crit tubes (Sherwood) or by aortic puncture.

Sexual behavior patterns were determined at 110 days of age. A receptive female primed with exogenous estradiol and progesterone was placed in the company of a cimetidine-exposed male in a test arena to which the male had been allowed to adapt for 5 minutes. Mounting patterns (latency period and the number of mounts) in a 15-minute period were recorded. The latency period was the time elapsed after introduction of the receptive female to the first mount by the test male. The performance of each cimetidine-exposed male was compared with that of a control male with the same female, to exclude possible differences in female receptivity. We used the Student's *t*-test (two-tailed) for all statistical analyses, considering a P value of $< .05$ as significant.

Anogenital distances and indices were reduced significantly in the cimetidine-exposed rats on day 1 and on day 5 compared to the controls (Table 1). Weights of the testicles and of the prostate glands and seminal vesicles at 55 days of age were reduced in the cimetidine-exposed animals compared to the controls (Fig. 1). Examination of testicular histology by light microscopy revealed no differences between the two groups. Compared to the control animals, the rats exposed to cimetidine showed reduced serum testosterone (Fig. 1), prolonged mount latency periods, and fewer mounts.

The reduced anogenital distances and indices in the cimetidine-exposed animals indicate a lack of masculinization at a period of exposure to cimetidine through breast milk. The reduction in sex organ weights at 55 days of age suggests a long-lasting specific antiandrogenic effect resulting in subnormal growth of androgen-responsive tissues even after discontinuation of the drug (35 days earlier). It may be that intrauterine and neonatal exposure to cimetidine modifies end-organ androgen receptor activity or responsiveness in either a qualitative or quantitative manner, rendering these organs less sensitive to androgenic stimulation later in life.

The reduction in testosterone concentrations in the cimetidine-exposed group cannot be fully explained by the present data. A long-lasting direct inhibitory effect of cimetidine on the hypothalamic-pituitary-gonadal axis is possible, making this axis relatively insensitive to negative feedback by testosterone. Deficient androgen imprinting of the fetal brain during intrauterine and neonatal life, as a consequence of intrauterine and neonatal exposure to cimetidine, may have resulted in a lack of sexual motivation in the adult animal. It should be noted that in addition to decreased sexual motivation, a decrease of sexual performance also occurred in the cimetidine-exposed animals compared to the controls.

On the basis of these results in rats, and until the controversy regarding the role of sex steroid imprinting of the human fetal brain has been settled, we suggest that cimetidine should be used with caution in pregnant humans, especially during possible critical periods for neuroendocrine programming of the fetal brain.

S. ANAND
D. H. VAN THIEL
University of Pittsburgh, School of Medicine, Pittsburgh, Pennsylvania 15261

References and Notes

1. S. J. Haggie, D. C. Fermont, J. H. Wyllie, *Lancet* **1976-I**, 983 (1976); H. Domschke, S. Domschke, L. Demling, *Excerpta Medica* **19**, 217 (1976); W. S. Blackwood, D. P. Maudgol, T. C. Northfield, *Gut* **18**, A420 (1977); D. H. Winship, *Gastroenterology* **74**, 402 (1978).
2. J. H. Funder and J. E. Mercer, *J. Clin. Endocrinol. Metab.* **48**, 189 (1979); S. J. Winters, J. L. Banks, D. L. Loriaux, *Gastroenterology* **76**, 504 (1979); D. H. Van Thiel *et al.*, *N. Engl. J. Med.* **300**, 1012 (1979).
3. J. P. Howe, J. H. Dundee, J. Moore, W. McCaughney, *Anaesthesia* **35**, 421 (1980); W. McGaughey, J. P. Howe, J. Moore, J. H. Dundee, *ibid.* **36**, 167 (1981); A. Somogy and R. Grugler, *Br. J. Clin. Pharmacol.* **7**, 627 (1979).
4. D. W. Warren, G. C. Haltmeyer, K. B. Eik-Ness, *Biol. Reprod.* **8**, 560 (1973).
5. N. MacLusky and F. Naftolin, *Science* **211**, 1294 (1981).
6. J. J. Chen and E. R. Smith, *Horm. Behav.* **13**, 219 (1979); F. T. Dianne, J. Y. Dubé, R. L. LeSage, R. R. Tremblay, *Acta Endokrinol.* **91**, 362 (1979).
7. E. Niechslag and D. L. Loriaux, *Z. Klin. Chem. Biochem.* **10**, 164 (1972).
8. Supported by the Hunt Foundation and the Gastroenterological Medical Research Foundation of Southwestern Pennsylvania.

