

**Anesthetic Properties of Sodium-Ethyl-Pentyl, Malonyl-Thiourea.\***

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It has been demonstrated that organic compounds which are related spatially as to the arrangement of the carbon atoms about a nonspecific central nucleus have similar pharmacological activities. Onium compounds formed about such atoms as nitrogen, sulphur, arsenic, phosphorus and antimony have properties best represented by the most active member of this group, acetyl choline (Dale and Burn,<sup>1</sup> Hunt<sup>2</sup>). Erlenmeyer and Berger<sup>3</sup> demonstrated the immunological equivalence between =O, =NH, and =CH, in certain "determinant groups." There is also a probability that the amino group in the so-called sympathomimetic amines can be replaced by -Cl, (Mulinos and Osborne<sup>4</sup>).

The present study is concerned with a compound in which the =O group in the urea molecule of pentobarbital has been replaced by sulphur. The new compound possesses much of the action of the barbiturate. We report here a comparison between the 2 drugs, with the intention of emphasizing the increasing importance played by the spatial arrangement of atoms, as distinguished from the specific pharmacodynamic power of the individual elements constituting the compound.

Pentothal-sodium, Abbott No. 8060, is an amorphous, greenish white powder, having a strong sulphurous odor. It dissolves readily in water, to form a 10% solution, which has a distinctly green color, and a very disagreeable odor. The sulphurous odor diminished rapidly, to become almost imperceptible within a week, during which time the solution seemed to have lost but little of its potency. The 10% solution is strongly alkaline to litmus, it has a pH of 10.6, and forms precipitates with acids, and salts of silver.

Our experiments were performed upon rats and cats. Studies on respiratory exchange were performed on urethanized rabbits.

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\* Abbott No. 8060, obtained through the courtesy of Dr. T. D. Buchanan, of the New York Post-Graduate Medical School and Hospital.

<sup>1</sup> Dale and Burn, *J. Pharm. Exp. Therap.*, 1914, **6**, 147, 417.

<sup>2</sup> Hunt, *J. Pharm. Exp. Therap.*, 1925, **25**, 315.

<sup>3</sup> Erlenmeyer and Berger, *Biochem. Z.*, 1932, **255**, 429.

<sup>4</sup> Mulinos and Osborne, *Proc. Soc. Exp. Biol. and Med.*, 1935, **32**, 1344.

TABLE I.  
Summary Comparison Between Pentobarbital and Pentothal. All Doses Administered Intraperitoneally.

Animal	Pentobarbital Sodium	Effect	Pentothal Sodium
Rabbits	40-50 mg. x Kg. 4-8 hr.	Anesthesia.	60-70 mg. x Kg. 6-12 hrs.
Cats	40-45 " " " 12-24 "	" "	60-70 " " " 18-36 "
Rats	40-60 " " " 3-5 "	" "	60-80 " " " 8-24 "
"	120-150 " " " 6 of 12 died	M.L.D.	90-100 " " " 9 of 15 died.
"	(0.64 mole x Kg.)	(Respiratory death).	(0.48 mole x Kg.) (See also Tatum <sup>9</sup> .)
Rabbits	0.36 in moles x Kg.	M.E.D./M.L.D.	0.70 in moles x Kg.
Cats	Depressed, with marked potentiation with morphine and heroine.	Respiration.	Depressed with marked potentiation with morphine and heroine.
	None. (See Lieb and Mulinos <sup>5</sup> ).	Vagus paralysis.	None.
	Sneezing and coughing marked during induction.	Respiratory tract.	Slight sneezing and coughing during induction.
Rabbits	None.	Irritation.	None.
Cats	None.	Blood sugar.	94 mg. %, av. of 11 cats.
Rats	102 Mg. %, av. of 97 cats. (See Mulinos <sup>6</sup> ).	Isolated uterus and intestine.	Depressed.
Rabbits	Depressed. (See also Gruber <sup>7</sup> ).	Reducing subst. in urine.	Traces in about one-third of animals.
Guinea Pigs	Definite in over one-half of animals. (See Barris and Magoun <sup>8</sup> and Mulinos <sup>6</sup> ).	Pupiloconstriction.	Slit pupil.
Cats	Slit pupil. (See Mulinos <sup>6</sup> ).	Relaxation of the nictitating membrane.	Marked.
"	Marked	Analgesia.	Poor.
Rats	Poor.		
Rabbits			
Cats			

<sup>5</sup> Lieb and Mulinos, PROC. SOC. EXP. BIOL. AND MED., 1929, **26**, 709.

<sup>6</sup> Mulinos, *Arch. Internat. Pharm. et Therap.*, 1934, **47**, 111.

<sup>7</sup> Gruber, *J. Pharm. Exp. Therap.*, 1936, **56**, 341.

<sup>8</sup> Barris and Magoun, PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 684.

<sup>9</sup> Tatum, *Am. J. Surgery*, 1936, **31**, 464.