

4<sup>th</sup>  
**COLORADO  
ALPHAHERPESVIRUS  
LATENCY SYMPOSIUM**

Vail, Colorado

May 14-16, 2014



*To convene researchers active in alpha herpesvirus latency  
To discuss current advances in a relaxed venue*

## *Welcome from the president*

Dear Colleagues,

It is with great pleasure that I welcome you to the 4<sup>th</sup> symposium of the Colorado Alphaherpesvirus Latency Society. Each year since 2011, we have assembled to discuss current advances in alphaherpesvirus latency in the relaxed setting of this quiet mountain community. The Christiania Lodge is again graciously providing our accommodations. CALS's success is a tribute to the continued collaboration of individuals from around the world with the common goal of eradicating disease produced by alphaherpesvirus reactivation by understanding the molecular mechanisms underlying establishment, maintenance and reactivation from latency.

This year 70 investigators, who have authored over 3010 PubMed listed publications have traveled 128,087 miles to attend the 2- day symposium consisting of 28 oral presentations by established investigators who will discuss advances in HSV-1, HSV-2, VZV, BHV, MDV and PRV latency research. We are pleased this year to have Michael Stark from BYU give a plenary talk describing the developing peripheral nervous system. His presentation continues our theme of inviting speakers outside virology to help us see latency in a different light. An especially exciting addition to this year's symposium is inclusion of postdoctoral fellows who will have 16 posters, each preceded by 3-minute oral summaries. This year we also inaugurate an open forum. This optional event will discuss topics submitted that have not been addressed in formal presentations. As you can see, CALS is a joint venture – its continued success is very much dependent upon your active contribution.

We are extremely fortunate to have secured conference support through an NIH R13 from the National Institute on Aging based on the unique attributes of our Society as well as our overall goal of mentoring postdoctoral fellows. I also wish to recognize and thank financial supporters that make our symposium affordable: Bio-Rad Laboratories, Cellular Dynamics, Quanta Bioscience, Integrated DNA Technology, Addgene, Macherey-Nagel, Inc., Rocky Mts. SIMS, Diagenode Inc., PerkinElmer, Fisher Scientific, Light Labs, and Colorado Mountain Express; private donations have also come from The VZV Foundation, The Kiwanis Club of Denver Tech Center and a personal contribution from Don Gilden.

Finally, I hope you recognize how much I appreciate your support, your open discussion of unpublished data, your cordial collaborations and your continued enthusiasm. This symposium fell in place like a large, beautiful jigsaw puzzle – with little resort to hammer.

Enjoy CALS 2014

Randy

# Colorado Alphaherpesvirus Latency Symposium

May 14-16, 2014

Christiana Lodge  
Vail, Colorado

## Wednesday, May 14

6:00 pm dinner – Bully Ranch

## Thursday, May 15

7:15 – 8:00 am breakfast - Christiana Lodge  
8:00 – 9:50 am Latency I: clinical  
9:50 – 10:10 am break  
10:10 – 12:10 pm Latency II: immune response  
12:10 – 2:00 pm lunch/free time  
2:00 – 4:00 pm Latency III: signaling mechanisms  
4:00 – 4:15 break  
4:15 – 5:15 pm plenary talk  
5:15 – 6:00 pm group photo / free time / music  
6:00 pm dinner – Up the Creek

## Friday, May 16

7:15 – 8:00 am breakfast – Christiana Lodge  
8:00 – 10:00 am Latency IV: model systems  
10:00 – 10:20 am break  
10:20 – 12:00 pm Latency V: preventatives, diagnostics and treatments  
12:00 – 2:00 pm lunch, poster set up  
2:00 – 3:00 pm Postdoctoral fellows: 3 minute presentations  
3:00 – 5:00 pm Postdoctoral fellows: poster viewing  
5:15 pm refreshments/music (Tamara Goldstein and Don Gilden)  
7:00 pm dinner – The Flame  
8:00 pm round table discussion (optional)

