Comments and Communications

Starvation and Responsiveness of Some Laboratory Animals

BULLFROGS, in a recent shipment, were quite lethargic after storage and reacted only when they were strongly stimulated. It seemed possible that they were sluggish from starvation; therefore, they were injected with small amounts of a high concentration of glucose in Ringer's solution. The frogs staged a dramatic comeback. After a day, the screen lid of the tank in which they were kept had to be weighted down because of their vigorous hopping. It has been observed over many years that frogs are not readily induced to eat in the laboratory or even in outdoor tanks unless placed under conditions closely simulating nature. Prolonged starvation is therefore usually the result of storage. However, no tests were made to see whether the glycogen in the liver and muscle was depleted.

To get some idea of the degree of absorption of injected sugar, a series of graded injections was made and the urine was tested for overflow of glucose. Urine was accumulated in the bladder by superficially inserting a very fine insect pin on each side of the cloaca and tying the anal pore with thread. When a sample was desired the thread was released. After a number of trials, it was found that a 1.5-ml injection of 8% glucose into a 49-g grass-frog gave a positive test for reducing sugar in the urine in 1 hr. Tests for reducing sugar at various periods of time showed that about one-third of the sugar injected appeared in the urine within 7 hr, after which no more was voided. Undoubtedly, the amount of sugar absorbed depends upon the degree of starvation as well as upon the size of the animal. Presumably excess sugar is voided by the kidney, and therefore excessive amounts injected into frogs should not hurt them.

A somewhat similar observation was recently made with the sipunculid worm, *Phascolosoma agassizzi*. Proboscis retractor muscles excised from freshly collected worms served as excellent though small experimental objects, but after a few days of starvation, contractions of such muscles were visible only under a magnifier and were insufficient to lift a blade of grass used as a lever for marking the kymograph. Muscles excised several hours after injection of glucose into the body cavity of the worm showed considerably more vigorous contractions. This was particularly true if the muscles were stored overnight in 0.1% glucose in sea water at 5° C. The results are reported because they may remind others of the possible depletion of sugar reserves in various animals stored under unnatural conditions while awaiting use in classroom experiments and the decreased responsiveness which may be reversed by supplying glucose.

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Radioactive Gold

IN the September 4, 1953, issue of SCIENCE, a brief communication appeared concerning "the danger of radioactive colloids" by Elemer R. Gabrieli of the Yale University School of Medicine. In this communication, reference is made to an article by Dr. Yuhl and myself (*Nucleonics*, **11**, 54 [1953]), which concerned the development of a new technique for recording the anatomic configuration of the liver by means of intravenously administered radioactive colloidal gold (Au^{198}). This was an experimental study carried out on animals. In this article reference was made to instrument developments in this laboratory in an effort to reduce the quantity of radioactive gold to a safe level for human application. This work has been completed and the method applied to the diagnosis of space-occupying lesions of the liver in humans.

It should be emphasized that the dosage of radiogold used in this procedure does not exceed 300 microcuries, which in an average patient delivers less than 15.2 equivalent roentgens to the liver. The total body radiation from this tracer dose of Au^{198} is approximately 0.32 equivalent roentgens. The application of this procedure has been limited to those patients with known primary malignant neoplasms elsewhere in the body who are suspected of harboring hepatic metastases from such primary lesions. There has been absolutely no evidence of radiation injury to the liver or hemopoietic tissue in these patients following the administration of a single tracer dose of 300 microcuries of radiogold.

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The Production of Heinz Bodies in Normal Human Erythrocytes by Metabisulfite

THE observation was previously made, and recently extended, that Heinz bodies formed in nonsickling erythrocytes of children and adults at pH 4.0 when exposed to a 2% aqueous solution of sodium bisulfite, prepared from reagent grade crystals or from 3 grain tablets of sodium metabisulfite.[1] The same results were obtained when 0.9% sodium chloride solution was used as the solvent (pH 3.6). These structures were not present when the wet mount was made, and appeared within the time limit (15 min) set for observing the sickling preparation. They were visible only at magnifications of 950–1000 ×, and were never seen within the sickled erythrocytes of patients with either sickle cell anemia or the sickle cell trait. No previous description of these changes could be found in the literature. The Heinz bodies went through the usual stages of formation at the periphery of the erythrocyte, coalescence, extrusion from the cell (with stalks),

[1] Supplied by Eli Lilly and Co.