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Opposition to the Use of Hormone Growth Promoters in Beef and Dairy Cattle Production Policy

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There is clear evidence that hormones originating outside the body can interfere with our own hormone function.[1] For example, estrogen is classified by the International Agency for Research on Cancer as a group 1 human carcinogen.[2] In 1971, the US Food and Drug Administration (FDA) banned use in pregnant women of diethylstilbestrol or DES (the first synthetic hormone) after scientific studies showed higher cancer risks in their daughters.[3–5] These "DES daughters," are at least 40 times more likely than the general population to develop clear cell adenocarcinoma, a rare kind of vaginal and cervical cancer, in their teens or twenties.[6] Experience with DES constitutes some of the earliest and most compelling human evidence that disruption of the human endocrine system occurs from exogenous hormone exposure.

In its first scientific statement issued in June 2009, the Endocrine Society, citing the Precautionary Principle,[7] determined that "Results from animal models, human clinical observations, and epidemiological studies converge to implicate EDCs [endocrine disrupting chemicals] as a significant concern to public health."[8, p293] The statement echoes the findings of a 1996 article in American Academy of Pediatrics News that "scientific knowledge about [EDCs'] effects on humans . . . appears sufficient to justify societal approaches to limiting population exposures."[5]

Fetuses, infants, and children are thought to be more vulnerable to the hormone-disrupting effects of exogenous hormones and hormone-like chemicals. A recent consensus conference reviewed the robust and growing body of science that exposure to environmental chemicals, especially in utero, can disrupt normal hormone function and alter child development, as well as alter fetal programming, adding to the risks for hormone-related cancer and other chronic diseases later in life.[9] Today, many hormone-related chronic diseases are common or on the rise, including breast and prostate cancer,[9–12] thyroid disease,[13–15] obesity and diabetes,[9,16–19] endometriosis,[20] uterine fibroids,21 and infertility.[22,23] Early-stage breast development in young girls appears to be occurring at younger ages today compared with 1991, as indicated by a recent study in Pediatrics.[24]

The relationship between these adverse trends in hormone-related development or chronic disease incidence and what likely are multiple social or environmental co-contributors is not completely understood. (Population genetics do not shift over such a small time period.) Conversely, biological plausibility and scientific findings now suggest that exogenous

hormones such as those used in our food system may be 1 such contributor to these negative trends. In a 2007 study, for example, sperm concentration of male offspring was found to be inversely related to their mothers' self-reported beef consumption while pregnant, with possible links hypothesized to the 6 steroid hormones routinely used in US beef production.[25]

American Public Health Association (APHA) Policy #2000-11, The Precautionary Principle and Children's Health, "encourages precautionary action to prevent potential harm to fetuses, infants, and children [from the continued manufacture and use of substances], even if some cause-and-effect relationships have not been established with scientific certainty."[25] APHA has reiterated its support for the Precautionary Principle in other policy, as well.[7] Because children cannot choose to avoid food and because the use of exogenous hormone growth promoters in beef and dairy production is unnecessary, this policy resolution lays out a precautionary rationale and scientific evidence for public health action to remove these food production uses of exogenous hormones.

Synthetic Hormones in Beef Production

From FDA approval in 1954 until 1979, DES continued to be used as a growth-promoting synthetic estrogen in beef cattle production, even after its human uses were halted.[27] Three natural steroid hormones (estradiol, testosterone, and progesterone), and 3 synthetic surrogates (zeranol, melengestrol, trenbolone) remain in widespread use by US and Canadian beef cattle producers to boost growth and production[25,28]; concurrent use of more than 1 steroid is approved.[29] Trenbolone, is thought to have 8 to 10 times greater anabolic activity than testosterone.[30] It is widely acknowledged that the use of these hormone growth promoters results in residues in meat.[31,32] Residues of these hormone growth promoters also persist for weeks to months in manure and feedlot runoff, raising concerns about the added exogenous hormone load to the environment.[33,34]

Since 1988, use of steroid hormones in cattle production has been illegal in Europe.32 According to the European Commission's Scientific Committee on Veterinary Measures Related to Public Health, the decision to ban the use of such hormones was based on the accumulating evidence on the fragility of the endocrine equilibrium in all stages of life as well as the potential genotoxicity of these compounds and their metabolites. . . . Exogenous hormone exposure may disrupt this delicate equilibrium as is evidenced by the pronounced effects of oestrogens and testosterone on functional imprinting. Thus even exposure to residual amounts of hormonally active compounds as present in meat and meat products needs to be evaluated in terms of potentially adverse effects to public health.[35]

