

Term Paper Topics

1. Anticancer Therapy: Intercalating Agents
2. Anticancer Therapy: Hormonal therapy including estrogen antagonists
3. Anticancer Therapy: Antitumor Antibiotics (bleomycins, dactinomycin, mitomycin, anthracyclines)
4. Anticancer Therapy: Antimitotic Agents: (Vinblastine, vincristine, taxanes)
5. Anticancer Therapy: Monoclonal antibodies
6. Anticancer Therapy: Kinase inhibitors
7. Anticancer Therapy: Anti-angiogenesis agents
8. Antiviral Agents: HIV drugs
9. Antiviral Agents: Non-HIV antivirals
10. Antibacterial Agents: beta-lactam antibiotics (penicillins, cephalosporins, and carbapenems)
11. Antibacterial Agents: quinolones
12. Antibacterial Agents: macrolides and ketolides
13. Antibacterial Agents: tetracyclines
14. Antibacterial Agents: Oxazolidinones
15. Antimycobacterial Agents (Agents to treat tuberculosis and leprosy)
16. Antifungal Agents
17. Use of gene therapy in the treatment of disease
18. Use of antisense therapy in the treatment of disease
19. The treatment of Type I-diabetes
20. The treatment of Type II-diabetes
21. Steroids: female oral contraceptives and abortifacients
22. General Anesthetics
23. Local Anesthetics
24. Anti-Migraine Drugs
25. Anti-depressants, and Anxiolytic agents
26. Anti-parasitic agents
27. Inhibitors of cholesterol biosynthesis
28. Non-steroidal anti-inflammatory agents (NSAID's)
29. Anti-coagulants
30. Opioid Analgesics
31. Steroids: Androgen, synthetic androgens, anabolic steroids, and anti-androgens
32. Anti-ulcer agents
33. Agents to treat gastric acidity and gastroesophageal reflux
34. Drugs to treat sexual dysfunction
35. Agents for Diagnostic Imaging
36. Vaccines to prevent viral infection
37. Agents to treat myocardial ischemia.
38. Agents to treat hypertension
39. Agents to treat hypercholesterolemia
40. Antihistamines
41. Agents to treat disorders of bowel motility
42. Agents which affect the immune response
43. Thyroid and antithyroid drugs
44. Treatment of poisoning
45. Drugs affecting renal function
46. Drugs of abuse: stimulants
47. Drugs of abuse: psychedelic agents
48. Drugs to treat alcoholism

49. Drugs to treat drug addiction
50. Hypnotics and Sedatives
51. Treatment of the psychotic disorders
52. Treatment of Alzheimer's disease
53. Treatment of Parkinson's and Huntington's Disease
54. Pituitary hormones and hormone antagonists
55. Drugs to slow ageing.
56. Antihepatitis agents
57. Uses of genomic information in the diagnosis of disease.
58. Therapeutic cancer vaccines
59. Anti-obesity drugs
60. Antibodies to treat autoimmune diseases, including rheumatoid arthritis.
61. Anticancer therapy: Nucleoside analogs
62. Anticancer therapy: Histone deacetylase inhibitors
63. Agents to treat insomnia
64. Agents to treat urinary incontinence
65. Antibacterial vaccines
66. Overview of protein therapeutics
67. Treatment of hepatitis C virus (HCV)
68. The process of identifying new drug targets (and overview of current drug targets)
69. The use of steroids to control inflammation
- 70: Steroids: estrogens, synthetic estrogens, estrogen antagonists, progestins, synthetic progestins
71. Personalized Medicine

Please Email me with your chosen topic as soon as possible (jbuynak@smu.edu). In your email, please include your full name, your topic NUMBER as well as the topic itself.

Style

What is the prevalence of the disease? How is it transmitted? What are the symptoms? What is the general prognosis if untreated?

History of drug discovery in chosen area (for some drugs, this may go back centuries, for others, perhaps only a few years)

Describe the physiology of the disease. What is known about the biochemical mechanism of the disease and what is the mechanism of action of the drug? Treat the topic from the point of view of a scientist/physician. Use as many chemical structural drawings, biochemical pathways, and biological illustrations as possible. If the drug is an enzyme inhibitor, is anything known about the binding of the inhibitor to the enzyme active site. If it interacts with a receptor, what is known about the receptor? Is the drug an agonist or antagonist of the natural messenger?

How the drug leads were discovered and chemically developed into actual drugs (will likely require reading original literature...use Scifinder and other data bases)?

