

The Evolution of KoRV-A and Its Transcriptional Silencing in Wild Koalas

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Why Koalas and Koala Retrovirus (KoRV)?



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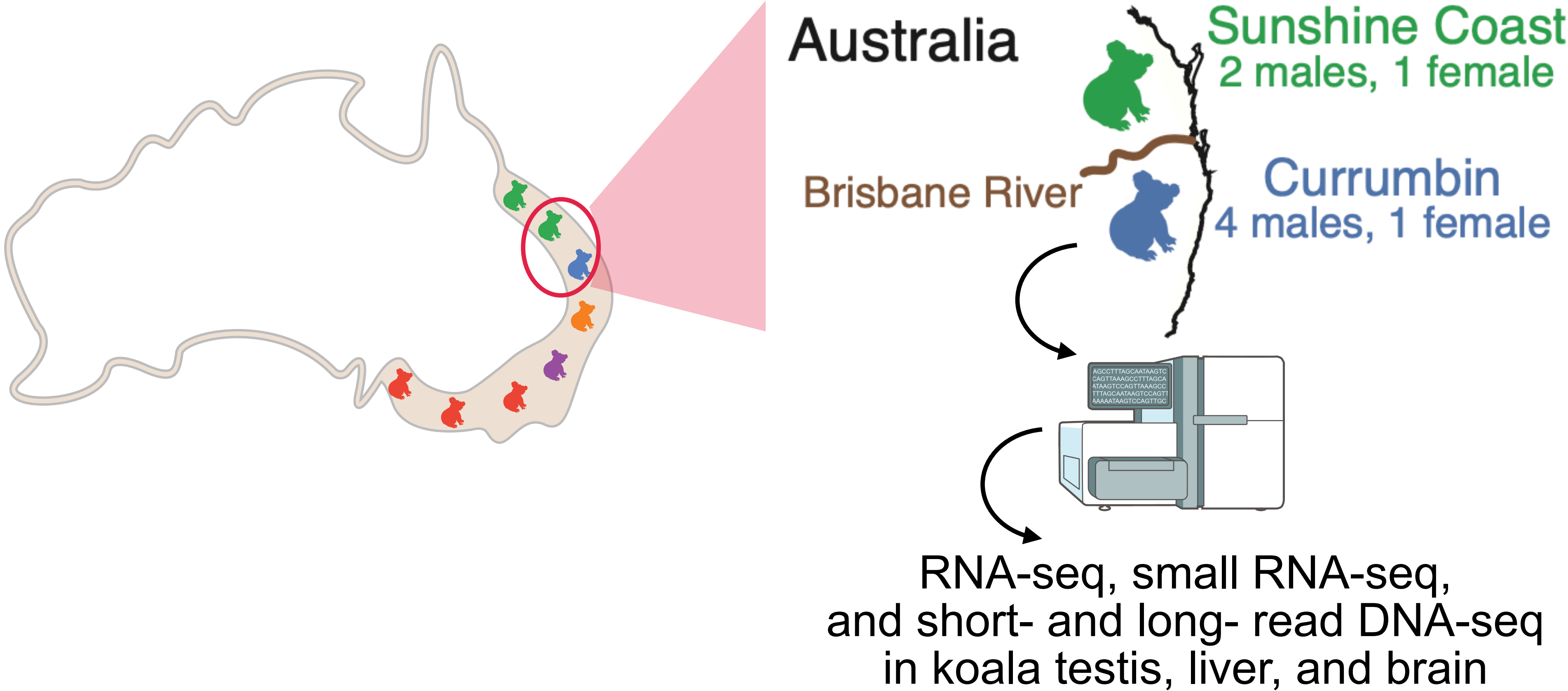


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 - *How koalas fight back!*
 - Studying the *history*: how did human and other species control the spreading of endogenous retroviruses?
 - Prepare for the *future*: how will our genome respond / what shall we do, upon new retroviral invasion?





