makes it impossible to form, from these data, a satisfactory hypothesis concerning the location of excess chloride. It can only be stated that the fact that the exchangeability of the total bone chloride was less than 100% in presumably older cats with lower bone water concentrations suggests that the location of some of the chloride was less accessible in older animals. The very presence, however, of excess bone chloride makes the use of the chloride space as a measure of the extracellular fluid volume of bone unsatisfactory.

The accuracy of the chloride analysis is attested by the fact that measurements with Br^{82}, after maximum exchangeability was reached, were in close agreement with the titrometric analysis even though with Br^{82}, the only chemical measurement involved was plasma chloride. The observation that less than 5% of the observed bone chloride was present as blood chloride indicates that the samples were well cleaned of marrow and that this source of error was negligible.

Summary. 1) Observations on chloride content of bone of cats and rats revealed, in all but adult rats, that there was more chloride present than would be expected if the entire bone water content was extracellular fluid. This excess was constant at 1.53 meq 100 g of fat free dry bone in the cat over a wide range of water concentrations but, in rats, varied from a similar value in weanlings to the complete absence of an excess in 150-day-old animals. No satisfactory hypothesis could be made concerning the location of this fraction of the total bone chloride. 2) The accuracy of chloride analysis was attested by the maximum variation of 7% between titrometric determinations of chloride and determinations using Br^{82}. Studies with Cr^{51} revealed that the blood content of well cleaned bone samples contributes less than 5% of the observed chloride and less than 10% of the observed water content.

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X-Ray Photography of Human Cell Tumors in X-Ray and Cortisone-Treated Rats.* (24209)

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We wish to present a series of pictures, in reference to previously published data(1,2) showing the application of x-ray photography to the study of tumor development in treated weanling rats injected intraperitoneally with human cells. The cells implanted were from continuous cultures of HeLa, FL, and Detroit-6 strains. X-ray photography was a useful supplement to manual palpation for detection of solid tumors in the living animal. A permanent record of tumor growths in individual animals may be obtained in a series of x-ray photographs. The necessity for using a large number of animals for experimental purposes may be reduced by application of this method. This is particularly applicable when the wide variation in sizes of tumors, even under apparently uniform conditions is considered.

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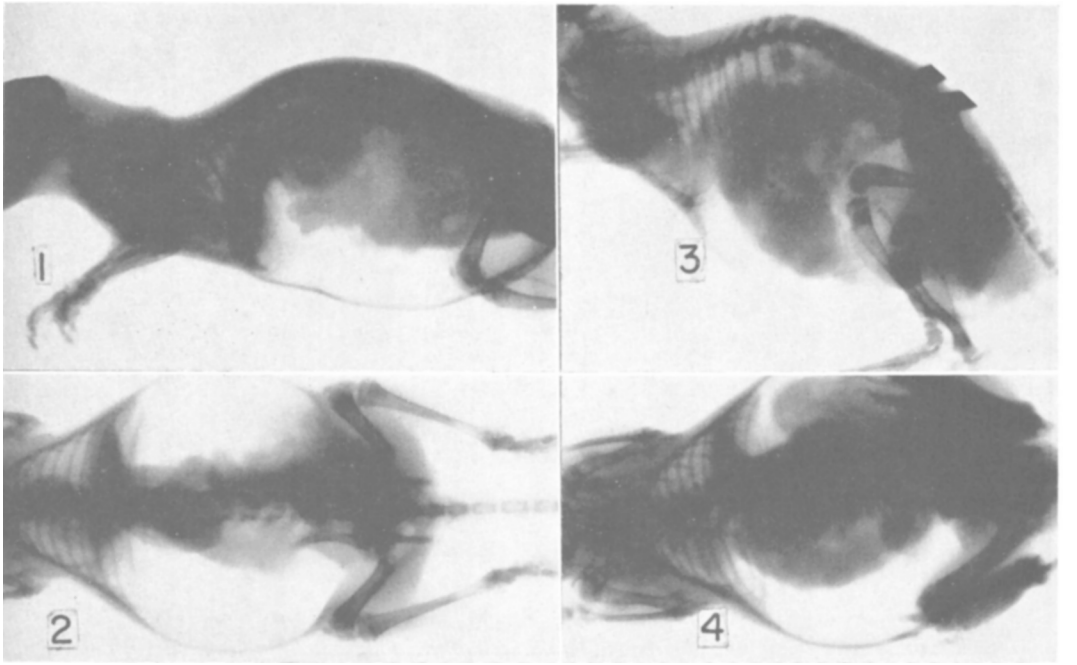

FIG. 1. Lateral view of rat (#549) without a tumor.
FIG. 2. Dorsal view of same rat.
FIG. 3. Lateral view of rat (#581) 19 days after inj. of HeLa cells. There is a medium sized tumor.
FIG. 4. Dorsal view of same rat 19 days after cell inj.

