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Investigation of Some Immune System Parameters and GFAP Immunoreactivity in Convulsive and Non-Convulsive Seizures in Rats

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Abstract: The aim of this study was to investigate the systemic humoral and cell-mediated immune system parameters, and glial fibrillary acidic protein (GFAP) immunoreactivity in non-convulsive absence epilepsy and pentylenetetrazole (PTZ)- induced generalized tonic-clonic seizures. Animals were divided into three groups: i. the control group, ii. the genetic absence epilepsy WAG/Rij group, and iii. the chronic generalized tonic-clonic convulsion group injected with PTZ. After the experimental procedure, blood samples were collected intracardially, and CD3+ (T cells), CD4+ (T helper), CD8+ (T cytotoxic), CD19+ (B cells) and CD25+ (IL-2 reseptor, active T cell) cell ratios were determined by indirect immunoflourescence in FACScan, and serum IgG, and IgA, IgM levels were evaluated by using rat radial immunodiffusion plates. After decapitation, the brains were removed and GFAP staining was evaluated in the caudate nucleus, thalamus, hippocampus, amygdala and cerebellum by immunohistochemistry. The evaluated immunological parameters were found to be significantly increased in the convulsion group given PTZ when compared with WAG/Rij and normal Wistar albino rats. In WAG/Rij rats, only CD8+ and CD19+ cell ratios were higher than in normal Wistar albino rats. IgM and IgA levels were found to be increased in both the PTZ group and WAG/Rij rats. GFAP+ cells did not differ among the groups except in the caudate nucleus where the GFAP+ cells were lower in WAG/Rij rats than in the other groups. Our findings indicated that PTZ-induced convulsions activated both humoral and cellular immunity without inducing gliosis. However, in rats with genetic absence epilepsy, humoral immune system parameters in particular were increased, and there were also significant changes in GFAP immunoreactivity. These results suggest that cellular and humoral immunity may contribute to the etiopathogenesis of epilepsy.

Key Words: Absence epilepsy, tonic-clonic seizures, PTZ, immune system, astrocytes, immunohistochemistry.

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