

**AquAdvantage Genetically Engineered Salmon
Questions on Animal Health and Welfare**

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The American Anti-Vivisection Society is opposed to the approval of the New Animal Drug Application for the AquAdvantage salmon (Docket No. FDA-2010-N-0001), which has been genetically engineered to grow faster than normal and is intended for use in aquaculture facilities. AAVS, founded in 1883, was the first non-profit education and advocacy organization in the U.S. established to monitor and expose problems with animal experimentation.

Genetic engineering is an experimental technology that often produces unintended and unpredictable effects, which can result in tremendous animal suffering and loss of life. There are many concerns with the FDA regulatory process for GE animals, and specifically with the NADA for the AquAdvantage salmon, including environmental risks and food safety. AAVS's focus is on animal health and welfare.

Specifically, a NADA is required to show that the proposed drug, in this case the genetic modification, is safe for the animals involved. The data presented in the AquAdvantage salmon NADA fall so far short of meeting the animal safety requirement, it's shocking. The science simply does not meet the standards for a New Animal Drug.

Highlighted below are some of AAVS's most serious concerns with the data in the AquAdvantage salmon NADA, the FDA's assessment, and the overall regulatory process for GE animals. These are questions that have not yet been answered by the FDA, but are integral to ensuring animal health safety.

For a more complete analysis of the animal health data and our concerns for animal welfare, please refer to written comments submitted to the FDA by AAVS and Farm Sanctuary, another animal protection non-profit organization. Please also refer to a letter submitted to the FDA that was signed by over a dozen other animal protection organizations, representing millions of members and supporters from across the country, outlining our main objections to the approval of the AquAdvantage salmon.

Questions about the data

We are concerned that the animal safety studies submitted by Aqua Bounty are poorly designed, the data skewed, and the conclusions of safety completely unfounded.

1. According to the application, Aqua Bounty engaged in "extensive culling" of deformed, diseased, and dying fish before any of the data in the application were collected. We would like to know how many fish were culled, how old they were, what health problems or deformities they exhibited, and how AquAdvantage salmon compared to non-GE salmon in this regard. To know if the genetic modification is safe, we need to know what happened to those animals. We currently only have data on the healthiest fish.
2. The FDA relied largely on only one animal safety study, and in that study, Aqua Bounty used a very small sample size of just 12 fish. We would like to see statistical analyses on the data and tests of statistical power. Without these, it is not possible to know if the study was capable of identifying all possible health effects, nor is it possible to know what would qualify as statistically different results. Such a small sample size generally has too little power to make any meaningful conclusions about health (as was even acknowledged by the FDA during its VMAC meeting on the AquAdvantage salmon Sept. 19-20, 2010).

3. The main study used fish from the 2007 year-class, which, if you look at the historical data in Table 4 of the FDA Briefing Packet, means that the most healthy AquAdvantage salmon since 2003 were compared to the least healthy non-GE fish. Clearly, this would skew the results in favor of the AquAdvantage salmon. We would like to see data on how a more representative population of fish fared.

4. Despite the limitations of the main animal safety study, the data provide indications that AquAdvantage salmon are unhealthy animals, experiencing high rates of abnormalities and mortality. For example, the FDA states that AquAdvantage salmon experience “increased frequency of skeletal malformations, and increased prevalence of jaw erosions and multisystemic, focal inflammation.” In Table 4, more than 30% more AquAdvantage salmon displayed slight-moderate abnormalities than non-GE salmon in 3 of the 5 years shown. In Table 5, of 15 averages provided for survival of AquAdvantage salmon from 2001-2006, 8 showed survival rates of 50% or less, and only one showed more than 90% survival. Survival even dipped as low as 2% in one instance. We would like to know how these data can be reconciled with a decision that the proposed genetic modification is safe.

Questions about FDA’s assessment

We are concerned that the FDA has not upheld the standards for a New Animal Drug review, and instead appears to be warping the process to support approval of AquAdvantage salmon.