By contrast, the US government position is that hormone residues in beef from adult cattle pose no threat to human health. This assumption of safety, however, has remained untested by long-term epidemiologic studies and instead relies on dated research concerning the ability of estrogen (estradiol) to mutate genes. This policy fails to reflect more recent research that hormones and hormonally active chemicals may exert their toxicity instead via epigenetic changes.[12,23]

rbGH Use in Dairy Production

Since 1994, recombinant bovine growth hormone, also known as rbGH or rbST, has been injected into dairy cows to increase milk production; the hormone typically increased production by an average of 11 to 15%.[36] rbGH was developed and marketed by Monsanto and sold to Elanco, a division of Eli Lilly, in October 2008. Although approved by the FDA in a November 1993 decision, both Canada and the European Union in 1999 refused to approve the drug's use, officially citing harm to cows' health.[37,38] No significant scientific studies since then have led these bodies to reconsider their stance. Australia, New Zealand, and Japan have also prohibited the drug's use.[39,40]

Although some studies (including several funded by Monsanto) have failed to demonstrate that rbGH harms dairy cows,[41] virtually all independent analyses of the data reached a different conclusion.[42] In addition to the Canadian and European studies, the FDA's analysis of the data submitted by Monsanto demonstrated that use of rbGH increases the incidence of 16 different harmful conditions in cows, including birth disorders, hoof problems, heat stress, diarrhea, increased somatic cell count, and mastitis, a painful udder infection.43 On the basis of this evidence, the FDA requires these risks be listed on rbGH package inserts, but not on finished dairy products.[43] Virtually all animal-welfare organizations, including the Humane Society of the United States and the Humane Farming Association, oppose the use of rbGH.[44]

rbGH use presents an additional risk to human health in the form of antibiotic resistance. As more cows develop mastitis caused by rbGH use, farmers necessarily increase their use of antibiotics to treat the udder infections.[45] There is now a consensus among scientists that antibiotic use in farm animals increases antibiotic resistance, which can then be transmitted back to humans through food or in the environment.[46,47] Reducing rbGH use would serve to reduce antibiotic use in dairy cattle.

Scientific committees for Health Canada and the European Commission have also raised concerns about the potential effects of rbGH on cancer.[48,49] Insulin-like Growth Factor-1 (IGF-1) is a necessary growth hormone present and identical in both cows and humans. However, elevated IGF-1 levels in human blood are associated with higher rates of colon, breast, and prostate cancers.[50–52] On the basis of data submitted by Monsanto, FDA determined that rbGH use raises levels of IGF-1 in cow's sera and cow's milk.[43] These data also show that IGF-1 survives pasteurization.[56] Animal models show that most IGF-1 in cow's milk survives digestion, reaching the bloodstream where it may promote cancer.[54–56] The United Nations' main food safety body, the Codex Alimentarius Commission, determined in 1999 that rbGH could not be declared safe for human health.[57]

More and more US public health organizations have taken formal stances opposing the drug, including Oregon Physicians for Social Responsibility,[58] Health Care Without Harm,[59] and the American Nurses Association.[61] In the last 3 years, more than 260 US hospitals have signed a pledge committing to serve rbGH-free dairy products.[61]

A 2008 national poll showed that more than 90% of consumers favor labeling of rbGH-free products.[62] Responding to this concern, many large retail establishments—including Wal-Mart—have phased out their milk brands produced using rbGH.64 Milk and many other dairy products from cows not treated with rbGH are now widely available; rbGH use fell from 22% of US farms in 2003 to 15% in 2007.[64] Use of the synthetic hormone is still common practice on many large dairy operations, however. In 2007, nearly 43% of large herds were treated with rbGH.[64]

In February 2007, Monsanto appealed unsuccessfully to the FDA and the Federal Trade Commission to restrict the labeling of rbGH-free milk. Since then, policymakers in 8 states have attempted to ban or restrict the labeling of rbGH-free dairy products through bills or administrative rules. All failed except in Ohio, where the proposed rules are being challenged in court.

Medical authorities and foreign governments have documented scientific public health concerns associated with rbGH use. As long as the FDA allows rbGH to remain on the market, consumers should have the right to know if it is present or absent in dairy products they consume. This right to know about hazardous or controversial substances has been defended in APHA Policy 2002-5.[65]

Precautionary Approach to Hormone Growth Promoters in Beef and Dairy Cattle Production

Consistent with its explicit endorsement of the Precautionary Principle, APHA is therefore opposed to the use of hormone growth promoters in beef and dairy cattle production, and strongly recommends the following actions:

1. The FDA should act with public health precaution to ban the use of hormone growth promoters on the basis of certain exposure and possibility of human health risks, pending long-term epidemiological data demonstrating such exposures to be without harm to workers or the population as a whole.
2. Hospitals, schools, and other institutions, especially those serving children, should preferentially purchase food products from beef and dairy cattle produced without such hormones.
3. Companies producing and retailers offering products produced without rbGH or other hormones should retain the right to label such products in an easily readable and understandable fashion so that consumers in the free marketplace can be equipped to make an informed choice about which brands they buy.
4. Public health organizations should support increased federal research to better delineate mechanisms of harm from hormone-disrupting chemicals in food and the environment and to assess the cumulative public health impact from low-level exposure to multiple such chemicals, including to fetuses, infants and children.

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