lism and pharmacokinetics testing. In fact, the National Toxicology Program has modified the design of its tests to include these kinds of data. Testing required by the FDA and the EPA for registration of new food additives and pesticides, as well as for industrial chemicals generally, is flexible enough to include such measurements, should the sponsors wish to obtain the data.

No toxicologist of my acquaintance would ever advocate doing away with chronic toxicity testing altogether. For substances with widespread, long-term human exposure, the cost in time, expense, and animal lives seems justified. However, most toxicologists want to conduct chronic tests using designs that return the most information for the expenditure. Clearly, the traditional "MTD carcinogenicity bioassay," the source of most of the results analyzed by Ames and Lois Gold, is not an efficient design. In bringing to public view the scientific deficiencies in those tests, Ames has performed a public service.

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The statement attributed by Marx to I. B. Weinstein that "some types of synthetic compounds, including halogenated hydrocarbons such as PCB [polychlorinated biphenyl], are not found in nature" is misleading if not erroneous. Such chemicals have been isolated and characterized from marine and terrestrial sources for decades. Indeed, the general chemical structure of the ancient Egyptian dye from mollusks, Tyrian Purple, which is a brominated indole, has been known since 1909 (*1*). Moreover, a myriad of chlorinated, brominated, and iodinated hydrocarbons, aliphatic and aromatic, are produced and secreted by numerous species of sea creatures, such as sponges, algae, mollusks, sea slugs, sea hares, tunicates, and others(*2*). Nearly 100 halogenated compounds have been identified in the edible Hawaiian red alga *Asparagopsis taxiformis* (*3*), and several polychlorinated phenolic compounds have been found in Australian terrestrial lichen (*4*). The simplest chlorinated hydrocarbon, chloromethane, was recently isolated from alga (*5*), and this chemical was previously known to be synthesized by wood-rotting fungus (*6*). In fact, it has been estimated that the global emission of chloromethane (5×10^6 tons per year) is largely from the marine and terrestrial biomass and that man-made emissions are insignificant by comparison (*5, 6*). The precursor of the herbicide 2,4-D, 2,4-dichlorophenol, is the sex pheromone of the female lone star tick (*Amblyomma americanum*) (7), and another polychlorinated aromatic compound, rebeccamycin, having powerful antitumor properties, is present in the bacteria *Nocardia aeroligenes* (*8*). Even the halogen fluorine is present in some plant carboxylic acids (*9*). The list goes on.

This is not a trivial point, since environmental hysterics seize upon and propagate such ignorance and imprecision to further their causes. Scientists should be accurate and vigilant in their presentation of chemical issues to an already badly informed and confused public.

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Kidney Transplantation: Overlooked Pioneer

I read with interest Joseph Palca's article "Overcoming rejection to win a Nobel Prize" (News & Comment, 19 Oct., p. 378). While the article was well done and factual, there was an unfortunate omission in the description of the sequence of events that led from the work of Robert Schwartz and William Dameshek to the use of 6-mercaptopurine and azathioprine in kidney transplantation. Roy Calne (now Sir Roy Calne) first used 6-mercaptopurine in kidney transplants in dogs; he then went to work with Joseph Murray in Boston, where he introduced azathioprine to prevent transplant rejection in dogs. That history is recorded in my Nobel lecture (Articles, 7 Apr. 1989, p. 41).

There is no question that Joseph Murray deserves the Nobel Prize for his pioneering work in kidney transplantation. However, one should not overlook the highly important contribution of Roy Calne to the eventual success of that therapeutic procedure involving unrelated donors.

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