**Intervention to nature: Animal Biotechnology Ethical Considerations and Challenges**

Kishea Asingua

*Central Mindanao University, College of Agriculture*

**Abstract**

With the constant advances of animal biotechnology, its range and depth of the intervention of nature, it is necessary to step back, pause, and address the basic relationship of humankind, and its alterations and technology to nature. Analysis of the ethical challenges posed by biotechnology reveals several problem areas that must be considered in developing ethical criteria for the investigation of gene technological activities. The purpose of this paper was to identify the ethical issues and considerations found in various animal biotechnology articles.

**Introduction**

Animal biotechnology is the use of science and engineering to modify living organisms. The goal is to make products, to improve animals and to develop microorganisms for specific agricultural uses. Examples of animal biotechnology include creating transgenic animals (animals with one or more genes introduced by human intervention), using gene knock out technology to make animals with a specific inactivated gene and producing nearly identical animals by somatic cell nuclear transfer (or cloning) (Singh, 2018). Animal biotechnology in use today is based on the science of genetic engineering. Under the umbrella of genetic engineering exist other technologies, such as transgenics and cloning, that also are used in animal biotechnology. Animal biotechnology, with its advances, has many potential use. The potential benefits of animal biotechnology are numerous and include enhanced nutritional content of food for human consumption; a more abundant, cheaper and varied food supply; agricultural land-use savings; a decrease in the number of animals needed for the food supply; improved health of animals and humans; development of new, low-cost disease treatments for humans; and increased understanding of human disease. Yet despite these potential benefits, several areas of concern exist around the use of biotechnology in animals. To date, a majority of the American public is uncomfortable with genetic modifications to animals.

**Literature**

The article, “FABRICATION TECHNIQUES AND UTILIZATION OF TRANSGENIC ANIMAL” by Gupta et.al. (2018) focuses about different aspects of producing transgenic animals such as DNA micro-injection, embryonic stem cell-mediated gene and retrovirus gene transfer techniques. It’s clear from the article’s abstract that people are concerned about the purpose of the applications, the methods of research, long term impact on human health. Since transgenic farm animals have applications in human medicine as a source of biologically active proteins, donors in xenotransplantation, disease models for the development of novel treatments, etc. The author concluded that the fabrication of transgenic animals has resulted in a transfer in the use of laboratory animals from the use of higher-order species such as dogs to lower-order species like as mice and has reduced the number of animals used in such experimentation, especially in the development of disease models. In which, made a good turn of procedures since transgenic technology holds great potential in many fields, including agriculture, medicine, and industry.

Genome editing in animals, US Food and Drug Administration scientists present their analysis of publicly available whole-genome sequencing data from genome-edited cattle. (Solomon, 2020). The report presents evidence of unintended alterations at a genome-edited target site. FDA’s analysis illustrates, why it is necessary for there to be regulatory oversight of intentional genomic alterations in animals, even when the intended modification seeks to replicate a naturally occurring mutation. The analysis shows that genome editing in animals can have unintended consequences and that regulators must be alert to the possibility of such consequences.

In Abdullah et.al (2021)’s article, the authors have discussed about significant advances in transcriptomic and genomics have stimulated interest in metabolomics and proteomics. A rise in population is demanding on the resources and among them food is the major resource for survival this stress isn’t only on the Planets resources but also on fellow species of the humans as more and more animal proteins are going to be needed. With this, concerns for the biotechnological advancement should aid health regulations, biosafety and not to be managed for benefit of corporations through concomitant sponsored research and therefore allowing exploratory trials on the public health and lives. It is important to note that, environmental protection is a significant factor in biotechnology progression directly via remediation procedures or indirectly preventative by replacements in the typical processes.

Research articles animal transgenesis and cloning has of course, created ethical concerns. It include the rights for animals that have been improved intellectually, legal ramifications, and possible health risks. There are safety concerns if new processes and products fail to gain consumer acceptance because of moral concerns. Even though humans can benefit from transgenic animals, the animal itself may not benefit (Frazier, 2018).

**Discussion and Conclusion**

An ethical perspective on a field like the application of genetic engineering on animals in farming and food production is much more than mere technology assessments of risks and benefits (Lanzerath, 2018). For example, in one of the articles the author had discussed above, intentional genome editing in animals can have can have unexpected and deleterious consequences no matter the size of the alteration or how it was produced. The findings demonstrate that there is good reason for regulators to analyze data on intentional genomic alterations in animals to determine whether there are any unintended results, either on- or off-target and, if so, to determine whether they present any cause for regulatory concern. The FDA just wants to ensure these alterations do not affect food safety. In order to avoid restricting itself to the moral aspects of technology assessment, ethics must approach the relationship between principles and practical moral challenges as a kind of reflective equilibrium (Rawls 1951 as cited in Lanzerath, 2018).

There are also varying social opinions about transgenic animal research, one of which is, some people feel that animals should be regarded as equal to humans in that they should have the same basic rights (Frazier, 2018). The use of animals in biotechnological research causes great suffering to the animals in question. Another argument (Frazier, 2018) about transgenic animals, attempt to focus on integrity of species has a right to exist as a separate identifiable entity. However, biologists do not regard species as fixed, water-tight entity; rather they are regarded as dynamic, constantly evolving groups (Frazier, 2018).

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