

occurred neither in our experiments nor in those of Harris and Nichols³ until after a long period of equilibration. Lyman¹ showed an increased uptake after 2-9 min. of equilibration. However, in two experiments in which equilibration time lasted for 4 hr., he also found less potassium-42 in the denervated muscle (75 and 89 per cent). As has been shown in the literature as well as in the present report, the uptake of potassium-42 by denervated muscle following a longer period of equilibration is decreased. This conclusion further corroborates our previous findings concerning the restitution of potassium following various experimental conditions which were found to be retarded^{7,8}.

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Histochemical and Biochemical Studies of Rat Liver in Experimental Cirrhosis after Partial Hepatectomy

As an outcome of our earlier work on experimental cirrhosis^{1,2} and regeneration of the liver³ it seemed of interest to study the dynamics of the regenerative process in the normal and cirrhotic liver after partial hepatectomy.

The experiments were made on 90 male Wistar rats of 170 gm. average body-weight divided into two groups and kept on a standard diet. In the animals of group 1 cirrhosis was produced with carbon tetrachloride (0.1 ml. subcutaneously every fourth day, a total of 29 doses over a 120-day period), while group 2 was untreated. Partial hepatectomy (65-70 per cent) was made on both groups and rats were killed 24, 48, 72 and 96 hr. after surgery. The removed lobes and postsurgical remnants were examined by histomorphological, histochemical and biochemical methods.

Succinic dehydrogenase activity (neotetrazolium method) in the cirrhotic liver proved to be somewhat less than in the normal one. The activity of this enzyme decreased very much in both groups 24 hr. after partial hepatectomy. This decrease in normal livers persisted unaltered for 3 days and a partial return of the activity was seen only on the fourth day. In contrast to this, the activity of succinic dehydrogenase of the regenerating cirrhotic liver reached that of the intact (unoperated) cirrhotic liver within 48 hr., and after 96 hr. closely approached that of the normal controls. The succinic dehydrogenase activity was also measured by a quantitative biochemical procedure⁴; the results of these determinations confirmed entirely those obtained by the histochemical technique.

Acid and alkaline phosphatase activities were studied both by histochemical procedures (Gomori-

Table 1. ACID AND ALKALINE PHOSPHATASE ACTIVITIES IN NORMAL AND CIRRHOTIC LIVER AFTER PARTIAL HEPATECTOMY

Hours after hepatectomy	Normal liver				
	Acid phosphatase		Alkaline phosphatase		
	Per wet weight	Per dry weight	Per wet weight	Per dry weight	
0	500	1,530	43	130	
24	323	1,075	106	351	
48	412	1,425	187	646	
72	614	2,106	122	418	
96	497	1,651	38	124	
		Cirrhotic liver			
0	295	1,143	84	324	
24	416	1,445	206	717	
48	577	2,042	360	1,274	
72	426	1,508	100	354	
96	515	1,840	116	378	

The activities are given as μgm . inorganic phosphorus liberated per hr. from β -glycerophosphate by 100 mgm. of wet or dry liver tissue. The inorganic phosphorus was determined by the method of Fiske and Subbarow (ref. 5).

Moffat) and by quantitative methods using liver suspensions^{5,6}. The results of both types of analysis were in agreement; the quantitative results are shown in Table 1. There was a substantial increase in the alkaline phosphatase activity both in the cirrhotic and normal livers 24 and 48 hr. after partial hepatectomy, the activities returning to the pre-operative levels by 96 hr.; the alkaline phosphatase activities in cirrhotic livers were generally much higher than in the normal organ. The acid phosphatase-levels were somewhat variable in normal livers after hepatectomy, but showed substantial increases in the regenerating cirrhotic livers.

In histochemical preparations the activity of lipase (Gomori's method) was seen to decrease early after partial hepatectomy in both groups of animals, but a return to normal followed quickly.

Cytochrome oxidase was also measured according to the method of Mitolo and Ruccia⁷. The activity of this enzyme showed a periodic change (decrease \rightarrow return to normal \rightarrow decrease) in the regenerating normal liver, whereas in the regenerating cirrhotic liver there was more than a threefold increase even on the fourth day after hepatectomy.

We could not observe any change in the architecture of the cirrhotic livers after partial hepatectomy. The mitotic activity seemed, however, greater in the cirrhotic post-operative remnants than in the non-cirrhotic ones during the early days of regeneration.

The results indicate that the enzymic responses of the cirrhotic liver after partial hepatectomy are more intense than those of the normal regenerating one. A more detailed study of this phenomenon and the evaluation of its significance in the regenerative process is in progress.

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