LETTERS TO THE EDITOR

Catechol Amine Excretion after Banana Feeding

SIR,—Marshall in a recent letter to this *Journal*[1] reported that the ingestion of bananas (which contain catechol amines in the pulp[2]) does not increase the urinary excretion of catechol amines. We have investigated this problem by feeding bananas to normal subjects with their meals and determining the subsequent excretion of catechol amines fluorimetrically. The free catechol amine excretion measured as noradrenaline equivalents increased slightly after banana feeding, but not above the normal range. After acid hydrolysis (100° for twenty minutes at pH 0–1) of these same urine specimens, however, the total (free plus conjugated) catechol amine excretion was found to be markedly elevated. The findings are shown in the following Table.

Subject	Day	Banana pulp ingested (g.)	Catechol amine excretion µg./day (as noradrenaline equivalents)	
			Free	Total
A	1	0	37	73
	2	205	48	560
	3	475	70	890
	4	0	41	150
B	1	0	43	94
	2	725	73	1660
	3	0	54	140
Normal range ..		.. .. ..	10–80	30–250
Phaeochromocytoma		.. .. .	100–2000	400–3000

Extracts of the hydrolysed urine were then chromatographed on Whatman No. 1 paper in a phenol : HCl system, and the appropriate areas on the chromatograms were eluted and assayed. The increase in catechol amine excretion after banana feeding could be accounted for as conjugates of noradrenaline and 3 : 4-dihydroxyphenylethylamine (dopamine); the latter was found in amounts 20–30 times that of noradrenaline. No increase in adrenaline excretion was found. These results are consistent with the findings by Waalkes and others that dopamine is present in banana pulp in large quantity, that noradrenaline is present in smaller amounts, and that adrenaline is not present. It was estimated from the chromatographic data that approximately one-half of the increase in total noradrenaline-equivalents after banana feeding actually represents noradrenaline and that the remainder represents interfering fluorescence from dopamine. The specific fluorescence of dopamine is 3–5 per cent of that of noradrenaline.

Bioassay of these same urine extracts was performed in an anaesthetised dog by a technique which separates qualitatively the effect of noradrenaline from that of dopamine[3]. The results were compatible with the presence of both amines. In spite of its low biologic activity relative to noradrenaline, dopamine contributed significantly to the total pressor activity of the extracts because of the large amount present. In view of this it seems reasonable to suspect that the biologic activity in banana extracts attributed to adrenaline by Marshall[1] represents in fact the effect of large amounts of dopamine.

The results show that free catechol amine excretion after banana feeding is not increased enough to produce a false positive test for pheochromocytoma.

This finding is in essential agreement with that of Marshall. If the practice of many laboratories of hydrolysing the urine to determine total catechol amines is followed, however, the ingestion of only a few bananas may easily produce levels compatible with pheochromocytoma. This source of diagnostic error may be avoided by collecting specimens on a banana-free diet or by determining free rather than total catechol amines. A full report of these findings will appear elsewhere.

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3. Goldberg, *Fed. Proc.*, in the press.

The Assay of Strychnine in Pharmaceutical Preparations of Nux Vomica

SIR,—The chromatographic separation of the alkaloids from nux vomica in its preparations prior to their spectrophotometric estimation has been described by El Ridi and Khalifa[1] using alumina and 86 per cent ethanol, and by Elvidge and Proctor[2] using oxidised cellulose.

We have found that a clean separation can be obtained using absolute ethanol on a column of highly activated alumina.

Method. Heat "Alumina for Chromatography" (B.D.H.) to 800° for six hours, cool and store in airtight containers. Pack a 1-cm. chromatographic tube "wet" with 10 g. of active alumina in absolute ethanol.

Take an aliquot of the sample containing approximately 0·5 mg. of strychnine, make slightly alkaline with N sodium hydroxide, and evaporate to about 2 ml. Mix this residue with about 1 g. of active alumina, and transfer to the top of the column with the aid of absolute ethanol. Elute at 5 to 10 drops per minute with 50 ml. of absolute ethanol under slight negative pressure. Allow the column to drain.

Evaporate the eluate to dryness and dissolve the residue in 100 ml. N sulphuric acid. Measure the absorption of the solution at 262 mμ (A) and 300 mμ (B) against a blank of N sulphuric acid, in 1-cm. quartz cells.

Then $$\text{per cent strychnine} = \frac{0{\cdot}318A - 0{\cdot}460B.}{100}$$

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Effect of Cutaneous Burn on Histamine and 5-Hydroxytryptamine in Mice

SIR,—Dekanski[1] in 1945 reported that total histamine in the body was approximately doubled in one hour after a superficial skin burn in mice. The increase was mainly due to the rise in skin histamine. In view of the importance of this finding in studies relating to metabolism of histamine, it was decided to repeat and extend this observation. Most of the histamine in the skin is contained in the mast cells[2]. It has also been suggested that mast cells might possibly contain also 5-hydroxytryptamine (5–HT)[3]. Therefore studies were made on the mast cell and 5–HT contents of the skin after a superficial skin burn.

Groups of albino mice were anaesthetised with ether and immersed in hot water at 60° for 10 seconds. After drying, the animals were placed in warm cages. A group of mice, anaesthetised and subsequently killed served as controls. Groups of mice were killed 10 minutes, 2 hours, and 24 hours after being subjected to a superficial skin burn. Mast cell spreads were made from the subcutaneous tissues, and mesentery. The histamine and 5–HT contents of the whole skin, subcutaneous tissue, outer skin, spleen and lungs were separately estimated according to the methods of Parratt and West[4]. The mast cells showed degranulation and rupture within 10 minutes after the superficial burn. The changes were essentially the same in the 2 hour and 24 hour specimens. There was no alteration in histamine or 5–HT values in any of the tissues studied as compared with normal controls. Dr. West writes us he has found similar results in rats. It is difficult to explain this difference between our results and those obtained by Dekanski[1].

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