

CHM 109 Homework assignment 2 pts.

Fall 2009

Tamoxifen vs. Raloxifene

Due Tuesday, 11-24-09, 4 P.M.

This assignment is designed to help you learn more about breast cancer risk factors, estrogen dependent breast cancer, clinical trials, and the structures of drugs that effect breast cancer by binding to the estrogen receptor.

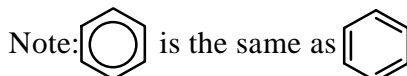
Today's assignment starts at the National Cancer Institute. Find a computer with internet access. (Sound capability will help below. Earphones available in library.) Go to:

<http://www.cancer.gov/cancertopics/understandingcancer/estrogenreceptors>

The page title should say "Understanding Cancer Series: Estrogen Receptors/SERMs." First, click on 1. What Are Estrogens?

What are estrogens? _____

In the space below, copy the line structure of estradiol on the left side of the space below. Next to the line structure, fill in all of the carbon (with a "C") and hydrogen (with "H") atoms.



Is estradiol a steroid? _____ Is estradiol relatively non-polar and planar? _____

What bonding patterns cause a structure to be relatively planar? _____

Estrogens have their greatest effects on specific sites within the human body. (Go to the next slide.) These sites are called target tissues. List six Estrogen Target Tissues in the spaces below:

(Next slide.) What do estrogen target tissues have that other tissues lack? _____

(Next slide.) In what organelle of the cell is the estrogen receptor located? _____

To what class of biological macromolecule does the estrogen-estrogen receptor complex bind? _____

To what specific region on this molecule does the estrogen-estrogen receptor complex bind?

What class of molecule is synthesized as a result of estrogen-estrogen receptor complex binding?

(Go to slide 7.) List two beneficial effects of estrogen.

1. _____

2. _____

(Next slide.) How do estrogen levels change during a menstrual cycle, and what effect does these [estrogen] have on breast cells?

(Next slide.) What is one way for cancer to occur? _____

(Next slide.) Does estrogen directly cause mutations? _____

Why (how) then does estrogen tend to increase breast cancer development? _____

(Go to slide 13.) What are antiestrogen drugs? ***In your own words***, describe how antiestrogen drugs work

(Next slide.) What are SERMs? _____

(Next slide.) What was the first SERM to be studied extensively for its anticancer properties?

Briefly explain the mechanism of tamoxifen action: _____

(Next slide.) What two steps and what outcome are often used and seen, respectively, with tamoxifen treatment of breast cancer?

(Next slide.) Do all breast cancer cell respond to tamoxifen? _____

Why? _____

Now go to <http://chemfinder.cambridgesoft.com> or any other source you prefer [Wikipedia?]. (Note that you must start with a line structure.) Type tamoxifen in the search box, and draw its line structure below.

Is tamoxifen a steroid? _____ Is tamoxifen relatively non-polar and planar? _____

Type raloxifene in the search box, and draw its line structure below.

Is raloxifene a steroid? _____ Is raloxifene relatively non-polar and planar? _____

Now go to <http://www.npr.org/templates/story/story.php?storyId=5346681> or go to npr.org and find the story “New Breast Cancer Drug Has Fewer Side Effects” by browsing. Some of the interview is contained in the text associated with the story, but I wrote most of these questions based on listening to the interview. Remember that the library computer lab will let you check out earphones.

What two drugs were compared? _____ & _____

How many women were involved in the study? _____

Why was there an interest in comparing these drugs? _____

For what health problem was raloxifene already approved? _____

Were the women involved in the study healthy, or did they already have breast cancer? _____

What three women whose pictures are shown took part in the breast cancer study?

In what year did Joe Palca say he first interviewed these three women? _____

What is one well known and dangerous side effect of tamoxifen? _____

To what type of animal did Ms. Cahill compare herself? _____

What was Joanne Stein’s profession? _____

How do you think Olga Wexler became relatively certain that she might eventually develop breast cancer? (See link listed below.)

How many years ago did Joe Palca say the interviews occurred? _____

Was raloxifene as effective as tamoxifen in preventing breast cancer? _____

Name two side effects associated with tamoxifen that were reduced in individuals taking raloxifene, and what percentage reduction was observed?

One side effect of raloxifene is _____

In the post-study interview, each of the three women described her thoughts about having participated in the study. Briefly summarize their comments below:

Judy Cahill

Joanne Stein

Olga Wexler

To learn a little more about invasive breast cancer risks, go to <http://www.cancer.gov/bcrisktool/>

List 3 of the 6 questions used to assess breast cancer risk for women who have never had a biopsy.

1. _____

2. _____

3. _____
