WINDSOR UNIVERSITY
SCHOOL OF MEDICINE

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Winter 2016 Semester

Literature-Based Biomedical Research Experience Rotation

Course Description

The literature-based Biomedical Research Experience Rotation is a four-week course intended to introduce the medical student to biomedical research and train him/her in biomedical research writing. This guided-research course will emphasize on proper research design and conduct, outlining of hypothesis and objectives, literature research methodologies, data analysis and presentation, references management and organization and manuscript writing. This rotation should prepare the student for conducting future biomedical research projects and writing biomedical research papers.

Participation in this rotation requires taking the one-day orientation offered at the beginning of the semester (the orientation date and program will be available at the beginning of the semester) where the students will be introduced to the course guidelines and requirements, the instructors and the proposed research topics. In addition, there will be class sessions to cover the basic principals of biomedical research, research ethics and conduct, plagiarism, essentials of planning and writing a review paper and instructions for using database searches and reference management software.

Course Director: Dr. Guri Tzivion
Email: ***tzivion@windsor.edu***
Students need to make appointments for meetings with mentors via email

Course Instructors:

Dr. Soumitra Chakravarty
Biochemistry
Email*: soumitra@windsor.edu*

Dr. Vivek Joshi
Biochemistry
Email: *vivek@windsor.edu*

Dr. Bikramajit Singh Saroya
Pathology
Email: *bsaroya@windsor.edu*

Dr. Baby Maloor
Microbiology
Email: *maloor@windsor.edu*

Dr. Uchechukwu Edith Amaefuna
Behavioural Sciences
Email: *uche@windsor.edu*

Selecting the research project topic:

The student can propose a research topic and discuss its feasibility and appropriateness with the selected/appointed research advisor or can select a topic from a list suggested by the course director and instructors.

The research project needs to address a specific medical problem or question and aim to provide a new answer or perspective to the topic.

Some points to consider when selecting the topic and formulating the research plan:

- What is the problem/question?
- What is the medical relevance or significance of the problem?
- What information is already available?
- What do you hope to achieve by your study?
- What additional data are needed to meet the objectives?
- How these data are collected?
- How these collected data are going to be analyzed?
- What is the expected outcome and impact of the project?

General guidelines for the literature-based biomedical research

Read this entire document before starting your research and be familiar with the guidelines!

1. Databases to use:

Use appropriate and complementary database search tools: Google and other general search engines have to be complemented with biomedical specific database searches such as **NCBI's PUB-MED: http://www.ncbi.nlm.nih.gov/pubmed/** or EBSCO: http://search.ebscohost.com (User Id: ns014579main, Password: main).

We recommend using initially the PubMed, since it provides free access to many articles. You can search directly through PubMed or use the EndNote reference management software to do the search.

In the EBSCO site (**http://search.ebscohost.com)** you can use the following databases that will provide also free access to some of the articles:

1) MEDLINE Complete
2) DynaMed
3) DynaMed Plus

The EBSCO access codes:
URL: http://search.ebscohost.com
User Id: ns014579main
Password: main

To help in the critical review of literature and research papers, you should consider the points listed below while reading the manuscripts and make detailed notes as you read so you can incorporate these when you write your research paper.

Points to consider in the literature search:

- Proper use of "and" and "or" combinations
- Objective selection of papers that support or negate your hypothesis
- Standing of the publishing journal e.g., impact factor, size, reputation etc
- Review articles versus original publications

Points to consider during paper review:

- What are the main findings of the study?
- Strength and weakness of the study
- Appropriateness and the quality of the methods and procedures used in the study: e.g., if a clinical study, size of the trial, control groups, blinded or not, one site or multi institutional.
- Do the results support the author's interpretations and conclusions?
- How does the article address previous studies, e.g., discussing the differences and similarities of their findings?
- Significance of the study: possible mechanism and implications for clinicians or policy makers
- Unanswered questions and future research/perspectives

General guidelines for conducting the research and writing the research thesis:

The thesis should be written in a way that biomedical professionals who are not experts in the field could understand. The following weekly assignments and objectives will help in conducting the research and formulating the final paper.

Weekly assignment and objectives:

Week 1:

1. Select the project and define a tentative title for the research project.
2. Read select updated and comprehensive review papers on the subject and make a general 'outline' of the research project and how you want the report to look like. **What is your hypothesis that you want to test using the literature based research.**
3. Describe the objectives you will address and what information you wish to present.

4. Describe the research strategy and which search tolls and databases you will use for the research. Indicate which keywords and combinations you will use for your search. What is your strategy to narrow down high hit numbers?
5. How do you plan to present your findings/results: tables, illustrations graphs. Use of statistical analysis and significance.
6. Submit the first report to your advisor summarizing the points listed above.

Week 2:

1. Perform an initial literature search and select 25-40 papers to focus your research on. It is recommended to perform your search using a reference management software such as Endnote (they offer a one month free subscription) or other available software.
2. Organize your references and create a library of the references using Endnote or other software.
3. Prepare an initial draft of the thesis: Include the background section and methodology. Include also the initial results of the literature search and list the references you wish to focus your research on.
4. Submit the second report to your advisor.

Week 3:

1. Analyze the results and organize the data for presentation (figures/tables etc). Use the analysis methods you proposed in your methods section.
2. Do a secondary literature search based on gaps or additions you fill are required to address questions related to the research.
3. Finalize your reference list.
4. Write an initial draft of the summary, results and discussion part.
5. Submit the third report to your advisor.

