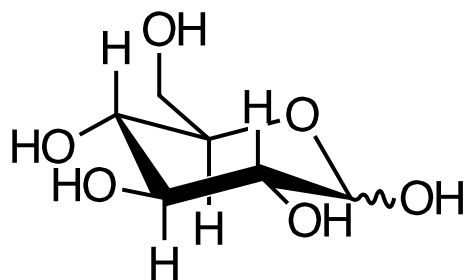
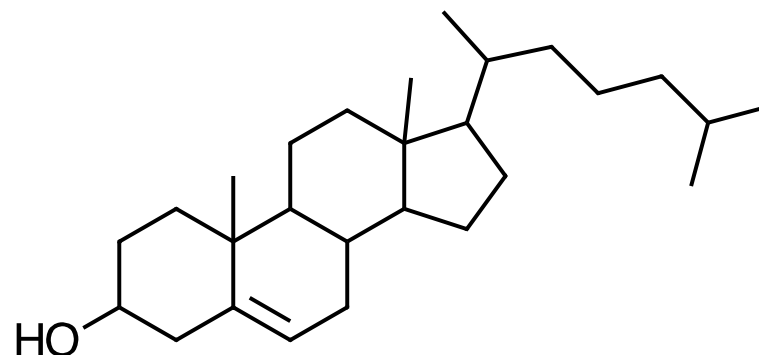


Don't *Panic*, It's Organic!

Organic Chemistry has a *Bad* Reputation



“Orgo”



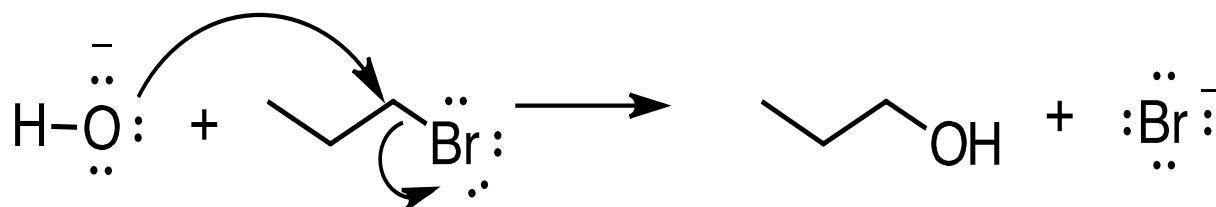
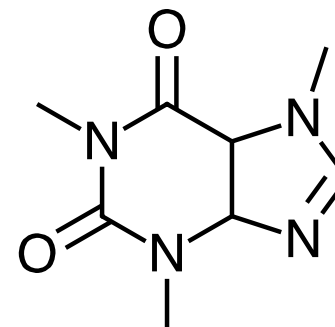
2nd hardest college class

(after Math)

<https://blog.essaytigers.com/7-hardest-college-classes/>

<https://studybreaks.com/college/hardest-college-classes-commonly-failed/>

“OChem”



Organic Chemistry is the **Biggest**, Most Studied Field of Chemistry

There are a lot of organic compounds = **50 million** known in the world

(http://wiki.answers.com/Q/How_many_organic_compounds_are_known_in_the_world)

99% of all living organisms and more than **99%** of all chemical compounds contain:

carbon, hydrogen, oxygen, nitrogen, phosphorous, and sulfur

(<http://www.wisegeek.com/how-many-chemicals-are-there.htm>)

E.g., biomolecules, petroleum products (fuels, solvents, cleaners, detergents, plastics, paints, dyes, antifreeze, synthetic rubber, drugs, insecticides, etc.)

Organic Compounds are Classified by Functional Groups

Learning Organic Chemistry

A reaction occurs when reactants collide with sufficient energy for bonds to break and form.

Structure: what atom/bond is “reactive”? Structural features

Reactions: reactants --- (conditions) --> ??
See structural features.

Synthesis: target compound (product) <---- ??
Starting with _____, how do you make it?

Mechanisms: reactants --- (conditions) --> products
Why is one product formed and not another?

Which bonds break? Which bonds form?

