



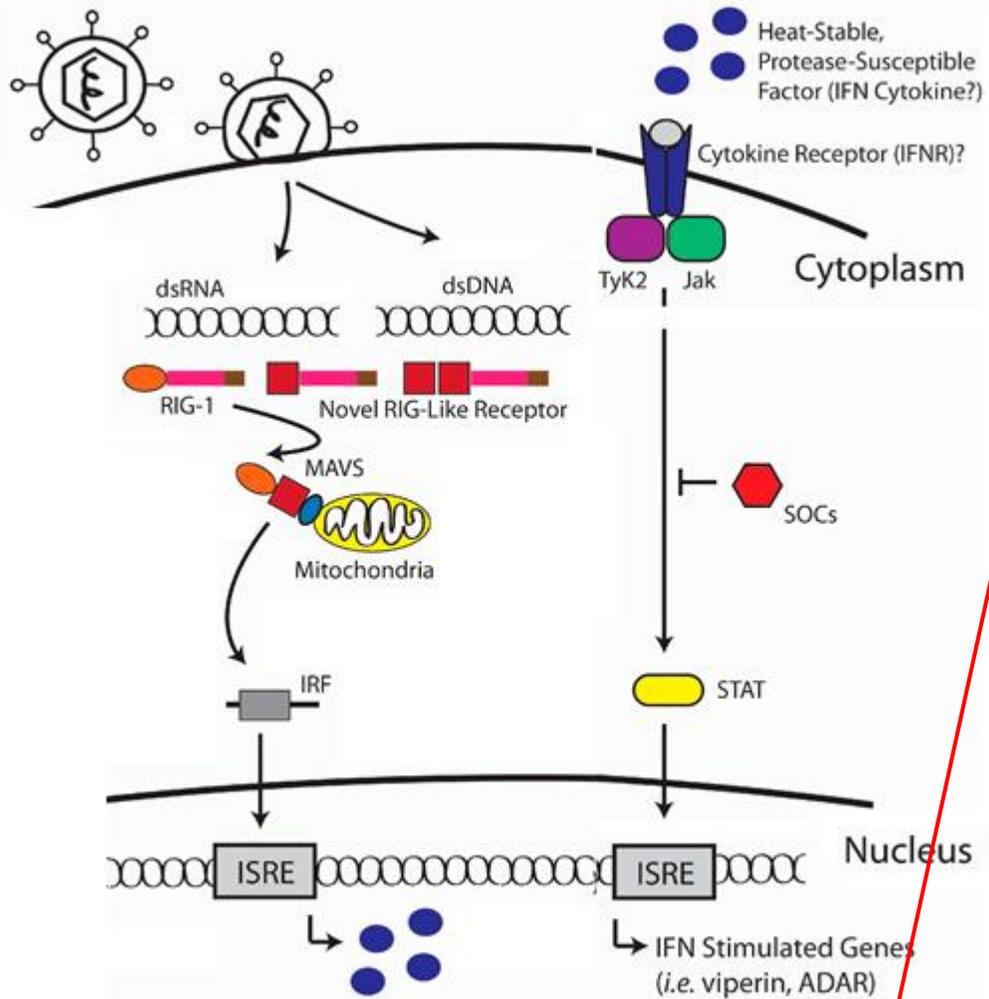
ALFRED-WEGENER-INSTITUT
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A-to-I RNA editing against *Ostreid herpesvirus 1*

