N,N-Dimethyl-p-phenylenediamine Oxidation by Serum from Schizophrenic Children

Interest in the oxidation of aromatic amines has been renewed by the work of Akerfeldt (*1, 2*) with the in vitro oxidation of N,N-dimethyl-*p*-phenylenediamine dihydrochloride (DPP) by the serum of normal and schizophrenic patients. Since a survey of the literature failed to reveal any published data concerning this oxidation reaction in the case of children, we have examined the sera from 23 children hospitalized because of psychiatric illness. The group ranged in age from 6 to 13 years. There were 5 female and 18 male children.

The Akerfeldt test (*1*) was modified slightly to yield a final solution of serum and DPP whose *p*H was between 7.00 and 7.15 (*3*). Three parameters were used in the analysis of the biochemical data. The first was the value of the slope when the optical density at 552 mμ was plotted against time. The second was the length of lag period which resulted in the majority of cases prior to the oxidation of DPP. The optical density at 552 mμ, determined 5 minutes after the addition of DPP to the serum, served as the final parameter. The length of the lag period has been shown to be a function of the amount of ascorbic acid in the serum (*1, 3*). The rate of change of optical density is the result of the influence of ceruloplasmin and the apposing activity of sulfhydryl groups (*2*) as well as other metabolites (*4*).

Observations in ten cases in which the psychiatric diagnosis (*5*) was not schizophrenia (group A) are given in Table 1. Seven cases specifically designated as schizophrenia (group B) by the attending psychiatrist, as well as an additional group of six cases in which the diagnosis of schizophrenic reaction is likely but not satisfactorily documented beyond reasonable doubt (group C), are also presented.

The biochemical criteria used to determine an abnormal response were as follows: (i) a lag period in the 0- to-1.6-minute range *and* (ii) an optical density reading of 0.39 or higher at 552 mμ after 5 minutes. Both criteria had to be met; if only one was satisfied the test was considered to be borderline.

The lag periods and optical density readings of the sera from the children in group A indicate that eight were "biochemically normal," one (No. 22) was borderline, and one (No. 21) showed an abnormal response. On the basis of these biochemical measurements, child No. 21 was thought to be schizophrenic; this interpretation was not in agreement with the psychiatric diagnosis. In the remaining nine subjects the absence of an abnormal response bore out the psychiatric diagnosis.

Of the children in group B, only in cases 5 and 14 did the results permit a prediction of schizophrenia on the basis of the biochemical data. In group C, only cases 11 and 15 met both biochemical criteria for such a prediction. The results in the cases of the remaining children in groups B and C were typical of those obtained from normal adults.

Statistical analysis of the data in groups A, B, and C failed to reveal any significant differences between the values for optical density, slope, or lag period obtained from biochemical measurement of the sera of schizophrenic children and those obtained from measurement of the sera of nonschizophrenic children. These results, therefore, offer little or no support for the suggestion that the Akerfeldt-type reaction can be used to distinguish between schizophrenic and nonschizophrenic children. Similarly, Horwitt *et al.* (*6*) were unable to distinguish, on the basis of the Akerfeldt test, between normal and schizophrenic adults.

Table 1. Biochemical parameters and psychiatric diagnosis of 23 children hospitalized because of psychiatric illness.

Case No.	Biochemical parameters: Slope	Lag period (min)	Optical density (552 mμ) at 5 minutes	Psychiatric diagnosis
		Group A		
12	0.168	3.2	0.32	Passive-aggressive
22	0.162	1.8	0.48	Chronic brain syndrome
6	0.132	3.4	0.22	Anorexia nervosa
7	0.126	4.1	0.17	Passive-aggressive
21	0.120	0.0	0.56	Passive-aggressive
1	0.120	4.0	0.17	Psychoneurosis
20	0.120	4.2	0.13	Mental retardation
17	0.120	2.3	0.32	Maladjustment, childhood
2	0.108	6.0	0.02	Emotional instability
4	0.108	3.8	0.16	Psychoneurosis
		Group B		
5	0.300	< 0.5	0.80*	Schizophrenia, autism
18	0.138	3.2	0.30	Childhood schizophrenia
8	0.138	5.5	0.03	Childhood schizophrenia
14	0.120	0.0	0.45	Childhood schizophrenia
9	0.120	4.3	0.13	Childhood schizophrenia
3	0.114	4.1	0.12	Schizophrenic reaction
13	0.084	3.8	0.13	Schizophrenic reaction
		Group C		
15	0.138	< 0.4	0.60	Schizoid personality
10	0.138	3.4	0.25	Childhood schizophrenia
11	0.170	< 0.4	0.39	Childhood schizophrenia
19	0.120	4.0	0.15	Schizophrenia (questioned)
23	0.114	5.0	0.03	Schizophrenia (questioned)
16	0.090	3.7	0.11	Schizophrenic reaction

* At 3.8 minutes.

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References and Notes

1. S. Akerfeldt, *Science* **125**, 117 (1957).
2. ———, work reported at the meeting of Brain Research Foundation, Chicago, Ill. 12 Jan. 1957.
3. M. H. Aprison and H. J. Grosz, *A.M.A. Arch. Neurol. and Psychiat.*, in press.
4. M. H. Aprison *et al.*, unpublished data.
5. We acknowledge the psychiatric assistance of Dr. J. H. Wells.
6. M. K. Horwitt *et al.*, *A.M.A. Arch. Neurol. Psychiat.* **78**, 275 (1957).

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Absorption of C^{14}-Labeled Sucrose by Alfalfa Nectaries

The physiological significance of nectar in the life of the plant has not been adequately determined. Bonnier, in 1878 (*1*), observed that reabsorption of nectar took place if it were not removed from the flower before pollination. Pankratova reviewed this subject in 1950 (*2*).

In the studies reported here, C^{14}-labeled sucrose was used to demonstrate the reabsorption of nectar and its distribution in the plant. A special capillary pipette was used to place 0.001 ml of a 40-percent solution of C^{14}-labeled sucrose on the nectary of an alfalfa flower. All