

USING FOOD TO TREAT CANCER

A high school lesson plan provided by the University of Guelph

75 MINUTES
+ TAKE HOME ASSIGNMENTS
SNC2P, SNC2D, SBI3U,
SBI4U, HFA4U

This lesson plan gives students the opportunity to learn about the human cell formation process and understand the link to Acute Myeloid Leukemia (AML). Students will expand their knowledge of the role nutraceuticals and functional foods play in preventing and treating diseases. Students are able to work together while applying individual creativity to better understand the human body and investigate the pathways of health improvement through diet.

This lesson is planned around Episodes 1 of The Why and How Podcast [“How can food treat cancer?”](#) The podcast looks to answer big questions in agriculture, food, and the environment through casual conversations rooted in research. It is hosted by undergraduate students and published by the Ontario Agricultural College of the University of Guelph.

Curriculum Alignments and Expectations

- Evaluate the effects that use of or exposure to a technology, substance, or environmental factor (e.g food additives/preservatives) may have on the function of human tissues, organs, or systems
- Evaluate the importance of various technologies, including Canadian contributions, to our understanding of internal body systems
- Evaluate, on the basis of research, some advances in cellular biology and related technological applications
- Evaluate new and emerging food- and nutrition-related products and services in terms of their real or perceived benefits to Canadian consumers

Learning Objectives

- Be able to define “nutraceutical”
- Understand the capacity of food to augment human health
- Apply knowledge of the process of hematopoiesis

Assessment Strategies and Success Criteria

- Take-home assignments
- Group and class discussions
- Creative projects
- Research

Cross Curricular Links

- Food and Nutrition – Nutrition and Health
- Nutrition and Health – Nutrition and Disease
- Families in Canada – Trends and Challenges for Individuals
- Career Studies – Identifying Possible Destinations and Pathways

Materials

- Chart paper
- Assortment of colorful markers and miscellaneous craft items (buttons, pipe cleaners, beads)
- Small pieces of paper
- Writing utensils



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TEACHER NOTES

Pre-Lesson Discussion

1. Before playing the podcast, have a discussion with students to explore their current level of understanding toward nutrition and food science.

- *What is food science?*
- *What do you think is the purpose of food science?*
- *Do you think food can be used as medication or treatment for diseases?*

Take-Home Work: Functional Foods Hiding on Your Plate

2. Assign students to listen to the podcast as homework (29 minutes) and to define the following terms discussed in the episode. Some terms may require additional online research to provide a definition.

- Nutraceutical and functional food
- Bioactive
- Acute Myeloid Leukemia
- Hematopoiesis
- Hematopoietic stem cell
- Lymphoid cell
- Myeloid cell
- Invitro

3. Ask students to choose a specific food item from a provided list that they regularly consume or is regularly consumed in their household. The following list can be altered by the teacher.

- Garlic
- Avocado
- Blueberries

- Ginger
- Soybeans
- Oranges
- Carrots
- Lentils

Ask students to investigate if this food has health benefits beyond “sustenance” and decide if they think the food should be considered as a “functional food”. *If yes, what are its health benefits? Has any of its compounds been used in nutraceuticals?*

In-Class Lesson

4. As a class, ask students to explain the difference between similar terms they researched as part of their pre-discussion homework.

Break the class into smaller groups of approximately four students per group. Ask students to discuss the following questions amongst themselves.

- *If and how your perception of food science has changed after listening to the podcast?*
- *Ask students to share their findings about the food items they researched for homework. Students from each group can share findings with the class.*
- *Ask them to hand in their research on their food item (optional).*

5. Activity 1: Hematopo-what?

Required Materials: Pens, markers, paper and miscellaneous craft materials, classroom with A/V and internet abilities.



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Watch the [video on Hematopoiesis](#) (10 minutes) with your students. If necessary, relisten to these sections of the episode: 1:54-3:48 and 8:34-11:29. Alternatively if students have suitable devices to watch the video on their own, they can replay the video as needed throughout the activity.

Divide the class into groups of 4 to 5 students, handing them chart papers, markers and craft supplies. Students should be encouraged to be as creative as possible while recreating the process of hematopoiesis. Encourage students to use short descriptions or definitions alongside drawings.

Each group will present their diagram to the class explaining the complete process of hematopoiesis. Make sure to set aside some time at the end of this activity to discuss errors or misunderstandings.

6. Activity 2: Nutraceutical group activity

Students may remain in the same groups they were in for the previous activity.

Students are to come up with a brief TV commercial which explores the benefits of nutraceuticals. Using what was discussed in the podcast and findings from research, the commercial should be creative and answer the following questions:

- *How could nutraceuticals and functional foods change future treatments of cancer and other diseases?*
- *Why might nutraceuticals be more desirable than other forms of medicine?
Cost-effectiveness, consumer*

- preference/comfort, renewable resources are all possible factors*
- *Examples of nutraceuticals and their positive bodily effects (Information from the homework research can be applied in this section of the commercial)*

7. Activity 3: Career Exploration

Discuss career opportunities in this field with students. Ask them:

- *“Where do you think Alessia, the researcher, could work once she graduates from her Ph.D.?”*

Encourage students to look into what each job might entail. Some career examples could include:

- Government researcher or policy advisor
- Medical researcher in a hospital or a pharmaceutical company industry
- University researcher
- Food company product developer

8. Activity 4: Debrief and Reflection

Required Materials: Small pieces of paper and writing utensils

Hand out small pieces of paper and ask students to anonymously write one thing they are taking away from the podcast or accompanying activities. Collect the responses and read a few of them aloud. Continue with a larger group debrief if needed.



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Additional Resources

- The [Department of Food Science](#), University of Guelph
- A written [transcript of the podcast episode](#)
- Visit us by registering for an [on-campus experience](#) and take part in a hands-on food science workshop from The Department of Food Science by selecting the session “The Gluten Project”, “Exploring Food Chemistry”, and more.

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