

Bioethics: Ethical and Social Issues in Animal Biotechnology

431 Ethics and animal biotechnology: A re-evaluation in light of the Bush Administration Science Policy. P. Thompson*, *Michigan State University, East Lansing.*

In previous studies, this author has advocated a procedural approach not unlike the one that is used in IACUCs to address ethical issues for animal biotechnology. Although there is no evidence that the Bush administration is contemplating action with respect to animal biotechnology, the accumulation of indicators in how key individuals within the administration approach science policy suggest that earlier recommendations emphasizing production goals and animal welfare needs to be re-evaluated. Three key indicators are reviewed in this process: policies on stem cell research, the published position of Leon Kass, Chair of the Bioethics Advisory Committee, and published statements by Mathew Scully, an occasional speechwriter for the President. These three indicators in combination provide the basis for thinking that it will be important to take a range of perspectives formerly associated exclusively with European attitudes into account in conceptualizing the ethical issues associated with animal biotechnology. This will, in turn, lead to a considerably expanded universe of issues that need to be addressed in any procedural approach to the ethics of animal biotechnology.

Key Words: Animal welfare, Cloning, Gene transfer

432 Animal biotechnology: Interfacing ethics with scientific advancement. R. Anthony*, *University of Alaska, Anchorage.*

One of the important tools and processes by which scientists determine the ethical merits of a particular research effort has been Russell and Burch's (1959) Principles of the Three R's, namely Replacement, Reduction and Refinement. Animal ethics review committees, i.e., Institutional Animal Care and Use Committees (often made up of mostly scientists), employ these principles to guide policies and scientific behavior as one way to assuage tensions between the social benefits of the research and the interests of the animal research subjects. Thus, committees wrestle with ways to replace the use of live-animal experiments with viable alternatives, reduce the number of animals used and the degree of their exposure to aversive experimental conditions, and refine techniques that may cause animals to suffer. The principles of the three R's have governed much of how laboratory

science that employs animals is conducted in the United States. They reflect a utilitarian reformist attitude that supports piecemeal changes to increase animal well-being, finding the most favorable balance of benefits and harms for all the sentient beings affected by human action. This presentation explores the extent to which recent advances in contemporary animal biotechnology challenges the ethical guiding prowess of the Three Rs. Recent cultural views regarding the dignity or integrity of individuals animals and concern for natural living will be discussed as a way to highlight opportunities to expand how we should consider animal research in this particular case but also more broadly. I consider other ethical notions like need, reciprocity, and care responsibilities with an eye to expanding discussions on governance issues related to research involving animals in North America.

Key Words: Animal biotechnology, Animal ethics, Institutional Animal Care and Use Committees

433 Genetically engineered animals and the ethics of food labeling. R. Streiffer* and A. Rubel, *University of Wisconsin, Madison.*

The current debate about labeling genetically engineered (GE) food focuses on food derived from GE crops, neglecting food derived from GE animals. This is not surprising, as GE animal products have not yet reached the market. Participants in the debate may also be assuming that conclusions about GE crops automatically extend to GE animals. But (i) there is already an interest in selling surplus GE farm animals used in research for use in the food supply, (ii) there are two GE animals, the Enviropig and the AquAdvantage Bred salmon, that are approaching the market, (iii) animals raise more ethical issues than plants, and (iv) U.S. regulations treat animal products differently from crops. Whether there are legally mandated labels may well impact the commercial viability of GE animal products: if labels enable consumers to make a choice at the point of sale as to whether to purchase GE animal products, consumers might well choose not to. This is therefore an important gap to fill in the existing literature. This presentation examines the specific question of whether there should be mandatory labeling on all food products derived from GE animals, including an examination of the likely regulatory pathways, salient differences between GE animals and GE crops, and relevant social science research on consumers' attitudes.

Key Words: Ethics, Labeling, Genetically engineered animals

Dairy Foods: Products and Processing

434 Aggregation of casein micelles and κ -carrageenan in reconstituted skim milk. S. Ji, H. D. Goff*, and M. Corredig, *University of Guelph, Guelph, Ontario, Canada.*

It is well known that 0.025% κ -carrageenan can gel skim milk. However, when the system is sheared while cooling from 60°C to 25°C, aggregates of 10-100 μm can be formed and the system shows fluid like behavior. Effects of shear (200, 400, 800 s^{-1}) and concentrations of κ -carrageenan (0.025%, 0.05%, 0.075%) on the formation of micellar casein/ κ -carrageenan aggregates were studied with a controlled stress rheometer. Particle size of casein/ κ -carrageenan aggregates decreased with increasing shear rate (200, 400 and 800 s^{-1}) but increased with carrageenan concentration (0.025%, 0.05% and 0.075%). The

microstructure of casein/ κ -carrageenan aggregates was studied with Cryo-SEM, field emission-SEM and TEM. Interaction between casein micelles and κ -carrageenan was significantly affected by the total solid content of solution. It was shown that the aggregation of casein micelles and κ -carrageenan decreased with increasing total solid content of solution and was completely inhibited at 21% of total solid content. Effects of casein/ κ -carrageenan ratio on casein/ κ -carrageenan interaction at different total solid contents (13%, 16%, 18% and 21%) were studied. It was shown that although the concentration of κ -carrageenan had great effects on particle size distribution of aggregates, at higher level of total solid content, increasing κ -carrageenan concentration did not significantly enhance casein/carrageenan interaction. Effects of K^+ and Ca^{2+} on the formation of casein/ κ -