Dog No. 6. Injection of trypsin into the portal vein.

Female dog. Wt. 9.8 kg. 60 mg. amytal per kg. intraperitoneally. 8 cc. trypsin injected into portal vein.

Time	Blood Sugar		
	Shaffer-Hartmann Method	Epstein Method	
(1) 1:07	.109	.126	
(2) 1:24	.106	.116	
1:32			Injection of trypsin
(3) 1:33	.114	.113	
(4) 1:41	.113	.113	
(5) 1:48	.101	.116	
(6) 1:55	.103	.132	
(7) 2:22	.108		
(8) 3:00	.100	.117	
(9) 4:05	.093		
(10) 5:55	.093	.129	

Urine negative for sugar at all times.

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Observation on the carbohydrate metabolism of acetone-butyl alcohol fermentations.

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A study of the general reactions involved during acetone-butyl alcohol fermentations was undertaken. A general carbon balance was established in which 95 to 98 per cent of the carbon was accounted for. Efforts to write general reactions were not successful until different stages of the metabolism were analyzed separately. During the true metabolism stage, during which most of the acetone and butyl alcohol is formed, it was found that acetone is produced in accordance with the general reaction

$$C_6H_{12}O_6 + H_2O \rightarrow C_3H_6O + 3\,CO_2 + 4\,H_2;$$

while the butyl alcohol was formed as follows:

$$C_6H_{12}O_6 \rightarrow C_4H_{10}O + 2\,CO_2 + H_2O.$$

Additional products, not accounted for by a disappearance of carbohydrate, arose as a result of the reduction of acetic and butyric acids to the corresponding alcohols, and involving a decrease in the amount of H_2 evolved with a corresponding increase in the percentage of CO_2. The increase in the percentage of CO_2 is only "apparent" and not actual as far as the real carbohydrate metabolism is concerned.

During the initial growth of the culture, acetic and butyric acids are produced. In analyzing this phase one encounters the difficulty that a certain amount of carbohydrate is incorporated into the protoplasmic structure of the cells. Further study on this phase is necessary, but it is thought that the general reactions involved are of a similar character to those of the metabolism phase. Acetic acid may possibly be produced as follows:

$$C_6H_{12}O_6 + H_2O \rightarrow 2\ CH_3COOH + 3\ H_2 + CO_2 + (\text{C and O, which are incorporated into the cell structure}).$$

Similarly

$$C_6H_{12}O_6 \rightarrow C_4H_8O_2 + CO_2 + 2\ H_2O + (\text{C, used in building up cell tissue}).$$

On the other hand an intramolecular rearrangement in accordance with the metabolic requirements and activities of the cells would yield only the neutral products. The possibility of glucose being broken up as follows:

$$C_6H_{12}O_6 \rightarrow C_4H_8O_2 + 2\ H_2 \text{ and } C_6H_{12}O_6 \rightarrow 3\ CH_3COOH,$$

and the possibility that all these reactions may take place simultaneously is not excluded as far as experimental evidence now at hand is concerned. With respect to the utilization of glucose by butyric acid forming organisms the literature presents some equations which involve hundreds of molecules. One is hesitant about accepting such reactions both because of the huge proportions and also because they appear to serve primarily to give a balanced written equation without taking into account the nutritive requirements of the organism.