Milky Abajorga

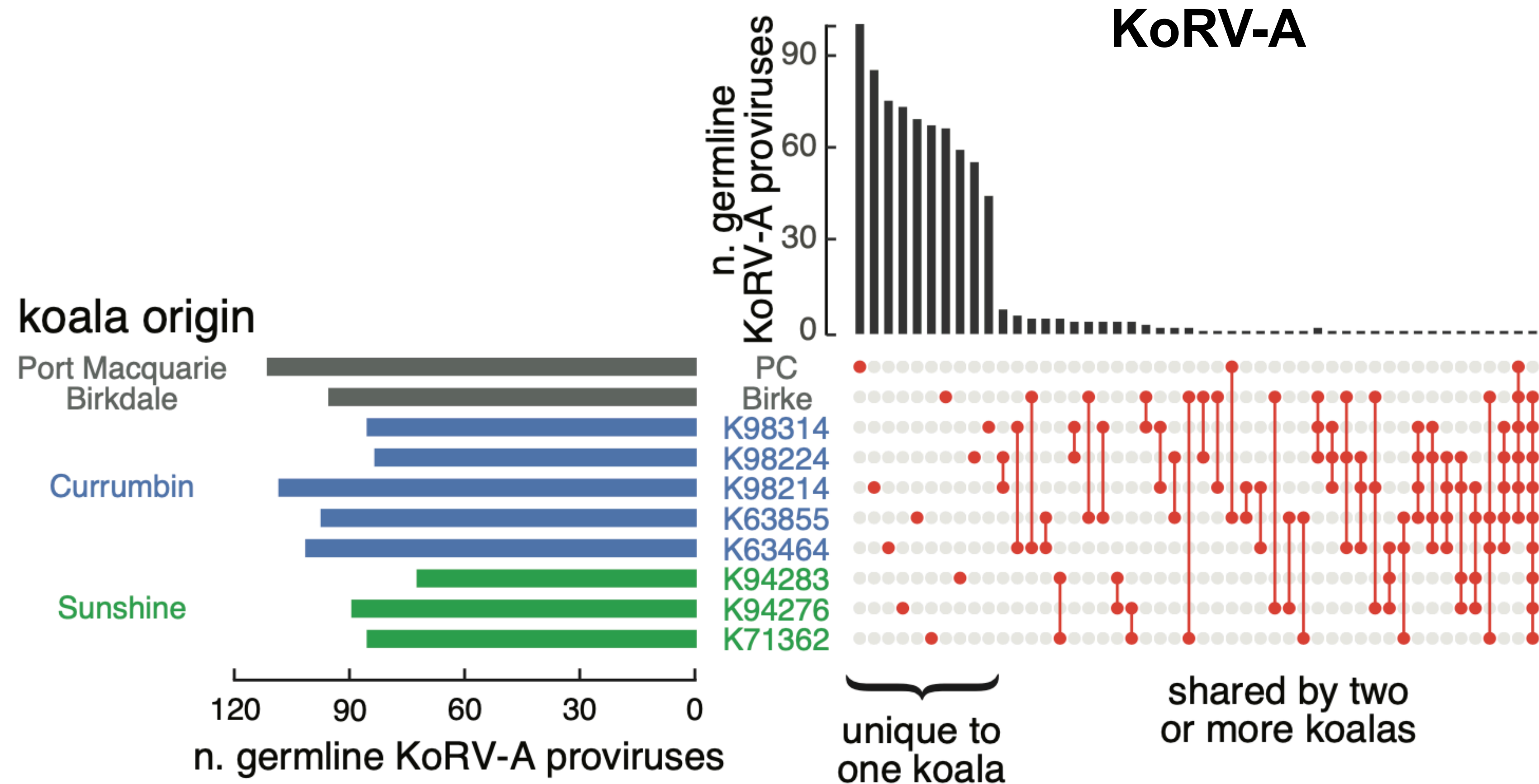


Samantha Ho
Birgit Koppetsch



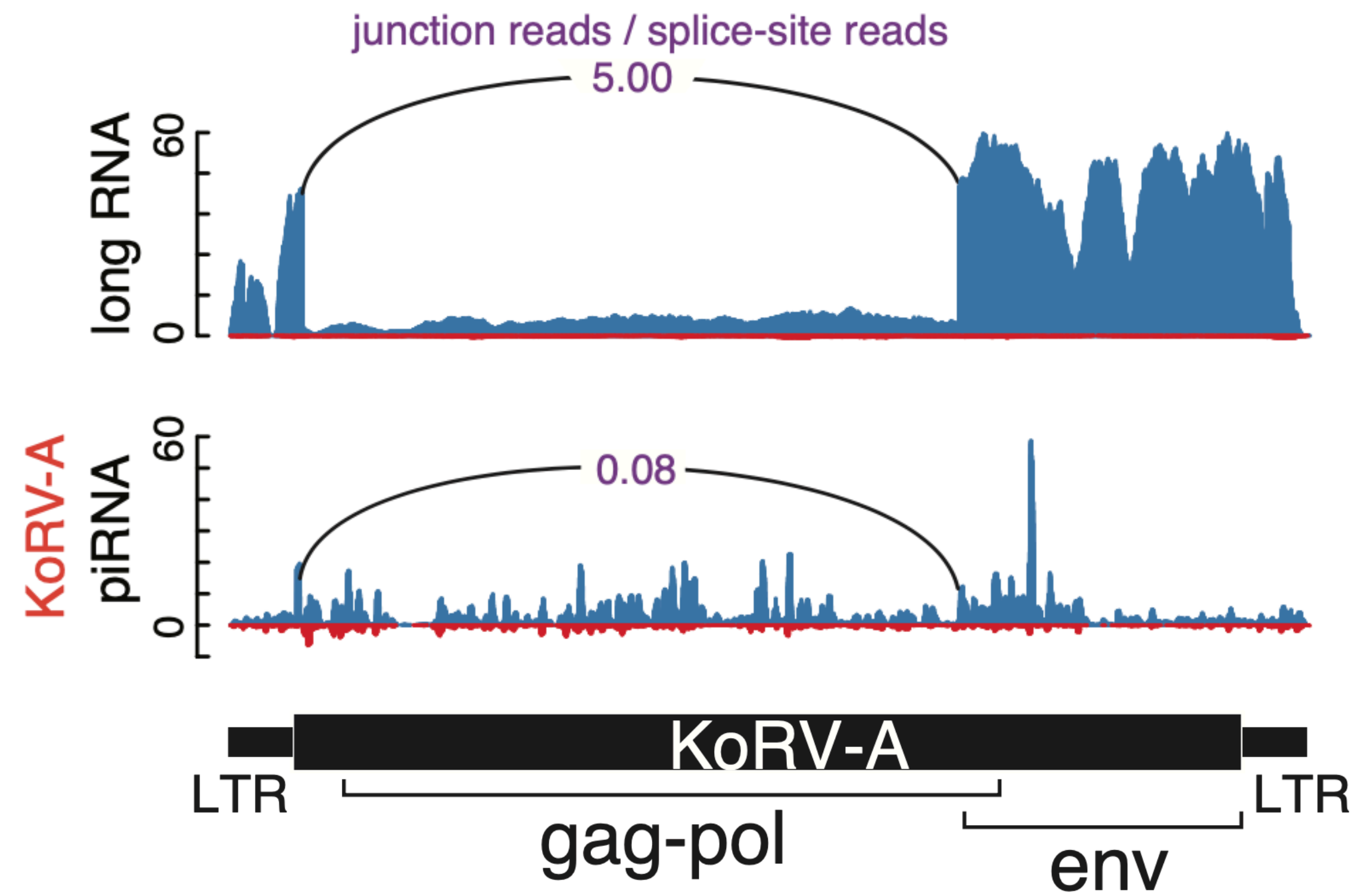
Michaela Blyton

KoRV-A are actively replicating in the koala genome

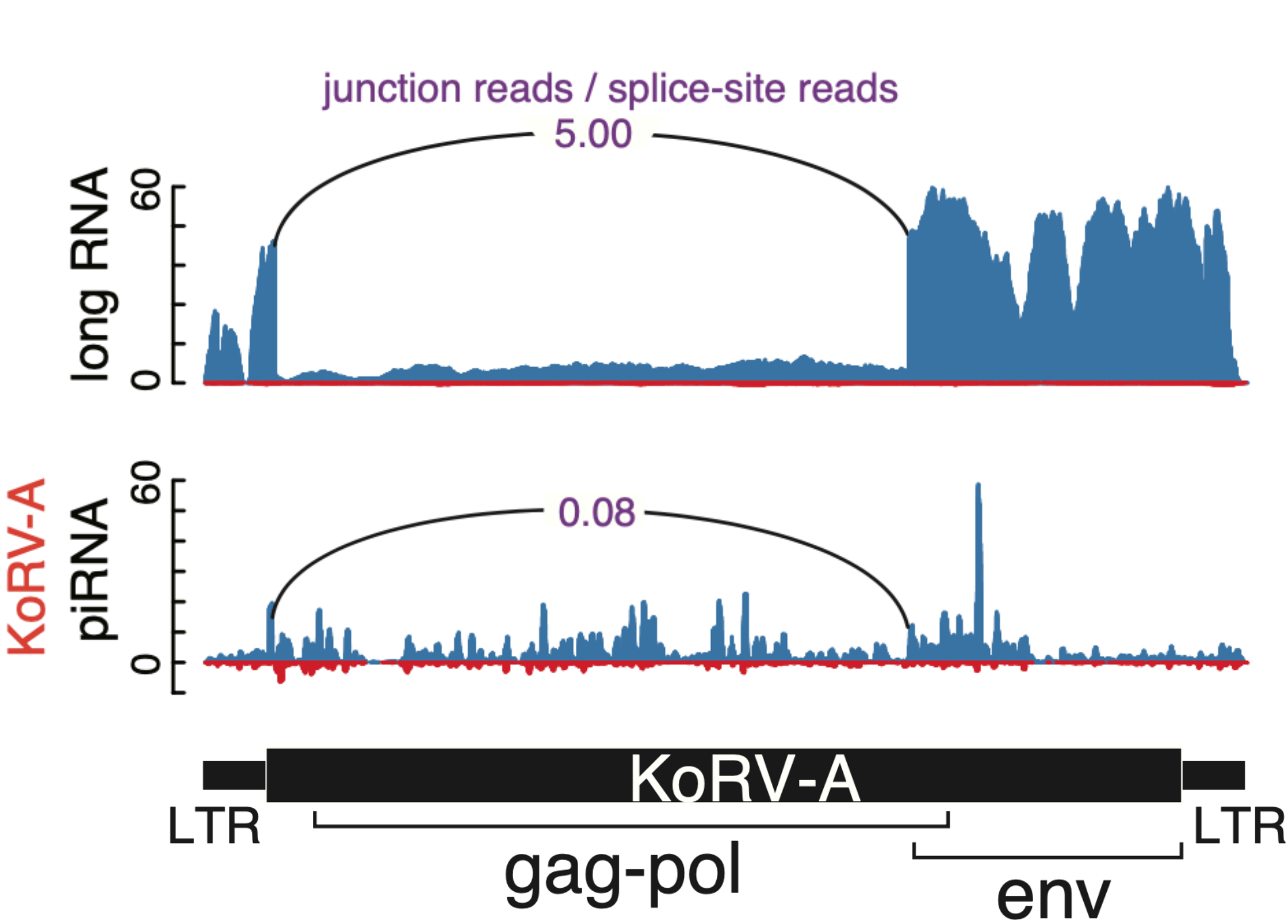


- Each koala have ~70–110 KoRV-A proviruses.
- Not a single KoRV-A provirus is share in all koalas.

The piRNA pathway cleaves unspliced KoRV-A transcripts



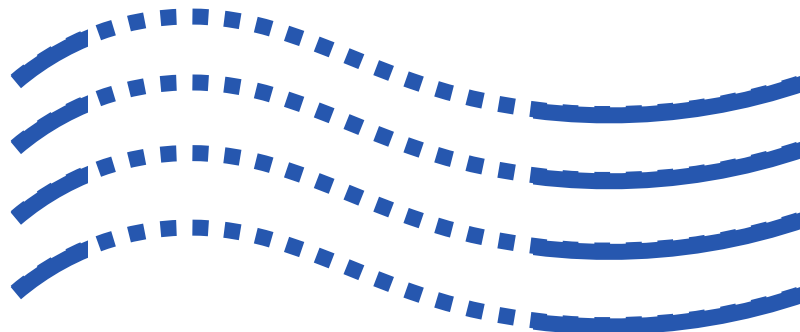
The piRNA pathway cleaves unspliced KoRV-A transcripts



