2 Animal Biotechnology: The Scientific Landscape

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The Science of Animal Biotechnology

What Is Animal Biotechnology?

One of the first things to realize about animal biotechnology is that it is not possible to give a simple answer to the question ‘What is animal biotechnology?’ The basic problem is that there is no agreement about where to draw the line in terms of what should be considered as biotechnology and what should be considered as more conventional uses of technology. Most people will readily agree that taking a gene from a human and inserting it into a goat embryo is an instance of animal biotechnology. But what about selective breeding? Or artificial insemination?

Behind these technical disagreements lies a value-laden discussion wherein, it is believed, the definition itself will help decide the ethical questions.

To many opponents of animal biotechnology, it seems that the more the definition stresses the novelty of the technology and the uncertainties about its effects, the more caution will be required to proceed. Not surprisingly, they therefore seek to have a narrow definition of animal biotechnology that includes only more recent developments, such as cloning and genetically modified animals. By contrast, the proponents of the technology believe that the more the technology is seen as a natural extension of already established practices, such as selective breeding and artificial insemination, the less reason there is to focus on the ethical aspects of the new technologies especially, since they are just a more advanced version of what we already know and accept (Clark

This discussion was also represented in the focus groups conducted within this project, where the arguments found in the literature were to a large extent repeated.

Now, combine this discussion about the nature of the technology with a discourse wherein proponents of the technology sometimes also stress the novelty of the technology and the limitless possibilities that it entails. Here the technology is often presented as something radically new. This most often happens when researchers or companies try to create attention and excitement about their research or products.

Clearly, the definition of animal biotechnology is not just a technical question, but is in itself a way of trying to promote a certain attitude towards the technology. Choosing what definition to work with is in itself a value-laden question. This illustrates well the very controversial nature of the technology. It is not even possible to pinpoint the subject without getting into the ethical discussion. And the question of definition also illustrates how facts and values cannot be separated from the beginning. Often there is a temptation to clarify the facts first and then discuss the values on the basis of these facts, as if the facts are neutral bits of information that can then be assessed through our value judgments. But facts are not neutral. This is not to say that something is not beyond discussion. Cells and DNA, cloning, and how to insert a gene into a genome are examples of factual realities that cannot be discussed. They are ‘objective’ in a pragmatic sense of the word. But how they are presented and how the discussion about them is framed is not a part of their objectivity. Already when we decide on whether to call something ‘genetic manipulation,’ ‘genetic engineering,’ ‘genetic modification,’ or ‘genetic enhancement,’ we apply our values to the world of facts.

In this book and in the focus group discussions, we have chosen to define animal biotechnology in terms of more recent developments within our understanding of molecular biology and genetics and our technological capabilities to utilize this knowledge. More precisely, throughout this book we will discuss animal biotechnology as technologies used to clone animals through some kind of somatic cell nucleus transfer (SCNT) or technologies used to modify the genome of an animal, either by inserting new genes into the genome or by ‘knocking out’ existing genes. We have done this for two reasons mainly. First of all, these are the uses of animal biotechnology actually discussed in the public ethical debate. While only a few discuss the negative impact of
selective breeding on farm animals as part of the animal biotechnology discussion, the effects of cloning are a frequently discussed subject. Therefore, to capture the central elements in the public debate and the opinions of the various stakeholders, we have chosen to focus on the more controversial and novel examples of biotechnology.

Second, we have chosen this definition because it seems that although there is a continuation between, for instance, selective breeding in the traditional sense and cloning of elite animals for breeding purposes, there is also a categorical difference in the amount of power that humans take over the process of animal procreation in these cases. As the American animal ethicist Bernard Rollin has put it, we move from putting square pegs into square holes to changing the pegs and holes as we see fit (Rollin 2008).

So when discussing animal biotechnology in this book, we will mainly discuss cloning and genetic modification of animals through the means of modern biotechnology. We realize that this is not without problems, but we believe that if both we and the reader keep in mind that the whole area of animal biotechnology is ethically controversial, this necessary reduction of a very broad subject will not limit the ethical discussion to only some viewpoints, be they for or against the technology.