FLUORESCENCE OF HARDERIAN GLANDS IN MICE OF CANCER-SUSCEPTIBLE AND CANCER-RESISTANT STRAINS[1]

IN the course of routine examination of mice under ultra-violet light (G.E. B-H4) it was discovered that there was a great variation in red fluorescence in the exposed Harderian glands of mice of the various strains. The degree of variability may be expressed by the symbols 0, +, ++, +++, ++++. The two extreme variants were found in adult mice beyond 300 days of life of the JK cancer-resistant strain (0 – +) and mice of the C_3H strain cancer-susceptible (+++ – ++++). Mice of the inbred strains have shown, so far, a fair degree of constancy, whereas, mice of the NH descent, which are relatively heterozygous (F_5–F_8 generations represented) have shown marked individual variability in red fluorescence of the Harderian glands. An age variation was also observed. Before the eyes were open at 14 days, no fluorescence of orbital contents was detected. In early sexual maturity a high fluorescence was seen. This was found to decrease in intensity in JK mice with advancing age and was completely absent in old mice. This decrease in fluorescence with advancing age was not observed in C_3H mice.

Red fluorescence of the Harderian gland is an indication of the presence of porphyrins (Graflin,[2] Derrien and Turchini[3]). Little is known regarding porphyrins within the body. There is, however, some evidence to indicate that they may be involved in the synthesis or destruction of hemoglobin (Lemberg,[4] Hill and Keilin[5]). Biliverdin results from the oxidative splitting or opening of the porphyrin nucleus of haemochromogen in the liver (Lemberg[4]). It was found by Strong and Werner[6] that there was a precocious drop in the hemoglobin level in a mouse of the C_3H strain as compared with one of the JK strain. A similar finding was reported by Strong and Francis[7] in mice of the A (cancer-susceptible) and CBA (partially cancer-resistant) strains. Strong[8] suggested that this precocious drop was due to one of two possibilities; (1) that hemoglobin was being produced at a rate lower than normal, or (2) that it was being destroyed at an abnormally high rate. Porphyrins are also known to be important constituent parts of catalase (Zeile[9, 10] and Stern[11]) the Pasteur enzyme (Stern and Melnick[12]) and cytochrome c (Hill and Keilin[5]).

Thus it is clear that the present observation may be of interest in the investigation of at least two problems: (1) A genetic analysis of the occurrence and transmission of such a variant, and (2) the investigation of various physiological states as influenced by the presence, absence or abundance of such a chemical within the body. Since mice of the JK and C_3H strains show the maximum degree of difference to both cancer susceptibility and porphyrins in the Harderian gland, such an investigation should include a search for a possible relationship between porphyrins and some physiological process that may be correlated with carcinoma susceptibility.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A NEW DIGESTION TUBE

THE chemist is often faced with the problem of having to determine accurately, by means of acid digestion, small quantities of protein. During digestion, these protein solutions may bump and foam. The possible loss of material by bumping may usually be controlled by good technique. Occasionally, however, with the most careful technique, loss of material may invalidate the entire procedure.

Certain types of determinations can be effected by the use of the N.P.N. tube and the Kjeldahl flask, to mention but two of the several digestion tubes and flasks available to chemists. Few of the methods involving the use of the N.P.N. tube are accurate.