Pharmacophore based drug discovery (if structure of receptor is not known)

Structure based drug discovery (if crystal structures of the target enzymes and/or receptors were available)

What is known about the precise binding and/or chemical mechanism of action of the drug? (Use as many chemical formulas as possible.)

What is known about pharmacokinetics and toxicity of currently available drugs in this area?

What problems remain? (e. g. drug resistance and/or tolerance, side effects)

What are the very latest discoveries (past two years) and where (i.e. at which targets) will future research in this area be directed?

How are the drug(s) manufactured (what is the precise chemical or biochemical process)?

Is the prevalence of the disease increasing? What is the market potential for this area?

Your paper must include references from the scientific literature including both recent review articles and original citations from the research literature.

Examples of journals which I anticipate you will utilize, include (but are not limited to):

The Journal of Medicinal Chemistry
Biochemistry
Bioorganic and Medicinal Chemistry Letters
Nature
Nature Reviews: Drug Discovery
Science
Antimicrobial Agents and Chemotherapy
Chemical Reviews
The Journal of the American Chemical Society
The Journal of Biological Chemistry
Drug Discovery Today
Cell
New England Journal of Medicine
Proceedings of the National Academy of Sciences
Chemical and Engineering News
Annual Reports in Medicinal Chemistry (Review Articles)

There are also specialty journals in each sub-field (e.g. cancer)

Also Required on, or before, the day of your seminar:

- 1) Assign a 5 – 20 page reading(s) for the class that covers your chosen term paper topic. This could be taken from one of our textbooks, or from other reference material available online. Your assignment should contain structural data on the drugs and biochemical mechanisms of action.
- 2) Devise 5 – 10 homework questions based on the reading, or on other material. Provide me with both the questions and the answers to the questions (different documents, please), which will be assigned to the class and graded.

Tips for searching the literature:

1. Begin by using SciFinder Scholar and Entrez/PubMed Databases. The web version of Scifinder Scholar is available online (start at <http://smu.edu/cul/apps/researchcentral/databases/sfs/>) if you are logged into the virtual private network (VPN) (<http://www.smu.edu/BusinessFinance/OIT/Services/VPN.aspx>) and Entrez/PubMed is a free database available at: www.ncbi.nlm.nih.gov/Entrez. Be sure to “exit” the SciFinder database **immediately** when you are done. We have a license that only allows two people to be logged on simultaneously.
2. Start by looking for general review articles. On SciFinder, you can “refine” the answer set to include only review articles. You may need to order some of these articles through the SMU Interlibrary Loan office. This is a free service, but articles may take a week or more to arrive, so please begin now. The web address is: <http://ill.libraries.smu.edu/Logon.html>. Please try not to abuse this service, since there are many of you in the class and only one librarian. Also, the University may need to pay for some of these articles.
3. On SciFinder, you also have the option to sort the articles by journal name (use the “analyze” button and sort by “journal name” alphabetically). This gives you the option of sorting out really weird journals and also to find journal articles in journals that the library already subscribes to. In particular, I like the journals: Journal of Medicinal Chemistry and Bioorganic and Medicinal Chemistry Letters. Our library subscribes to both of these.
4. Often, articles in good journals will begin with a brief description of relevant reviews. Thus you might use one (more recent) journal article to find a relevant, but slightly older, review, for example. Since the review article might not be carried by the library, however, there is good reason to start reading the relevant recent articles at this time.
5. The library at Southwestern Medical Center has a better collection of medical journals than does the SMU library. You might find yourself going there to get a better overview of what is available. Call first, or check their website to make sure they have what you are looking for.
6. Plan on spending approximately five dollars (more?) photocopying relevant articles. It is better to have the needed info beside you when you are writing the paper than to try to recall it from memory.
7. Keep it interesting by following your own interests. (However, please maintain the point of view of a scientist.) If you do a good job of searching the literature, you will have no shortage of information for the paper itself. Thus, you will be forced to condense the relevant information. See the “style” guide above, however, to make sure you hit all the relevant points.
8. Once you have the reviews in hand, look for articles published in the past year or two, since these will often contain references to important earlier work. Look at titles and abstracts to get more info about the article before ordering or looking up the article.
9. If you feel the topic is too broad, after you present an overview of the area, you may wish to focus on specific examples of widely used (or new) drugs from your chosen area of concentration. I anticipate an average paper length of twenty to twenty-five pages.