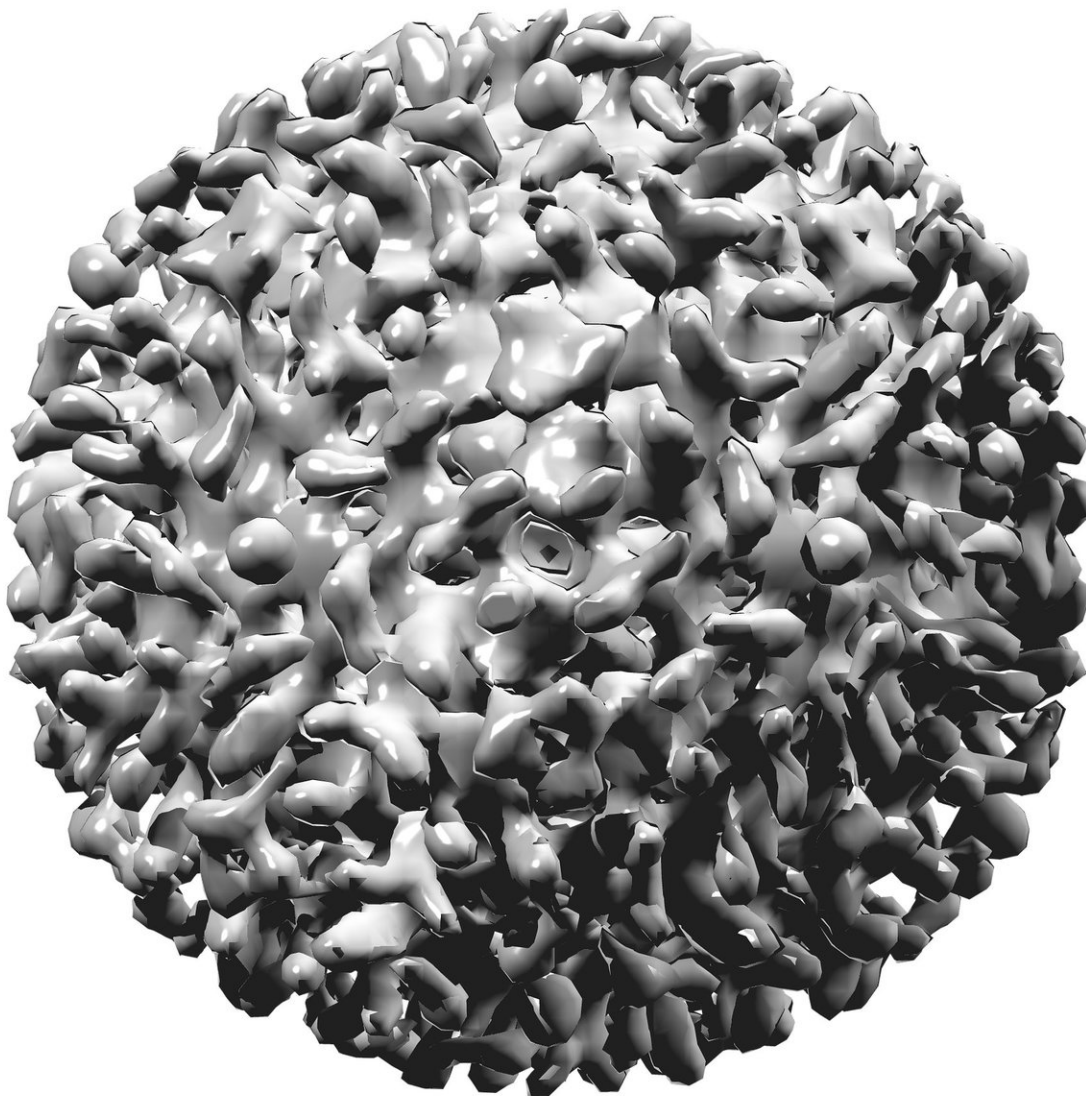


Hepatitis B virus can trigger genetic changes in liver cells years before cancer diagnosis

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Researchers at the Francis Crick Institute and Universidade de Santiago de Compostela have identified how the hepatitis B virus (HBV) can support the survival and growth of liver cancer, with this process starting early in tumor development; in some instances up to 20 years before cancer diagnosis.

Around 240 million people around the world are infected with HBV. This virus is known to affect chromosomes in the liver and can cause hepatocellular cancer, the most common type of liver cancer. This process involves DNA from the virus being integrated into liver cells.

In their [study](#), published in *Nature Communications* on 25 November, the scientists used recent advances in DNA sequencing methods to study 296 hepatocellular tumors that are part of the Pan-Cancer Analysis of Whole Genomes database.

They found DNA from HBV had integrated into cancer cells' DNA in 51 samples, in a total of 148 instances. In 23 samples, the integration of the viruses' DNA caused [large-scale changes](#) to the DNA of the cells it infected, thereby likely playing a large role in cancer development.

Using advanced computer algorithms, the researchers estimated the timing of when the HBV genetic material was inserted into the [liver cells](#). In some instances, this was found to be years before [cancer diagnosis](#), and in one case, it was found to be 21 years earlier.

Eva Álvarez, first author and Ph.D. student at the University of Santiago de Compostela, says, "Hepatocellular cancer kills 700,000 people each year. While not all cases are linked to HBV, and while not everyone with

the virus will develop cancer, uncovering more about this relationship could potentially help with finding new treatments or ways to monitor people infected with this virus to identify those at risk."

Peter Van Loo, author and group leader at the Crick and MD Anderson, says, "HBV is one of only a handful of viruses currently associated with cancer. It's now becoming clear how this virus can cause large-scale genomic damage, and thereby have a big impact on tumor development. This area of study can offer valuable new insight into cancer formation and evolution."

The study will continue to look into the relationship between HBV and [cancer](#), including studying non-cancerous tissue infected with the [virus](#).

More information: Eva G. Álvarez et al, Aberrant integration of Hepatitis B virus DNA promotes major restructuring of human hepatocellular carcinoma genome architecture, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-26805-8](https://doi.org/10.1038/s41467-021-26805-8)

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