Role of ganglioside GM1 expression in T lymphocytes membranes in cervical cancer development

Damir Danolić, Marija Heffer, Jasenka Wagner, Ivana Skrlec, Ilija Alvir, Ivica Mamić, Lucija Šušnjar, Luka Marčelić, Tomislav Bečejac, Mario Puljiz

¹University Hospital Center Sestre Milosrdnice, University Hospital for Tumours, Zagreb, Croatia

²Faculty of Medicine, University of Osijek, Osijek, Croatia

³University Hospital Center Zagreb, Zagreb, Croatia

Introduction

Cervical cancer is worldwide the second most common cancer in females. Immune response appears to be a key determinant in controlling human papilloma virus (HPV) infection (1). Cell mediated immunity plays a significant role in progression or regression of neoplastic cervical lesions. Lipid rafts have essential role in T lymphocyte activation (2,3). Gangliosides play an important role in the formation and stabilization of specific cell lipid membrane domains (4, 5). This study aims to determine whether ganglioside GM1 expressions in T cell membrane represent risk factor for cervical cancer.

Methodology

In total, 20 women participated in our study. Peripheral blood samples were obtained from 10 cervical cancer patients and 10 healthy controls at University Hospital for Tumors, Zagreb, Croatia. A 3 mL sample of venous blood was collected from each subject into a test tube containing EDTA as anticoagulant. For T cell subtypes isolation we used Anti CD4 Phycoerythrin antibody and Anti CD8 Peridinin Chlorophyll Protein Complex antibody. Ganglioside GM1 expression in T lymphocytes membranes was analyzed using double labeling antibodies on ganglioside GM1 and cholera toxin.

Results

We have not found difference in ganglioside GM1 expression in T lymphocytes membranes between the two groups (Figures 1. and 2.).

Figure 1. Comparison of ganglioside GM1 expression in T lymphocytes membranes using double labeling antibodies on ganglioside GM1. The difference between the groups was not statistically significant ($t = -0.67$; $df = 18$; $P = 0.549$).

Figure 2. Comparison of ganglioside GM1 expression in T lymphocytes membranes using cholera toxin. The difference between the groups was not statistically significant ($t = -1.468$; $df = 18$; $P = 0.166$).

Conclusion

The present study did not show association of ganglioside GM1 expression in T lymphocytes membranes with cervical cancer development.

References

1. Stanley M. Immune responses to human papillomavirus. *Vaccine* 2006 30;24 (Suppl 1): S16-22.
2. Inokuchi J, Nagafuku M, Ohno I, Suzuki A. Distinct selectivity of gangliosides required for CD4+T and CD8+ T cell activation. *Biochim Biophys Acta*. 2015; 1851: 98-106.
3. He HT, Lelloucha A, Margueta D. Lipid rafts and the initiation of T cell receptor signaling. *Seminars in Immunology*. 2005; 17: 23-33.
4. Sonnino S, Mauri L, Chigorno V, Prinetti A. Gangliosides as components of lipid membrane domains. *Glycobiology*. 2007; 17: 1-13.
5. Lopez PH, Schnaar RL. Gangliosides in cell recognition and membrane protein regulation. *Curr Opin Struct Biol*. 2009; 19: 549-557.