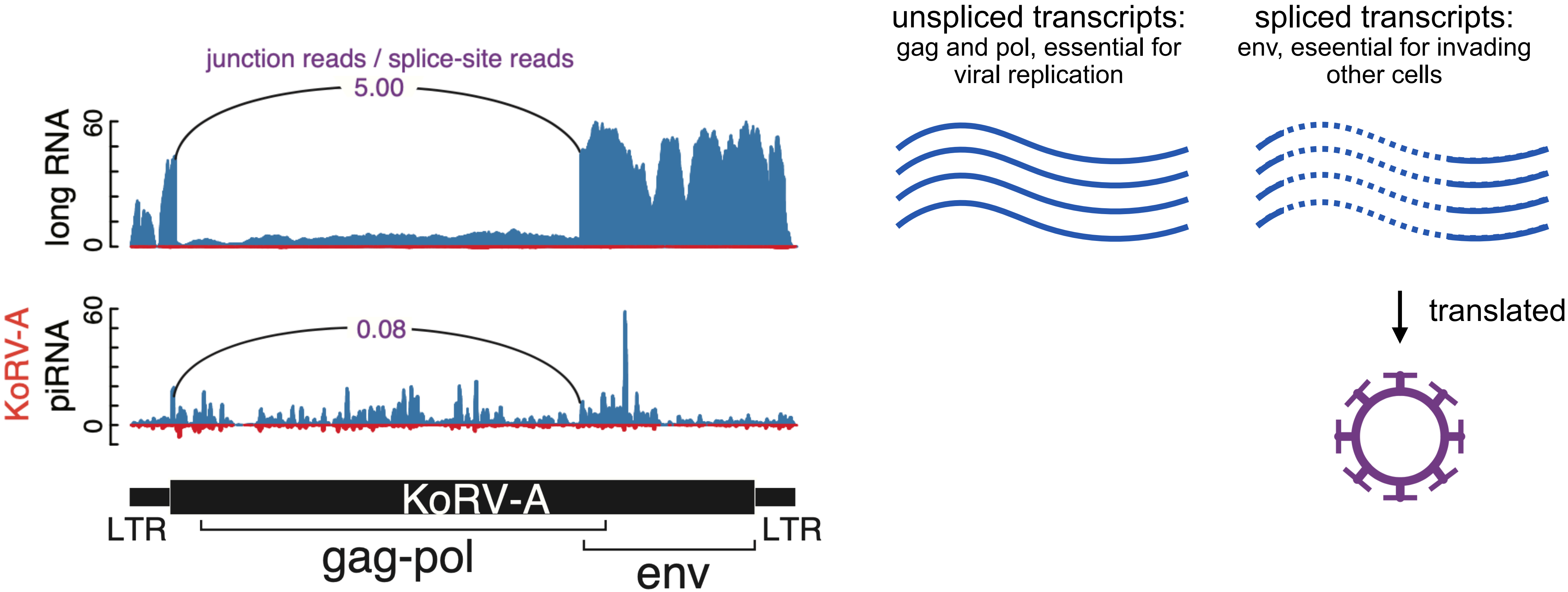
unspliced transcripts:
gag and pol, essential for
viral replication



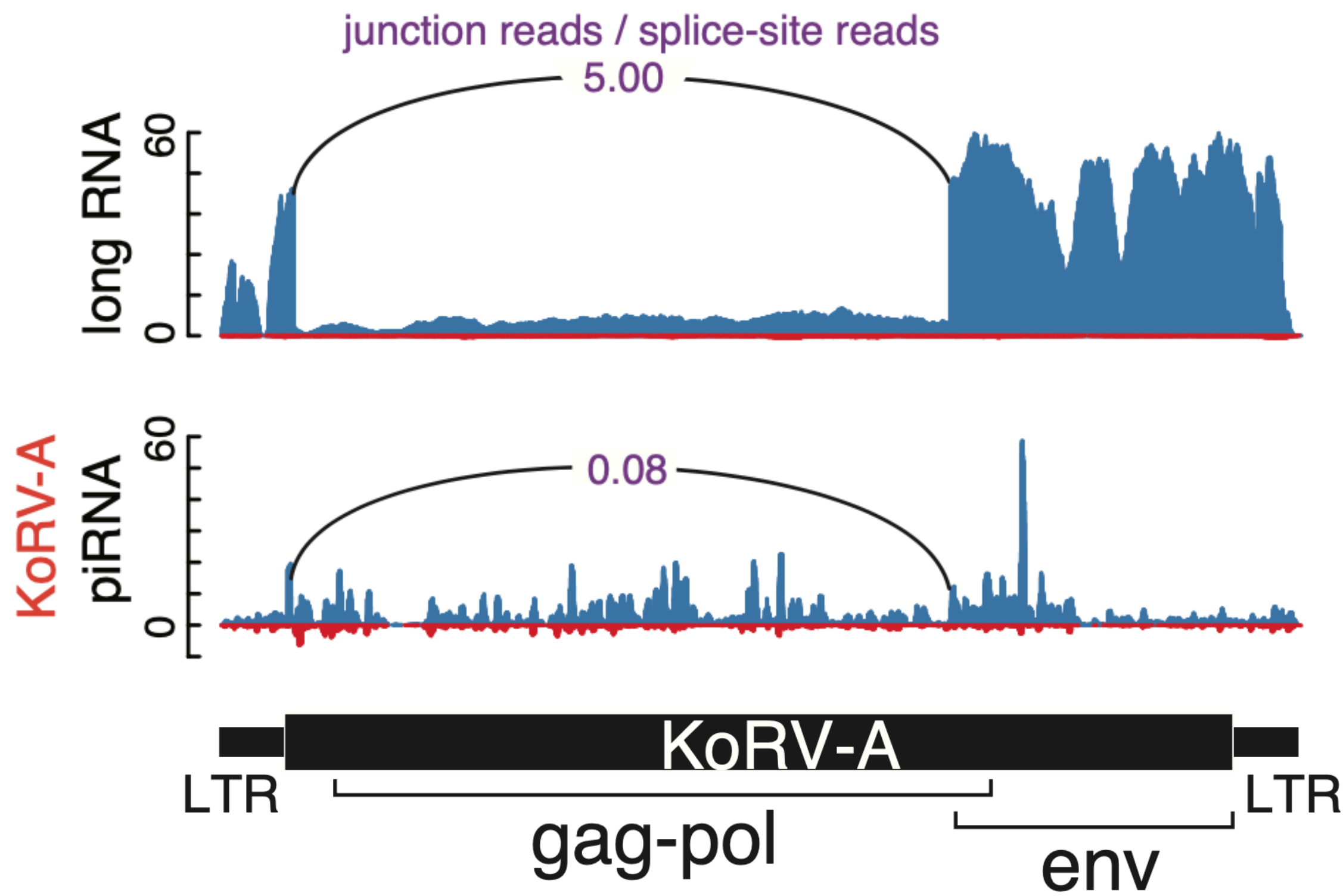
spliced transcripts:
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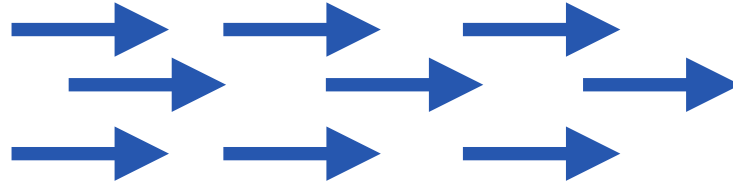
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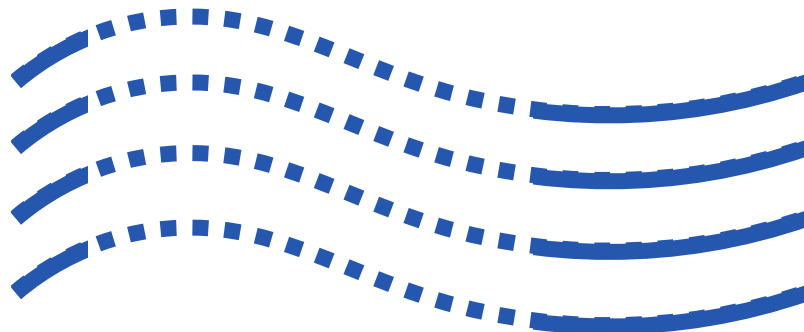


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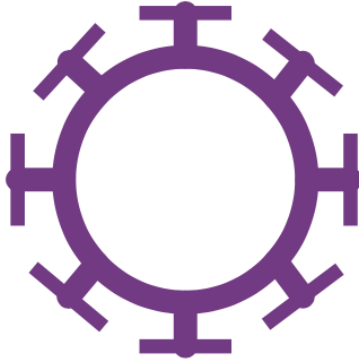


