Have your cake — and no salt too

That half a teaspoon or so of salt that most cake recipes call for can provide "a surprising amount of sodium" per 100-gram serving — from 240 milligrams in white or yellow cake, to about 300 mg in spice cake and almost 390 mg in devil's food cake, according to Virginia H. Holsinger, a food scientist with the Agriculture Department's Eastern Research Center in Philadelphia. She says the condiment, which has a complex role in baking, was probably originally added to recipes to enhance the flavor of other ingredients. However, new taste-panel tests by her lab indicate that salt-free cakes were either equal to or preferred over those baked with salt. In fact, she says, most tasters rated the salt-free cakes as being sweeter.

Changes observed in the salt-free versions included: a 4 to 6.8 percent reduction in cake height or volume; a 12.5 to 16 percent increase in firmness; and in chocolate cakes, a "freckling" (formation of light-colored spots) on the surface — apparently due to sugar crystalization. Holsinger says the shrinkage and firmness changes were "not so bad that they were unacceptable," and the cosmetic freckling problem was eliminated by switching from regular sugar to superfine.

Though eliminating salt reduces a cake's sodium content, it does not eliminate it. For example, the baking powder used to leaven the batter can add 100 milligrams per serving in the form of sodium bicarbonate. However, Holsinger notes, research suggests that because of the form in which it is delivered, the sodium bicarbonate — unlike the sodium in table salt — may not play a role in high blood pressure.

Prenatal 'sex change' for a leaner ewe

Pregnant sheep given five 200-milligram injections of testosterone over an eight-week period delivered offspring that appeared to be solely male. In fact, many were chromosomally female. Not only did treatment with the male sex hormone cause the female lambs to develop what appeared to be male genitalia, but it also caused profound changes in the way they metabolized their food. And these metabolic changes interested researchers at the Agriculture Department's Meat Animal Research Center in Clay Center, Neb.

Explains John Klindt, who heads the four-year-old project there, "In ruminant animals such as sheep, males are heavier, grow faster, and produce more lean muscle tissue [meat]." After treating some 600 pregnancies, he and his co-workers have now established that prenatal testosterone will cause female lambs to gain at least 10 percent more weight daily, after birth, than untreated female lambs. While this weight gain is 10 percent less than occurs in the normal male lamb, Klindt notes it's still an important improvement. "And in our best study," he adds, "we got a 30 percent per day weight increase — which roughly comes to about an extra pound per week on 16 percent less feed." Treated females were also 13 percent leaner than their untreated female counterparts — or about as lean as the normal male sheep. Details of the work appear in the June PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE.

Klindt's studies show that the testosterone, which has a three-day half-life in sheep, does not carry over into the meat. Moreover, the treatment appears to have no measurable effect on the males treated in utero, nor lasting effects on the pregnant ewes. As to what it does to female fetuses, that remains a mystery: Klindt and others had always assumed the increased weight gain in treated females resulted from some early testosterone-fostered changes that altered both the eventual production of growth hormone and the hormone prolactin. In fact, Klindt's new data show no change in either hormone among treated females.

Klindt's lab is working to reduce the number of injections necessary to achieve the desired gains in weight and leanness. His most recent data show that treatment can be successfully started later in gestation than tried originally; doing so prevents obvious changes to the female's genitalia.

NAS reports on pathogens in poultry . . .

Current federal inspection procedures for poultry focus on removing diseased broiler chickens identified by sight, smell and touch on the basis of a bird-by-bird analysis. However, such organoleptic (human-sense based) inspections "are not designed to detect the most important human pathogens on poultry," according to a recently released study by a National Academy of Sciences (NAS) panel. The study says that epidemiological data suggest that contaminated chicken not only accounts for roughly 48 percent of gastroenteric disease in the U.S. caused by *Campylobacter jejuni* bacteria, but also for many of the *Salmonella* bacterial poisonings. The two most common human pathogens detected in chicken, *Salmonella* and *Campylobacter* together infect up to one in 50 persons in the United States annually.

To attack the problem, the panel recommends: that organoleptic inspections be supplemented with detailed laboratory analysis of microbe contamination in some statistically sampled portion of those birds passing through the slaughterhouse; that pathogen levels in "market-ready poultry" be measured and compared against both incidence of human disease and changes in industrial pathogen-control strategies; and that educational campaigns be developed to teach consumers how to handle poultry so that any pathogens present need not lead to disease.

The NAS panel also found that toxic chemical contamination of poultry poses a potential health risk. And like the pathogens, toxic chemicals are also largely undetectable under the current federal poultry inspection program. Although the NAS study concludes that adequate methods exist for identifying chemical contaminants and for controlling their entry, it states that "a comprehensive approach to the control of chemical residues [in poultry] is not now possible" — in part because acceptable human-tolerance levels for many chemicals do not yet exist.

. . . and pesticides in food

Citing Environmental Protection Agency (EPA) data, a new National Academy of Sciences study reports that 60 percent (by weight) of all herbicides used in the United States can cause tumors in animals, as can 90 percent (by volume) of all fungicides used and 30 percent (by volume) of all insecticides. Under the Delaney Clause, a provision of the Federal Food, Drug and Cosmetic Act, pesticides capable of inducing cancer in animals or that accumulate in processed foods are not supposed to be granted "tolerances" (federally granted permissible limits) for their allowed presence in food. But, the NAS study finds, many of these oncogenic pesticides — especially those granted "tolerances" more than 10 years ago — do find their way into foods. As a result, the study says, consistent enforcement of the Delaney Clause (for older pesticides as well as new ones, and for raw foods as well as processed ones) may force EPA to pull many agriculturally important and widely used pesticides off the market as these chemicals periodically come up for reregistration.

The NAS panel would prefer to see adoption of a new "negligible risk" policy in enforcement of the Delaney Clause — one that ignores chemicals whose presence in foods poses only a small risk to health and concentrates efforts on eliminating those which pose significant risk. For example, such a policy might initially focus on those 10 pesticides, used on only 15 different foods, that the panel estimates account for roughly 80 percent of the dietary risk posed by all pesticides.