Technic. Rats to be photographed were starved overnight. The animals were anesthetized with ether, and 8-12 ml of air injected into 2 sides of the abdominal cavity. The x-ray equipment was the 100 KV Muller therapy unit, operated at 37 KV, 10 mA, with a 0.40 mm Al filter. Film target distance was 156 cm. Anesthetized animals were placed directly on the cassette and exposed in lateral view for 0.5 sec and in dorsal view for 0.5 sec. The 2 views were taken on the same x-ray film, half of plate covered with lead plate. Total dose of radiation under above conditions was 0.04 r for 2 exposures, as measured by Victoreen r-meter (Victoreen Instrument Co., Cleveland, O.). The film was the Eastman "Blue Brand," 5 x 7 inches, x-ray film designed for use with screen cassette. For further sharpness, a single screen technic was used. Screen below film was covered with opaque paper. Processing of film was standard for x-ray film.

Results. Fig. 1 to 10 show examples of x-ray pictures. No animals were lost due to this technic. Medium to large sized tumors were observed without difficulty, whereas

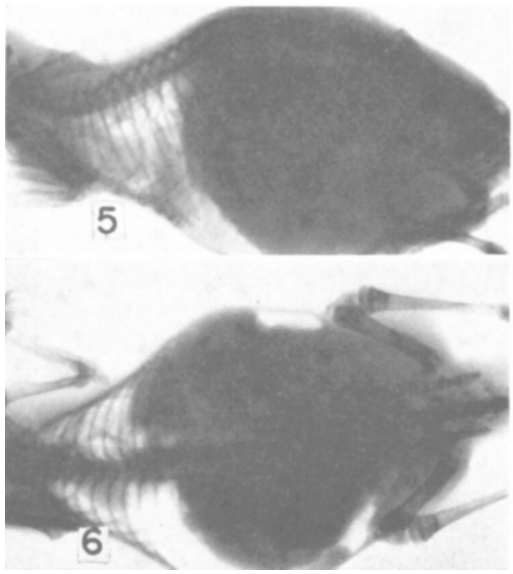

FIG. 5. Lateral view of rat (#581) 31 days after cell inj.
FIG. 6. Dorsal view of same rat 31 days after cell inj. Rat died the following day.

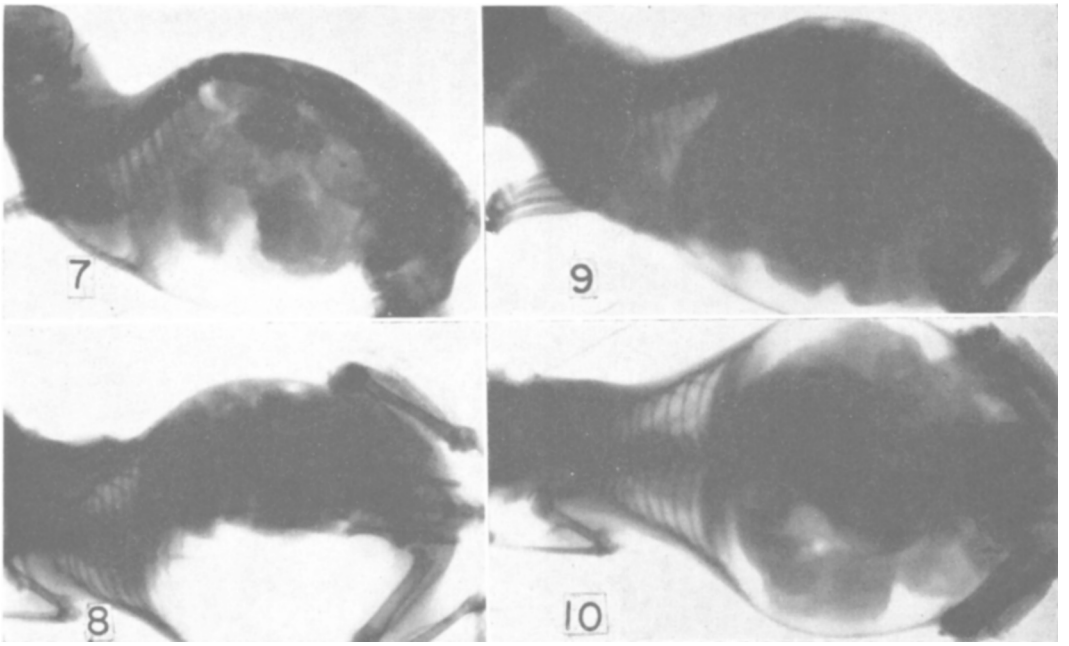

FIG. 7. Lateral view of another rat (#583) 19 days after inj. of HeLa cells. There is a small- to medium-sized tumor.

FIG. 8. Dorsal view of same rat 19 days after cell inj. Air was inj. only on one side. Picture shows that under such conditions determination of size and shape of the tumor is uncertain.

FIG. 9. Lateral view of same rat 25 days after cell inj. Tremendous increase in tumor size within the 6-day period.

FIG. 10. Dorsal view of same rat 25 days after cell inj.

identification of small tumors was unreliable. Detection of small tumors may require further refinement of technic.

Starvation of animals was an important step, since intestinal contents might mask the tumor. Air injected into the peritoneal cavity could be removed easily by needle.

Discussion. Our technic offers some advantages. Size, shape and to some extent, localization of tumors can be estimated repeatedly in the living animal. Exact measurement of size of animal can be recorded and compared to later stages of development. Animals can be used for various purposes during or after taking a series of x-ray photographs. We believe that the low dose of radiation did not affect the rat-tumor system.

Summary. Application of x-ray photography to the study of tumor development in treated rats injected with human cells is demonstrated.

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