piRNAs

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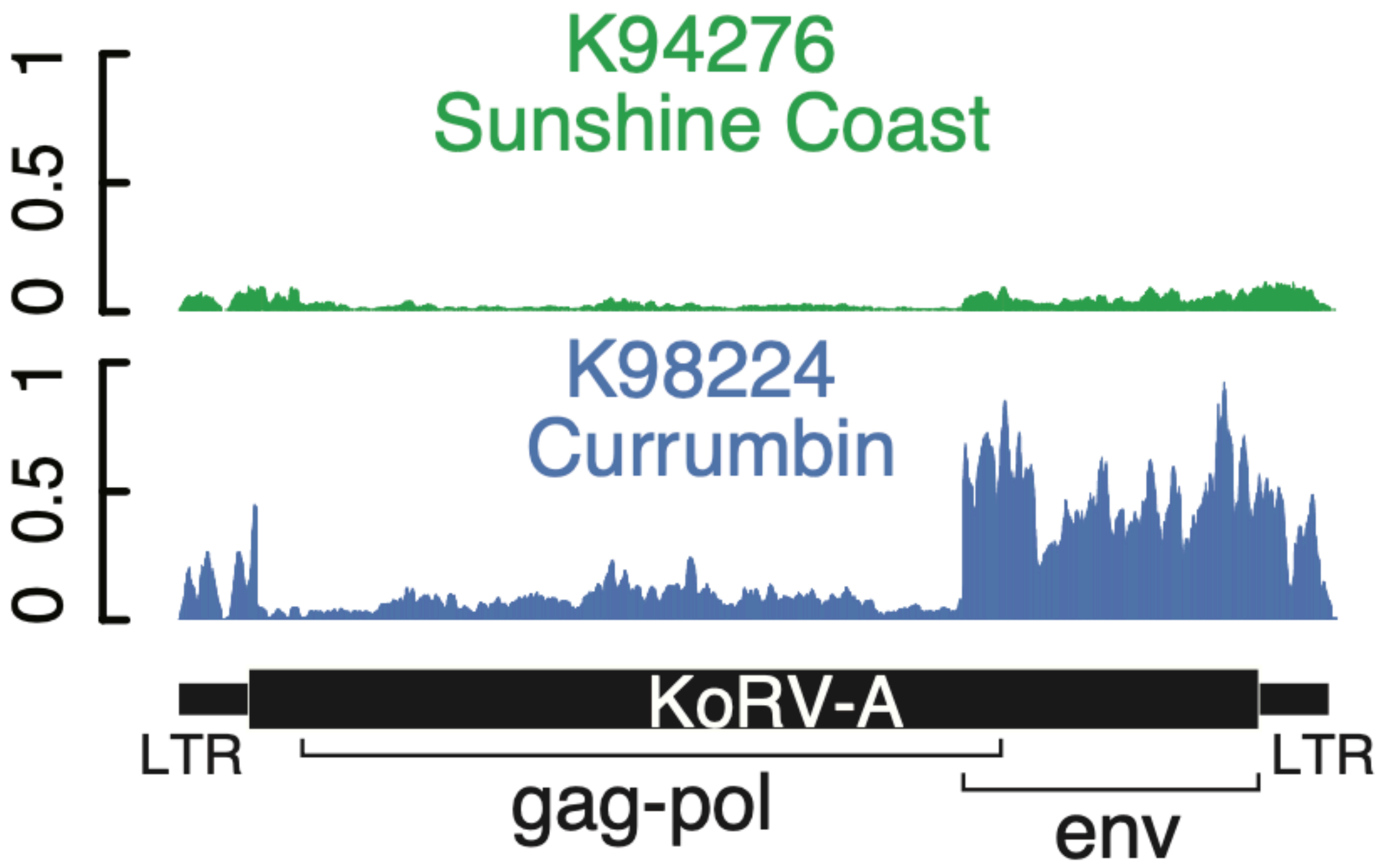
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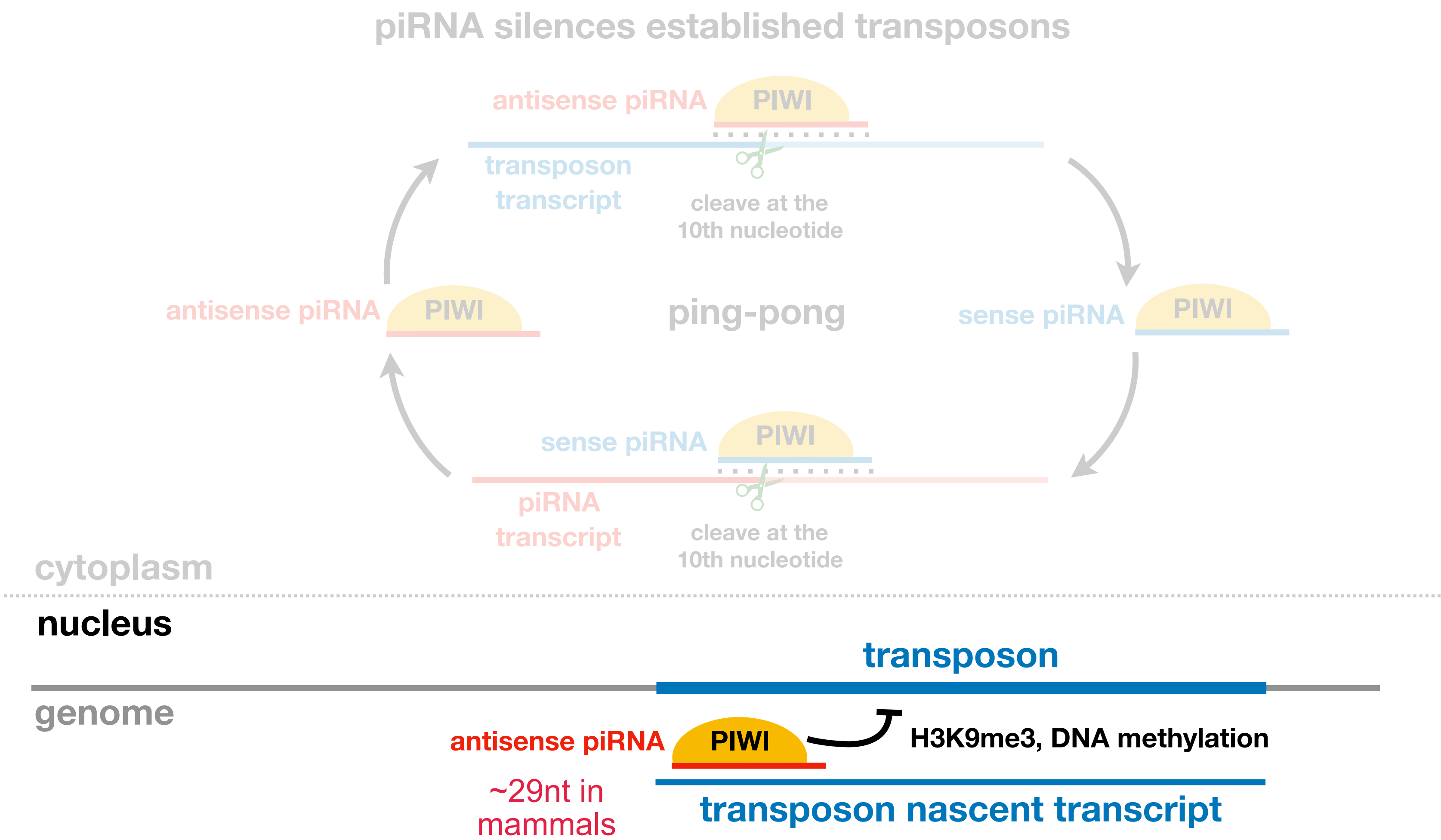


