the test drug a large peak time, and the potency ratio between the two drugs is formed by use of doses which are equieffective at the same rigid time interval from administration. According to the preceding discussion, potency evaluations by way of ED_{50} comparisons are, to say the least, highly problematic unless they include determination of peak time as the indispensable criterion of ED_{50} and define this value with the same biometrical elaborateness as the values presented as ED_{50}s. How Median Peak Time can be determined is indicated in the preceding example.

Summary. The intertwining of temporal and intensity features of drug effects and the necessity of its consideration in their quantitation are demonstrated by two examples: 1. "Duration of effect" requires reference to an endpoint of intensity of effect; it is then appropriately determined by "median duration" and suitable confidence limits. 2. The customary "median effective dose" is meaningless as a measure of potency unless determined at the time of peak effect; thus, determination of "median peak time" and its confidence limits is the prerequisite of ED_{50} determinations.

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Increased Excretion of Dehydroascorbic and Diketogulonic Acids by Rats After X-Ray Irradiation.* (19954)

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Recent work has shown that rats excrete increased amounts of dehydroascorbic acid (DHA) and diketogulonic acid (DKA) in the urine when they are exposed to environmental temperatures of 0°C(1). In order to establish whether this increased excretion of oxidized ascorbic acid (AsA) is a specific response to cold stress or a more general one obtained from stress of other kinds, adult albino rats were exposed to a second type of stress differing from the cold environment, namely, X-ray irradiation.

Experimental. Eight rats of the same inbred strain as those used in the cold experiments(1) with starting weights of about 200 g, paired as to sex, were used. The animals were placed 2 at a time in a flat wooden box and carried to the X-ray wing of the hospital, and then returned without treatment to the constant temperature animal room and placed in individual metabolism cages. The floors and funnel portions of the cages were silicone-coated, and the 24-hour urine was collected and analyzed for AsA, DHA and DKA(2). Any possible effect of the trip in the irradiation box was thus reproduced in the controls. The control excretion was determined for 10-14 days, and then the same rats were taken back to the X-ray wing and exposed, 2 at a time, to a single, total body irradiation of 800 r, in air. (200 KV, 15 ma., 0.5 mm Cu and 3.0 mm aluminum filters, 50 cm target distance, 15 x 15 cm cone, and 25 r per minute dose rate). This dose represents an LD_{50} in 30 days in rats, and has been used by Smith and coworkers in metabolic studies(3). At each time of exposure, 2 new rats were carried along to start as controls. All irradiated animals survived the experimental period 10 days after exposure in apparent good health. The urinary excretion of AsA, DHA and DKA was determined exactly as in the control period.

Results of the analyses are summarized in Table I. As in the animals exposed to low

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TABLE I. Twenty-Four Hour Urinary Excretion of Ascorbic, Dehydroascorbic, and Diketogulonic Acids by Rats before and after Exposure to 800 r X-Ray Irradiation.

Fraction determined	No. of analyses		Avg 24 hr excretion, μg with S.D.		
	Control	Irradiated	Control	Irradiated	"F"
AsA	89	77	347 ± 269	477 ± 490	4.64*
DHA	89	77	34 ± 37	88 ± 80	31.6 †
DKA	89	77	19 ± 38	63 ± 79	21.8 †

* Probability of variance ratio "F" less than .05, greater than .01.
† " " " " " " " .01.

environmental temperatures, the daily variation in excretion was great. The increase in AsA excretion was too slight to be statistically significant. The increases in the 2 oxidized forms were about 150% for DHA and 230% for DKA, roughly comparable to the increases obtained from cold stress, and statistically highly significant.

Discussion. The increased urinary excretion of oxidized forms of AsA in 2 forms of stress as widely different as cold environment and X-ray irradiation would seem to indicate that this may be a general response to stress. The mechanism of the production of DHA and DKA in the body, and the site of this production, remain to be established.

Summary. 1. Adult albino rats were exposed to 800 r single dose total body X-ray irradiation. 2. Urinary excretion of dehydroascorbic acid increased 150% after irradiation, diketogulonic acid excretion increased 230%. 3. The increase in excretion of oxidized ascorbic acid in the urine may be a general response to stress.

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Blood Volumes of Ducks Using Human Serum Albumin Labeled with Radioiodine. (19955)

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For the past 70-odd years the literature has abounded with reports of various technics for blood volume determinations. One of the most widely used and undoubtedly one of the most precise methods involves evaluation of the plasma dilution of injected radioiodine (I^{131}) labeled human serum albumin(1,2). Using various technics blood volumes have not only been reported for the human, but also for the cat(3), dog(4), goat and horse(5), rabbit(6), and rat(7). The authors have in several of their investigations found a need for similar data on the duck, *e.g.*, in a more quantitative pathological evaluation of avian malaria in ducks(8), in a study of the normal hematology of the duck(9), in the evaluation of the hematological effects of toxic agents in the duck(10), and in a recently developed method for determination of the life of the duck erythrocyte(11).

Further study along several of these lines

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