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BRIEF COMMUNICATION

STRAIN DIFFERENCES IN SUSCEPTIBILITY OF MICE AND RATS TO CADMIUM-INDUCED TESTICULAR DAMAGE

SAMUEL A. GUNN, THELMA CLARK GOULD AND W. A. D. ANDERSON

Department of Pathology, University of Miami School of Medicine, Miami, Florida, U.S.A.

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The observations of Pařízek & Zahor (1956) and Pařízek (1957a, b) on the selective destructive effect of cadmium on the testis of the rat and mouse have since been confirmed by Meek (1959), Kar & Das (1960), Gunn, Gould & Anderson (1961), Allanson & Deanesly (1962), Chiquoine (1964), Mason, Brown, Young & Nesbit (1964) and others. During studies on the induction of interstitial cell tumours of the testis by cadmium (Gunn, Gould & Anderson, 1963), we noted that cadmium failed to cause any degree of damage to the testis of the BALB/c mouse. A study was, therefore, undertaken to determine if this resistance to cadmium-induced testicular injury was unique to the BALB/c strain of mice and whether strain differences in testicular response to cadmium might also be observed in rats. A single subcutaneous (interscapular) injection of 0·03 m-mole/kg of $CdCl_2$ was chosen for the preliminary testing since overwhelming testicular destruction, without other manifestations of acute toxicity, had been reported with this approximate dosage in both rats and mice (Pařízek & Zahor, 1956; Pařízek, 1957a, b; Meek, 1959; Kar & Das, 1960; Gunn *et al.*, 1961). Animals were killed 48 hr after the injection of cadmium.

A total of 130 mature (8-week-old) male mice, composed of eighteen different inbred strains* and one random bred strain (CD-1, derived from HaM/ICR Swiss mice)† were tested. Following the administration of $CdCl_2$, necrosis was seen consistently in the random-bred CD-1 strain, as well as in ten of the inbred strains: AKR/J, CBA/J, C57BR/cdJ, C57L/J, C58/J, DBA/1J, DBA/2J, RF/J, SWR/J and 129/J. The SJL/J strain gave a variable response. Experiments with lower doses revealed that the amount of cadmium needed to produce minimal testicular damage varied within these susceptible strains.

Seven of the inbred strains of mice showed no microscopic evidence of testicular damage from $CdCl_2$: A/HeJ, A/J, BALB/cJ, C3H/HeJ, C3HeB/FeJ, C57BL/6J and C57BL/10J. Increasing the dose of cadmium to the lethal range still did not produce a testicular effect.

* The Jackson Laboratory, Bar Harbor, Maine.

† Charles River Mouse Farms, Inc., North Wilmington, Massachusetts.

A total of ninety mature (12-week-old) male rats were tested, composed of Wistars from two commercial sources (W* and CFN†), Sprague-Dawleys from two commercial sources (CFE† and SD‡), a strain descended from the Sprague-Dawley (CD*) and an inbred Fischer strain (CD-F*). All of these rats showed characteristic testicular injury, but there were indications that the dose of cadmium needed to produce minimal testicular damage may differ in the various strains and even in the same strains of rats derived from different commercial sources. This may explain why low doses of $CdCl_2$, which have been reported by others (Kar & Das, 1960; Kar, Dasgupta & Das, 1961; Mason *et al.*, 1964) as sufficient to damage the rat testis, have been completely ineffective in our hands.

Although this particular communication deals only with the male rat and mouse, strain and even substrain differences in susceptibility may explain the apparently contradictory findings presented below on the effects of cadmium in various species. Pařízek (1957b) and earlier Hessel (1926) reported that the rabbit testis was acutely damaged by cadmium; Cameron & Foster (1963) described somewhat inconsistent changes; Smith, Smith & McCall (1960), referring to experiments by Wells, Smith & Kench (unpublished), as well as Kar & Das (1962) reported that the rabbit testis was resistant to injury from subcutaneously administered cadmium. Both Chiquoine (1964) and Erickson & Pincus (1964) reported that the rooster testis was not damaged by cadmium, but conflicting reports have appeared concerning the effect of cadmium on the testis of the pigeon (Chiquoine, 1964) and dove (Maekawa, Suzuki & Tsunenari, 1964). If strain differences in response to cadmium are also found in the female, this may explain why we have not noted the ovarian changes in prepuberal rats after treatment with $CdCl_2$ described by Kar, Das & Karkun (1959). An apparent discrepancy, which also might be due to differences in susceptibility of different substrains, appears in comparing Pařízek's (1964) observations that the administration of $CdCl_2$ to pregnant rats between the 17th and 21st day of gestation caused an interruption of pregnancy, with those of Maekawa & Hosoyama (1965) who reported no abnormal changes when cadmium was administered to females on the 14th, 16th or 18th day of gestation.

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