1. The FDA asserts that it will accept such limited and highly flawed data, and instead rely on post-market surveillance to determine the rate of health problems in AquAdvantage salmon. We would like to know how this could be consistent with standards for a normal drug approval process, as the FDA is saying it will approve first and get the safety data later.

2. The FDA dismisses most adverse outcomes from the genetic modification as being associated with fast growth or triploidy. We would like to know the FDA’s justification for dismissing these side effects, since the “drug” is intended to produce the effect of fast growth, and the side effects are a direct consequence of “administering the drug.” These fish would not exhibit these characteristics if they had not undergone procedures to produce the AquAdvantage salmon under review. Furthermore, we would like a full rationale explaining the choice of comparator fish. The fact that fish raised in aquaculture are often unhealthy and deformed should not be used as a standard to justify producing a fish that will perpetuate these problems.

3. The data show that genetics can greatly affect outcomes, as certain genetic crosses led to 95% mortality, and FDA admits that husbandry conditions can impact health in unknown ways. We would like more information on how genetic background or husbandry conditions impact the “drug’s” effect, and we would like to see the FDA specify standards for how these fish should be raised to minimize adverse outcomes and promote health. These are standard procedures for a normal NADA.

4. Perhaps most importantly, we would like to see data on any and all animals who “received the drug,” not just those who would enter the food supply. The FDA only considered animal health in the context of how it would impact marketability and food safety. Therefore, animals who would likely be excluded from the food supply were considered inconsequential, regardless of how many health problems they experienced. But a new animal drug is supposed to be evaluated for any adverse outcomes it causes for *all* animals who receive that drug (i.e., all animals involved in the genetic modification).

Questions about use of the New Animal Drug rubric to regulate GE animals

We are concerned that a genetic modification is simply conceptually different from a drug, and overall, the drug model is ill-suited for handling impacts to animal health and welfare associated with genetic engineering.

1. A drug is typically designed to provide some benefit to animal health, against which the FDA would weigh potential risks (cost-benefit analysis). Genetic modifications, at least the kind under evaluation with the AquAdvantage salmon, do not benefit the animal in any way. How will the FDA make approval decisions for a drug that has no benefit but does carry risk of harm?
2. Using the drug model, “lots” that are found to be “out of specification” would be destroyed. That’s one thing when talking about a batch of pills, but how will the FDA handle that situation when dealing with living animals? What are the implications for impacts on animal health and welfare?

Conclusion

The AquAdvantage salmon application sets a precedent for future reviews of other GE animals already in the pipeline. It should be held to the highest standards to ensure that animal health, human health, and the environment, are maximally protected.

We believe that, given the significant shortcomings described above, the data and review for the AquAdvantage salmon sets a dangerous precedent. The AquAdvantage salmon NADA fails to demonstrate animal safety and, in fact, is wholly lacking in scientific rigor. In addition, the FDA’s approach to and analysis of the AquAdvantage NADA raises serious questions about the agency’s commitment to protecting animal health. Fish are sentient animals, capable of experiencing pain, fear, and distress. The risks of the proposed genetic modification, in terms of health and mortality, should not be ignored.

There has been an outpouring of public opposition to animal biotechnology, hundreds of thousands of letters from all sectors. First rbST, the growth hormone injected into dairy cows; then cloning; then the announcement of an approval process to let GE animals into commerce; and now this GE fish. When will the FDA listen? This is not what the public wants. The FDA has asked Congress for nearly 2 million dollars to facilitate the approval of GE animals for FY 2011 alone. Surely, there is a better use for tax-payer dollars – safeguarding our existing food supply from contaminated peanut butter and eggs would be just one suggestion.

For all these reason, and many others, AAVS requests that the NADA for AquAdvantage salmon be rejected. We do not need any more studies. In addition, reviews of any other genetically engineered animals under the NAD rubric should be halted.