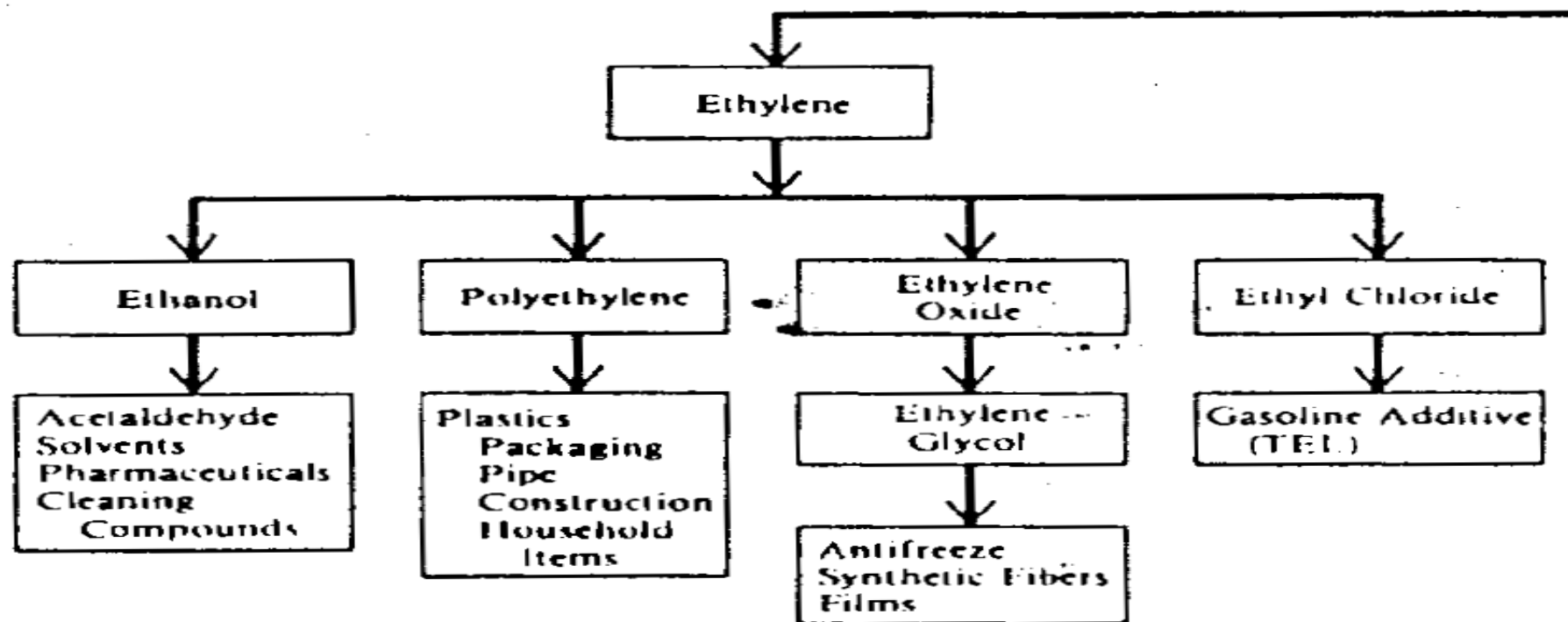
Organic Chemistry is the Chemistry of _____

Properties of Carbon:

- 4 valence electrons --> 4 bonds to C
- Single bonds, double bonds, and triple bonds to C
- 4 single bonds to C = Tetrahedral shape - see *enantiomers*
- Forms chains, rings, sheets

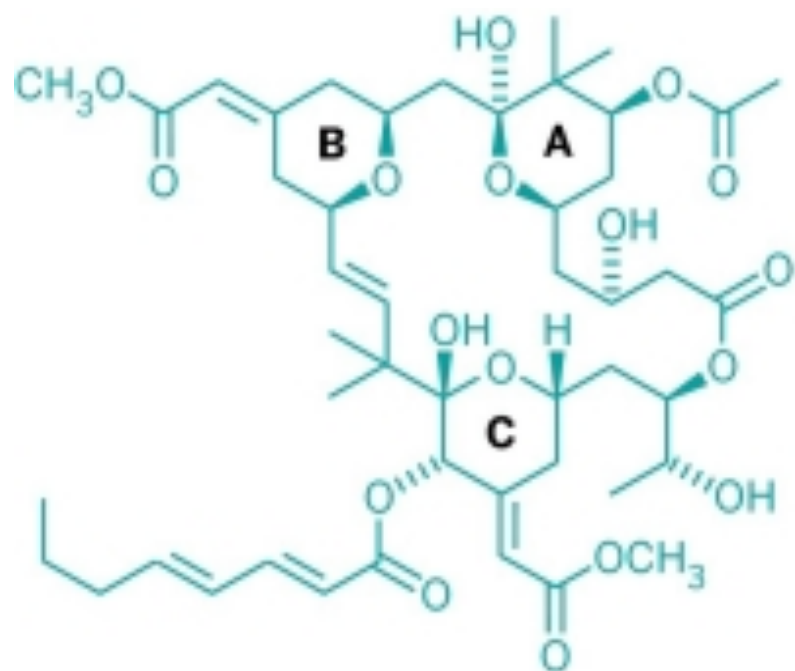
Biological Molecules (carbs, proteins, fats) and Biochemistry are based on ***Organic Chemistry***

Components of Petroleum Make Many Useful Functional Groups



<http://cen.acs.org/articles/89/i43/BryostatinsTale.html>

10/24/11, CEN, p. 10 Bryostatins are marine natural products which are drug candidates for cancer, Alzheimer's disease, HIV.



