

A Testicular Autoantigen Capable of Binding IgG Is Expressed by Undifferentiated Spermatogonial Stem Cells after Busulfan Treatment

이미숙, 권득남, 박찬규*, 김진희

Dept. of Dairy Science, Division of Applied Life Science,
Gyeongsang National University

* Laboratory of Molecular Genetics, Department of Animal Biotechnology,
Cheju National University

Identification of spermatogonial stem cell-specific surface molecules is important in understanding the molecular mechanisms underlying the maintenance and differentiation of these cells. We have found that spermatogonia from busulfan treated mice expressed an autoantigen that distinguishes between undifferentiated and differentiated spermatogonia. Four to six weeks after busulfan treatment, germ cells located in the basal compartment of seminiferous epithelium show isotype-specific IgG deposits that form due to autoimmunity. Before busulfan treatment, the level of testicular IgG was very low but IgG levels began to increase after week 4 and peaked at week 6. When cells from the busulfan treated testis were analyzed using laser scanning cytometry (LSC), the frequency of cells positive for IgG deposits, 6-integrin, and 1-integrin were $16.5 \pm 3.8\%$, $11.8 \pm 2.6\%$, and $9.0 \pm 1.4\%$, respectively. Immunofluorescent staining suggested that most, if not all of the cells with IgG-deposits isolated from a laminin-coated dish, were also positive for a spermatogonial stem cell marker $\alpha 6$ -integrins as well as for a germ cell-specific marker TRA 98. We determined serum and intratesticular IgG levels and the soundness of seminiferous tubule basement membrane from busulfan treated mice using electron microscopy, in order to study the mechanism responsible for IgG deposits in spermatogonia. We found that the basement membranes of seminiferous tubules from busulfan treated mice were severely impaired when compared to those of normal adult, neonates and w/wv mice. Furthermore, new blood cells were observed in the surface of the damaged basement membrane along the seminiferous tubules. These results suggest that the IgG in spermatogonial stem cells accumulates from circulating blood through the impaired basement membranes induced by busulfan treatment. Taken together, our study suggests that IgG can be used as a new marker for undifferentiated spermatogonia cells.

Key words) *autoantigen, IgG, busulfan, LSC, spermatogonial stem cells*