TABLEAU II

EFFET DE L'ACIDE FOLIQUE (OU DE LA VITAMINE B_{12}) EN PRÉSENCE DES QUATRE BASES DES ACIDES NUCLÉIQUES SUR L'INCORPORATION DE L'ADÉNINE-8-^{14}C OU DE $H^{14}COONa$ DANS LES ACIDES RIBONUCLÉIQUES DES LEVURES NON IRRADIÉES ET IRRADIÉES

Min d'incubation	*Activité spécifique* (coups·min mM ÷ 0.01)					
	adénine-8-^{14}C			*$H^{14}COONa$*		
	non irradié + ac. fol.	*irradié*	*irradié + ac. fol.*	*non irradié + ac. fol.*	*irradié*	*irradié + ac. fol.*
15				0.82	0.14	0.57
30	6.22	5.13	5.16	4.95	3.07	4.81
60	21.59	14.33	14.51	21.21	14.85	21.86
120	37.02	23.92	24.75	40.81	29.21	40.88
180				46.71	32.68	46.92

ALEKSANDAR BEĆAREVIĆ*

Laboratoires de Morphologie animale et de Chimie biologique, Faculté des Sciences, Université libre de Bruxelles (Belgique)

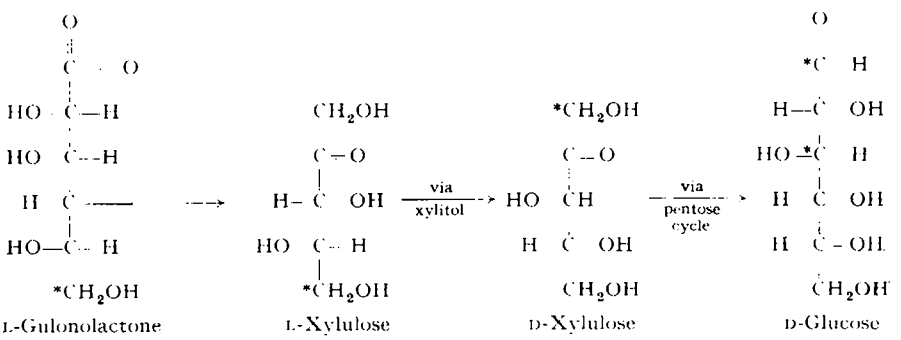
1 F. HEINMETS ET R. H. KATHAN, *Arch. Biochem. Biophys.*, 53 (1954) 205.
2 A. KELNER, *J. Bacteriol.*, 65 (1953) 252.
3 P. A. SWENSON ET A. G. GIESE, *J. Cell. Comp. Physiol.*, 36 (1950) 369.
4 A. BEĆAREVIĆ, sous presse.
5 H. CHANTRENNE, *Biochim. Biophys. Acta*, 16 (1955) 410.
6 R. ABRAMS, *Arch. Biochem.*, 30 (1951) 44.
7 H. CHANTRENNE, *Arch. Biochem. Biophys.*, 65 (1956) 414.
8 S. SPIEGELMAN, H. HALVORSON ET R. BEN-ISHAI, dans *Amino Acid Metabolism* (Editors: W. D. MCELROY ET B. GLASS), Baltimore, The Johns Hopkins Press, 1955, p. 124.

Reçu le 1 juin, 1957

* Adresse permanente: Institut des Sciences nucléaires "Boris Kidric", Laboratoire de Biologie, Beograd, Yougoslavie.

Metabolism of L-gulonolactone in rats via pentose formation

L-Gulonolactone has been shown to be a precursor of L-ascorbic acid in rats[1,2,3] and to be extensively oxidized to CO_2 in rats and guinea pigs[1]. Recent studies have demonstrated an active enzyme system in rat kidney which catalyzes the conversion of L-gulonolactone to L-xylulose[4]. Since mammalian tissues possess the enzymes required for the conversion of L-xylulose to D-glucose[5-8], the following scheme is suggested for the metabolism of L-gulonolactone:



The present communication reports evidence for the conversion of L-gulonolactone to D-glucose *in vivo* via this pathway in rats.