# Thursday morning, May 15

7:15 breakfast - Christiana Lodge

8:00 Randy Cohrs  
Welcome

## Latency I: Clinical. Moderator: Todd Margolis

8:10 Charles Grose  
Evidence supporting the Hope-Simpson hypothesis that subclinical VZV reactivation maintains VZV latency and prevents herpes zoster until late adulthood

8:30 Andrea Bertke  
HSV-1 and HSV-2 in autonomic neurons

8:50 Deepak Shukla  
Progressive deficits in neuron size, number and density in trigeminal ganglia of mice latently infected with HSV-1

9:10 Robert Hendricks  
Reversible nerve damage regulates pathology in murine HSV stromal keratitis

9:30 Leigh Zerboni  
Investigation of VZV neurotropism in the SCID-DRG mouse model reveals restricted replication in cutaneous mechanoreceptive neurons

9:50 coffee break

## Latency II: Immune response. Moderator: Georges Verjans

10:10 Homayon Ghiasi  
Interplay of LAT and HVEM affect HSV-1 latency and CD8+ T cell exhaustion

10:30 Ilhem Messaoudi  
Robust mucosal immune response after intrabronchial infection of rhesus macaques with SVV

10:50 David Koelle  
The T-cell response to VZV cross-reacts with HSV

11:10 Patrick Stuart  
CD28 costimulation required for optimal antigen-specific CD8 T cell expansion

11:30 Joshua Schiffer  
HSV-2 shedding patterns in HIV-1 infected men suggest deficient cell-mediated immunity in both ganglia and genital mucosa

11:50 Ken Jones  
Genes controlling cholesterol biosynthesis are down-regulated in VZV-infected human neurons

12:10 lunch

# Thursday afternoon, May 15

## Latency III: Signaling mechanisms. Moderator: David Bloom

- 2:00 David Davido  
HSV-1 up-regulates p35 and changes localization of CDK-5 during acute infection in trigeminal ganglia
- 2:20 David Tschärke  
HSV spread and lytic promoter activity during establishment of latency
- 2:40 Luis Schang  
The essential HSV-1 transcription activator ICP4 induces histone mobilization
- 3:00 Ian Mohr  
Regulation of HSV-1 latency by signaling through the neuronal DNA damage response network
- 3:20 Clinton Jones  
Identification of factors that stimulate productive infection during stress-induced reactivation from latency
- 3:40 Edouard Cantin  
An HSV-1 gene required for reactivation
- 4:00 brief break
- 4:15 **Plenary talk. Michael Stark** with introduced by **Clinton Jones**  
The developing peripheral nervous system in the early embryo: from neural crest and placodes to neurons and glia
- 5:15 refreshments/music (**Tamara Goldstein and Don Gilden**)
- 6:45 group photograph
- 7:00 dinner

## Friday morning, May 16

7:15 breakfast - Christiana Lodge

### Latency IV: model systems. Moderator: Charles Grose

- 8:00 Benedikt B. Kaufer  
*In vitro* model for Marek's disease virus latency
- 8:20 Angus Wilson  
Modeling entry and exit from HSV-1 latency in cultured neurons
- 8:40 Ron Goldstein  
Model of VZV latency and reactivation in neurons derived from human embryonic stem cells.
- 9:00 Mike Gershon  
Reactivation of VZV from latency in a guinea pig model: effects of stress and tacrolimus-induced immunosuppression.
- 9:20 Paul Kinchington  
An inflammatory component to pain states in the VZV rat model of PHN
- 9:40 Jürgen Haas  
Identification and characterization of host protein interactions of latent VZV proteins by genomic *in vitro* screens
- 10:00 coffee break

### Latency V: preventatives, diagnostics and treatments. Moderator: Judy Breuer

- 10:20 Martine Aubert  
Inactivation of latent HSV-1 by homing endonuclease directed mutagenesis
- 10:40 Christine Johnston  
Dual strain genital HSV-2 infection identified by next generation sequencing
- 11:00 Moriah Szpara  
Intra-strain variation of HSV-1
- 11:20 Hua Zhu  
Role of ORF 7 in VZV tissue tropism and potential for novel vaccine
- 11:40 Satish Mehta  
Rapid, high-sensitivity diagnostic assay for VZV DNA in saliva of patients with zoster
- 12:00 lunch/business meeting/poster setup