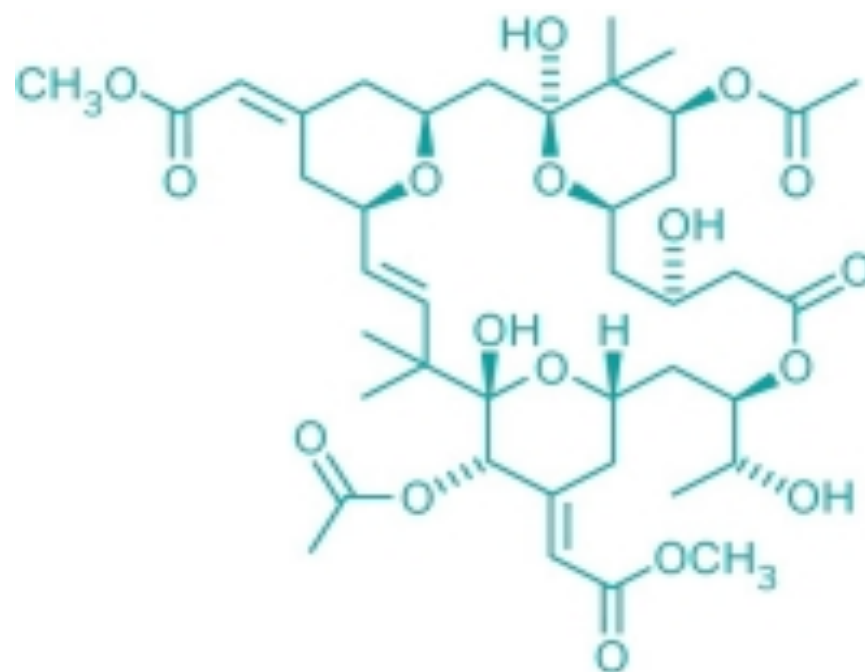
Bryostatin 1

1990: 1st total synthesis in 79 steps

2011: total synthesis in 36 steps

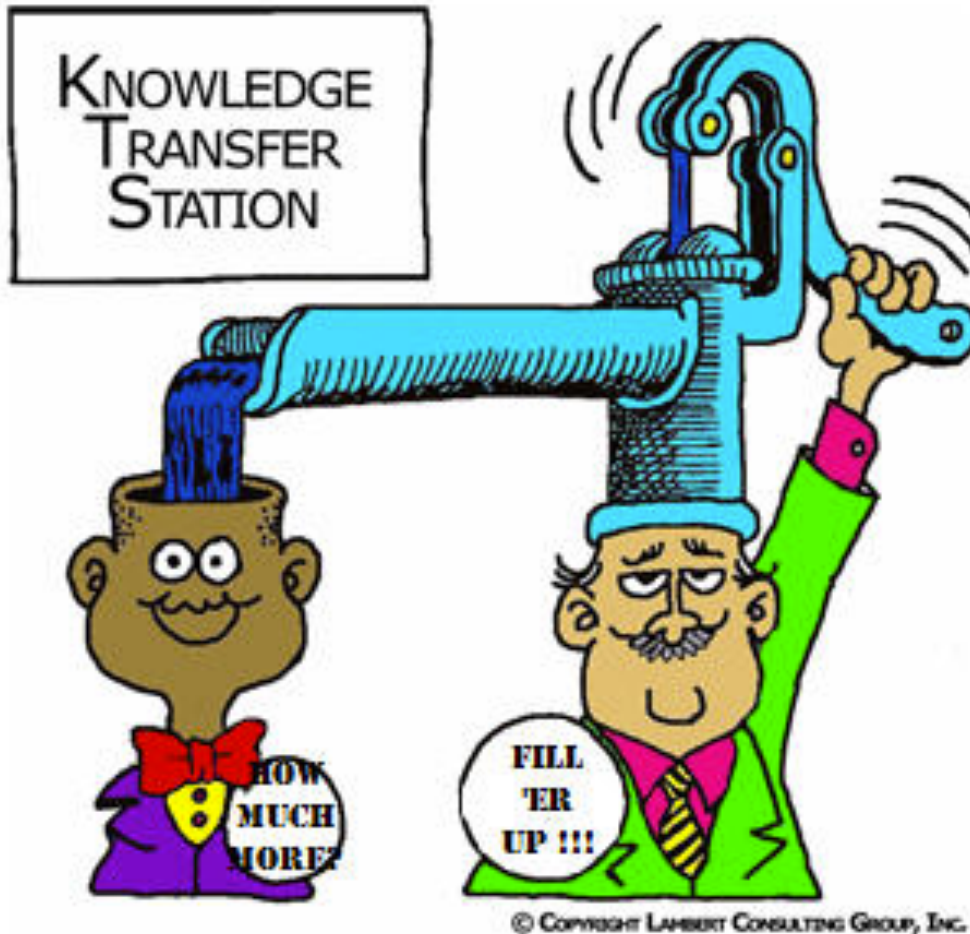
1991: 18 g of bryostatin 1 extracted from 14 tons of *B. neritina* collected off the California coast

