NATIONAL CENTER FOR CASE STUDY TEACHING IN SCIENCE

# Would You Supersize My Canc

## A Case Study Exploring Chemicals in the

*by*
Ashley Coffelt and Mark M. Richter
Department of Chemistry
Missouri State University, Springfield, MO

## Part I—Analyzing the Headlines

One afternoon, Johnny sat in front of the television eating a hamburger and French fries from his favorite burger restaurant down the street. His sister Else was heading upstairs when she noticed Johnny about to shove several fries in his mouth at one time. She quickly ran over to him and smacked the fries out of his hand.

"What are you doing?" Johnny yelled. "That was my lunch! Have you lost your mind?!"

"Johnny, you can't eat fries anymore! There's acrylamide in them!" Else shouted back, as she took the rest of the fries from his bag and threw them in the garbage.

Johnny was still fuming as he blurted out, "Isn't that the stuff they use for those fake nails you wear?"

"That's called acrylics—and no!" Else retorted. "In science class today we were talking about issues in the news. My friend in class asked Mr. Woods if French fries are deadly because that's what she heard on the news the night before. Instead of answering our question, Mr. Woods took us to the library and had us look up articles online about acrylamide."

"How can French fries and acrylamide have anything to do with one another?" asked Johnny.

"I read today that French fries contain a chemical named acrylamide, which has been linked to cancer," replied Else. "Now do you see why I don't want you to eat those fries?"

"Well, is it an absolute sure thing that they cause cancer?" asked Johnny. "It seems today that everything causes cancer. Last week you threw my cell phone in the toilet because you said the radiation from the phone causes cancer!"

Else gave Johnny a mean look and asked him, "Would you at least read these news articles I have and tell me what you think?"

After thumbing through the news articles, Johnny said, "I'll look through these with you on one condition: You buy me more fries if I don't agree with your position or you have to buy me another hamburger, since I can't eat French fries if I do!"

"Deal!"

The following is a listing of headlines for the news articles that Else gave to Johnny:

1. "Serving up Cancer"
2. "California Wants to Serve a Warning with Fries"
3. "Acrylamide: Snack Food Cancer Risk or Not"

4. "Cancer Chemical Link to Crisps Discovered"
5. "Acrylamide in Foods: Fact Sheet"
6. "Fried Food Chemical Is Not a Health Risk"

### *Questions*

1. Assuming all of the news articles are using the same scientific research study as a source, why do you think some headlines say acrylamide is cancerous and others say it is not? (Hint: Look at headlines #1, 3, and 6.)
2. Should you infer, based on the headlines alone, that acrylamide in fried foods is a health risk?
3. Should you conclude, based on the headlines alone, that acrylamide in fried foods is a health risk?
4. What do you think about Headline #2? Do you think restaurants should include a warning label on the carton of French fries? Why or why not?
5. After reading these headlines alone, would you reduce your intake of French fries? Yes? No? Maybe? Justify your answer.
6. Predict what kinds of scientific methods the news stories used in determining whether or not acrylamide is cancerous.

## Part II—Analyzing the News Articles

The class will be divided up into groups and each group given copies of one or two of the news articles listed in Part I (see Resources below). When everyone in the group has read an article, please work as a team to answer the following questions.

### *Questions*

1. Look at the article carefully and state what it says about:
   - Why acrylamide is harmful.
   - What individuals need to do about their intake of acrylamide.
   - How acrylamide is formed.
   - What experiment(s) did the source use to determine the effects of acrylamide.
   - What group, organization, or people wrote the article.
   - List the main conclusion(s) of the article.
2. Is the article from a credible source? Explain your answer.
3. Explain how you would have performed this experiment differently. If you would have tested acrylamide in the same way, please explain why.
4. To do an accurate risk assessment, one would need to know the toxicity of acrylamide and the amount of acrylamide an individual is exposed to. Does the article discuss these terms or make reference to toxicity and/or exposure?
5. After reading the actual news articles, would you reduce your intake of French fries? Yes? No? Maybe? Explain your answer.

### *Writing Assignment*

Write a one-paragraph (or less) answer to the following question. Your response is due by the start of the next class period: *Create a headline that best sums up the research for acrylamide based on your readings from the articles and the class discussion.*

***[Editor's note:*** This case was originally published in 2008. Some of the following articles may no longer be available at their original locations. You can use the Internet Archive at **https://archive.org/** to retrieve the missing material.]

Headline #1—Serving up Cancer. *ABC News Online*, Australian Broadcasting Corporation.
http://www.abc.net.au/news/indepth/featureitems/acrylamide.htm

Headline #2—California Wants to Serve a Warning with Fries. *The New York Times*.
http://www.nytimes.com/2005/09/21/business/21chips.html?ex=1284955200&en=c13bc075dcd88fae&ei=5088&partner=rssnyt&emc=rss

Headline #3—Acrylamide: Snack Food Cancer Risk or Not? Swedish Medical Center.
http://www.swedish.org/16408.cfm

Headline #4—Cancer Chemical Link to Crisps Discovered. *BBC News World Edition*.
http://news.bbc.co.uk/2/hi/health/2288975.stm

Headline #5—Acrylamide in Foods: Fact Sheet. U.S. National Institutes of Health.
http://www.cancer.gov/cancertopics/factsheet/acrylamideinfoods

Headline #6—Fried Food Chemical Is Not Cancer Risk. BUPA Co, UK.
http://www.bupa.co.uk/health_information/html/health_news/230305acrylamide.html

## Part III—Journal Articles

For the next class period, your assignment is to read the journal articles "Acrylamide in French Fries: Influence of Free Amino Acids and Sugars" (Becalski et al., 2004) and "Acrylamide: The Next Food Safety Issue?" (Viator and Muth, 2004). Answer the following questions about each article and be ready to discuss the articles in class.

### *Questions*

1. List some differences and similarities you found in both the news article headlines from Part I and the scientific journal articles from Part III.
2. List some differences and similarities you found in both of the scientific journal articles from Part III.
3. According to the research, how did the researchers reduce acrylamide formation in French fries?
4. What other foods contain acrylamide? Are these possible cancer risks as well?
5. Do you think acrylamide should be reduced in foods?
6. Taking into account the information from Parts I, II, and III, would you reduce your intake of French fries? Yes? No? Maybe? Explain your answer.

### *Resources*

Becalski, A., B.P.-Y Lau, D. Lewis, S.W. Seaman, S. Hayward, M. Sahagian, M. Ramesh, and Y. Leclerc. 2004. Acrylamide in French Fries: Influence of Free Amino Acids and Sugars. *Journal of Agricultural and Food Chemistry* 52:3801–3806.

Viator, C., and M.K. Muth. 2004. Acrylamide: The Next Food Safety Issue? *Choices* 1st Quarter 2004:13–17.