EPSTEIN BARR VIRUS AND ITS ROLE ON BURKITT LYMPHOMA AND MULTIPLE SCLEROSIS

Andrea Aira Gomez, Grau de Microbiologia, Universitat Autònoma de Barcelona, 2015. (andrea_aira@hotmail.com)

Introduction

Epstein Barr virus (EBV) is one of the most common human viruses (affecting 95% of world population) and causes numerous infectious, but also it is known for its properties of causing deregulations of the host immune system and establishing latency in B lymphocytes.

Here, there is a compilation of results from diverse studies which debate the role of EBV in two diseases: Burkitt lymphoma and Multiple sclerosis, in order to comprehend its importance in these processes.

Burdick lymphoma (BL) is a neoplastic disease that affects human B lymphocytes and it is presented multifocal, but is found typically in the area of the jaw [Figure 3]. BL is not frequent and usually affects children aged 3-13 years with a peak of incidence at 6 years and it is more common in boys than girls. In untreated cases it provokes death.

There are three types of BL: Endemic (or African) BL, related with the presence of EBV; sporadic BL and immunodeficiency associated BL.

It is known that EBV can transform and drive B cells into unlimited proliferation in vitro. It has been observed that most tumour cells from endemic BL contains multiple EBV genomes and infectious viruses can be found in tumour cell lines.

EBV-BART-6-3p miRNA specially plays an important role in BL pathogenesis, affecting the function of important signal transducers involved in regulating the cell cycle.

Although EBV has these abilities, it is not enough to cause pre B BL and there are two possible factors that affect the regulation of apoptosis in BL: Malaria and MCV translocation.

MYC TRANSLATION between the long arm of chromosome 8 and 12 or 22 is a critical event in lymphoma’s formation.

MYC protein is a potent inducer of proliferation causing apoptosis and its deregulation in homozygous B cells.

EBV infected B cells present typical somatic hypermutation regions which suggests that they have passed through the germinal centre where it is found the activation-induced cytidine deaminase (AID) gene, responsible for MYC translocation.

There are different types of EBV latency classes:

1. **EBV type I latency**: EBV expresses all EBNA, IP, 3 LP, and LMP1. EBV expresses this pattern in IM and some post-transplant lymphoproliferative disorders (PTLDs).

2. **EBV type II latency**: Only EBNA1 and EBER are expressed. It is common in Burkitt lymphoma.

3. **EBV type III latency**: EBNA1-4, BZLF1, LMP1, LMP2A and EBER1 and EBER2 are expressed. This pattern is present in EBV-positive Burkitt lymphoma and PTLDs.

For reactivation is necessary to replicate viral genomic DNA and the synthesis of specific proteins for packing the newly DNA into infectious virions.

EBV B lymphocytes can also present specific CD8+ T cells that recognize antigens as EBV.

Conclusions

- EBV is able to regulate the host immune response in lytic and latent infections and remain invisible for long periods. That difficult the control and possible eradication of this virus.

- EBV latent genes and miRNAs are essential for inducing B cells proliferation and tumours generation.

- EBV infection is a prerequisite for the development of BL and MCV but it is not enough by itself to cause these diseases.

- The association between malaria, EBV infection and MCV translocation is strongly related with BL development. The eradication of malaria could decrease the incidence of BL.

- Controlling EBV infection could be important between EBV infection and other viruses infections are needed to have convincing results.

- There is no vaccine to protect against EBV.

- There is no treatment for EBV but there are advices for relieving symptoms in IM.

- In sporadic BL cases there is a treatment with antineoplastic agents which produces an improvement in 80% of cases.

- MS has no defined treatment but sunlight and vitamin D protect against that disease.

- The switch from latency to latency replication cycle is a critical step in virin spreading Fta regulates this change and it is a possible target for future vaccines.

References


