THE GALACTOSE TOLERANCE TEST IN PHENYLKETONURIA.

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IN cases where there is known to be a disturbance of metabolism it is natural to speculate upon the possible site of dysfunction in the organs and tissues of the body.

In phenylketonuria the basic biochemical error is a disordered metabolism of phenylalanine, the patient being unable to dispose of this substance at a normal rate (Jervis *et al.*, 1940). The phenylpyruvic acid in the urine of phenylketonuric patients is derived from a deamination of phenylalanine in the kidney.

Jervis and his co-workers (1940) put forward evidence to show that the normal route of phenylalanine catabolism passes through tyrosine. This conversion appears to be the stage at which the block occurs in the metabolic system in phenylketonuria.

Jervis (1947) showed that the intravenous administration of phenylalanine to rabbits is followed by an increase of a tyrosine-like substance in the blood, indicating that the conversion of phenylalanine was not due to changes occurring in the intestinal tract.

Embden and Baldes (1913) showed that when the liver is perfused with phenylalanine, tyrosine is found in the perfusion fluid. This points to the liver as being one possible site of dysfunction in phenylketonuria.

The findings of only two post-mortem examinations on phenylketonuric patients have been published. In the first (Penrose, 1939) it is stated that the liver appeared normal. In the second, reported by Coquet *et al.* (1944), perilobular fatty degeneration and stasis in the intratrabecular capillaries were noted.

Delay *et al.* (1947), in a discussion of the pathogenesis of phenylketonuria, mention the extrapyramidal signs and choreoathetotic movements observed in phenylketonuria, Kinnier-Wilson's disease and in the pseudosclerosis of Westphal-Strümpell. In the latter two diseases hepatic lesions exist, and Delay and his co-workers point out that it is not without interest to compare these lesions with those found in the liver in the post-mortem examination of the phenylketonuric patient reported by Coquet *et al.*

In the same paper (Delay *et al.*, 1947) it is stated that the galactose tolerance test performed on a phenylketonuric patient gave a result similar to that found in acute hepatitis.

The present writer has carried out galactose tolerance tests for liver function on 12 phenylketonuric patients at the Fountain Hospital. In this test 40 gm.

of galactose are given orally to a fasting patient. An excretion of 0 to 3 gm. of galactose in the urine in the following five hours is within normal limits. In none of the cases was more than 2·87 gm. of galactose excreted in the urine in the five hours following ingestion. The results obtained are given in the accompanying table.

Comment.

In the galactose tolerance test, excretion of over 3 gm. of galactose during the five hours following ingestion is considered a decreased tolerance and indicates diffuse degeneration or damage of the liver by infection or by toxins (Shay, 1931). A decreased galactose tolerance is commonly accepted as being indicative of gross liver damage. The results obtained in the 12 cases of phenylketonuria under consideration exclude the presence of any pathological condition of the liver demonstrable by this test.

Patient.	Sex.	Age.	Mental level.	Amount excreted in five hours after ingestion. Gm.
P.— P.	Female	20 yrs. 2 mths.	Idiot	0·55
I.— S.	,,	12 ,, 9 ,,	,,	0·79
L.— B.	,,	18 ,, 8 ,,	,,	0·82
J.— S.	,,	21 ,, 9 ,,	,,	0·87
F.— W.	Male	6 ,, 4 ,,	,,	0·96
C.— B.	Female	6 ,, 9 ,,	,,	0·96
P.— Pa.	,,	4 ,, 6 ,,	,,	1·05
B.— C.	Male	8 ,, 11 ,,	,,	124
D.— T.	,,	14 ,, 10 ,,	Imbecile	1·75
J.— R.	,,	7 ,, 9 ,,	Dull and backward	1·89
A.— J.	,,	9 ,, 9 ,,	Idiot	2·69
F.— T.	Female	7 ,, 8 ,,	,,	2·87

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