



## Does Epstein - Barr Virus Cross Talks with Sex Hormone Receptors on Lymphoid Cells Differently to Produce Lymphoma?

Ahed J Alkhatib\*

*Department of Legal Medicine, Toxicology of Forensic Medicine, School of Medicine, Jordan University of Science and Technology, Jordan*

**\*Corresponding author e-mail: [ajalkhatib@just.edu.jo](mailto:ajalkhatib@just.edu.jo)**

*Received on: 04-01-2018; Revised on: 05-01-2018; Accepted on: 15-01-2018*

### ABSTRACT

It has been recently reported that the idea of cross-talks between hormone receptors including estrogen receptor (ER) and progesterone receptor (PR) in breast cancer to have significant impacts on breast cancer. The interactions of Epstein - Barr virus (EBV) and lymphoma have been previously demonstrated by many studies including ours. In this study, we aimed to examine the hypothesis that "EBV crosstalk with sex hormones plays a role in directing the type of lymphoma, Hodgkin's Lymphoma (HL) or non -Hodgkin's Lymphoma (NHL)". We studied the expression of sex hormones, ER, and PR in addition to EBV in lymphoma cases representing HL and NHL. Immunoperoxidase staining was used to assess the expression of these biomarkers in lymphoma cases. The findings of our study showed that EBV cross talks with ER significantly associated with HL ( $p < 0.05$ ), while its talk with PR was significantly associated with NHL ( $p < 0.05$ ).

**Conclusions:** The results of the present study showed that EBV may work as the maestro of an orchestra and leads the events of lymphoma through different crosstalk with sex hormones. This may open the door for new therapeutic options for lymphoma.

**Keywords:** Lymphoma, Cross-talk, HL, NHL, Epstein - Barr virus

### INTRODUCTION

In their review study, Grywalska and Rolinski (2015) reported that the Epstein-Barr virus (EBV) was proved to be associated with the pathogenesis of cancer. EBV belongs to the Herpesviridae family Arvey et al., EBV has adopted some mechanisms to keep integrity of viral genome and to escape from the immune system of the host in the latent stage of infection through the expression of various genes. It is thought that this expression facilitates the occurrence of malignancies. EBV has the ability to invade various types of cells leading to disease variations including B-cell lymphoma (Middeldorp et al., Rasul et al.,).

### EBV and lymphoma

Several studies have reported the link between EBV infection and Hodgkin Lymphoma (HL) (Grywalska and Rolinski), and the presence of EBV in Hodgkin/Reed-Sternberg (HRS) was confirmed by researchers such as Weiss et al, and Takeuchi et al. On the other hand, Non-Hodgkin Lymphoma (NHL) includes a variety of lymphomas such as Burkitt Lymphoma (BL) and diffuse large B-cell lymphoma (DLBCL) (Rosenwald and Ott; Chabay and Preciado) [1-9].

### Cross talk between EBV and microenvironment in the pathogenesis of lymphomas

In his study, Dolcetti (2015) indicated to the ability of EBV to modulate microenvironment to make it more appropriate for cell transformation [4]. EBV can increase the production of various factors to improve the growth and/or the survival of lymphoid cells and to facilitate their escape from immune system reactions. There is an existing complex interplay between lymphoid cells infected by EBV and tumor microenvironment, which is expected to have therapeutic potential against EBV-driven lymphoid malignancies.

In this study, we present our data in which we think that we

have got unique patterns that, up to the best of our knowledge, are the first reports to describe cross-talk patterns between EBV and sexual steroid hormones estrogen receptor and progesterone receptors on lymphoid cells to determine which type of lymphoma may result. Our preliminary data showed that EBV cross talks with ER resulting in HL ( $p<0.05$ ). On the other hand, the cross- talk of EBV with PR results in NHL ( $p<0.05$ ).

#### CONCLUSIONS

The results of the present study showed that EBV may work as the maestro of an orchestra and leads the events of lymphoma through different cross-talks with sex hormones. This may open the door for new therapeutic options for lymphoma.

#### REFERENCES

1. Rosenwald, G. Ott., *Ann. Onco.* **2008**, 19 (4), 67-69.
2. Aaron, T. Italo, T. Kevin, C. S. Horng, T. Nadezhda, K. Michael, L. Christina, M. Paul., *Cel. Ho. Mic.* **2009**, 12, 233-245.
3. E. Abu, E. Rasul, N. Noémi, S. Ebba, A. Mónica, C. Hans-Erik, K. George, K. Eva., *J. Immuno. Met.* **2012**, 385 (1-2), 60-70.
4. R. Dolcetti., Cross-talk between Epstein-Barr virus and microenvironment in the pathogenesis of lymphomas. *Seminars in Cancer Biology.* **2015**, 34.
5. E. Grywalska, J. Rolinski., Epstein-Barr Virus–Associated Lymphomas. *Seminars in Oncology*, **2015**, 42 (2), 291-303.
6. H. Takeuchi, R. Kobayashi, M. Hasegawa, K. Hirai., *Arch. Virol.* **1997**, 142, 1743-1756.
7. M. Jaap, A. Middeldorp, J. Cvan, J. L. Chris, M. Meije., *Crit. Rev. Onco. Hema.* **2003**, 45 (1), 1-36.
8. P.A. Chabay, M.V. Preciado., *Int. J. Can.* **2013**, 133, 1286-1292.
9. L. M. Weiss, J. G. Strickler, R. A. Warnke, D. T. Purtilo, J. Sklar., *Ame. J. Path.* **1987**, 129 (1), 86-91.