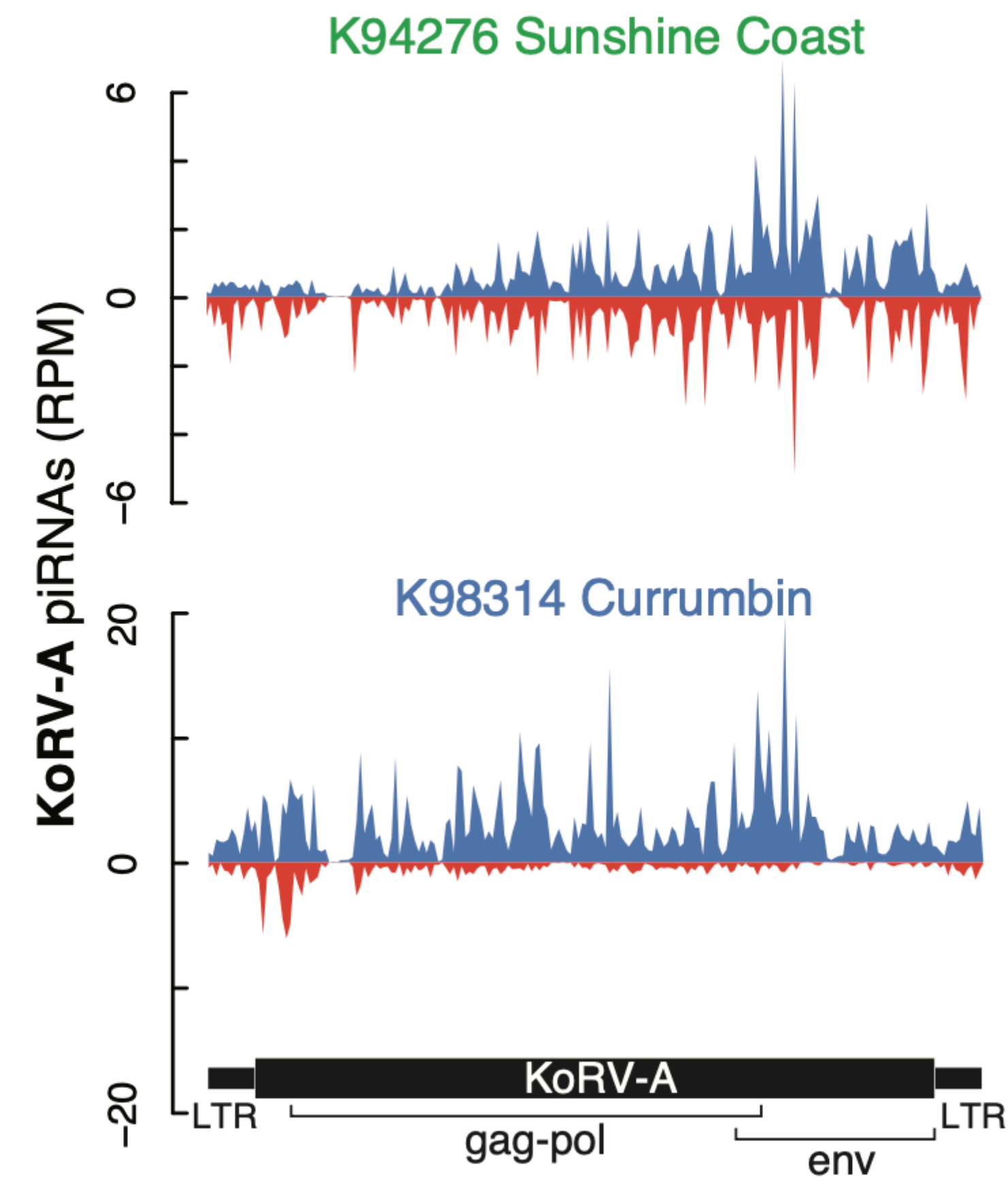
KoRV-A is silenced in the north

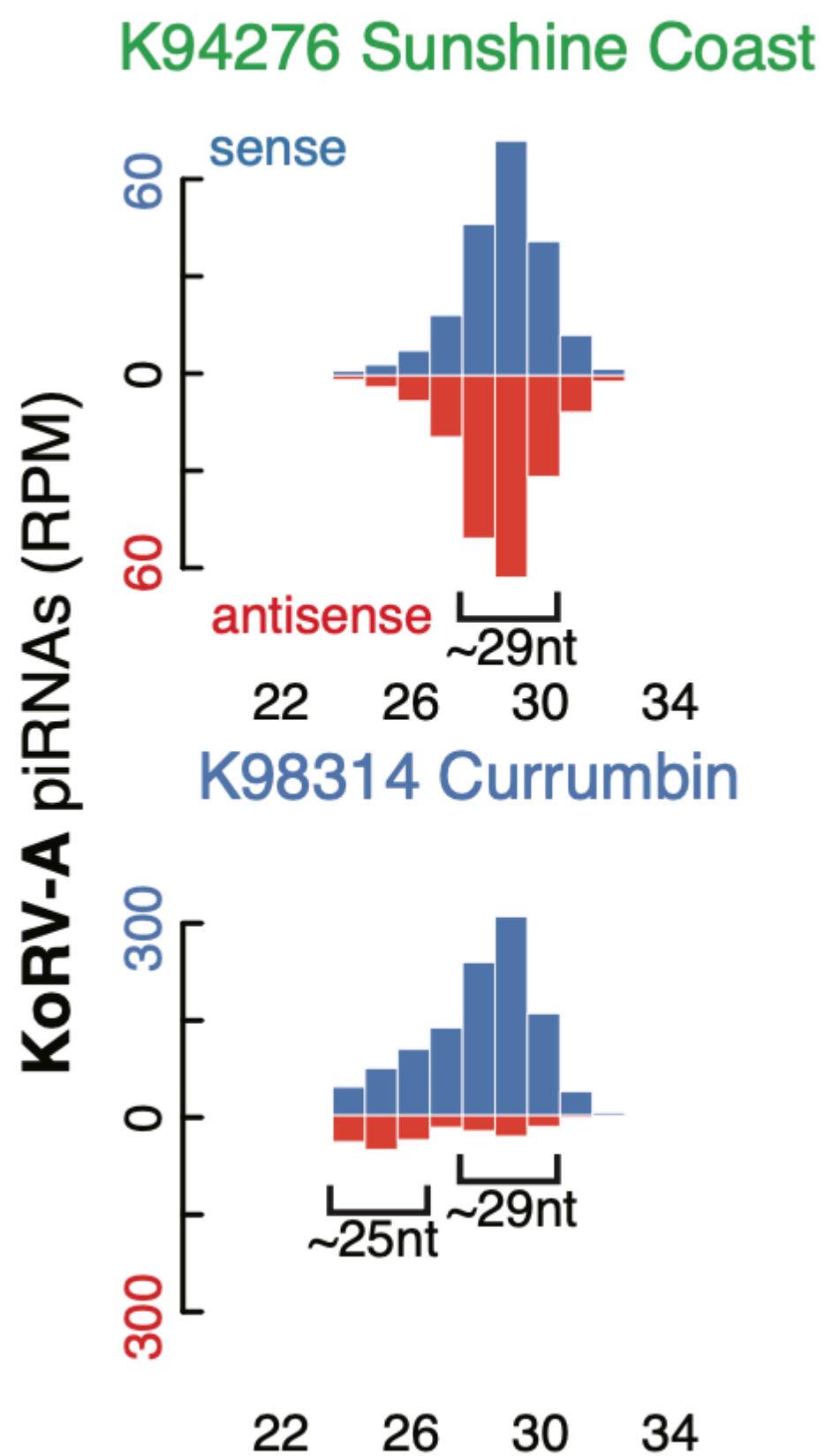
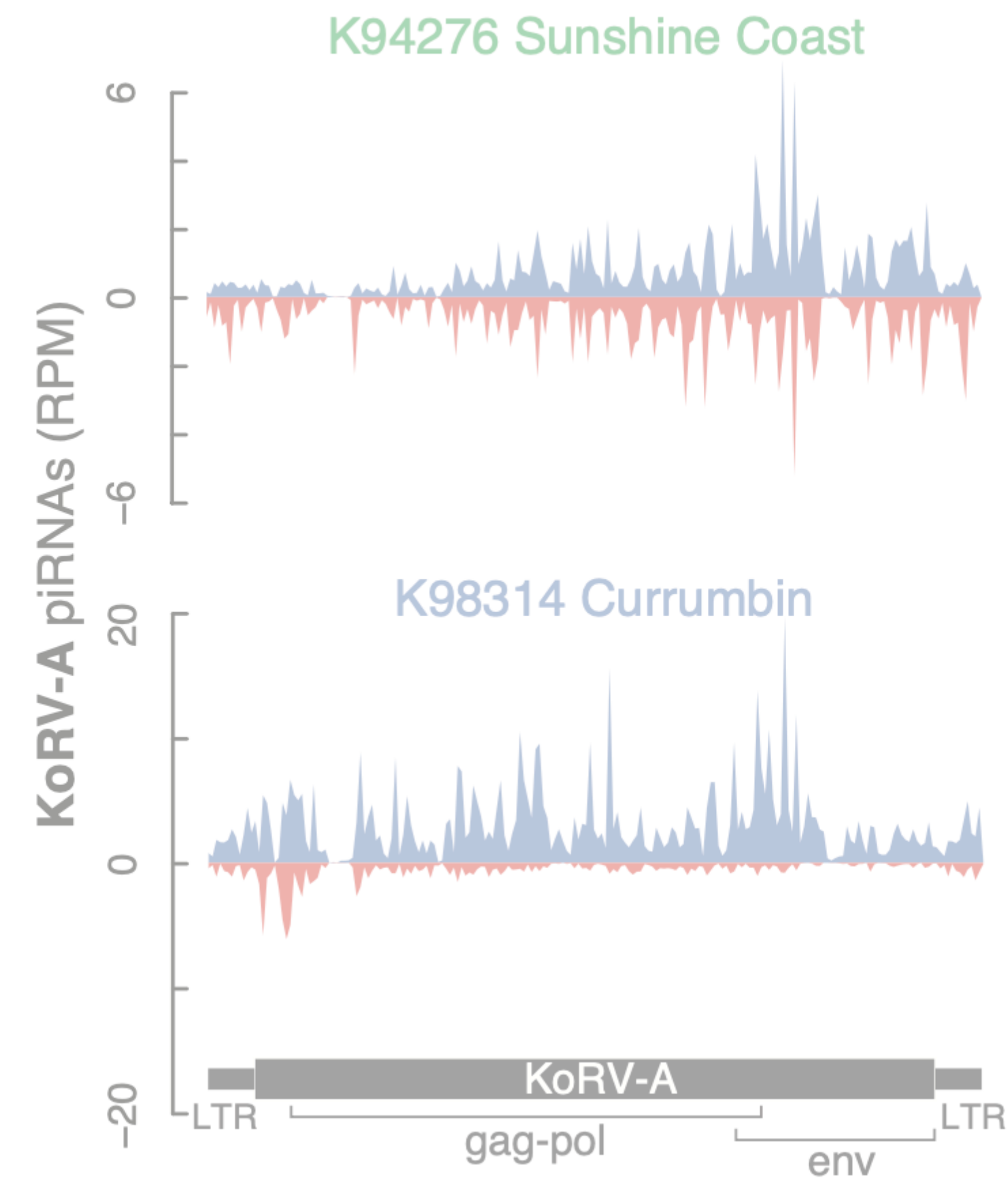


