

- 1 Acknowledgments. This work was supported by the Medical Research Council and etomidate was provided by Janssen Pharmaceutica.
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Histological changes in thyroid of rat under the acute exposure of O-chloro-benzylidene malononitrile

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Summary. This communication describes histological changes in the thyroid gland of rats under the acute stress of O-chlorobenzylidene malononitrile (CS) (10 mg/kg and 20 mg/kg). It has been observed that CS, when injected, causes histological changes in the thyroid of varying degrees, depending on the dose used.

O-Chlorobenzylidene malononitrile (CS) was originally developed as a riot control agent (Lacrimator)². Recently Chowdhury et al.³ had reported the changes in histology and cytometry of the adrenals of rats after i.p. administration of sublethal doses of O-chlorobenzylidene malononitrile (CS). The present communication deals with the histological changes of the thyroid of rats on the same treatment with CS.

Materials and methods. CS was synthesized according to standard methods⁴. 30 female albino rats (180±5 g) from the DRDE colony were used in the experiment. The animals were divided equally into 3 groups. The 1st group (group A) was the control, the 2nd and 3rd groups were injected with a solution of CS in olive oil at a dosages of

10 mg/kg (i.p.) (group B) and 20 mg/kg (i.p.) (group C) respectively for 10 days. The control animals were injected with equivalent amount of olive oil daily for 10 days. The doses were 25% and 50% of the LD₅₀⁵ for female rats (LD₅₀=40 mg CS/kg i.p.). On the 11th day, the animals were sacrificed by cervical dislocation. The thyroid was dissected out and fixed in Bouin's fluid for routine histological processes.

Result and discussion. The histological pattern of the thyroids showed an orderly arrangement of thyroid follicle with an oval nucleus (figure 1) in the control group. After the administration of CS at a dosage of 10 mg/kg, mild degenerative changes were noticed in the thyroid follicle. Follicular epithelium and nuclei in this dosage were highly hyperproliferative, and most of the follicles were filled up with a lower amount of thyroglobulin; the nuclei were vacuolated, but at the dosage of 20 mg/kg, there was complete degeneration of thyroid follicle and in addition calciolysis of the cellular material (figure 2) was observed. Histological changes of the thyroid during acute and chronic stress have been discussed by Brown-Grant et al.⁶. It has been observed by many workers⁷ that physical stresses, such as haemorrhage, trauma and the injection of irritating substances, induce a prompt and prolonged inhibition of thyroid secretion, presumably as a consequence of diminished release of TSH. The degenerative changes in the thyroid gland recorded in this paper might also be due to continuous inhibition of the secretion of TSH leading to the atrophy of the thyroid follicle; however, a direct toxic action on the thyroid cannot be ruled out.

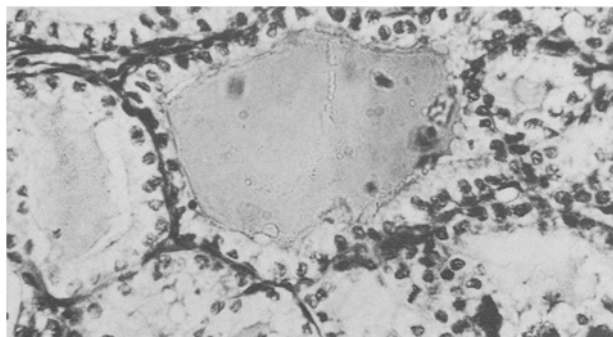


Fig. 1. Normal histological feature of thyroid gland of rat. ×200.

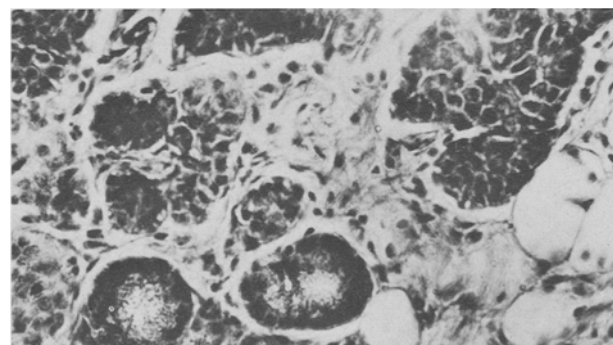


Fig. 2. 20 mg/kg CS shows the complete degeneration of thyroid gland. ×200.

- 1 The authors are thankful to Dr P.K. Ramachandran, Defence Research and Development Establishment, Gwalior for his sustained interest and critical suggestions in the course of this study. We are also thankful to Mr H.K. Taneja for microphotography.
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