

Protective effects of melatonin in endosulfan induced immunomodulation and their association with oxidative stress markers in rats

Rishi Pal^{1,2*}, Kavita Gulati², BD Banerjee³ & Arunabha Ray²

¹Department of Pharmacology & Therapeutics, King George's Medical University, Lucknow-226 003, Uttar Pradesh, India

²Department of Pharmacology, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi-110 007, India

³Department of Biochemistry, University College of Medical Sciences (UCMS) & GTB Hospital, Dilshad Garden, Delhi-110 095, India

Received 09 March 2016; revised 22 September 2017

Endosulfan toxicity affects the nervous system as well as immunological functions. It also causes oxidative stress and subsequent mitochondrial dysfunction. In the present study, we tried to evaluate the protective effects of melatonin on endosulfan (END) induced immunological and biochemical changes in rats. Wistar rats (200-250 g, n=8/group) were immunized with fresh SRBC (0.5×10^9 cells/kg) and were exposed to END (4-16 mg/kg, orally), simultaneously exposed animals were treated with vehicle or melatonin (10 and 50 mg/kg) for 14 days. On day 15, their blood and spleen was collected for immunological assays and oxidative stress markers. Endosulfan (8 and 16 mg/kg) significantly suppressed (i) anti-SRBC antibody titer; (ii) footpad thickness; (iii) spleen PFC counts; and (iv) Th₁ (IFN- γ) & Th₂ (IL-4) and significantly increases serum TNF- α level as compared to controls ($P < 0.05$ in all parameters). Endosulfan induced immunological changes were found associated with changes in oxidative stress markers as evidenced by the results of this study. Endosulfan, while significantly decreased GSH, SOD and CAT activity ($P < 0.05$), it increased serum TBARS activities ($P < 0.001$). These endosulfan induced changes in immunological and biochemical parameters were found significantly reversed by the treatment with melatonin (10 and 50 mg/kg) in a dose dependent manner by differential degrees. Results of the present immunological and biochemical data suggest the protective role of melatonin in endosulfan induced immunomodulation which is associated with oxidant/antioxidant imbalance.

Keywords: Cytokine, Immunomodulation, Melatonin, Oxidative stress, Pesticide toxicity