normalized KoRV-A
transcription levels in testis

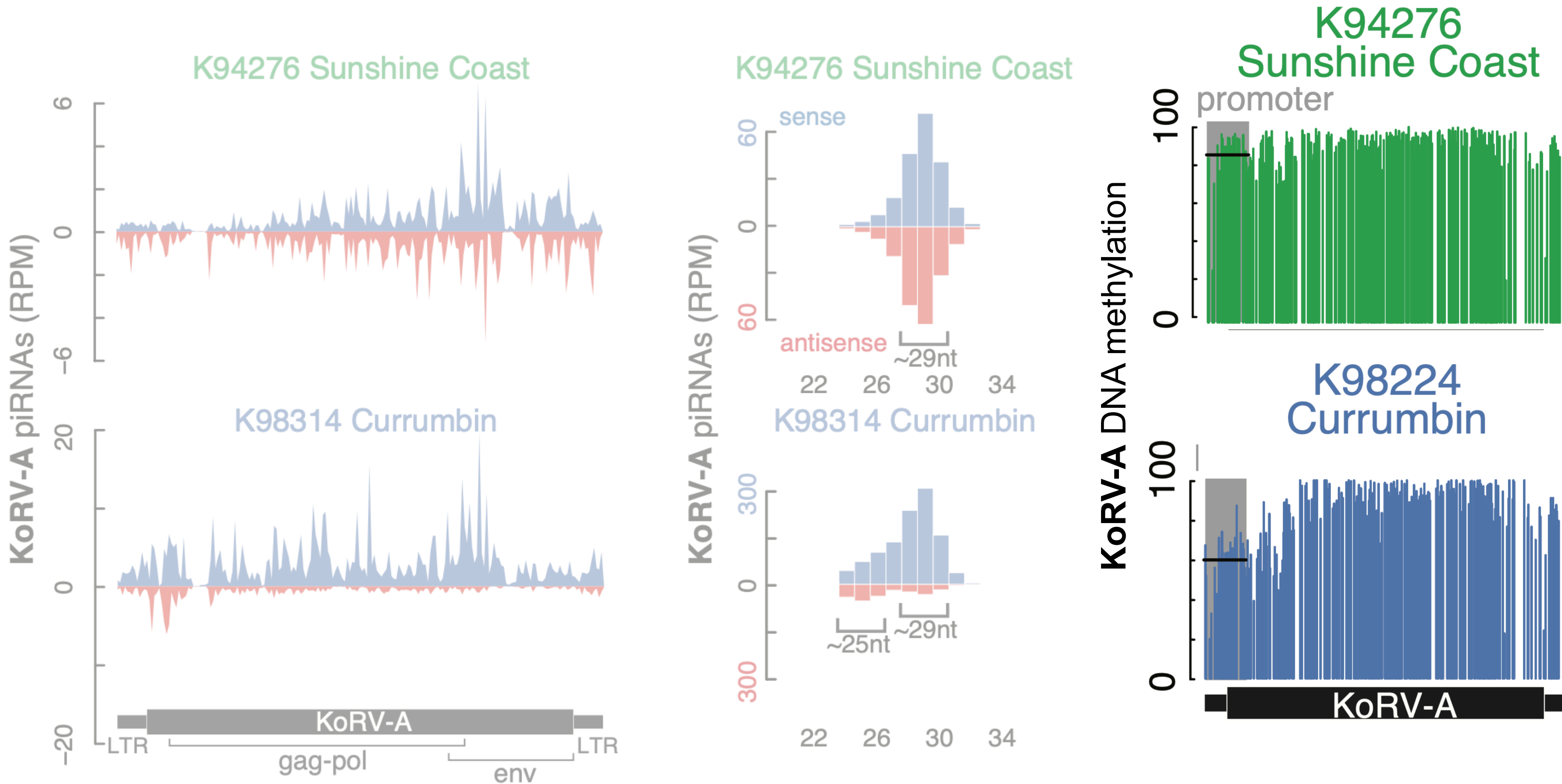


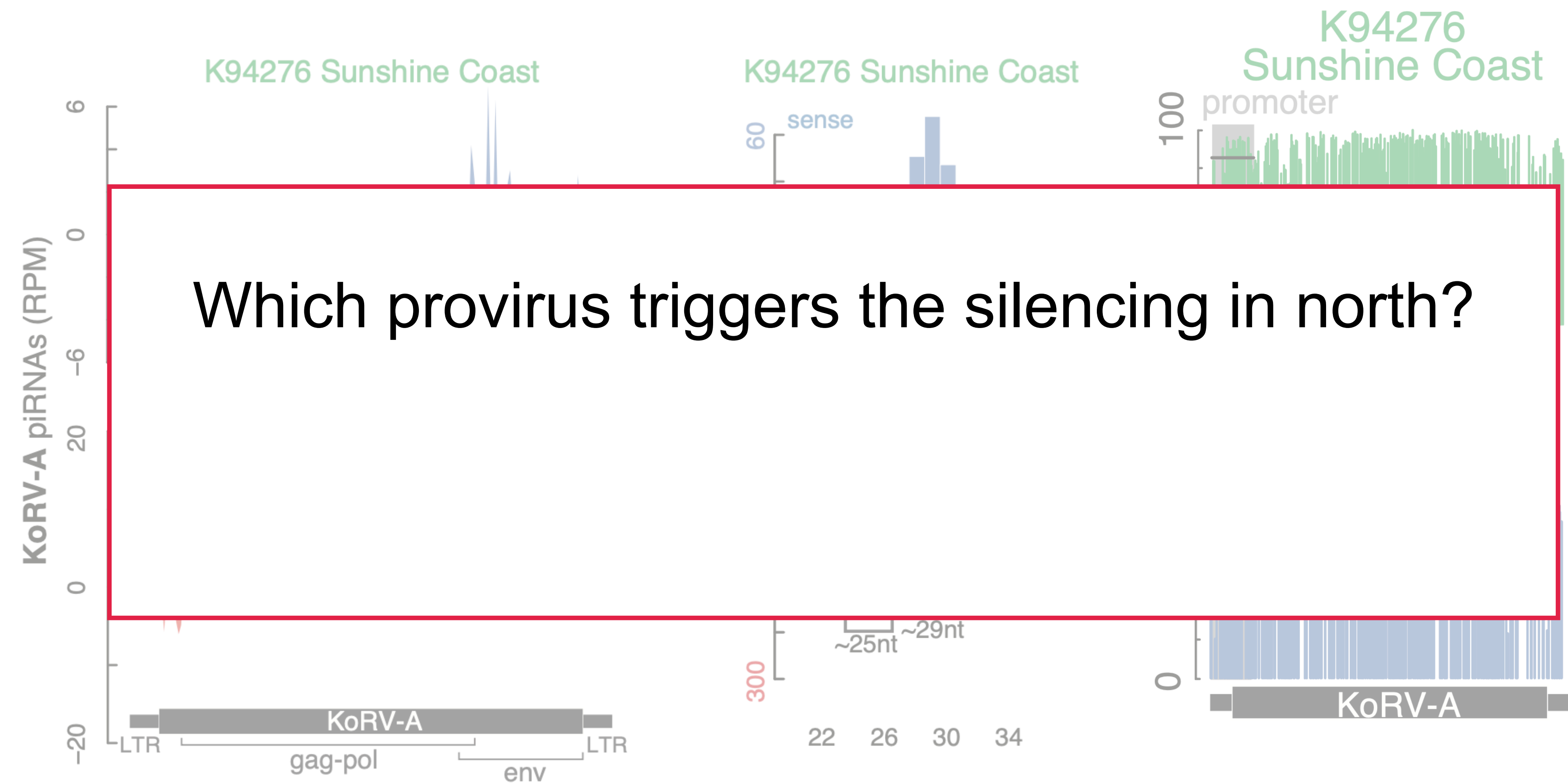


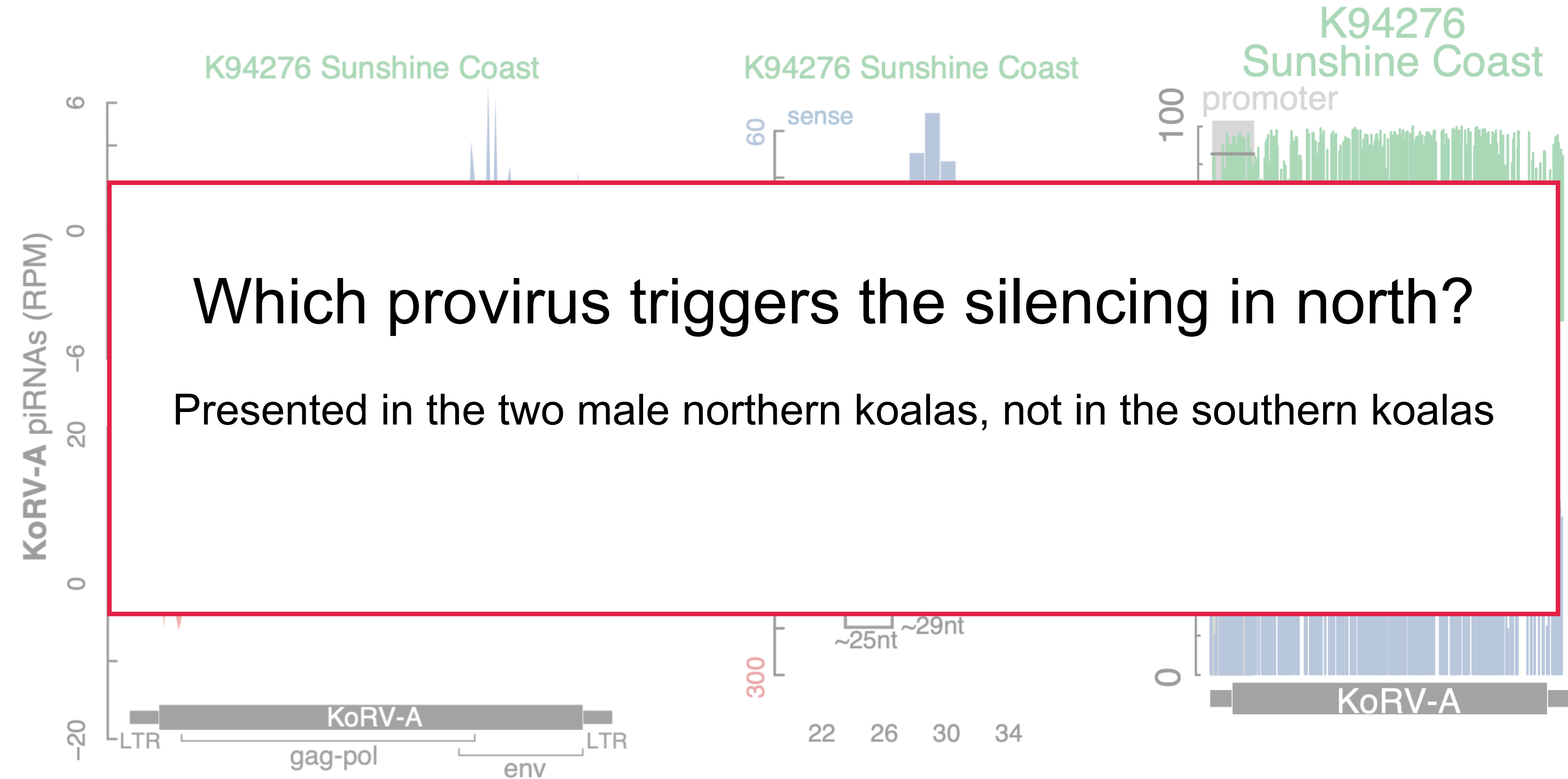