Umberto Rosani

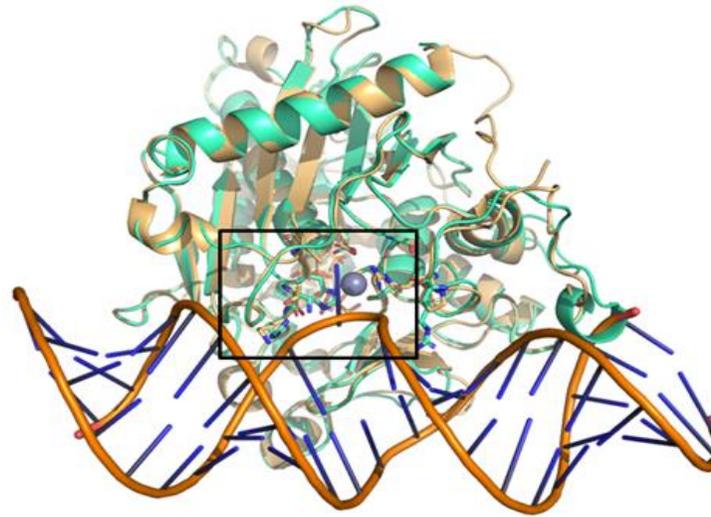
AWI, Germany

The interferon pathway and ADAR1



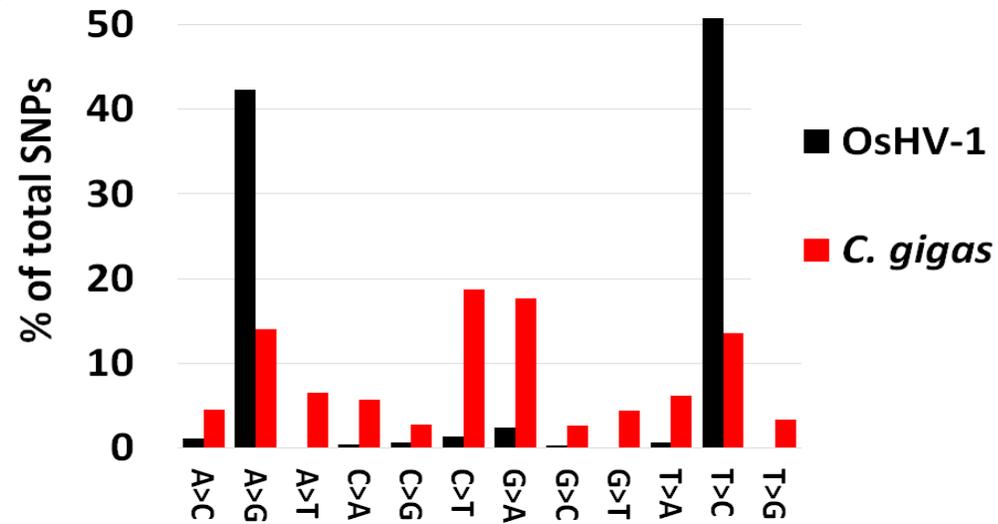
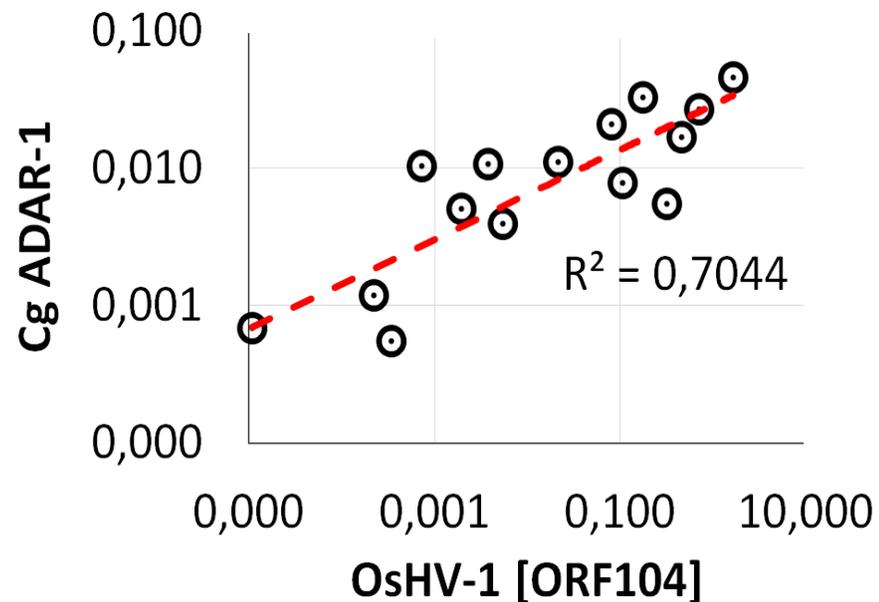
Adenosine deaminase acting on dsRNA

- ▶ ADARs perform single nucleotide editing on double-stranded RNA
- ▶ ADAR1 recognizes “TA” motifs on dsRNA and flips the “A” into “Inosine” (A-to-I editing), resulting in A-to-G variations



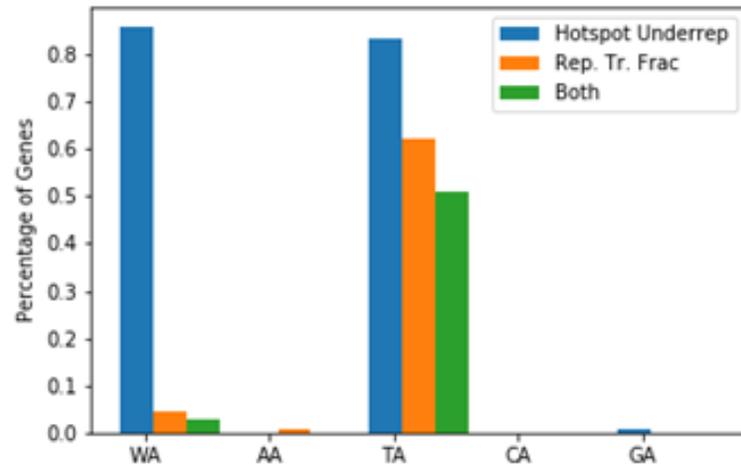
Oyster ADAR1 during OsHV-1 infection

- ▶ CgADAR1 correlates with the level of OsHV-1 RNA
- ▶ ADAR SNPs impact OsHV-1 RNAs, although at low frequency (mean= 1.7%)



1- Is ADAR-editing beneficial or detrimental for OsHV-1?

