However, the data on this point are as yet not conclusive.

From the effects of azide in particular we conclude that adaptation to galactose fermentation involves the synthesis of one or more compounds which are not metabolic intermediates of galactose utilization, probably enzymes or coenzymes.

Summary. The effects of several enzyme inhibitors on the adaptation of yeast to galactose fermentation has been studied. The results strongly indicate that the process of adaptation involves the synthesis of one or more new enzymes.

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15503

Influence of an Alkaline Solution on Tissue Toxicity of Uranium Nitrate.

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The observation was made in this laboratory[1] that a solution of sodium carbonate would not only protect the kidney against the toxic action of a uranium salt but that it would furthermore protect it against the injurious effect of a general anesthetic body. The first part of this observation was confirmed by Goto[2] and very recently further extended by the studies of Donnelly and Holman[3] who were able to demonstrate a similar order of protection from a solution of sodium citrate. In a later paper[4] these authors and their associates attempt an explanation for this phenomenon of protection. They attribute it not to the action of a solution of sodium citrate as an alkaline medium but they believe that their "data on sodium citrate protection against uranium injury point to the maintenance of one or more vital equilibria (possibly the 'citric acid cycle' of carbohydrate metabolism) while the normal processes of repair are taking place, for we have no evidence that repair is accelerated or altered in any way." It becomes difficult to see how these authors could come to such a conclusion without employing control experiments in which sodium carbonate[1] or sodium bicarbonate[2] were used as agents to induce protection against uranium. Such an observation is especially appropriate when the fact is well established that citrates are rapidly and completely changed in the tissues to carbonates.

The way in which an alkaline solution protects the kidney, the liver and likely other tissues against a uranium injury is not known. It is furthermore not known how uranium induces its injury. Holman and Douglas[5] have shown they were able to recover from 31 to 88% of uranium nitrate from the urine of dogs during the first 24 hours of an intoxication by 5 mg of this substance per kg of weight. It is at this period that the renal injury commences and rapidly progresses. The suggestion is here repeated[1] that the cellular toxicity of uranium salts may be due to their ability to inhibit processes of intracellular oxidation and that such an inhibition is due to the characteristic of the uranium atom to be radioactive. Such an inhibition would lead to an intracellular accumulation of hydrogen ions with a change in the chemical environment in which various oxidation reduction systems exert their

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2 Goto, Kingo, *J. Exp. Med.*, 1917, **25**, 693.

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4 Donnelly, G. L., Ross, C. J., Meroney, W. H., and Holman, Russell L., PROC. SOC. EXP. BIOL. AND MED., 1944, **57**, 75.

5 Holman, Russell L., and Douglas, William A., PROC. SOC. EXP. BIOL. AND MED., 1944, **57**, 72.

influence. The fact that such a tissue disturbance does exist is shown by the observation that a reduction in the reserve alkali of the blood invariably occurs in the dog during the course of a uranium intoxication.[6] With this order of reasoning, the suggestion is made that the intravenous use of an alkaline solution: carbonate, bicarbonate or citrate, exerts its tissue protection not by the neutralization of hydrogen ions in the sense that they are as such responsible for the tissue damage, but by maintaining through such a binding or neutralizing effect an intracellular chemical environment of such an order of balance (acid-base) that various enzymatic systems can operate in an effective manner as life processes.

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15504

Effect of Parabiosis on Experimental Uremia.*

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The purpose of these experiments was to study the efficiency of peritoneal anastomosis in parabiotic rats, one member of the pair being uremic.

Putnam[1] demonstrated in cats that fluids in the peritoneal cavity came into almost complete osmotic equilibrium with the blood plasma. Ganter[2] first studied peritoneal lavage as a therapeutic measure, noting that the introduction of salt solution into the peritoneal cavity of dogs with bilateral ureteral ligation improved the resulting uremic symptoms. It has been demonstrated that peritoneal lavage can reduce the values of nonprotein nitrogenous constituents of the blood[3-6] and prolong the lives of uremic dogs[7,8] and patients.[9,10] Frank, Seligman and Fine[11] eliminated uremia in a patient with acute renal failure by peritoneal irrigation.

A number of investigators[12-15] have studied renal function by the method of parabiosis. Herrmansdorfer[12] joined pairs of rats in parabiosis with coelioanastomosis and later removed the kidneys of one of the parabionts; he was able to remove 3 kidneys from the 2 rats and maintain life without a rise in nonprotein nitrogen, or other constituents of the blood. All of these investigators produced

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