**CHY 111: CH 11 Nuclear Medicine Project, summer 2022**

1. Select one of the radioactive nuclides and the associated application listed in the *CH 11 Nuclear Medicine Topics* document posted in BrightSpace. A nuclear medicine topic not listed in this document requires approval.
2. Complete the Nuclear Medicine Worksheet based on the form of nuclear medicine selected. The content of this worksheet will be incorporated in to your research paper.
3. Write a ~ 4 page research paper that describes the radionuclide you selected from the chemistry perspective and discusses how it is used in medicine. More information on the format for the paper follows. In addition, a rubric is posted.

**Paper Guidelines**

Your paper needs to focus on a specific use of a radionuclide in the treatment or diagnosis of a condition. This application should be one of the radionuclides used in nuclear medicine from the CH 11 Nuclear Medicine Topics document. For example, you could research the use of iodine-131 to treat thyroid cancer OR internal radiation from radioactive iodine seeds, called **brachytherapy**, to treat prostate cancer.

**Introduction:** The introduction is a single paragraph. It gives an overview of the topic selected for the paper. This includes information on the radionuclide selected and the condition being treated/diagnosed and. The introduction section should end with a thesis statement in which you state the focus of the paper.

**Chemistry of the Radionuclide Selected:** The next section of the paper will give a written version (sentences in a paragraph) of the content covered in the worksheet. State the radionuclide used, describe and write out the radioactive decay reaction(s)\* associated with the radionuclide used in the treatment, give the types of radiation emitted by the radionuclide (remember that gamma rays are not always shown, you will need to research if the radionuclide selected gives off gamma rays), the half-life of the nuclide. \*The decay reaction written in the format of a chemical reaction (as done in lecture, text, and OWL) is required in this section.

**Biological Impact of the Ionizing Radiation:** Include a paragraph on the nature of the ionizing radiation given off and its impact on living tissue. This was covered in lecture and the text. For example, if the radionuclide selected gives off gamma rays, describe gamma rays. You will find this information in section 11-9 of the text.

**What comes after the introduction will vary based on the topic selected.**

**Treatment/Diagnostic Technique Described:** If you selected the use radioactive iodine to treat thyroid cancer you would give detailed information on the treatment presented as you, a healthcare professional, might explain it to a family member or patient. This would include a description of the procedure/treatment, why/how the treatment works, side-effects and what causes those side effects, effectiveness of the treatment.

**Condition being treated or diagnosed:** Include a section on the condition selected. In the example I have given, you would describe thyroid cancer – the condition, its incidence, who is at greatest risk, symptoms, prognosis, other treatment options, genetic aspects (if any)…. See what you can find. Please be aware that one size does not fit all in terms of much just listed. Research how age, race, gender, and other factors impact the topics listed.

**Conclusion:**

End your paper with a concluding/summary paragraph that gives an overview of key points of the paper and makes an interesting point about your topic – why your topic is of interest …why the reader should care about your topic!

**Citations and References**:

**Both in-text and end of paper citations are needed**. In-text citations cite where any information that is not common knowledge comes from. The works cited/reference section goes at the end of the paper and lists all sources cited in-text in the paper. There are multiple formats for doing this. I am not picky about format, but others are. My understanding is that the Nursing program uses the APA format. I recommend using this or whatever you are using in your English courses.

Paper Help: I am happy to review an outline of your paper and give feedback. I also highly recommend working the writing tutors at any stage of the process. They can help with all but the chemistry of your paper!

Writing Center (VAWLT): <https://mycampus.maine.edu/web/vawlt/>

KEEP READING!

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| **CHY 111: CH 11 Project – What I am looking for, almost a rubric!****Each paper topic is unique and will not necessarily include all as stated.** **HOWEVER, ALL PAPERS should include an introduction, conclusion, radioactive decay reaction(s), information on the ionizing radiation emitted, a focus on nuclear chemistry, and research on some interesting and relevant topic.**  |
| Paper is 4 pages or more in length, not including references, or title page. Other:--double spaced, 12pt font --title page includes paper title, your name, course name and number, date |  |  |
| Well organizedGrammatically correctNo spelling errors. **Paper does not include quotes.** |  | Paper may/should include labelled sections.  |
| A minimum of 4 credible references cited in-text and at the end of the paper.***The use of multiple sources, even for the same information, helps to confirm the accuracy of information found at a single source. It also adds to your understanding of the topic.***  |  | Wikipedia is not a credible reference |
| Paper has an introduction that ends with a thesis statement.One paragraph |  | Introduction gives an overview of the topic. For example, if your paper is about using a radionuclide as a treatment, your intro could give an overview of how radioactive substances are often used in treating cancer or treating the particular cancer you selected. You would end this paragraph by stating the focus of the paper (thesis statement) |
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| Paper includes detailed information on the radionuclide involved in your topic. --the symbol for the nuclide, the decay reaction(s) that produce the radiation associated with the treatment/diagnosis, half-life of all radioactive nuclides discussed--as appropriate, source of the nuclide, to include any nuclear decay reactions and half-life of the source of the nuclide selected. |  | Much of this is based on the information on the worksheet. |
| Describe the ionizing radiation, penetrating ability, impact on living tissue, side-effects…You might explain what ionizing radiation is! |  |  |
| The treatment or diagnostic technique is described in detail – how long does it take, does it require hospitalization, side-effects, effectiveness, why/how it works… – differs by topic |  |  |
| Detailed Information on a specific condition being treated or diagnosed.  |  |  |
| Paper ends with a concluding/summary paragraph that gives an overview of key points of the paper and makes an interesting point about your topic – why your topic is of interest …why the reader should care about your topic! |  |  |
| Overall the paper shows an in depth knowledge of the chemistry and use of the radionuclide selected as well as knowledge of the condition described. |  | Other aspects may be addressed as long as the paper fully addresses the chemistry aspects required. |