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ORIENTATION IN THE DIBENZOFURAN SERIES

W. G. BYWATER, E. W. SMITH, G. E. BROWN, AND H. GILMAN

In connection with physiological properties of dibenzofuran types it was necessary first to determine the position assumed on the introduction of one substituent into the parent type; and, second, the effect of a substituent already present on the position assumed by a second substituent.

It has been shown that sulfonation and halogenation (chlorination and iodination) occur in the 4-position. Metallation (like mercuration and replacement of nuclear hydrogen by an alkali metal) occurs in the 2-position. As was previously established by others, nitration occurs in the 3-position.

A number of definite formulations will be given on the rules underlying the introduction of a second nuclear substituent, either like or unlike the one already present. For example, sulfonation of 4-dibenzofurylsulfonic acid gives the 4, 7-disulfonic acid; nitration of 4-bromo-, and bromination of 3-nitrodibenzofuran give the same 3-nitro-4-bromodibenzofuran; bromination of 3-acetaminodibenzofuran gives 3-amino-4-bromodibenzofuran.

Rules for orientation of the substituents in the several reduction products of dibenzofuran will also be presented.

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A STUDY OF TOTAL AND REDUCED GLUTATHIONE
WITH OXYGEN CONTENT AND CAPACITY
IN THE BLOOD OF PREGNANT AND
NON-PREGNANT WOMEN

FRED W. OBERST AND E. B. WOODS

Much speculation has been offered as to the exact nature and function of glutathione in circulating blood. It has often been considered as playing some part in cell respiration. A study has been made on total and reduced glutathione content of blood in the non-pregnant, in the pregnant during the labor and the parturition including cord blood, during the postpartum four-ten days, and in the toxemias of pregnancy. This offered an opportunity to study the relation between total and reduced glutathione in blood under conditions of varying oxygen content and capacity of systemic blood. The study also included a group of experiments in which

blood (with and without fluorides) kept at -3° , 23° , and 38°C . for periods as long as seventy-two hours was analyzed at given intervals for total and reduced glutathione. Oxygen content of the blood was also determined simultaneously with glutathione on the specimen kept at 38°C .

The rate of disappearance of pure glutathione added to water and to blood kept at 38°C . for periods as long as forty-eight hours has also been studied.

No apparent correlation was found between oxygen content and capacity of blood and the concentration of reduced and total glutathione. The reduced and total glutathione during gestation was within the general range of the normal non-pregnant. The values for the toxemias of pregnancy were approximately the same as those of the normal pregnant. Glutathione values of cord blood were somewhat higher than those of maternal blood.

Oxygen content of aerated and non-aerated blood at 37°C . decreased at a uniform rate over a period of time until oxygen depletion. Glutathione concentration did not change appreciably the first twelve hours, but thereafter decreased slowly until nearly depleted. At a lower temperature (23°C .) the rate of diminution was decreased, while at -2°C . no glutathione was lost after twenty-four to thirty-six hours. Added glutathione disappeared more rapidly from blood than from water kept at 38°C . for several days. Sodium fluoride added to blood at 37°C . slightly increased the rate of diminution of glutathione over a twenty-four hour period.

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THE OXIDATION OF GLUCOSE BY *RHIZOBIUM* *MELILOTI*

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The extent of oxidation of glucose by *Rhizobium meliloti* has been determined by comparing the amount of oxygen consumed with the theoretical amount necessary for complete oxidation to carbon dioxide and water. With M/540, M/270, and M/180 concentrations of glucose as a substrate, the rate of oxygen consump-