

All of the hemolytic phenomena in Table I have been shown to be osmotic in character and not erythrolytic, as in each case the hemolysis is prevented by isotonic salt solution. To avoid the influence of saline constituents upon the speed of hemolysis unbuffered solutions were employed, hence the variations in pH of the solutions of the compounds studied. Jacobs⁸ has stated that under certain conditions variations of 0.01 pH unit may produce a measurable effect upon the degree of hemolysis of red blood cells. In these experiments where effort was made to have the solute in isosmotic concentration, pH changes of much greater magnitude did not produce measurable changes in the speed of hemolysis. However, we may emphasize the necessity of considering the reported speeds of hemolysis as relative, dependent upon a great number of factors including individual variations among animals of the same species.

Summary. An inspection of the data shows that the sugar alcohols and their anhydrides up to 3 carbon atoms in the molecule rapidly hemolyze red cells. With erythritol containing 4 carbon atoms the hemolysis is slow, but that produced by its anhydride, erythritan, is rapid. The sugar alcohols containing 5 and 6 carbon atoms in the molecule and their monoanhydrides slowly hemolyze red cells. The double anhydrides, isomannide and isosorbide, cause rapid hemolysis. Mannitol hemolyzes the red cells of several species slowly; isomannide induces rapid hemolysis of the red cells of the same species.

10930

The Electroencephalogram of Schizophrenic Patients During Administration of Vitamin B₁.

MORTON A. RUBIN.

From the Memorial Foundation for Neuro-Endocrine Research, Worcester State Hospital, Worcester, Mass.

Recent studies¹ suggest that a deficient oxygen metabolism is present in schizophrenia. Increasing the rate of oxygen consumption in schizophrenics by means of thyroid² and dinitrophenol³ has resulted in some clinical improvement. Since vitamin B₁ is known to influence oxygen consumption of the brain,⁴ it is seemed desirable to

¹ Hoskins, R. G., *Arch. Neurol. and Psychiat.*, 1937, **38**, 1261; Rheingold, J. C., *Psychosom. Med.*, 1939, **1**, 397.

² Hoskins, R. G., and Sleeper, F. H., *Am. J. Psychiat.*, 1930, **87**, 411.

³ Looney, J. M., and Hoskins, R. G., *Am. J. Psychiat.*, 1935, **91**, 1009.

⁴ O'Brien, J. R., and Peters, R. A., *J. Physiol.*, 1935, **85**, 454.

investigate its effect on the schizophrenic psychosis. The results of this study by Dr. L. H. Chase have been published elsewhere.⁵ The present report has to do with the electroencephalograms recorded during the major investigation. It has been found previously that thyroid⁶ and dinitrophenol⁷ increase the frequency of the "alpha" rhythm of the electroencephalograms. If vitamin B₁ had the same effect, more direct evidence would be at hand to decide whether the medication influenced the metabolism of the brain.

Five schizophrenic patients were given 100 mg of synthetic crystalline vitamin B₁ daily* for a period of 6 to 9 weeks. The medication was given orally except for the last 2 weeks, when it was administered intravenously. Weekly electroencephalograms were obtained from each patient for 3 weeks prior to medication, during medication and for 3 weeks after discontinuation of vitamin B₁. Small, lead disc-electrodes were placed over the occipital lobes, and potentials recorded with reference to a pair of earthed leads on the mastoid processes. Two Grass amplifiers and ink-writing undulators were employed.

The "alpha" frequency remained within normal limits of variation⁸ throughout the medication and post-medication periods. Likewise the amount of "alpha" activity (*percent time alpha*) did not vary more during medication than it did before or after vitamin B₁ administration.

Vitamin B₁ administration has no observable influence on brain potentials from normal pigeons, but does have an appreciable effect in avitaminotic pigeons.⁹ Our failure to find changes in frequency or amount of "alpha" waves in schizophrenic patients, coupled with the findings in pigeons, leads to the conclusion that the schizophrenics studied do not have an avitaminosis B₁. In addition, it follows that vitamin B₁ is not involved in the decreased oxygen consumption reported for the schizophrenic patient.

⁵ Chase, L. H., *Am. J. Psychiat.*, 1939, **95**, 1035. No significant changes were found in blood pressure, pulse rate, oxygen consumption rate, venous carbon dioxide and glutathione levels.

⁶ Rubin, M. A., Cohen, L. H., and Hoagland, H., *Endocrinol.*, 1937, **21**, 536.

⁷ Hoagland, H., Rubin, M. A., and Cameron, D. E., *J. Neurophysiol.*, 1939, **2**, 170.

* We are indebted to Merek and Co. for their generosity in supplying us with synthetic crystalline Vitamin B₁ (Betabion).

⁸ Rubin, M. A., *J. Psychol.*, 1938, **6**, 325.

⁹ Tokaji, E., and Gerard, R. W., *Proc. Soc. Exp. Biol. and Med.*, 1939, **41**, 653.