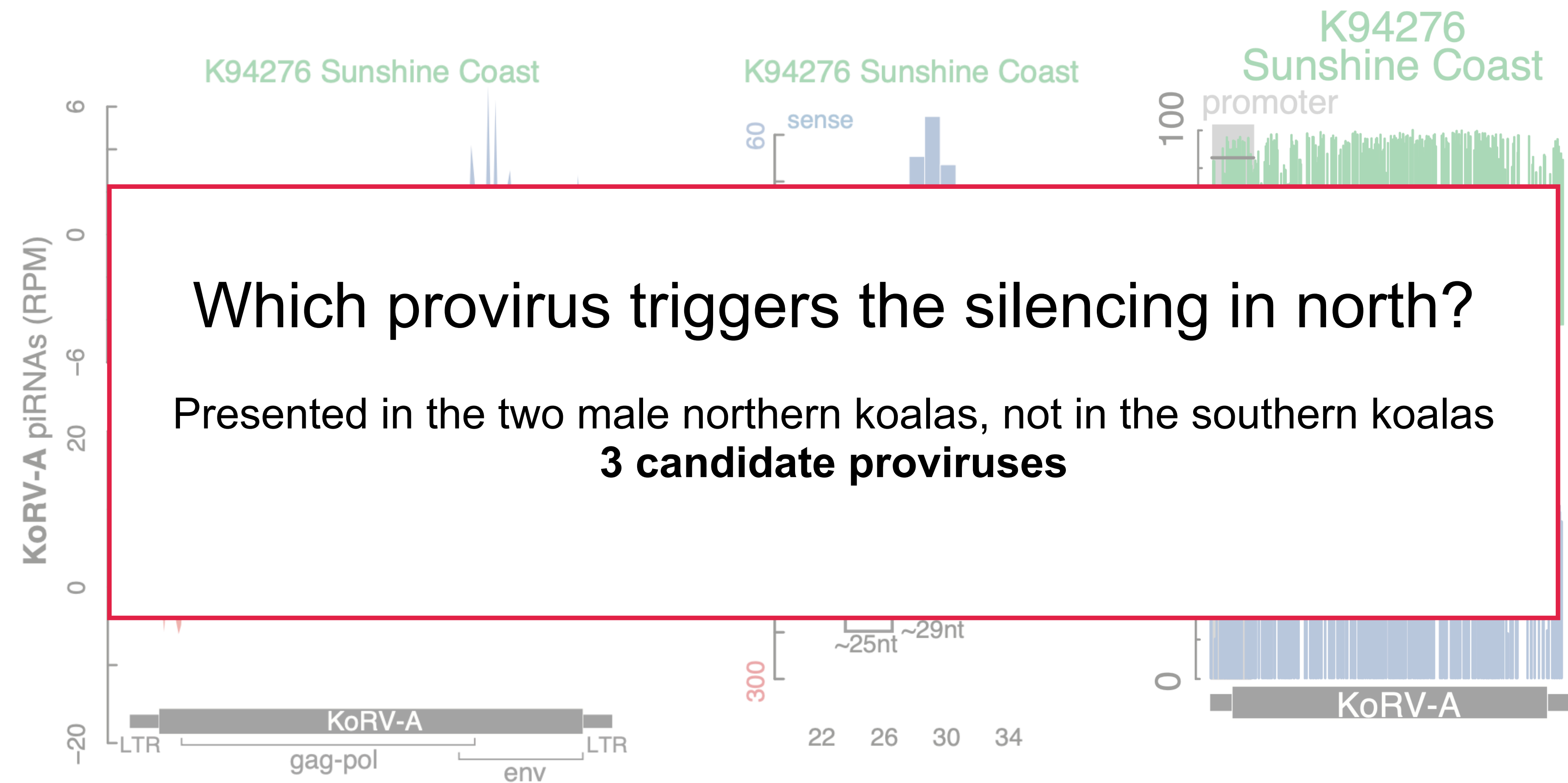


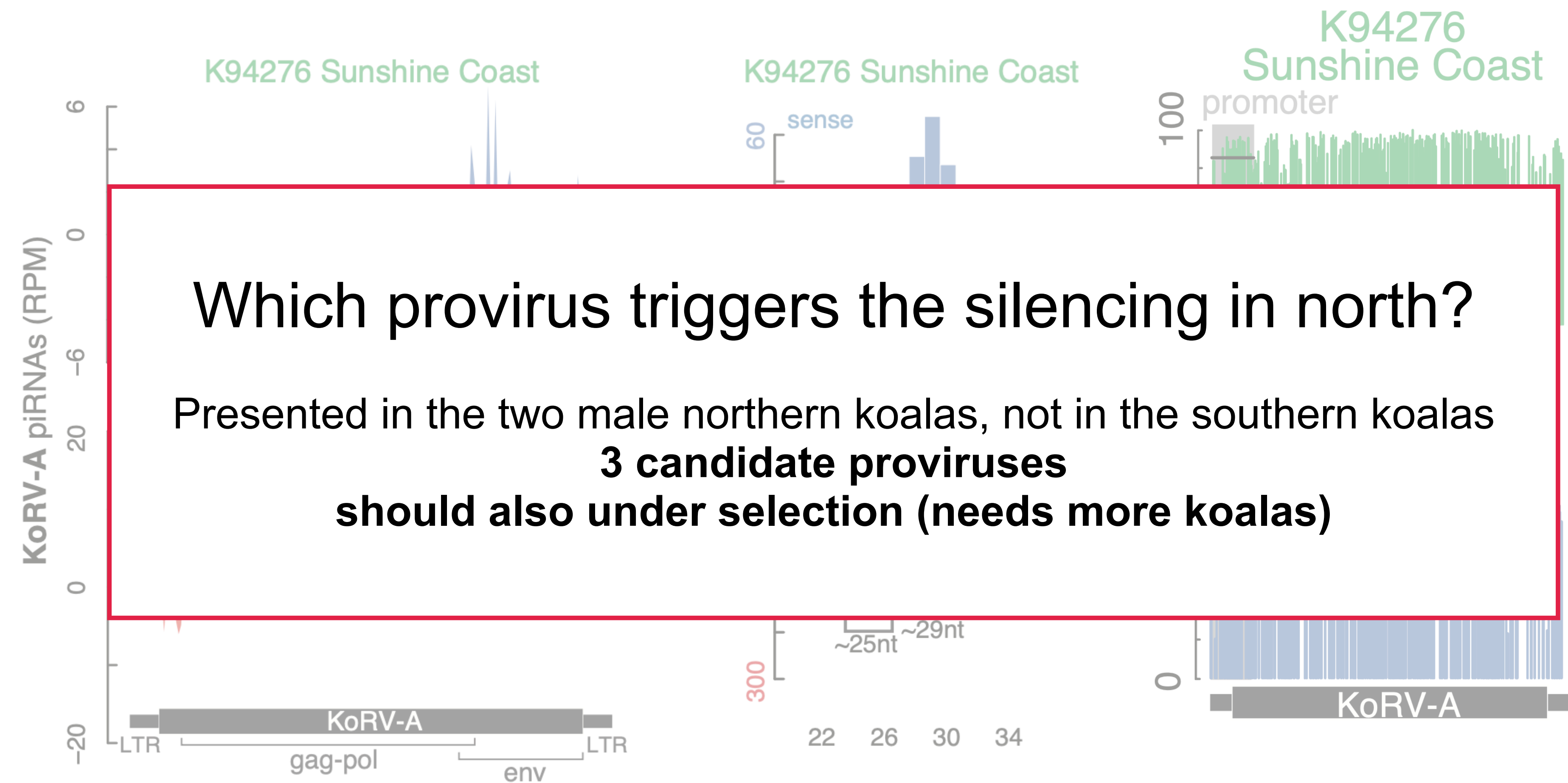
29-nt antisense piRNAs directs KoRV-A silencing in the north



