

Adsorption of Physiologically Active Substances by Activated Charcoal.

FELIX SAUNDERS, SYDNEY S. SCHOCHET AND JULIUS E. LACKNER.

(Introduced by F. C. Koch.)

From the Departments of Physiological Chemistry and Pharmacology, and Physiology of the University of Chicago, and the Nelson Morris Institute of the Michael Reese Hospital, Chicago, Illinois.

During the progress of some studies on adsorption, it became necessary to have some information regarding the action of activated charcoal on physiological substances. A search through the literature did not reveal any previous work except a paper by Guerrant and Salmon¹ on the adsorption of quinine. We were not concerned in this case with the mechanism of adsorption or activation. We merely wanted to know whether or not certain drugs would be adsorbed from aqueous solution by activated charcoal. To insure uniformity of results, we decided to use an activated charcoal easily obtainable on the open market.* The following drugs were studied: strychnine sulphate, brucine sulphate, adrenalin hydrochloride, histamine hydrochloride, acetylcholine hydrobromide, ephedrine hydrochloride, tyramine hydrochloride and diamino butane hydrochloride.

The activity of the drug was studied by intravenous injection. The solutions were prepared as follows: The drug was dissolved in water or physiological salt solution. 25 cc. of the solution were put into a 100 cc. flask as a control solution. Another 25 cc. portion was added to a 100 cc. flask containing 1 gm. of the active charcoal. Both solutions were then shaken for 20 minutes and filtered through a folded filter. The activity of these filtered solutions was determined by intravenous injection. Nine dogs under ether anesthesia were used as the test animals. All injections were made into the left femoral vein.

When strychnine, brucine, adrenalin, histamine and tyramine are treated with activated charcoal they are quantitatively inactivated either through adsorption or modification. In the case of acetylcholine and ephedrine the inactivation is not quite complete.

¹ Guerrant, N. B., and Salmon, W. D., *J. Biol. Chem.*, 1928, **80**, 67.

* The charcoal which we used was furnished by the Allied Carbon Company of New York. It is sold under the trade name of "Carboraffin". We are glad to have the opportunity for acknowledging their kindness in supplying us with this material.