Biochemical Pharmacology, 1964, Vol. 13, pp. 1095–1096. Pergamon Press Ltd., Printed in Great Britain.

SHORT COMMUNICATIONS

ALA dehydrase activity in liver and kidney of rats and rabbits with experimental porphyria*

(*Received* 7 *March* 1964; *accepted* 6 *April* 1964)

PREVIOUS studies carried out in our laboratory[1] and by Abbot and Rudolph[2] with experimental porphyria induced by allylisopropyl acetamide and Sedormid (allylisopropylacetyl carbamide), in rats and rabbits, showed a high urinary excretion of δ-amino levulinic acid (ALA) in rats and a slight increase of the same porphyrin precursor in rabbits. Stich[3] has reported a normal excretion of ALA in rabbits with Sedormid experimental porphyria and suggested that it could be a differential feature with human acute porphyria. In order to explain these observed differences, comparative determinations of ALA dehydrase activity in liver and kidney of normal and porphyric animals were carried out. It may be recalled that Gibson reported[4] an increase of ALA dehydrase activity in liver of rabbits with Sedormid experimental porphyria.

Experimental porphyria was induced in male Wistar albino rats, weighing 280–400 g, with Sedormid (250–300 mg/kg body wt.) and in male white rabbits weighing 1,500–2,000 g with Sedormid (200–250 mg/kg) and allylisopropyl acetamide (200 mg/kg), as previously described.[1]

Animals were sacrificed after 6–10 days of drug administration; it was usually after 3 or 4 days with a positive test of PBG (porphobilinogen) in urine (Ehrlich reaction).

ALA dehydrase activity in liver and kidney homogenates was determined according to the methods described by Gibson *et al.*[5], using cysteine as activator.

Representative results of different experiments are given in Tables 1 and 2.

TABLE 1. ALA DEHYDRASE OF NORMAL AND PORPHYRIC RABBIT TISSUE

	Activity* (μmoles PBG/hr per g wet wt)								
Normal	1	2	3	4	5	6	7		Av.
Liver	0·75	0·76	0·69	0·61	0·87	0·73	0·77		0·73
Kidney	0·48	0·38	0·36	0·46	0·47				0·43
Porphyric	8	9	10	11	12	13	14	15	Av.
Drug	AIA†	AIA	AIA	Sed.‡	Sed.	Sed.	Sed.	Sed.	
Liver	2·00	1·80	2·11	1·95	2·08	1·99	2·10	1·60	1·95
Kidney	0·97	1·11	1·04	1·13	0·88	0·99			1·02

* Each value is the average of three determinations in each rabbit. Activity in porphyric liver: 167% over the normal. Activity in porphyric kidney: 137% over the normal.
† Allylisopropyl acetamide.
‡ Sedormid.

As shown in the tables there is a definite increase in ALA dehydrase activity with liver and kidney preparations from porphyric rats and rabbits. However, the increase in rabbit liver is much higher, practically double on a gram wet weight basis, than in rat liver.

The studies of Scott[6] indicate that ALA and PBG are excreted rapidly by normal and porphyric

TABLE 2. ALA DEHYDRASE OF NORMAL AND PORPHYRIC RAT TISSUES

	Activity* (μmoles PBG/hr per g wet wt)											
Normal	1	2	3	4	5	6	7	8				Av.
Liver	0·70	0·77	0·63	0·71	0·71	0·70	0·70	0·75				0·72
Kidney	0·22	0·26	0·23	0·23	0·28	0·23						0·24
Porphyric (all Sedormid)	9	10	11	12	13	14	15	16	17	18	19	Av.
Liver	1·37	1·00	1·41	1·09	1·47	1·22	1·18	1·31	1·11	1·41	1·42	1·27
Kidney	0·56	0·50	0·62	0·43	0·54	0·43						0·51

* Each value is the average of three determinations in each rat. Activity in porphyric liver: 76% over the normal. Activity in porphyric kidney: 112% over the normal.

patients. The urinary excretion of ALA and PBG observed in our animals may be a reflection of the levels of these precursors in liver and kidney. The present data would then agree and explain our previous results[1], which showed a greater urinary excretion of ALA, a slight increase of PBG, uroporphyrins, and coproporphyrins in rats, and a minor increase in the level of ALA excretion together with much greater excretions of PBG, uroporphyrins and coproporphyrins, in rabbits. The observed urinary excretion levels would then reflect the dehydrase activity in liver and in kidney.

Cátedra de Química Biológica,
Facultad de Ciencias Exactas y Naturales,
Universidad de Buenos Aires,
Buenos Aires, República Argentina.

ANA TANCIONI
HORACIO A. TIGIER
MOISÉS GRINSTEIN

* This work was supported in part by a research grant from the Consejo Nacional de Investigaciones Cientfficas y Técnicas. República Argentina.

REFERENCES

1. H. A. TIGIER, E. A. RIVAS and M. GRINSTEIN, *Rev. Soc. argent. Biol.* **37**, 370 (1961).
2. J. D. ABBOT and S. G. RUDOLPH, *Fed. Proc.* **20**, 376 (1961).
3. W. STICH, *Klin. Wschr.* **36**, 386 (1958).
4. K. D. GIBSON, in *Ciba Foundation Symposium on Porphyrins Biosynthesis and Metabolism*, G.E.W. WOLSTENHOLME and E. S. P. MILLAR, Eds., p. 27. London (1955).
5. K. D. GIBSON, A. NEUBERGER and J. J. SCOTT, *Biochem. J.* **61**, 618 (1955).
6. J. J. SCOTT, in *Ciba Foundation Symposium on Porphyrins*, p. 51.

Biochemical Pharmacology, 1964, Vol. 13, pp. 1096–1098. Pergamon Press Ltd., Printed in Great Britain.

Effects of hydrazine and alkylhydrazines on carbohydrate metabolism of rat brain

(*Received* 20 *January* 1964; *accepted* 6 *April* 1964)

IN A previous study[1] it was observed that hydrazine (HY), unsymmetrical dimethylhydrazine (UDMH), symmetrical dimethylhydrazine (SDMH), and monomethylhydrazine (MMH) produced an initial hyperglycemia after injection into rats. The present report describes observations on the metabolism of carbohydrates in brains of poisoned rats.