12 June 1982; revised 2 August 1982

DDT in the Sewers

Fry and Toone (*1*) stated that "Between 1950 and 1970 offshore southern California was subjected to massive contamination by the discharge of as much as 1.9 million kilograms of commercial DDT from the Los Angeles sewer system." This statement is referenced to a publication by MacGregor (*2*) and to a footnote that states that "The estimate of 1.9 million kilograms is based on the measured release of 250 kg/day in 1970" (*3*), and on a subsequent reiteration of this by the Environmental Protection Agency in 1976 (*4*). The report by Carry and Redner does not record a "measured release of 250 kg/day in 1970."

MacGregor bases his estimate on three figures, first, a single aberrant value of 647 pounds (294 kg) in table 6 by Carry and Redner (*3*), which records samples from a sewer receiving influent from Montrose Chemical Company; second, a record of monthly samples taken December 1969 through March 1970, from influent into the Joint Water Pollution Control Plant, which received input from many sources in addition to Montrose; third, the DDT content, estimated at 250 kg/day, of alkaline waste trucked out by Montrose as an alternative procedure (starting in April 1980), replacing the former method of disposal of liquids from a settling pond into the sewers. The alkaline waste had not been allowed to settle (*5*).

Regarding the single aberrant value, the chief engineer of the Los Angeles County Sanitation District stated (*6*) that it represented the "highest ever obtained in the Sanitation Districts' sewerage wastes and cannot be said to represent average conditions of the actual amount of DDT being wasted by Montrose since the Montrose waste stream was not sampled." However, another report (*7*) quotes an analytical value, December 1969, of 5000 parts per billion in the Montrose effluent line with a volume of 280,000 gallons per day, representing DDT discharge of about 5.5 kg/day. Sobelman (*8*) stated that, for 25 years, Montrose's effluents had passed through a settling pond so that the sewer effluent "contained entrained DDT equivalent to about 10–15 lb/day," about 2 percent of the amount reported by Fry and Toone (*1*).

The estimate of 1.9 million kilograms of DDT discharged into the ocean is based on extrapolations that are not well founded.

THOMAS H. JUKES
Department of Biophysics and Medical Physics, University of California, Berkeley 94720

References and Notes

1. D. M. Fry and C. K. Toone, *Science* **213**, 922 (1981).
2. J. S. MacGregor, *U.S. Fish Wildl. Serv. Fish. Bull.* **72** (No. 2), 275 (1974).
3. C. W. Carry and J. A. Redner, a report of the Los Angeles County Sanitation District, 1970, Los Angeles, Calif., as reported in (*1*).
4. An unsigned item in *Science 81* (November 1981, p. 10), repeated this charge.
5. The solubility of DDT in water is about 1.2 parts per billion, so that settling removes most of it.
6. J. D. Parkhurst, "The control of pesticide emissions from industrial discharges," statement to California Water Resources Control Board, Los Angeles, 18 February 1971, p. 5.
7. Letter from M. Sobelman to J. Perkins (National Academy of Sciences), 31 August 1973.
8. M. Sobelman, *Nature (London)* **241**, 225 (1973).

22 December 1981

0036-8075/82/1029-0494$01.00/0