POLSKY Center for Entrepreneurship and Innovation
THE UNIVERSITY OF CHICAGO

# Inhibition of Herpes Simplex Virus

## SUMMARY

Herpes simplex viruses (HSV) establish latent infections in sensory or autonomic ganglia, which can be reactivated due to physical, hormonal, or emotional stress. Prof. Bernard Roizman and his colleagues have identified new pathways by which HSV reactivation occurs, and several compounds which block HSV reactivation via these pathways.

## KEY RESULTS

The Roizman lab has identified several key molecular pathways which play a role in the latent reactivation of HSV: 1) broad spectrum/specific histone deacetylase-1 or -4 inhibitors, STAT3 inhibitors (which relieve latency and reactivate the virus), and 3) activation of p300/CBP (essential for HSV reactivation).

Curcumin, a p300 acetyl transferase inhibitor, blocks HSV reactivation. A dose-dependent suppression of LAT (latency-associated transcript) accumulation was observed with curcumin treatment. Furthermore, HSV reactivation by STAT3 inhibition, rather than p300 inhibition, requires *de novo* protein synthesis, providing additional targets for therapeutic development.

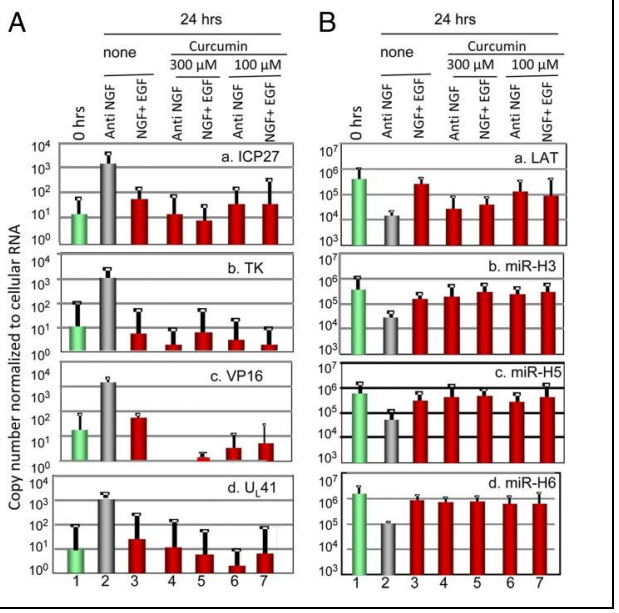
## ADVANTAGES

- New strategy for treatment of latent herpesvirus infection.
- Identification of a new class of targets for herpesvirus therapy.

## APPLICATIONS

- Treatment of latent herpesvirus infection
- New mechanism identified suitable for therapeutic development against viruses, including herpesvirus, HIV, human cytomegalovirus, and Epstein-Barr virus.

*The p300/CBP inhibitor curcumin blocks reactivation of viral genes in ganglia*




*Viral gene, LAT, and miRNA expressions during virus reactivation from latently infected ganglia treated by the p300 inhibitor curcumin. Viral mRNAs (Panel A), and LAT and miRNA (Panel B) are normalized to cellular RNA.*

## TECHNICAL DESCRIPTION

HSV-1 and HSV-2 are ubiquitous human pathogens which establish latent infections in neurons and reactivate later on due to different stimuli. Current antiviral drugs only target active, replicating viruses, but cannot treat latent viruses. Dr. Roizman's research has identified several avenues for activating and destroying latent viruses, providing valuable drug targets. Molecules which inhibit HDACs or STAT3, or which reactivate p300/CBP present new opportunities for therapeutics that effectively prevent the reactivation of latent HSV.

**REFERENCE**
UCHI 2161

**DEVELOPMENT STAGE**
*Ex vivo* proof of concept.
Candidate therapeutic molecules identified

**THERAPEUTIC AREAS**
Infectious disease
Herpes Simplex Virus

**PUBLICATION**
Du et al., PNAS 2013

**INTELLECTUAL PROPERTY**
Issued US Patent
US 14/891,200

**INVENTOR(S)**
Prof. Bernard Roizman, Sc.D. a member of National Academy of Sciences and the American Academy of Arts and Sciences. His pioneering research into herpes viruses has opened the way for a deeper understanding of the molecular basis of herpes virus diseases and of their prevention. In addition to hundreds of scientific publications, Prof. Roizman is the holder of multiple patents in the therapeutic use of genetically engineered herpes viruses.

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