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Comparative Studies of Histological Skin Changes Produced by X-Rays and by Lipoid Solvents

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By varying the time period of exposure and transmitting the ray through an opening 1 cm. in diameter, we have produced various degrees of x-ray burns of the skin in a series of white rats. The quantity of x-rays used varied from 5 miliampere minutes to 50 miliampere minutes. Animals were placed on high vitamin A, low vitamin A, and balanced stock rations to determine if these dietaries would produce a difference in reaction to the x-rays. Our studies, thus far, have not shown any striking differences. The characteristic gross picture is depilation over the area of skin exposed, with the persistence of a roughened, scarred skin that appears from 14 to 21 days after the exposure to the x-rays. Five miliampere minutes and 10 miliampere minutes produce no effect grossly apparent.

Microscopically the lesion is that of shrinking and edema of the epithelial layer, hyperplasia of the hair follicles, and in some cases a metaplasia of the basal layer of the skin. The subcutis shows varying degrees of hyalinization. With the high doses (50 miliampere minutes) there is a hyalinization of the subcutis and the glandular structures in it. The epithelium remains intact over the area, the higher dosages producing a pyknosis of the cell nuclei and a hyalinization of the cytoplasm.

In the second series we applied a 50 per cent coal tar or pine tar preparation to a denuded area 2 cm. in diameter. The white rat was used. The tar was painted on the area with a cotton swab every 2 or 3 days. A roughening of the skin and a gradual loss of hair

was noted grossly. Microscopically a hyperkeratosis begins at the 30th day, and gradually progresses. At 45 days there is an extensive hyperkeratosis that in some cases involves nearly the entire epithelial layer, with an extension into the hair follicles and glands of the skin.

In comparing the effect of x-rays and the tar preparations in these cases it is interesting to note that the x-rays penetrate deeply to effect the corium and structures in it, while the tar preparations act locally at the site of application. Otherwise the effect of the two are similar.

Former studies from the laboratory show that coal tar, mazola oil, mineral oil, etc., may be classed as lipid solvents.¹ When they are introduced into the subcutaneous tissue they remove the ergusia (lipoid element) from the tissues with which they come in contact. Further studies from the laboratory have shown that animals on a vitamin A deficient diet are protected for a time by certain doses of x-rays.² This indicates that x-rays must liberate this vitamin from the tissue absorbing it.

This is a preliminary report.

¹ Jorstad, L. H., *J. Can. Res.*, 1926, x, No. 2.

² Burrows, M. T., Jorstad, L. H., and Ernst, E. C., *J. Am. Med. Assn.*, 1926, lxxxvii, 86-89.

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Further Study of the Bacteriemia of Experimental Streptococcus Endocarditis.

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When the aortic or mitral valves of dogs are injured by passing a suitable steel rod down the left carotid artery, the resulting wound of the valve shows, at the end of 49 days, a hyalin-like mass at the point of injury. As late as 60 days after such injury the injection intravenously, of non-hemolytic streptococci results, constantly, in a bacterial vegetative growth on the injured area productive of petechiae, infarctions, thrombo-glomerular nephritis, and small areas in the heart muscle in which a round cell infiltration follows a punctate hemorrhage.