EBV Viral Load Assay to Diagnose and Monitor Epstein-Barr Virus-Related Neoplasia

The UNC Hospitals Molecular Genetics Laboratory performs real-time PCR to quantitate EBV DNA in blood plasma and cerebrospinal fluid (CSF). Results contribute to diagnosis and monitoring of patients with post-transplant lymphoproliferative disorder (PTLD), nasopharyngeal carcinoma, or AIDS-related brain lymphoma.

Pathobiology of EBV infection and Clinical Utility of EBV Viral Load Measurement

Nearly every human becomes EBV infected by the time they reach adulthood. The vast majority of infections are brought under control by the immune system, and EBV persists in symbiosis with its human host. A small fraction of patients develop EBV-related tumors such as PTLD, nasopharyngeal carcinoma, or AIDS-related brain lymphoma. In affected tumors, the virus is localized to all malignant cells, suggesting viral presence before malignant transformation and utility of EBV as a tumor marker as manifest by high levels of circulating EBV DNA. Serial plasma EBV DNA levels reflect tumor burden over time.

Clinical Indications for Testing:

Transplant patients at high risk for developing PTLD are monitored so that pre-emptive therapy may be considered. Therapeutic efficacy is gauged based on the relationship between circulating EBV load and tumor burden. Healthy recipients usually have plasma EBV levels below 700 IU/mL.

In HIV infected patients suspected of having CNS lymphoma (per clinical and radiographic findings), EBV DNA in CSF strongly favors a diagnosis of lymphoma, potentially averting the need for brain biopsy.

In nasopharyngeal carcinoma patients, plasma EBV load correlates with tumor stage, and serial EBV load reflects tumor burden and is a harbinger of relapse.

Specimen requirements and methods: The preferred sample is EDTA anticoagulated blood (3mL purple-top) or cerebrospinal fluid (1mL). Quantitative PCR amplifies a segment of the EBV EBNA1 gene using analyte specific reagents from Qiagen on an Abbott m2000 instrument. Assay calibration is traceable to the World Health Organization International Standard. The assay is sensitive to as few as 50 IU/mL, and measurable values below this level are reported as “Detected, <50 IU/mL”. Technical variability is two fold so, for example, a viral load reported as 1,000 IU/mL represents a value between 500 and 1,500 IU/mL.

Normal Range: EBV DNA is undetectable in plasma or CSF of healthy individuals. EBV serology is useful for diagnosis of primary infection in immunocompetent hosts.

References:

Questions?
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