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Effect of Infra-Red Radiation on Growth of Rachitic Rat.

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The results of a series of experiments on the biological effect of isolated bands of radiation, show that a 10 minute daily exposure to near infra-red radiation, (ranging from 720-1120$\mu\mu$) of an intensity 0.132 gm. cal/min/cm^2, will produce a definite effect upon young rats fed upon a rickets-producing diet. This effect is not fully apparent until the 5th or 6th week of experiment. The radiation causes increased growth of the animals, and prolongs by a period of 4 to 6 weeks their survival on the rickets-producing diet, without conferring any protection against the disease. Infra-red radiation, therefore, acts in a manner different from ultra-violet, and exerts a physiological action whose effect can be demonstrated.

In a limited number of animals examined, this growth-promoting effect of infra-red radiation was found to be associated with marked enlargement and hypertrophy of the thyroid gland. Irradiation with ultra-violet, in corresponding litter-mates, was found to prevent this hypertrophy whether or not the rat was exposed to infra-red radiation. This result must be corroborated by further experiment.

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The expenses of this investigation have been defrayed from a Gift Fund of the Department of Pediatrics, Yale University.

Some hyperplasia of the parathyroid gland was observed in a group of rats receiving infra-red radiation. The glands of the corresponding group, receiving ultra-violet, were of normal size.

Ash analysis of the bones of 18 rats protected against rickets with ultra-violet radiation showed slightly higher ratios between the ash and organic residue, than those of a similar group of litter mates that had received in addition to the ultra-violet, a daily exposure to near infra-red radiation.

These experiments have been in progress, in collaboration with Mr. L. A. Jones of the Eastman Kodak Company, for the past two years.

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Some Experiments on Reducing Reaction of Cerebro-Spinal Fluid.

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Benedict's copper method for determining blood sugar[1] has been applied to the study of a considerable series of spinal fluid specimens. The values obtained agree almost exactly with published results obtained by the technique of Folin and Wu. A series of direct comparisons described by Lyttle and Hearn[2] and confirmed by a few experiments in our own series showed that the difference was approximately 3 mg. %, expressed in terms of glucose. The Folin method gave the slightly higher values. It seems probable that the non-glucose reducing compounds which cause rather marked differences in the sugar values in whole blood and plasma do not enter the spinal fluid in appreciable amounts.

Since the compounds which reduce the "uric acid reagents" in acid solutions, but which are not precipitated by silver lactate are supposed to be in part responsible for these differences in blood, studies were carried out to demonstrate their presence in or absence from the spinal fluid. They either were absent, or were present in traces so slight that they could not be demonstrated.

The rate of reduction of Benedict's copper reagent by pure glucose and by spinal fluid was compared. After heating for 1 minute the apparent sugar was 1½ to 2 times as high as when the heating was continued longer. If the time of heating was between

[1] Benedict, S. R., *J. Biol. Chem.*, 1925, lxiv, 207.

[2] Lyttle, J. D., and Hearn, J. E., *J. Biol. Chem.*, 1926, lxviii, 751.