WHITEPAPER

Oncoviruses:
Viruses That Can Cause Cancer

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One of the defining features of viruses is their ability to "hijack" the cellular machinery of their host to ensure their survival and proliferation.[1] Most viruses are relatively benign.[1] However, a select few viruses are known to increase the likelihood of cancer, particularly when coupled with other contributing factors such as immunosuppression or co-carcinogens.[1] These viruses are termed oncogenic viruses or oncoviruses.[1] Globally, oncoviruses contribute to an estimated 12-20% of all human cancers.[1,3,4]

Oncoviruses are a heterogeneous class of viruses, but they generally have several features in common: they are mostly DNA viruses, they mainly encode growth-stimulating proteins, and they establish persistent, long-term infection in the host.[2] Infection with oncoviruses may cause cancer due to cellular dysfunction from chronic inflammation, genomic instability from viral genome integration, and dysregulation of tumor suppressor genes and other oncogenes in the host cells.[1] These virus-induced cancers typically do not arise acutely after infection but may develop 15-40 years later.[5]

There are currently seven known oncoviruses:[3]

Epstein-Barr Virus (EBV): EBV, a member of the herpesvirus family, is associated with 40% of Hodgkin lymphoma cases, over 95% of endemic Burkitt lymphoma cases, most type II and III nasopharyngeal cancers, and some cases of stomach cancer.[3] It is often referred to as the "kissing disease" because it causes infectious mononucleosis.[5]

Hepatitis B and C viruses (HBV and HCV): Chronic infections with these viruses can lead to liver cancer (hepatocellular carcinoma).[3] Both viruses can cause long-term liver damage and cirrhosis.[5]

Human Papillomavirus (HPV): HPV is one of the most well-known oncoviruses. It is responsible for over 95% of cervical cancer cases, as well as some cases of anal, throat, and genital cancers.[3] Vaccines against certain high-risk HPV strains have been developed to reduce the risk of these cancers.[3]

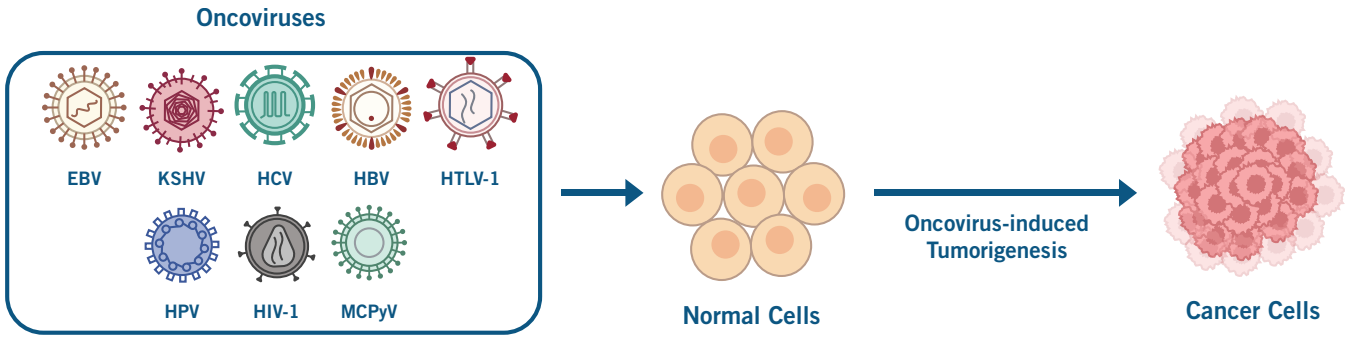
Human T-cell Leukemia Virus-1 (HTLV-1): HTLV-1 is linked to the development of nearly all adult T-cell leukemia/lymphoma (ATLL) cancers.[3]

Kaposi's Sarcoma Herpesvirus (KSHV): KSHV, also known as Human Herpesvirus 8 (HHV-8), is associated with Kaposi's sarcoma, a cancer that often occurs in immunocompromised individuals, such as AIDS patients.[3]

Merkel Cell Polyomavirus (MCPyV): MCPyV has been linked to 80% of cases of Merkel cell carcinoma, a rare and aggressive skin cancer.[3]

Preventive measures, such as vaccines against HPV and HBV, have been developed to reduce the risk of virus-induced cancers.[3] However, the role of oncoviruses in cancer development continues to be a subject of study for both prevention and the development of targeted therapies for virus-associated malignancies.[1]

Oncoviruses Illustration



To learn more about assays for the viruses listed above, please visit our websites at biocare.net and empiregenomics.com or call 1-800-799-9499, option #3

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