Two doubly labeled tracers, L-gulonolactone-1-^{14}C, -6-^{13}C and L-gulonolactone, uniform-^{14}C, -6-^{13}C* were administered to fasted rats along with unlabeled D-glucose, and the incorporation of each isotope into liver glycogen was measured (Table I). The results show marked incorporation of carbon 6 of L-gulonolactone into glycogen, averaging 28%, compared to an average of about 1% for carbon 1. Appreciable incorporation of uniformly labeled L-gulonolactone into glycogen, averaging 18%, also occurred. These results are in agreement with the postulated pathway for the metabolism of L-gulonolactone, since carbon 1 of L-gulonolactone would be lost as CO_2 and therefore would be converted to glycogen to a considerably lesser extent than either carbon 6 or carbons 2 to 6. In addition, glycogen obtained in Expts. 1 to 3 was degraded[9], and it was found that 62, 49 and 59% of the total ^{13}C in glucose was present in carbon 1 and about 3% in carbon 6. This is expected, since carbon 6 labeled L-gulonolactone would yield carbon 1 labeled D-xylulose which in turn would be converted, via the pentose cycle, to D-glucose labeled in carbons 1 and 3 with the major fraction of isotope in carbon 1[8,10]. The fate of carbon 6 of L-gulonolactone is shown by asterisks in the postulated pathway.

TABLE I

CONVERSION OF LABELED L-GULONOLACTONE TO LIVER GLYCOGEN IN FASTED RATS*

Expt.	*Labeled* L-*gulonolactone*	% *conversion* ^{14}C	^{13}C
1	1-^{14}C, -6-^{13}C	1.6	29
2	1-^{14}C, -6-^{13}C	0.81	24
3	1-^{14}C, -6-^{13}C	0.75	26
4	uniform-^{14}C, -6-^{13}C	17	30
5	uniform-^{14}C, -6-^{13}C	19	32

* Rats were fasted for 24 h and sacrificed 3 h after receiving 25 mg doses of labeled compound by intraperitoneal injection along with 600 mg glucose/100 g body weight by stomach tube.

The results of this study rule out conversion of L-gulonolactone to glycogen by reversal of its biosynthetic pathway[11]. According to this scheme the carbon chain of L-gulonolactone would be transferred, intact, to D-glucose through D-glucuronolactone so that carbon 1 of L-gulonolactone would become carbon 6 of D-glucose. From the amount of ^{14}C in carbon 6 of D-glucose after administration of the carbon 1 labeled tracer, it was estimated that less than 0.1% of the administered L-gulonolactone was converted to D-glucose by this pathway.

The findings of this study furnish evidence for the metabolism of L-gulonolactone in rats via pentose formation. The importance of such reactions in the metabolism of D-glucose *in vivo* is now under investigation.

J. J. BURNS
PETER G. DAYTON
FRANK EISENBERG, JR.

National Heart Institute and National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda, Md. and the Research Service, Third (New York University) Medical Division, Goldwater Memorial Hospital, Welfare Island, New York, N.Y. (U.S.A.)

1 J. J. BURNS AND C. EVANS, *J. Biol. Chem.*, 223 (1956) 897.
2 M. UL HASSAN AND A. L. LEHNINGER, *J. Biol. Chem.*, 223 (1956) 123.
3 J. J. BURNS, P. PEYSER AND A. MOLTZ, *Science*, 124 (1956) 1148.
4 J. J. BURNS AND J. KANFER, *J. Am. Chem. Soc.*, 79 (1957) 3604.
5 S. HOLLMANN AND O. TOUSTER, *J. Biol. Chem.*, 225 (1957) 87.
6 J. HICKMAN AND G. ASHWELL, *J. Am. Chem. Soc.*, 78 (1956) 6209.
7 B. L. HORECKER, J. HURWITZ AND P. E. SMYRNIOTIS, *J. Am. Chem. Soc.*, 78 (1956) 692.
8 P. A. SRERE, J. R. COOPER, V. KLYBAS AND E. RACKER, *Arch. Biochem. Biophys.*, 59 (1955) 535.
9 F. EISENBERG, JR., *J. Am. Chem. Soc.*, 76 (1957) 5152.
10 H. H. HIATT, *J. Biol. Chem.*, 224 (1957) 851.
11 J. J. BURNS, *J. Am. Chem. Soc.*, 79 (1957) 1257.

Received June 3rd, 1957

* This notation indicates that all six carbon atoms are labeled uniformly with ^{14}C and carbon 6 is labeled specifically with ^{13}C.