INFLUENCE OF GLUCAGON, AN INDUCER OF

RUSSELL J. DEUEL and CHRISTIAN DE DUVE

bodies, is observed in the liver within an hour after injection (see reference 11). It has already been shown by Berthet (6) that this phenomenon

motor at about 1000 rpm., or with an all-glass homogenizer (Kontes Glass Company, Vineland, New Jersey) of the type described by Dounce et al.

Appelmans and de Duve (1) was followed to assess their osmotic sensitivity. The preparations were diluted to final sucrose concentrations ranging between 0.20 and 0.025 M and kept at 0° for 30 min; they were then brought back to the original 0.25 M concentration by addition of a suitable amount of concentrated sucrose.

Sedimentation-velocity analysis was carried out on cytoplasmic extracts by differential density-gradient et al. (9) and at a temperature of 0–2°. Special care was taken to reduce convection artifacts by following the precautions recommended by these authors. A portion of the extracts used in preparing the gradients was also centrifuged at high speed for the determination of unsedimentable activities, as described above.

All the fractions as well as the original extract were assayed for various enzymes. The extracts were also analyzed for free acid phosphatase activity before and

scribed by Beaufay et al. (4). They were further converted to a sedimentation coefficient scale by means of the approximate formula given by Beaufay et al. (3), assuming a simple linear relationship between sedimentation coefficient and radial distance. When design permitted it, the results were analyzed by factorial variance analysis and the significance of the observed effects was estimated from the value of the variance ratio F. Differences between individual means were evaluated by the multiple range test of

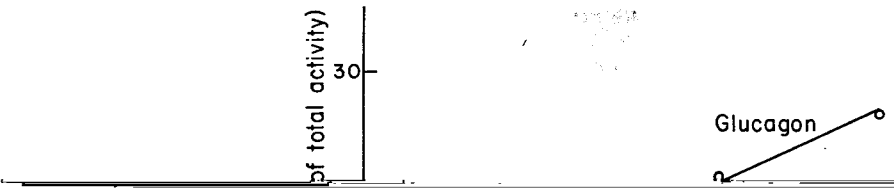


FIGURE 3 Influence of glucagon on mechanical fragility of hepatic lyso-

TABLE IV

Free Acid Phosphatase Activity of Control Preparations Exposed to 0.15 M Sucrose

Values, which are pooled from animals killed

tion of solvent, represent free acid phosphatase

concentration was chosen for a more detailed time study of the phenomenon. Potter homogenates or cytoplasmic extracts were used in these experiments. Both preparations exhibited the same

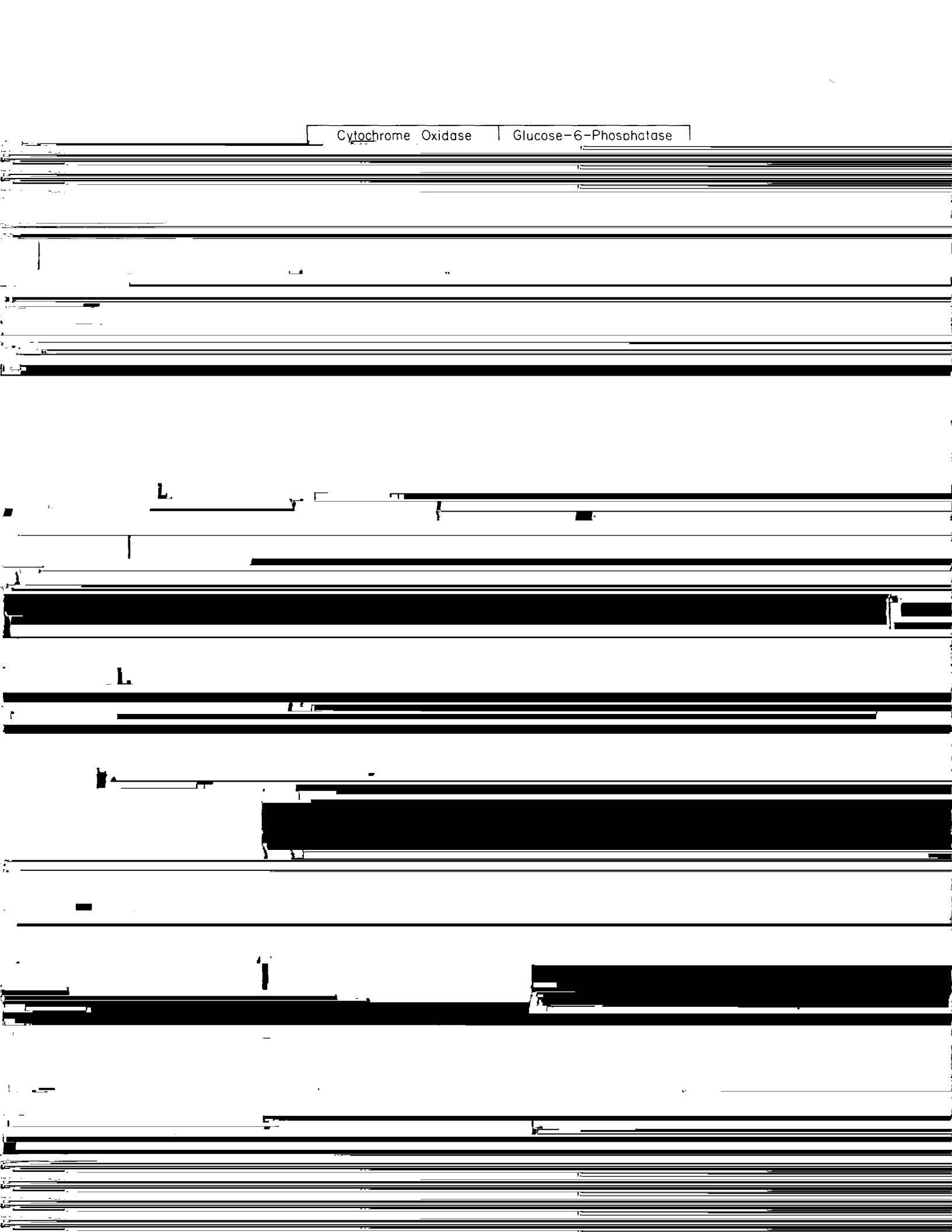
control (Table IV) and experimental series at all

shock, over and above the amount set free by solvent. As shown in Table V, the increased

Potter homogenization. osmotic fragility of the lysosomes induced by

formed on Dounce homogenates from animals homogenates. There is even an indication that

killed 1½ hr after injection of either glucagon or more particles are disrupted by the osmotic shock


Cytochrome Oxidase
Glucose-6-Phosphatase


Acid Phosphatase
Acid Phosphatase

tion diagram. The *intermediate component* was estimated by difference. Finally, the *median sedimentation coefficient* was obtained from the abscissa value corresponding to the point on the boundary curve

not be ascribed to improper control of the centrifugation conditions, since a similar increase in the median sedimentation coefficient of cytochrome oxidase was not observed. A slight, though

result of glucagon administration. In the cases of cathepsin D and acid deoxyribonuclease, which are least affected by an increase in the slow component, the increment in median sedimentation coefficient is of the order of 50%. If the particles are spherical and their density and shape remain unaltered, this would correspond, on an

a boundary in higher centrifugal fields and is at least 50% latent, suggesting that it is associated with true lysosomal particles. It is possible that small lysosomes appear as an outcome of the fusion processes believed to be involved in autophagic-vacuole formation, or that primary lysosomes are formed as a result of glucagon injection, perhaps

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