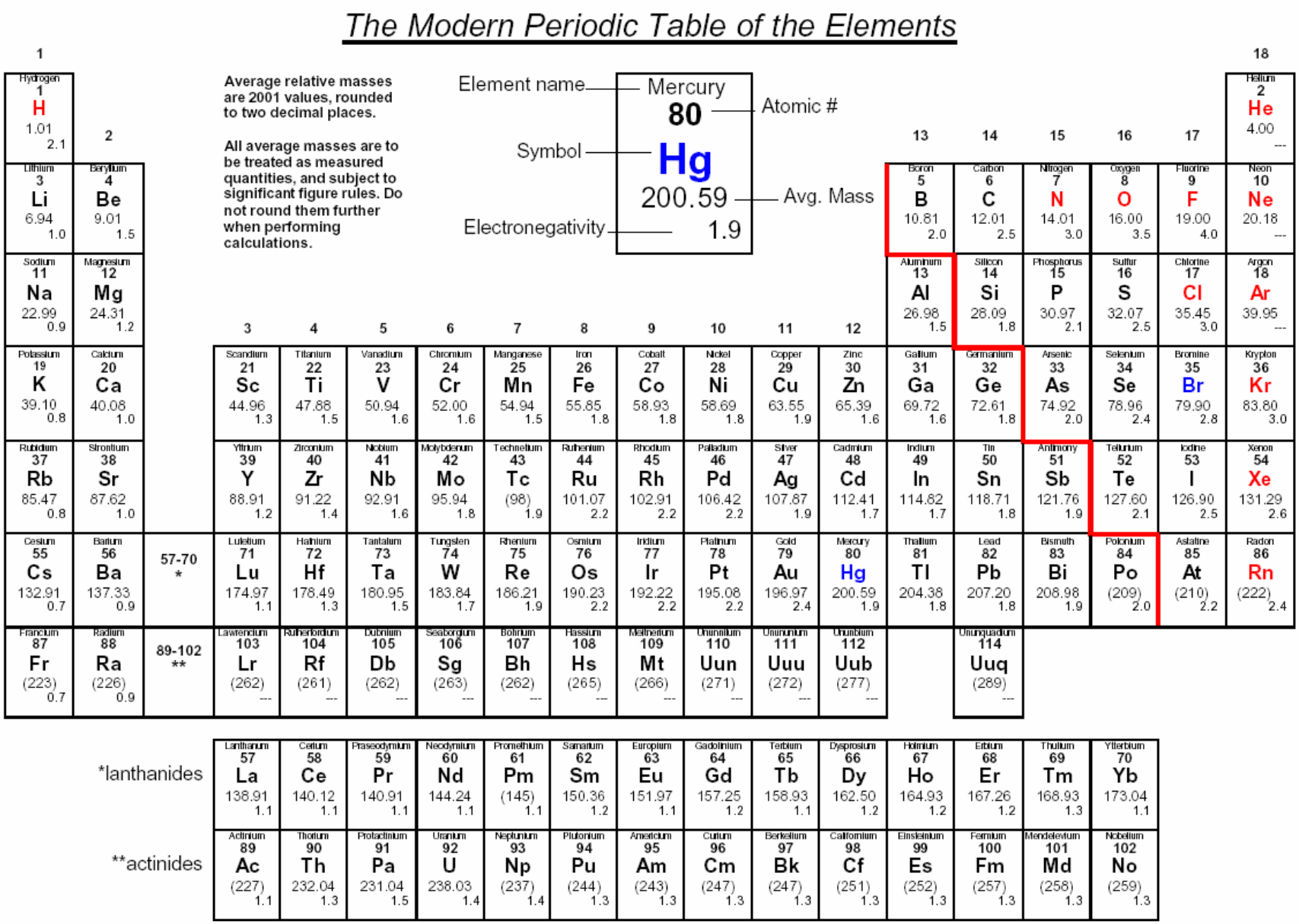
Ley, Veitch, Beckmann, Burke, Boyer and Maslen. *ACIEE*, **August 2007**

Carey Chapter 1 - Chemical Bonding

"Structure determines properties"

- Atomic and electronic structure of atoms
- Ionic and covalent bonding
- Electronegativity and polar covalent bonds
- Structures of organic compounds - representations
- Resonance within molecules
- Shapes of molecules
- Molecular orbitals and orbital hybridization

Periodic Table of the Elements



1.1 Atoms, electrons, and orbitals

Probability distribution for an electron

Figure 1.1

Boundary surfaces of a 1s and 2s orbital

Figure 1.2

Boundary surfaces of the 2p orbitals

Figure 1.3

Electronic Configurations of Atoms

Electronic Structure of Atoms

Atom	Atomic No.	Electronic Structure
H	1	$1s^1$
He	2	$1s^2$
Li	3	$1s^2\ 2s^1$
Be	4	$1s^2\ 2s^2$
B	5	$1s^2\ 2s^2\ 2px^1$
C	6	$1s^2\ 2s^2\ 2px^1\ 2py^1$
N	7	$1s^2\ 2s^2\ 2px^1\ 2py^1\ 2pz^1$
O	8	$1s^2\ 2s^2\ 2px^2\ 2py^1\ 2pz^1$

1.1 General Concepts

- Orbitals higher in energy further they are from nucleus.
- Designated by principal quantum number (1, 2, 3, etc.).
- Degenerate orbitals (same energy) fill up singly before they double up (Aufbau).
- Maximum of two electrons per orbital, each having opposite spin (Pauli exclusion principle).
- Impossible to know both the speed and location of an electron at the same time (Heisenberg uncertainty).