Letters

Science and the Courts

As an attorney (and former molecular biologist) practicing in areas involving the recombinant DNA technology, I offer a few comments on the recent article (News and Comment, 26 Sept., p. 1492) about the lawsuit over the interferon gene cloned from KG-1 cells.

The factual scenario outlined in the news article rivals that in any law school exam question I have ever seen and certainly involves a variety of complex legal, as well as scientific, issues. If the case ever proceeds to trial, contract and property law principles may provide some resolution; but certainly relevant legal precedent, from which the law derives, is nil. No court heretofore has been asked to evaluate property rights in human genes. In any case, the article seems to suggest that the court may resolve many of the issues presented in the case.

It should perhaps be realized that courts often are not suitable forums for resolving scientific questions and disputes that have legal consequences. By necessity, courts must defer on scientific determinations, even though they frequently have legal ramifications. Then too, factual distinctions that have obvious scientific meaning, such as whether genomic DNA or complementary DNA made from messenger RNA is used in an experiment, may or may not be of legal significance or have legal consequences.

A relevant case touching upon some of these notions is Mack *v.* Califano (*1*). Here the court held that it would not enjoin risk assessment experiments designed to test the biological properties of polyoma DNA, since they were conducted in compliance with the NIH (National Institutes of Health) guidelines. It reasoned that research performed in accordance with the guidelines would have no adverse environmental or public health consequences. The court could not inquire into such substantive (scientific) issues as whether compliance with the guidelines did indeed provide adequate protection to the public health, or whether the specific host-vector system involved was as innocuous as was argued.

The Mack case aptly demonstrates that courts of law are not necessarily the best place for resolving controversies involving science or scientists. When asked to do so, courts will often decide such cases on procedural grounds and eschew the substantive (scientific) issues. Their inquiry is not so broad as some may think and frequently depends on how the issues are framed. Consequently, litigation of the type reported in the article may provide some "answers" and a few Pyrrhic victories; but more often than not it will offer little comfort to litigants who might have easily and more amicably resolved the problem outside the court system, or avoided it altogether by taking a few precautions.

The point is made in the news article that the powerful forces of profit associated with the new recombinant DNA technology "have the capacity to strain and rupture the informal traditions of scientific exchange." In my opinion, the ever-present quest for the Nobel prize had already dissolved many of the so-called traditions long before the advent of the new technology.

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1. 447 *Fed. Rep. Suppl.* 668 (U.S. Dist. Ct., D.C., 1978).

Antibiotics in Animal Feeds

Representative John D. Dingell concludes (Letters, 5 Sept., p. 1069) that there is no simple scientific answer to the human health risk posed by feeding antibiotics to farm animals. He raises the important point that large-scale operations are probably more dependent on the use of antibiotic feed additives than are smaller, diversified producers. However, irrespective of the size of operation, with good management and sound husbandry practices the use of such drugs in feed every day would be unnecessary.

It has been shown in the United States that antibiotics have significantly helped reduce disease losses in swine (*1*). It is probable, however, that large-scale producers would experience very serious losses if antibiotic feed additives were outlawed because, as has recently been pointed out (*1*), over the last few years swine mortality rates have actually *increased*. This increase is attributed to increasing numbers of swine being raised in total confinement, in often overcrowded conditions and not always being adequately managed by hired hands. D. C. Van Houweling (*2*), Washington representative for the National Pork Producers Council, believes that to oppose the use of antibiotic feed additives would be contrary to the animals' welfare. While some livestock specialists might agree that feeding antibiotics is not a substitute for sound animal husbandry, the short-term use of antibiotic feed additives for a few days to protect animals from stress when they arrive at a farm for finishing (or fattening) has much support. But a logical alternative solution is to change the structure of certain livestock production systems that may jeopardize both animal and consumer health. In this example, farrowing (breeding) and finishing on the same farm would be preferable and would eliminate the stress and costs of transporting young pigs from the breeder to the finisher and the need for "protective" medication of the feed.

By and large, antibiotic feed additives have become substitutes for good husbandry practices; their abolition would most likely necessitate significant improvements in management and animal health and welfare down on the "factory" farm and would also reduce a very real consumer health hazard.

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1. R. N. Van Arsdall and H. C. Gilliam, in *Another Revolution in U.S. Farming?* (Department of Agriculture, Washington, D.C., 1979).
2. D. C. Van Houweling, personal communication.

Dingell alleges that the use of antibiotics in pig feeds is "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." This reason is unlikely; antibiotics were shown to be highly effective when fed to small groups (four or five) of pigs (*1*). Many other, diverse circumstances have contributed to the increased size of agricultural units. Practices that favor efficiency in production should not "portend extinction."

Dingell notwithstanding, the therapeutic effectiveness of antibiotics is not

"rapidly diminishing," at least not in the farm milieu, where penicillin and the tetracyclines retain their effectiveness as feed ingredients for farm animals after many years (*2*). There have been incidents, of course, in which prolonged use of antibiotics in clinical medicine has been followed by intractable resistance to pathogens. The disparity between the two sets of observations has not been explained.

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1. T. H. Jukes, E. L. R. Stokstad, R. R. Taylor, T. J. Cunha, H. M. Edwards, G. B. Meadows, *Arch. Biochem.* **26**, 324 (1950).
2. V. W. Hayes, in *The Use of Drugs in Animal Feeds* (Publication 1679, National Academy of Sciences, Washington, D.C., 1969), p. 11; T. MacAuliffe, A. Pietraszek, J. McGinnis, *Poult. Sci.* **55**, 183 (1976).

Coca, Not Cocoa

In the issue of 12 September, a letter of mine appeared protesting the confusion in a previous article (News and Comment, 11 July, p. 256) of coca leaf with isolated cocaine. However, you turned "coca" into "cocoa" in the text of the letter, the title, and the table of contents.

Cocoa is what some people drink for breakfast. It is a product of the cacao tree, *Theobroma cacao* L. Coca is the leaf of several species of *Erythroxylum*. *Erythroxylum* is unrelated to *Theobroma* botanically, chemically, and pharmacologically.

I do not advocate research on the therapeutic use of cocoa, although I consider it a pleasant and innocuous substance in moderation. I do urge research on coca, starting with an understanding of what it is and is not.

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Kidney Transplants

The Research News article by Jean L. Marx on improving the success of kidney transplants (8 Aug., p. 673) greatly emphasizes the benefit of transfusions in reducing the risk of kidney graft rejection. Yet there is no mention that Gerhard Opelz and Paul Terasaki were the first to report (*1*), in 1973 and 1974, the beneficial effect of transfusion in kidney graft