

Dear FDA Director:

I respectfully disagree with the FDA's approval for use of cloned animals (cattle) for food. I am also writing to FDA (as a consumer of meat products) to offer my scientific opinion on the long-term dangers of using cloned animals for human consumption.

As background, my opinion is based on my experience of 20 years in many biology-related fields including molecular biology, genetics, and neuroscience and thoughtful consideration of the use of cloning technologies for both humans and animals. I am a research investigator that studies the mechanisms underlying neurological diseases including Alzheimer's disease, Parkinson's disease, and Schizophrenia.

My first objection is that "cloning" is essentially "in breeding" of the worst kind. It dramatically decreases the natural diversity among cattle used for milk and meat products based on consumer preferences for quality of meat or other taste preferences. This would not be bad in itself, but for the possibility that such highly inbred clones 1) could carry deadly mutant forms of natural proteins that could predispose humans to neurological diseases that would not be apparent for many decades and 2) could harbor hidden susceptibility to the constantly evolving world of viruses and bacteria that could wipe out huge herds of cloned genetically identical cattle, suddenly creating a food crisis at a unprecedented level.

Hence it is both unwise and terribly short-sighted to meddle with millions of years of nature's design to maximize genetic diversity among all forms of life including cattle based on transient human preferences, especially when there is no shortage of food. Cloning is essentially "asexual" reproduction that creates a bottleneck in the gene pool with possibly terrible and unpredictable consequences to human survival. Despite arguments from companies that are marketing this technology that humans have been breeding cattle for hundreds of years to derive specific preferred characteristics, these breeding methods still left a huge genetic diversity intact in cattle.

The transmissible diseases I am concerned about are those from "amyloidogenic" proteins that become toxic following spontaneous mutations that occur in the genes that encode these proteins. Examples of these types of proteins in humans are Amyloid Precursor Protein which gives rise to Alzheimer's disease, alpha-synuclein that causes Parkinson's disease, Transthyretin which causes many types of neuropathies and cardiomyopathies, and amylin that may cause diabetes. These are only examples of KNOWN proteins that can form toxic amyloidogenic structures due to mutations in them, much like prion proteins that cause Cruetzfeld Jacob disease and mad cow disease, and have deadly neurological consequences many decades after they accumulate in human brains and other tissues. These diseases would be considered to be related to transmissible spongiform encephalopathies. Such mutations would be expected to also occur spontaneously in these and other proteins in cattle, but their natural genetic diversity would limit the toxic transmissibility to humans through milk and meat products to only a small number of individuals. Cloning threatens to amplify such "trojan" toxic proteins, only some of which we are aware of today, and their toxicity in humans may not be evident in humans for decades, and may never be detected in the cloned cattle themselves because they have much shorter lifespan naturally or due to human slaughter criteria for food consumption. The common practice of eating "rare" stakes or large amounts of milk further increases the risk of amyloidogenic problems in humans, though some variants of these proteins may be resistant to heat levels used in cooking.

I hope I have made a reasonable case for not encouraging cloning of animals other than for research purposes, where such cloned animals help scientists identify susceptible genes for various human diseases by reducing the number of genetic variables, where it is absolutely essential for saving a nearly extinct species, or where the product is not directly consumed as food .

Thank you for consideration of my personal opinion and for safeguarding products that we all consume.

Best regards
Rene Anand
Associate Professor
Department of Pharmacology
333 W. 10th Ave
The Ohio State University, Columbus, Ohio