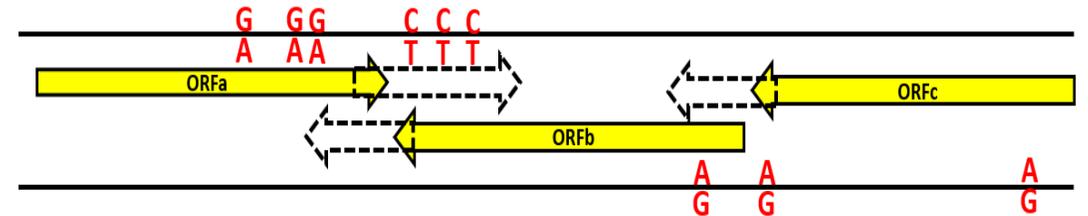
- ▶ We look at the di-nucleotide distributions along OsHV-1 genes
- ▶ 85% of the OsHV-1 genes showed a statistically significant under-representation of the “TA” motif



- ▶ To counteract ADAR’s evolutionary pressure, OsHV-1 has reduced the number of weak motifs (TA) along its genome

2- What is the source of dsRNA?

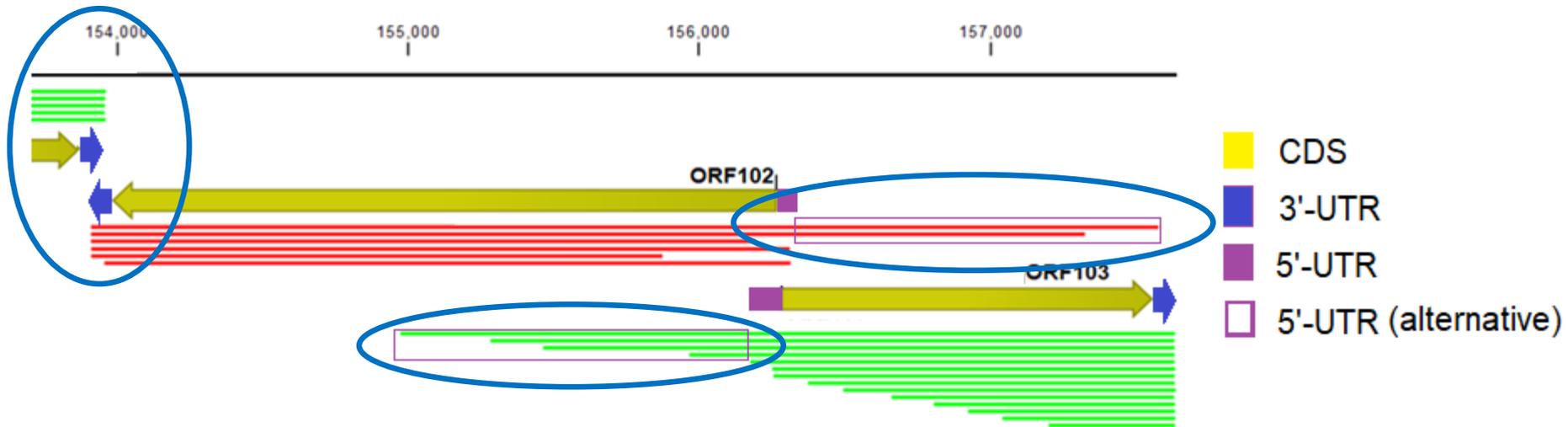
- ▶ ADAR-1 SNPs are mostly located at gene-flank positions
- ▶ Convergent or divergent genes could partially overlap, resulting in dsRNA



- ▶ The UTR extensions are unknown and cannot be resolved with Illumina short reads
- ▶ And the other ADAR SNPs?

Single Molecule Real-Time RNA sequencing (SMRT-PacBio)

- ▶ Sequencing of full-length RNA molecules, useful to study the complex transcriptomes of DNA viruses (multiple isoforms, polycistronic genes, overlapping genes)



- ▶ Soft- and hard-overlaps produced antisense transcription (dsRNA) along most of the viral genome
- ▶ The ratio of dsRNA/RNA is low, explaining the low-frequency of ADAR editing

Conclusions

- ▶ Oyster ADAR1 is a powerful editor of OsHV-1 dsRNAs
- ▶ ADAR- is highly expressed in OsHV-1 infection
- ▶ Although we suggested that ADAR1 plays an antiviral role, it is unclear if OsHV-1 can take advantage of ADAR-editing

A-to-I RNA editing **pro/**against OsHV-1

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