

A Taxing Issue: How Human T-lymphotropic Virus Can Cause Leukemia In Adults

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Researchers have identified a potential new mechanism through which human T-lymphotropic virus type-1 (HTLV-1) causes leukemia in adults. The findings, published this week in the online open access journal *Retrovirology*, represent the first time that a reduction in histone protein levels has been linked to viral infection and the development of cancer.

HTLV-1 is a retrovirus that causes adult T-cell leukaemia/lymphoma (ATLL). A single protein made by the virus, Tax, is thought to be enough to trigger cancer development. Tax has a number of effects in the cell, including promoting inappropriate cell division, repressing DNA repair mechanisms and causing genomic instability. These effects are thought to combine and cause cancer, although the exact details of the process are unclear.

James Bogenberger and Paul Laybourn from Colorado State University, USA found that the levels of histone proteins and histone transcripts were lower in T-cell lines infected with HTLV-1 than in uninfected cell lines. They also showed that Tax could cause a drop in the levels of histone transcript in uninfected cells.

Histone proteins are required for the packaging of DNA in cell nuclei and are involved in many key processes associated with DNA, including transcription, repair and replication. The authors suggest that Tax uncouples cell division and replication-dependent histone gene expression, allowing cell division to continue while the levels of histone

protein fall.

They write: “We suggest Tax repression of replication-dependent histone gene expression will result in reactivation of viral gene expression, deregulation of cellular gene expression and genomic instability. All of these effects may contribute to the development of adult T-cell leukemia/lymphoma. To our knowledge, this is the first example of a reduction of histone levels correlating with viral infection and cancer development.”

Source: BioMed Central

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