

## 11944 P

**Effects of CO and Methylene Blue upon O<sub>2</sub> Consumption of Shark (*Mustelus*) Blood.\***

MATILDA MOLDENHAUER BROOKS.†

*From the Department of Zoology, University of California, and the Marine Biological Laboratory, Woods Hole, Mass.*

The purpose of this experiment was to see if methylene blue had any effect upon the O<sub>2</sub> consumption of shark (*Mustelus*) red blood cells in the presence of carbon monoxide or air. Since these red blood cells are nucleated and have a considerable rate of respiration, it was thought of interest to test Barron's conclusions that the action of methylene blue in increasing oxygen consumption is less marked, or even *nil*,<sup>1</sup> in nucleated erythrocytes or leucocytes as contrasted with such non-nucleated erythrocytes as mammalian. In addition it was also thought of interest to find out whether methylene blue antagonizes the effects of CO on the respiration of these nucleated erythrocytes.

The blood was collected fresh for each experiment into tubes by cutting the dorsal posterior fin of the shark. In some experiments the blood was centrifuged and the erythrocytes were subsequently washed several times in 1.1% NaCl and in others whole blood was used. No difference in the results was noted. Aliquot portions of 2 cc of blood were placed in the bottom of cups of Warburg respiration apparatus, temp. 20°C. Either 100% CO‡ or air was used in the system. CO<sub>2</sub> was absorbed by KOH in the insets in the usual way. The concentration of methylene blue added was .004% made in 1.1% NaCl. Tests were made to see if complete darkness affected the results with CO. No such effects were noted. The material was found to be remarkably uniform in behavior, and remarkably resistant to hemolysis in a wide range of NaCl concentrations.

The results are shown in Table I.

This table shows (1) that *Mustelus* blood has a considerable rate

---

\* Aid from a grant from John Wyeth & Bros. is herewith gratefully acknowledged.

† With the technical assistance of R. R. Ronkin.

1 Barron, *J. Biol Chem.*, 1929, **81**, 445, states that the action of methylene blue was nil when chicken blood was used.

‡ CO was prepared by dropping formic acid into hot concentrated H<sub>2</sub>SO<sub>4</sub> and leading the gas through soda lime.

TABLE I.  
Mm<sup>3</sup> O<sub>2</sub> Consumed in 2 to 4 Hours by *Mustelus* Blood.

	In air	In CO	In air	In CO
Added	Nothing	Nothing	Methylene blue	Methylene blue
No. of exp.	15	12	9	8
O <sub>2</sub> consumed (in mm <sup>3</sup> )	23.3	14.4	35.2	20.1
" " %	100 ±	61.8 ±	151 ±	86.1 ±
	2.7%	7.2%	5.0%	4.3%

of respiration: (2) that in air methylene blue causes an increased O<sub>2</sub> consumption of 151% over the controls in 2 to 4 hours under the conditions of the experiment—this does not confirm Barron's conclusions that methylene blue has little or not effect upon the respiration of nucleated red blood cells; (3) that CO produces a decrease to 61% (it was not determined in these experiments whether this change in the manometric readings was due to residual oxygen remaining after the atmosphere was saturated with CO, or actual CO consumption); (4) that methylene blue counteracts this decrease, increasing the rate to 86%. This increased rate in CO is about the same in percent as that produced by methylene blue in air.

## 11945

### Oral and Intramuscular Ineffectiveness of "Hypotensive" Extracts.

W. VAN WINKLE, JR.

*From the Department of Pharmacology, Stanford University School of Medicine, San Francisco.*

Administered intravenously in animals, the commonly used "hypotensive" extracts obtained from the pancreas, muscles and urine possess definite, though fleeting and complex, hemodynamic actions, with marked individual and species differences.<sup>1, 2</sup> However, the therapeutic claims for these extracts in circulatory disorders (Raynaud's disease, Buerger's disease, hypertension, angina pectoris, intermittent claudication, etc.) are based on oral and intramuscular administrations. Therefore, it was thought worth while to in-

<sup>1</sup> Lehman, A. J., and Van Winkle, W., Jr., *Arch. internat. de pharm. et de therap.*, 1938, **59**, 75.

<sup>2</sup> Van Winkle, W., Jr., and Lehman, A. J., *Arch. internat. de pharm. et de therap.*, 1938, **59**, 133.