

variance with the views of Overton and Hoerber, but agrees with the observations made by Jacques Loeb, Robertson and by the botanist, Ruhland. We are well aware of the number of variable factors which are to be taken into account in the interpretation of these phenomena which may perhaps later necessitate a somewhat more complicated explanation; but we believe that comparative studies in the toxicity of stains and of various other substances will prove to be of value in the elucidation of the problems of cell permeability and of the cause of toxicity.

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The influence of calcium chloride and of adrenalin upon the secretion of urine and upon absorption from the peritoneal cavity.

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I. Intravenous injection of calcium chloride diminishes the secretion of urine. Porges and Pribram ascribed this effect to the lowering of blood pressure which follows the intravenous injection of this substance. Our experiments, we believe, show such an interpretation to be erroneous for the following reason:

If we add adrenalin to sodium chloride solutions the blood pressure rises during the intravenous injection of this fluid and we also find a noticeable increase in diuresis under the influence of adrenalin. If we now add calcium chloride to the adrenalin-sodium chloride mixture the blood pressure remains likewise very high during the intravenous injection and the ultimate fall due to the influence of calcium chloride is delayed for a considerable time, but notwithstanding the high blood pressure produced by adrenalin which is in itself a substance favorable to diuresis, the addition of calcium chloride again causes a marked decrease in diuresis. The effect of calcium chloride in diminishing the secretion of urine can therefore not be ascribed to its action on the blood pressure, but to some other condition, most probably to its direct influence upon the epithelial cells of the kidney, an interpretation originally given by John B. MacCallum.

II. As Exner and Meltzer and Auer found, the intravaneous (Meltzer and Auer) and intraperitoneal (Exner) injection of adrenalin delays the absorption of fluoresceine and other substances from the tissues, from the peritoneal cavity and from the blood vessels. On the other hand, we found that adrenalin has a distinctly accelerating effect upon absorption of isotonic sodium chloride solutions from the peritoneal cavity, if adrenalin is injected repeatedly intraperitoneally during a period of two and a half hours. This accelerating effect is absent in nephrectomized animals; it is, however, noticeable in rabbits injected twenty hours previously with uranium nitrate and is still indicated in animals injected with uranium nitrate three days before testing the absorptive power.

Adrenalin also causes an increase in the secretion of urine and the improved absorption might therefore perhaps be ascribed to the increased elimination of fluid through the kidneys. Such an interpretation seems to be strengthened, if we consider that in nephrectomized animals this effect of adrenalin is absent. On the other hand, in individual experiments, parallelism between the absorption from the peritoneal cavity and the degree of diuresis frequently is absent. In experiments concerning the effect of coffeine upon the absorption from the peritoneal cavity we found that after injection of coffeine the absorption from the peritoneum may be very slight notwithstanding a very strong diuresis. We also notice that during the first period of the action of uranium nitrate the increased diuresis is not accompanied by a corresponding increase in absorption.

Notwithstanding these possible objections, at the present we cannot yet exclude the possibility that the improvement in absorption from the peritoneal cavity under the influence of adrenalin is due to the diuretic action of this substance. The difference in absorption from the peritoneal cavity which we notice in experiments with animals after nephrectomy on the one hand and after administration of uranium nitrate on the other hand, is of interest and may perhaps be a causative factor in the edema which develops in animals injected with uranium nitrate.

Furthermore these experiments suggest that adrenalin may improve the absorption of water, but at the same time retard the absorption of sodium chloride from the peritoneal cavity. We have begun experiments, in order to decide this question.