## Friday afternoon, May 16

- 2:00            **Postdoctoral fellows: presentations. Moderators: Klaus Osterrieder & Andrea Bertke**
- Talk 1            Nicholas Baird  
Interferon gamma inhibits VZV growth in human neurons
- Talk 2            Travis Whitmer  
SVV ORF61 inhibits NFκB signaling by preventing ubiquitination of IκBα
- Talk 3            Karen Johnson  
The role of host nuclear innate immune sensor, interferon-γ-inducible protein 16 (IFI16) in HSV-1 replication
- Talk 4            Christine Meyer  
VZV infection of rhesus macaques induces a host response in the absence of viral replication and latency
- Talk 5            Alexander Rowe  
Memory T-cell sequestration in latently infected ganglia
- Talk 6            Erin Buckingham  
Autophagy induced by VZV: from rash to reactivation in brain.
- Talk 7            Megan Steain  
Cell type specific modulation of anti-apoptotic proteins by VZV
- Talk 8            Amos Markus  
Cellular transcriptome analysis reveals differential expression of pro- and anti-apoptotic genes in VZV-infected neurons and fibroblasts
- Talk 9            Derek Jacobs  
The initial viral inoculum affects establishment of HSV-1 latency in trigeminal ganglionic cultures in a LAT-dependent manner
- Talk 10           Farhana Musarrat  
CTCF as a potential mediator in the latent-lytic switch in HSV-1
- Talk 11           Anna Cliffe  
C-Jun N terminal kinase activity is required for initiation of HSV lytic gene expression during reactivation
- Talk 12           Orkide Koyuncu  
What determines the outcome of retrograde alphaherpesvirus infection in neurons?
- Talk 13           Nikki M Thellman  
An immortalized human dorsal root ganglionic cell line provides a novel context to study HSV-1 reactivation
- Talk 14           Chung Dang  
Use of engineered homing endonucleases to prevent HSV-1 reactivation from mouse neurons
- Talk 15           Daniel Depeldge  
Genetic correlates of VZV encephalitis and differences in body compartments
- Talk 16           Joshua Geltz  
HSV-2 glycoproteins are not the dominant antigens of a latency-biased HSV-2 ICP0- mutant vaccine

## Friday afternoon, May 16

- 3:00            **Postdoctoral fellows: poster viewing**
- 6:00            dinner, location to be decided
- 8:00            informal optional round table discussion

## Saturday morning, May 17

- 730 - 900      breakfast - Christiana Lodge
- Departure

### Discussants

John Blaho	City University of New York
David Bloom	University of Florida College of Medicine
Judy Breuer	University College London
Jason Chen	Columbia University School of Medicine
Randall Cohrs	University of Colorado School of Medicine
Stacey Efstathiou	University of Cambridge
Nigel Fraser	Perelman School of Medicine of the U. Pennsylvania
Seth Frieze	University of Northern Colorado
Anne Gershon	Columbia University School of Medicine
Don Gilden	University of Colorado School of Medicine
Peter Kennedy	University of Glasgow
Ravi Mahalingam	University of Colorado School of Medicine
Todd Margolis	Washington University School of Medicine
Donna Neumann	LSUHSC- New Orleans
Klaus Osterrieder	Berlin University
Duane Pierson	NASA
Scott Schmid	Center for Disease Control & Prevention
Georges Verjans	Department Viroscience, Erasmus Medical Center
Marieke Verweij	Oregon Health Sciences Center



**We thank the following for their support of our 2014 symposium**

**NIA – NIH**

**VZV Foundation**

**Abcam**

**Addgene**

**Bio-Rad Laboratories**

**Cellular Dynamics**

**Colorado Mountain Express**

**Diagenode Inc.**

**Fisher Scientific**

**Integrated DNA Technologies**

**Kiwanis Club of DTC**

**Light Labs**

**Macherey-Nagel Inc.**

**PerkinElmer**

**Quanta Bioscience**

**Rocky Mountain SIMS**

**Colorado Mountain Express**

**Don Gilden**

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