Letters

Animal Feeds: Effect of Antibiotics

I would like to praise Eliot Marshall for his evocative article on the use of therapeutic antibiotics in animal feeds (News and Comment, 25 July, p. 481). Marshall incisively reveals the true stripes of those groups who have failed to acknowledge the authentic risks to human health resulting from this practice.

Vocal, well-financed groups such as the National Pork Producers Council, which oppose restrictions on antibiotics and ostensibly speak for the whole industry, actually represent the large, specialized producers. In fact, during the 2 days of hearings on H.R. 7285, the Antibiotics Preservation Act, statements by small producers (supported by the results of a recent survey of the University of Missouri at Columbia) hold precisely the contrary view. Small diversified producers point to the practice of using antibiotics in animal feeds as the primary reason for the growing trend toward large, concentrated operations in the hog industry. This trend in turn portends the extinction of the small, efficient, well-managed feedlot. Moreover, small producers appraise antibiotic use much more critically than do their specialized counterparts. It is this latter factor that goes to the heart of the rhetoric of the Pork Producers and the drug manufacturers—the fear that restrictions on the two most popular antibiotics, penicillin and tetracycline, will stimulate a more critical appraisal of antibiotic use on the part of the entire livestock industry and thereby eliminate the casual consumption and use of these drugs.

It is also common to hear proclamations that the science of this issue is not well understood. There is no question that the therapeutic effectiveness of antibiotics is rapidly diminishing; this decline is directly attributable to the selective pressures of antibiotics. Furthermore, the high degree of similarity of the genes that code for antibiotics resistance from the bacteria of animals and humans leads to the inescapable conclusion that a common selective pressure is at the source of proliferating bacterial resistance. What remains unclear is the precise quantification of the human risk attributable to the use of antibiotics in feeds. However, given that equal quantities of antibiotics are used for therapeutic and feed purposes, the call for quantification will be difficult if not impossible to answer.

The science of this issue is well in hand, but we cannot call upon it to do the impossible. Twenty years of scientific investigation have identified but not quantified the risk to human health. We now face a fork in the road where prudent policy decision and not further study will be the pathfinder.

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Analytical Chemistry Techniques

The article "Separations by MS speed up, simplify analysis" by Thomas H. Maugh II (Research News, 8 Aug., p. 675) is an excellent summary of recent work in tandem mass spectrometry (MS/MS). We object, however, to characterizing analytical chemistry as having "two main functions: separation of the components in a mixture and identification of each component." Not only does this definition neglect what is perhaps analytical chemistry's ultimate function—quantitation, but it also fails to take into account the many analytical methods that are used for both identification and quantitation without separation.

Although MS/MS is indeed a powerful and important technique for analytical chemistry, it too has its limitations, none of which are mentioned in the article. As pointed out by Burlingame (*1*),

> One serious point which tends to be glossed over, minimized, or not mentioned at all in consideration of MS/MS as a competitor for GC/MS. . . . or LC/MS is the nature of processes in the *transformation* of the sample into ions, which can then be treated in a straightforward way and certainly improved instrumentally. Put simply, are the ions created representative of the actual molecules in the sample? Has there simply been a physical phase transformation without altering the compositional nature of the original sample? This point is the most serious, of course, in biological and mineral matrices."

Finally, the prediction that such a powerful and expensive technique will be used for "routine analyses and on-line monitoring of reactions" is questionable. For studying reactions, its use cannot be faulted, but for routine analysis, a simpler and less expensive technique can probably be found to do the job.

The above is not meant to detract from the impressive developments outlined in Maugh's article or the contributions by the scientists. Indeed, one of the contributors, Fred W. McLafferty of Cornell University, has been named winner of the American Chemical Society Award in Analytical Chemistry (sponsored by the Fisher Scientific Company) for his work in mass spectrometry.

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References

1. A. L. Burlingame, *Anal. Chem.* **52**, 214R (1980).

Multiyear Funding Authorization

John Walsh's News and Comment article "Looking out for science policy" (15 Aug., p. 783), provides useful insight into congressional and White House views on multiyear authorization for science budgets and on the problems of government science planning. His comments are largely about issues at the highest level of government, but an analogous problem occurs at the lowest level—that of the individual principal investigator with a small grant and a small research group. Thus the need to balance budgets on a 1-year cycle can wreak havoc with even the best designed research program. For example, the salary and research supplies for a postdoc who was expected to join one's research group but did not complete his Ph.D. thesis in time can give rise to a carry-over that is a significant fraction of the budget. On the other hand, it often happens that no graduate students join one's research group one year, but two are eager to do so the next. A 1-year budget cycle permits only one to join. The National Science Foundation has begun to allow budget averaging over the period of the typical 3-year grant, but the National Institutes of Health and other agencies have not.

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