Chem 227 / Scientific Literature Research / Organic Synthesis

Dr. Rusay / Spring 2010

Planning is a critical component of any endeavor including scientific research and organic synthesis. A thorough examination of the published literature is necessary to develop a strategic and effective approach to any experimental research including organic molecules. Electronic search tools are most valuable in quickly surveying the scientific literature and examining what has been published. Abstracts provide summaries, which lead to an enormous body of published experimental results. Accessing, evaluating and communicating the content of the published literature in a concise, clear, well-written form are essential skills in any scientific field.

There are 2 parts to this individual assignment.
See the course Web calendar for scheduled assignment due dates.

PART I: Calibrated Peer Review (CPR) on-line writing assignment

Design and Development of Drugs
http://cpr.molsci.ucla.edu/

- You are to read an article from the *Journal of Chemical Education* about organic synthesis and the history of many drugs and medicines,
  K.C. Nicolaou, et. al., JChemEd, 75, 1226-1258, (1998); See Chem 227 Assignments Webpage for pdf files.
- Learn about the way that one drug (aspirin) was discovered and how chemists contributed to its improvement.
- Learn to identify new synthetic methods necessary in drug synthesis and drug development.
- Learn about a commonly used approach to the rapid development and screening of new chemical compounds using "Combinatorial Synthesis" and how "chemical libraries" (in a non-traditional sense) are used.
- Write an essay explaining how aspirin was developed, the methods chemists currently use to develop new and better drugs, which can be applied to any area including nano-materials, and in new applications of organic synthesis.

PART II: Literature Research

You are to select a compound which interests you. The accompanying list includes a number of compounds for your consideration, *eg. thienamycin*. Everyone will have a different individual compound. You are to identify and report your target compound, its **CAS** number, its **General Class**, *eg. β-lactam antibiotics*, and include a set of related **Keywords**, *eg. thienamycin, β-lactam antibiotics, penems, carbopenems, monobactams, penicillins, etc.*, to Dr. R. by e-mail on or before **April 16th**. The compound does not have to come from the accompanying list, but you must have your selection approved before you begin your research.

Using **Google Scholar**, *http://scholar.google.com/schhp?hl=en*, **Google Patents**, *http://www.google.com/patents?hl=en*, and ERIC: **Educational Resources Information Center**, *http://www.eric.ed.gov/*, you are to find literature references, evaluate them, and produce a bibliography with abstracts that includes one or more relevant non-primary background reference(s) [books, review articles, etc.] or primary literature references [peer reviewed journals], which describe the General Class of compounds, their use, educational importance, and value to society, plus citing **a minimum of 5 primary literature references**, which describe the following topics: 1) physical, stereochemical and spectroscopic related data, e.g., [α], m.p or b.p., IR, ^{1}H NMR, ^{13}C NMR, 2) biological mode of action/ pharmacology/ toxicology, 3) one or more total or partial syntheses of the selected compound and/or its analogs. (*More than one primary reference per topic is acceptable.*)

Your report is to be type-written with a complete bibliography (6 references minimum: 1 non-primary, 5 primary), patents are acceptable as primary references, and it must include respective abstracts. See: http://chemconnections.org/organic/chem227/Chem_227_thienamycin-10.pdf
The report is to be type-written and include an introductory narrative section on the general class of compounds, their use, importance, and history. The report is to include the CAS number of your compound and a clearly drawn structure as a cover page with a Title, your name, and course and section information. You are to use a chemical drawing program such as ISIS/Draw or marvin/Draw for the drawing, which are free to students and faculty (See course Web site for download links.) or they can be used directly on the PS 110 computers. (Cutting and pasting, or freehand/ stenciled drawings are unacceptable.)

Two copies of the report are to be submitted by **5:00PM** on **April 30th. Late reports will not be accepted**.

COMPLETED ASSIGNMENT DUE April 30th.

Compound	*General Class*
abrusoside E	sweeteners
acyclovir	antivirals / AIDs
adriamycin	anticancer / antineoplastic agents
aflatoxins	toxic fungal metabolites
albuterol	bronchodilators
amphotericin B	antibiotics
ampicillin	antibiotics
avenaciolide	antifungals
betulinic Acid	anticancer / antineoplastic agents
brevitoxin	marine natual products
bufenolide	vasodilators / antihypertensives
calciferol	vitamin / rodenticide
campherenone	aromas and fragrances
camptothecin	anticancer / antineoplastic agents
chlorpheniramine	antihistaminics
cognex	alzheimers drugs
cortisone	steroids / hormones
cytovaricin	microbial macrolide
dendrobine	convulsants
depudecin	anticancer / antineoplastic agents
dynemicin	antitumor/antibiotic
epothilone A	anticancer / antineoplastic agents
estrone	steroids / hormones
ethacrynic acid	diuretics
fumagillin	anti- fungals
grandisol (boll weevil)	pheromones
grass hopper ketone	allochemicals (defensive)
illudin S	anticancer / antineoplastic agents
juvenile hormone/methoprene	insect hormones
lactitol	laxatives
lovastatin	antihypercholesterolemics
lufenuron	ectoparasitic agent
lysergic acid/lysergide/LSD	psychoactive active agents
mifepristone	abortifacients
mitomycins	anticancer / antineoplastic agents
monensin	antibiotics
morphine	narcotic analgesics
muscone	aromas and fragrances

Compound	*General Class*
myrocin	fungal antibiotic
nootketone	aromas and fragrances
norepinephrine	adrenergic agents
norethindrone	contraceptive
occidentalol	aromas and fragrances
patchouli alcohol	aromas and fragrances
paxil	psychotherapeutic
penicillin / cephalosporins	antibiotics
periplanone B	prostaglandins
porphyrins/ porphobilogen	photodynamic light therapy
physostigmine/ eserethole	psychoactive alkaloids
progestrone	steroids / hormones
prostaglandin E2/PGE2	prostaglandins
prozac	antidepressants
pyrethrins/pyrethroids	insecticides
quinine	antimalarials
raloxifene	anticancer / antineoplastic agents
rapamycin	immuno-suppressants
resperpine	antihypertensives
resiniferatoxin	ultrapotent capsaicin analog
ropivacaine	anesthetics
saxitoxin	marine natural products
squalene/ squalestatin S1	antibiotics
spongistatin	cytotoxic macrocycles
stevioside	sweeteners
strychnine	natural product poisons
tamoxifen	anticancer / antineoplastic agents
tertatolol	antihypertensives
testosterone	steroids / hormones
tetrahydrocannabinols	psychoactive active agents
thienamycin	antibiotics
triketones	herbicides
viagra	erectile dysfunction
vamicamide	anticholinergics
valium (benzodiazepines)	tranquilizers
vincristine/vinblastine	anticancer / antineoplastic agents
vitamin B	vitamins
warfarin	anticoagulants
zocor	anticholestemic
zoloft	psychotherapeutic

Some other compounds to consider: atisine, disparlure, milbemycin, sinensal, cedrene, longifolene, vermiculine, seychellene, emodin, eleuthrin, occidentalol, methyl jasmonate, gephyrotoxin, eremophilone, chyrosophanol, acoradiene, griseofulvin, mesembrine, trachelanthamidine, lycopodine, daphniphyllium alkaloids, juvabione, pupukeanone, yohimbine