

very restricted ranges of concentration and time, they are far from conclusive on this point. Indeed, since recycling of nitrate occurs through saliva and through the gut and since nitrate is metabolized by the bacterial flora, it is hard to see why clearance should be first-order, especially for near-normal endogenous levels.

The title of our *Science* report implies that the chemical form of  $^{13}\text{N}$ , once ingested, is not known. Although we are currently attempting to separate and characterize these  $^{13}\text{N}$  derivatives, our work with germfree (GF) rats may answer, to some extent, several of these questions raised by Tannenbaum, if one correlates our  $^{13}\text{N}$  results (after  $^{13}\text{NO}_3^-$  and  $^{13}\text{NO}_2^-$  are administered to GF and CV rats) with the chemical data when these same (unlabeled) compounds were given to GF and CV rats. Basically, GF rats do not appear to convert  $\text{NO}_3^-$  to  $\text{NO}_2^-$ . However, GF rats do chemically alter  $\text{NO}_2^-$  to excrete the  $^{13}\text{N}$  from gavaged  $^{13}\text{NO}_3^-$  more rapidly than do CV rats, and there appears to be more  $^{13}\text{N}$  in the intestinal tracts of CV rats than in GF rats. This suggests to us that the flora of conventional rats alters and metabolizes the  $^{13}\text{NO}_3^-$ . Also,  $\text{NO}_3^-$  and  $\text{NO}_2^-$  were never chemically detectable in the caeca of CV rats given 1000 ppm of sodium nitrate or 1000 ppm of sodium nitrite, whereas these ions were detectable in the caeca of GF rats fed the ions. We interpret these results to indicate that the nitrogen of ingested  $\text{NO}_3^-$  or  $\text{NO}_2^-$  reaches the lower intestinal tract in CV rats, but that these ions are chemically altered in the process. This bacterial reduction of available  $\text{NO}_3^-$  in the ileum may be responsible for ileal  $\text{NO}_2^-$  values as noted by Tannenbaum *et al.* (30 June 1978, p. 1487), rather than an oxidation of more reduced forms of nitrogen.

Our  $^{13}\text{N}$  data on GF and CV rats also show that, after intravenous injections of  $^{13}\text{NO}_3^-$  or  $^{13}\text{NO}_2^-$ , the  $^{13}\text{N}$  is present in both intestinal tissue and contents. In fact, most of the  $^{13}\text{N}$  (intravenously injected) present in the lower intestine of CV rats with ileocecal ligation (see table 2 in our *Science* report) was primarily located in the intestinal contents.

Although the idea of nitrification by intestinal bacteria is an extremely exciting concept, both biologically and in terms of the etiology of several types of human cancer, we feel the analytical, microbiological, and pharmacokinetic data to date are insufficient for such an assumption. This is essentially what prompted us to submit our report to *Science*. Our exposure to nitrite may be unavoidable, not because of bacterial heterotrophic nitrification, but because of our large in-

take of nitrate, which is known to be reduced to nitrite by alimentary tract bacteria. Whether the bacteria metabolizes nitrite to harmful or innocuous compounds remains to be determined.

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**Erratum:** In a letter to the editor (3 Aug., p. 447), Yvonne Brackbill writes (p. 448, column 2, line 11), "In the state of New York, two recent Court of Appeals decisions (27) found physicians negligent in failing to advise, or advise accurately, the pregnant women who consulted them to obtain such information." Reference 27 is to "Becker vs. Schwartz, 46 N.Y. 2d Ser., 401 (1979); Park vs. Chessin, *ibid.*" This statement is not correct. The Court of Appeals did not, in these cases, rule on negligence or lack thereof on the part of the physicians. The decisions were that, under certain circumstances, parents had the right to bring an action to determine whether they had received pertinent information. The court in no way discussed the validity of the particular claims in either case.

The Park vs. Chessin case was tried after the Court of Appeals decision, and the defendant physicians, including Chessin, were found not negligent. The Becker vs. Schwartz case is still awaiting trial.

**Erratum:** In the article "Dynamics of skeletal pattern formation in developing chick limb" by S. A. Newman and H. L. Frisch (17 Aug., p. 662), a clause was omitted. The clause should be inserted on page 667, third column, line 31, as follows: "[. . . respectively.] at  $t = t_0$ , but subsequently we would like the gradient in the  $z$  direction to be maintained, and thus require

$$\frac{\partial c}{\partial z} - \lambda c = 0$$


at  $z = 0$  and  $z = d$ , for all times (radiation boundary conditions). [The number . . . ]"



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