Living Environment

Unit 6: Genetics

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_ Score: \_\_/10

**Homework 32: Genetically Engineered Salmon!**

**Directions:** **As you read the news article in the left column, answer the guided reading questions that follow along in the right column. You must also use your knowledge of Biology to answer the questions.**





**Genetically Altered Salmon Get Closer to the Table By** [**ANDREW POLLACK**](http://topics.nytimes.com/top/reference/timestopics/people/p/andrew_pollack/index.html?inline=nyt-per) June 25, 2010

🡨**A gene-engineered fish, top, and a natural one of the same age.**

The [Food and Drug Administration](http://topics.nytimes.com/top/reference/timestopics/organizations/f/food_and_drug_administration/index.html?inline=nyt-org) is seriously considering whether to approve the first genetically engineered animal that people would eat — salmon that can grow at twice the normal rate.

The developer of the salmon has been trying to get approval for a decade. But the company now seems to have submitted most or all of the data the F.D.A. needs to analyze whether the salmon are safe to eat, nutritionally equivalent to other salmon and safe for the environment, according to government and biotechnology industry officials.

Some consumer and environmental groups are likely to raise objections to approval. Even within the F.D.A., there has been a debate about whether the salmon should be labeled as genetically engineered ([genetically engineered crops](http://topics.nytimes.com/top/reference/timestopics/subjects/g/genetically_modified_food/index.html?inline=nyt-classifier) are not labeled).

The salmon’s approval would help open a path for companies and academic scientists developing other genetically engineered animals, like cattle resistant to [mad cow disease](http://topics.nytimes.com/top/news/health/diseasesconditionsandhealthtopics/mad_cow_disease_bovine_spongiform_encephalopathy/index.html?inline=nyt-classifier) or pigs that could supply healthier bacon.

The salmon was developed by a company called AquaBounty Technologies and would be raised in fish farms. It is an Atlantic salmon that contains a growth hormone gene from a Chinook salmon as well as a genetic on-switch from the Ocean Pout, a distant relative of the salmon.

Normally, salmon do not make growth hormone in cold weather. But the pout’s on-switch keeps production of the hormone going year round. The result is salmon that can grow to market size in 16 to 18 months instead of the normal three years.

1. How has the proposed salmon been modified?

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1. Describe one aspect of the salmon the FDA is investigating before approving its release.

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1. Why do you think some argue that the salmon should be labeled if placed on the market for sale?

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1. List another genetically engineered animal in the works. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Describe at least one effect the genetic engineering has on the salmon. \_\_\_\_\_\_\_\_\_\_\_\_\_

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How consumers will react to a genetically engineered salmon on the market is not entirely clear. Some public opinion surveys have shown that Americans are more wary about genetically engineered animals than about the genetically engineered crops now used in a huge number of foods. But other polls suggest that many Americans would accept the animals if they offered environmental or nutritional benefits.

Mr. Stotish said the benefit of the fast-growing salmon would be to help supply the world’s food needs using fewer resources.

The government has in the past opposed mandatory labeling of foods from genetically engineered crops and animals merely because genetic engineering was used. Foods must be labeled, it says, only if they are different in their nutritional properties or other characteristics. One possibility could be voluntary labeling by those who sell the fish.

The company had submitted data to the F.D.A. showing that its salmon was indistinguishable from nonengineered Atlantic salmon in terms of taste, color, vitamins, minerals, fatty acids, proteins and other nutrients. “Our fish is identical in every measurable way to the traditional food Atlantic salmon,” Mr. Stotish said. “If there’s no material difference, then it would be misleading to require labeling.”

Virtually all Atlantic salmon now comes from fish farms, not the wild.

The F.D.A. must also decide on the environmental risks from the salmon. Some experts have speculated that fast-growing fish could out-compete wild fish for food or mates.

Mr. Stotish said the salmon would be grown only in inland tanks or other contained facilities, not in ocean pens where they might escape into the wild. And the fish would all be female and sterile (not able to reproduce), making it impossible for them to mate.

The F.D.A. is expected to hold a public meeting of an advisory committee before deciding whether to approve the salmon. Typically at such advisory committee meetings, much of the data in support of the drug application is made public and there is some time allotted for public comment.

1. Describe one possible reaction Americans might have to the genetically modified salmon.

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1. Why has the government opposed labeling foods in the grocery store as “genetically modified?”

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1. How does the genetically modified salmon compare to the nonengineered salmon in terms of taste, color, and nutrients?

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9. What environmental risk do experts fear if the genetically engineered salmon is released into the wild?

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10. How do you feel about eating genetically engineered animals and plants?

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