

39 (1999)

The effect of ultra-violet rays on rats, deprived of vitamine A in their diet.

By OLIVE SHEETS and CASIMIR FUNK.

[From the Biochemical Laboratory, College of Physicians and Surgeons, Columbia University, New York City.]

Experiments have demonstrated that both xerophthalmia and rickets can be prevented and cured by the administration of cod liver oil, and that rickets can be cured and prevented by sunlight and ultra-violet light.

We know that the absence of vitamine A from the diet will produce xerophthalmia, and it was believed by some workers, notably Mellanby, that the same deficiency is responsible for rickets. It is generally agreed, however, that the two above named pathological conditions are distinct entities and our experiments bear out this opinion. We have investigated whether light has any noticeable effect on growth and xerophthalmia in analogy to its effect on rickets, presumably on account of a better utilization of the stored vitamine A in the body.

With this view in mind the following experiment was undertaken:

Twelve young rats of the same age were placed upon a diet as nearly free as possible from vitamine A. The diet used was that of Osborne and Mendel (with oxidised casein and oxidised lard), and as source of B vitamine, a yeast preparation was added. The rats were divided into two lots of six each. One lot was exposed for five minutes daily to the action of a carbon arc lamp for three weeks, and for the remainder of the experiment for three minutes daily, except Sunday, to ultra violet light. The animals were kept in an animal room that received the usual amount of daylight.

CONTROLS

Rat. No.	Init. weight February 2	Fin. weight June 17	Xerophthalmia after
25 ♂	36 grams	70	134 days
26 ♂	28 grams	69	129 days
29 ♂	37 grams	86	137 days
32 ♀	43 grams	92
33 ♀	33 grams	74
35 ♀	51 grams	102

RAYED ANIMALS

Rat. No.	Init. weight February 2	Fin. weight June 17	Xerophthalmia after
27 ♂	35 grams	72	128 days
28 ♂	29 grams	70	128 days
30 ♂	32 grams	80
31 ♀	40 grams	88
34 ♀	33 grams	80	140 days
36 ♀	59 grams	110

It can be seen from the table that there was no difference as regard the rate of growth and incidence of xerophthalmia as the result of treatment with ultra violet light. We could not tell whether the earlier development of xerophthalmia in the males is of any significance or only purely accidental. A histological examination of the ribs of both series of rats was undertaken with the view to detecting rickets. The results were negative.

We are indebted to Dr. Hess for placing at our disposal the sources of light mentioned. We also thank the pathological department of the College of Physicians and Surgeons for help extended to us.

40 (2000)

The influence of light and darkness upon the development of xerophthalmia in the rat.

By G. F. POWERS, E. A. PARK and NINA SIMMONDS.

[From the Department of Pediatrics, Yale University School of Medicine, New Haven, Connecticut, and the Department of Chemical Hygiene, Johns Hopkins University, Baltimore, Maryland.]

The preventive influence of direct sunlight and of radiation with the mercury vapor quartz lamp upon the development of experimental rickets in rats has been demonstrated in experiments reported in previous studies. A logical further step was to determine whether or not direct sunlight and radiation with the mercury vapor quartz lamp would also prevent the development of xerophthalmia in rats fed diets which, under ordinary