Week 4:

1. Finalize the results and analysis of the data.
2. Make final figures for the thesis that provide a visual summary of the data.
3. Write and submit the final research paper organized in the following sections:
    a. **Title of the research paper**
    b. **Author's name and title**
    c. **Advisor's name and title**
    d. **Summary** of the thesis **(limit to 250 words)**. Should cover the background, your objective/hypothesis, methods, result and conclusions.
    e. **Background/introduction**, (**limit to two pages)**. Should provide a brief coverage of the research topic to unfamiliar, professional reader. Do not provide a comprehensive review of the field. Focus on specific points related to your research topic. Conclude

with your research objective/hypothesis. Make sure to include 2-3 illustrations or graphic displays to help in conveying the information.

f. **Methods**: provide a detailed description of the methodologies **you** used for your research. List the databases you searched, the keywords you used and their combinations. How you selected which papers to focus on for your final analysis. Detail any statistical methods you used.

g. **Results** (**unlimited pages, 6 pages suggested**). Provide a detailed description of the results. Initial numbers of hits in your searches. Organize the data in tables or figures to illustrate the results. Embed the figures with the text and provide figure/table legends as appropriate. You can divide the results section into distinct/titled subsection/headings.

h. **Discussion (limit to two pages)**. Provide an analytical interpretation of the results and your conclusions. Discuss the references that support your conclusions as well as those that may oppose them and explain why you think that your conclusions are justified. Discuss the significance of your findings to the biomedical field and the specific topic area. Discuss future perspectives and what should be the next research steps in the field in your opinion.

i. **References:** we require using a reference style that provides full author list, title, journal name, volume pages and publication year. Cite the references in the text by numbers in the order they appear in the text. Recommended reference style: Vancouver.

Examples:

Tzivion G, Luo Z, Avruch J. A dimeric 14-3-3 protein is an essential cofactor for Raf kinase activity. Nature. 1998;394(6688):88-92. 1.

Leicht DT, Balan V, Kaplun A, Singh-Gupta V, Kaplun L, Dobson M, et al. Raf kinases: function, regulation and role in human cancer. Biochim Biophys Acta. 2007;1773(8):1196-212.

j. **Acknowledgments and other comments**.

Assessment:

Weekly reports: 15% for each of the initial three weekly reports
Final paper: 40%
One-on-one meetings: 15%
The final evaluation consists of a Pass/Fail grade and a written narrative.

Reading recommendations:

1. Brkic S, Bogdanovic G, Vuckovic-Dekic Lj, Gavrilovic D, Kezic I. Science ethics education: Effects of a short lecture on plagiarism on the knowledge of young medical researchers. J BUON. 17: 570-574, 2012.
2. Sharma BB, Singh V. Ethics in writing: Learning to stay away from plagiarism and scientific misconduct. Lung India. 28: 148-150, 2011.

3. Shahabuddin S. Plagiarism in Academia. International Journal of Teaching and Learning in Higher Education. 21: 353-359, 2009.
4. Zhu F, et al. Biomedical text mining and its applications in cancer research. Journal of Biomedical Informatics. 46: 200–211, 2013.
5. Glicken A. Mentoring Students in Research: The Literature Review Process. http://www2.paeaonline.org/index.php?ht=action/GetDocumentAction/i/25114

Proposed Research Topics:

1. Diabetes and/or obesity as a risk factor in breast or prostate cancer in distinct populations: e.g. African Americans, Asian Americans, Caucasians, Japanese, European or any other population that has been sufficiently studied. You should focus on a specific breast cancer type, e.g., triple negative, Her 2 positive or hormone-dependent.
2. Calorie intake/restrictions and/or dietary supplements, e.g., resveratrol or its analogues as risk factors/treatment options for select medical conditions, e.g., diabetes and or obesity, cardiovascular, neurodegenerative, aging and lifespan or cancer.
3. Novel targeted cancer therapies, e.g., kinase inhibitors in cancer treatment: Recent advances and future prospective.
4. Current medical diagnostic advancements (you can focus on a specific test or disease) and their contribution to early diagnosis/treatment options and implementation in developing versus developed countries.
5. Epigenetics and the role of epigenetic modulation in tumorigenesis of hematologic malignancies. Mechanisms of resistance to standard chemotherapeutic agents/monoclonal antibodies, methods of overcoming resistance by combination of epigenetic and immunotherapy.
6. Novel agents for the treatment of KRAS and BRAF mutant GI cancers (colon). Use of monoclonal antibodies in combination with standard chemotherapy (stomach, esophageal).
7. Early discharge of patients following allogeneic bone marrow transplantation: common illnesses encountered post transplantation (neutropenic fever, neutropenic sepsis, graft vs host disease, UTI, fungal pneumonia). Methods to improve overall survival and reduce morbidity.
8. Novel combination treatment approach in rare hematologic malignancies like Mantle Cell Lymphoma, Cutaneous T Cell Lymphoma (T-PLL or Sezary syndrome), Marginal Zone Lymphoma, Follicular Lyphoma, Diffuse Large B cell Lymphoma, Hairy Cell leukemia.

Note that the research topics are very broad and you will have to formulate a specific topic. You can consult your advisor or course director in formulating your research topic and hypothesis.