CXXVIII. EFFECT OF PENTOSE INGESTION ON URIC ACID EXCRETION.

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It has been stated by Thomas and his co-workers [1927, 1, 2] in a series of papers that the ingestion of small amounts of pentoses exerts a decided influence on the excretion of nitrogenous bodies by the kidneys. One of the results claimed was an increased excretion of uric acid commencing some 6 hours after the pentose had been taken by the mouth. Were this correct, it might be of definite therapeutic importance in the treatment of gout, for the pentoses are absolutely non-toxic and compare very favourably in this respect with atophan. Again, as sucrose even in doses of over 200 g. has been found by Mendel and Stehle [1915] to have a negligible effect upon uric acid excretion, the effect of pentoses would be somewhat specific and therefore of theoretical interest. The experiments were repeated therefore upon three healthy adult males in the following way. Each was the subject of three experiments; with xylose, arabinose and rhamnose respectively. 5 g. of the pentose dissolved in about 100 cc. of water were taken by mouth on a fasting stomach. At the same time samples of blood were taken for uric acid estimation and the bladder was emptied. Urine was collected at 15 or 30 minute intervals for 2 hours and thereafter at intervals of 1-2 hours till the end of the 9th hour. Samples of blood were taken for uric acid determinations at various times during the day. Estimations of pentose and uric acid were carried out on the specimens of urine. The subjects were allowed a very light lunch of bread and cheese 4 hours after the pentose had been ingested.

The estimations were made by the following methods.

(1) Uric acid in urine by Folin's method [1925] as set forth by Beaumont and Dodds [1926].

(2) Uric acid in blood by Folin's method [Beaumont and Dodds, 1926] with the added step of precipitating the uric acid as the silver salt. This was deemed a wise precaution in view of the work of Hunter and Eagles [1925] on ergothioneine in blood and the colour this compound is known to give with the uric acid reagent.

(3) Xylose, arabinose, and rhamnose in urine by McCance's methods [1926, 1929].

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Fig. 1 shows the results of one typical experiment in detail. It will be noted (a) that the excretion of pentose is almost over in 6 hours; (b) that there is no rise of uric acid excretion 6 hours after taking the pentose; (c) that although the uric acid excretion is variable from hour to hour it bears no relation to that of the pentose. The sudden fall coincident with the peak of pentose excretion is fortuitous and not shown in our other experiments. Hourly variations in the excretion of uric acid are known to occur, although no satisfactory explanation has been advanced to account for them. They are apparently not caused by fluctuations in the level of uric acid in the blood. On averaging a series of experiments these spontaneous fluctuations disappear and the following figures have been obtained by taking the average of the nine separate experiments which have been carried out.

Time after pentose ingestion (hrs)	Average rate of uric acid excretion per hour (mg.)
1-3	19.44
3-6	19.6
6-9	18.8

Fig. 1.

Uric acid and pentose curves:

Each point is plotted in the centre of the period during which that particular specimen of urine was secreted. It indicates in mg. the average amount of uric acid or arabinose excreted per minute over that period of time.

Blood-uric acid curve:

Each point indicates in mg. per 100 cc. of whole blood the uric acid present at the time the specimen was taken.

The average uric acid excretion remains very constant for these three persons and certainly does not appear to be affected by the ingestion of pentose. There is no evidence here of any regular daily fluctuation [Mendel and Stehle, 1915].

Carbohydrate such as glucose in doses of upwards of 100 g. administered by mouth raises the uric acid excretion of fasting persons who have a high blood-uric acid and a low uric acid excretion [Lennox, 1925]. It is probable that pentose would do the same, but we have no evidence on this point.

SUMMARY.

No evidence has been obtained that the ingestion of pentose has any influence upon the excretion of uric acid.

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