2011: total synthesis in 58 steps



Bryostatin 7

Does A Person Learn This Way?



Yes?

or

No?

Student

Teacher

<http://pmblog.ninethsense.com/2013/12/kill-concept-of-knowledge-transfer-and.html>

We Learn:

10%	of what we read
20%	of what we hear
30%	of what we see
50%	of what we see and hear
60%	of what we write
70%	of what we discuss
80%	of what we experience
95%	of what we teach

Chemistry
Students



[https://
ed240s12a.wikispaces.com/Mindtool+-
+Jonassen](https://ed240s12a.wikispaces.com/Mindtool+-+Jonassen)

We learn **20%** of what we hear.

“You don’t really understand something until you can explain it to your grandmother.”

- Einstein

We learn _____ % of what we teach.

What is the best way to learn Organic Chemistry?

a) Sit passively in lecture and stay awake

b) Re-write your notes

c) Do experiments in lab and discuss with your lab partner

d) Discuss and try to teach someone what you learned

What is the best way to learn Organic Chemistry?

“You *can't memorize* all the possible answers—you have to rely on intuition, *generalizing from specific examples*. This skill, far more than the details of every reaction, may actually be useful for medicine.”

<https://www.nytimes.com/2013/11/03/education/edlife/how-to-get-an-a-in-organic-chemistry.html>

3 Factors to get good at something (Ochem):

- Deliberate Practice
- Insightful Coaching
 - Motivation

What is the best way to learn Organic Chemistry?

Work with a Group

- Studies show students who work in cooperative **GROUPS** tend to get **BETTER GRADES** and enjoy course more than students who work individually and competitively.
- Work in teams in industry
- Build and develop social skills (introduce self, listen, encourage, check, accountable)

Coordinator – make sure all group members know their responsibilities and understand problem solution

Recorder – write ideas, possible solutions, and final answer

Checkers – check solution for accuracy before submitting

"Problem solving is what you do when you don't know what to do, otherwise it is not a problem."

Problem Solving Model 1:

- Understand the Problem
- Devise a Plan
- Carry out the Plan
- Look Back

G. Bodner, "Problem Solving: The Difference Between What We Do and What We Tell Students To Do," U. Chem. Ed., 2003, 7, 37.

"Problem solving is what you do when you don't know what to do, otherwise it is not a problem."

Problem Solving Model 2:

- Read the Problem
- Read the Problem **AGAIN**
- Write down what you think is the relevant information
- Draw a picture, make a list, write an equation or formula to help you begin to understand the problem
- Try Something (*Trial And Error*)
- Try Something **ELSE**
- **SEE** where this gets you

To be continued ...

G. Bodner, "Problem Solving: The Difference Between What We Do and What We Tell Students To Do," U. Chem. Ed., 2003, 7, 37.

"Problem solving is what you do when you don't know what to do, otherwise it is not a problem."

Problem Solving Model 2: Continued ...

- **TEST** intermediate results to see whether you are making any progress toward an answer
- Read the Problem **AGAIN**
- When appropriate, strike your forehead and say, "Son of a ..."
- Write down "**an**" answer (not necessarily "the" answer)
- **TEST** the answer to see if it makes sense
- Start over if you have to, **CELEBRATE** if you don't

G. Bodner, "Problem Solving: The Difference Between What We Do and What We Tell Students To Do," U. Chem. Ed., 2003, 7, 37.