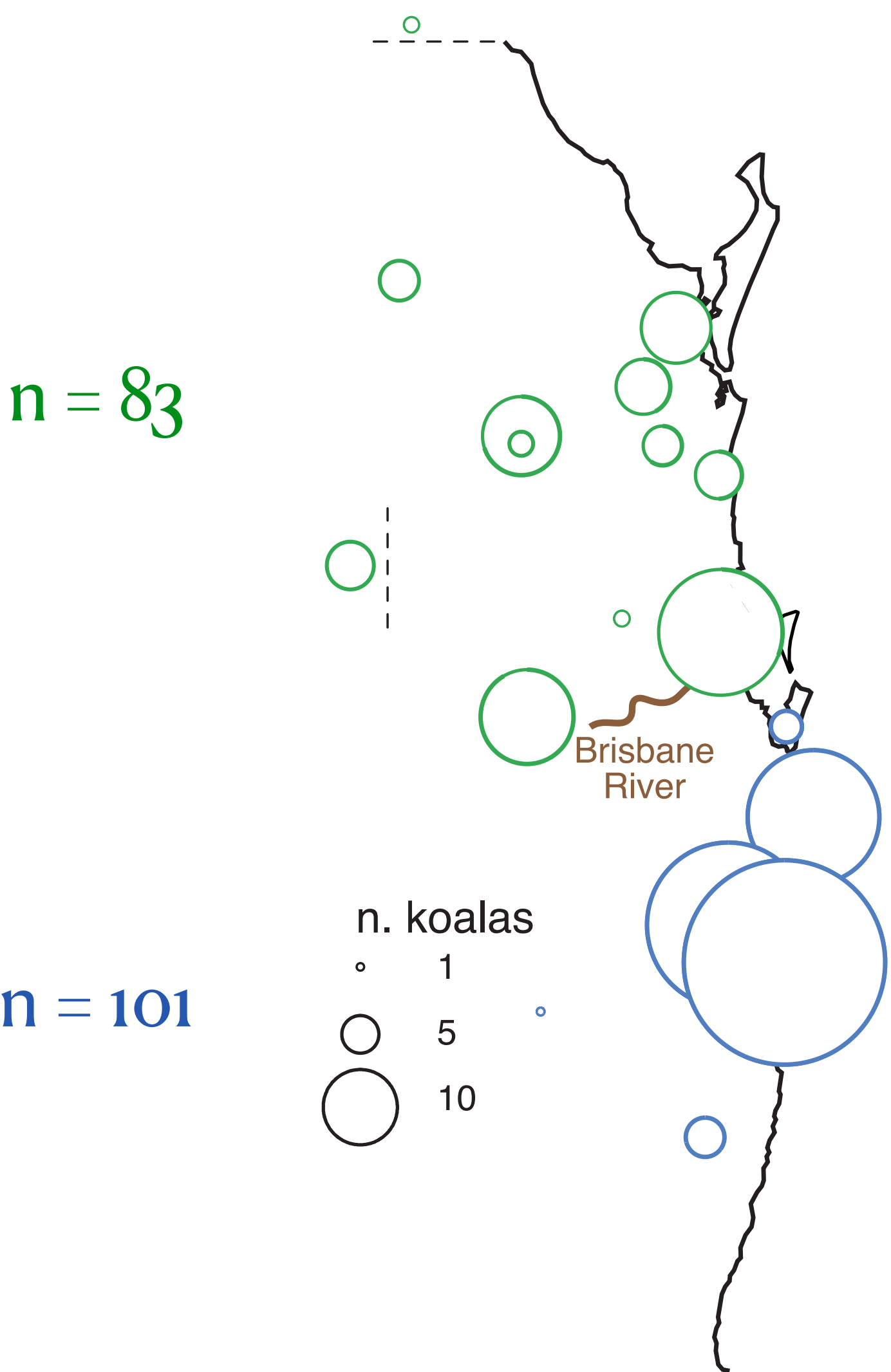




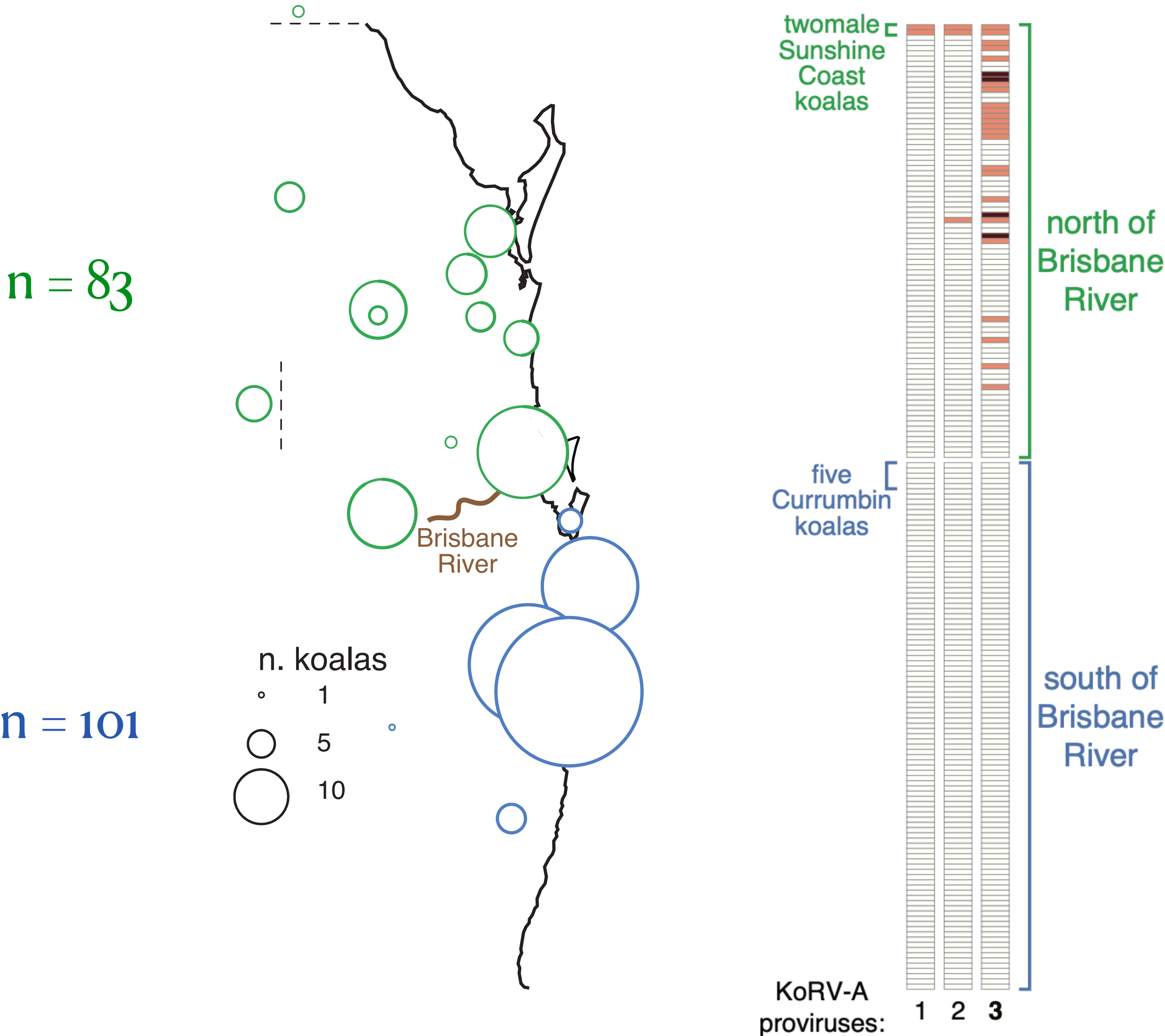




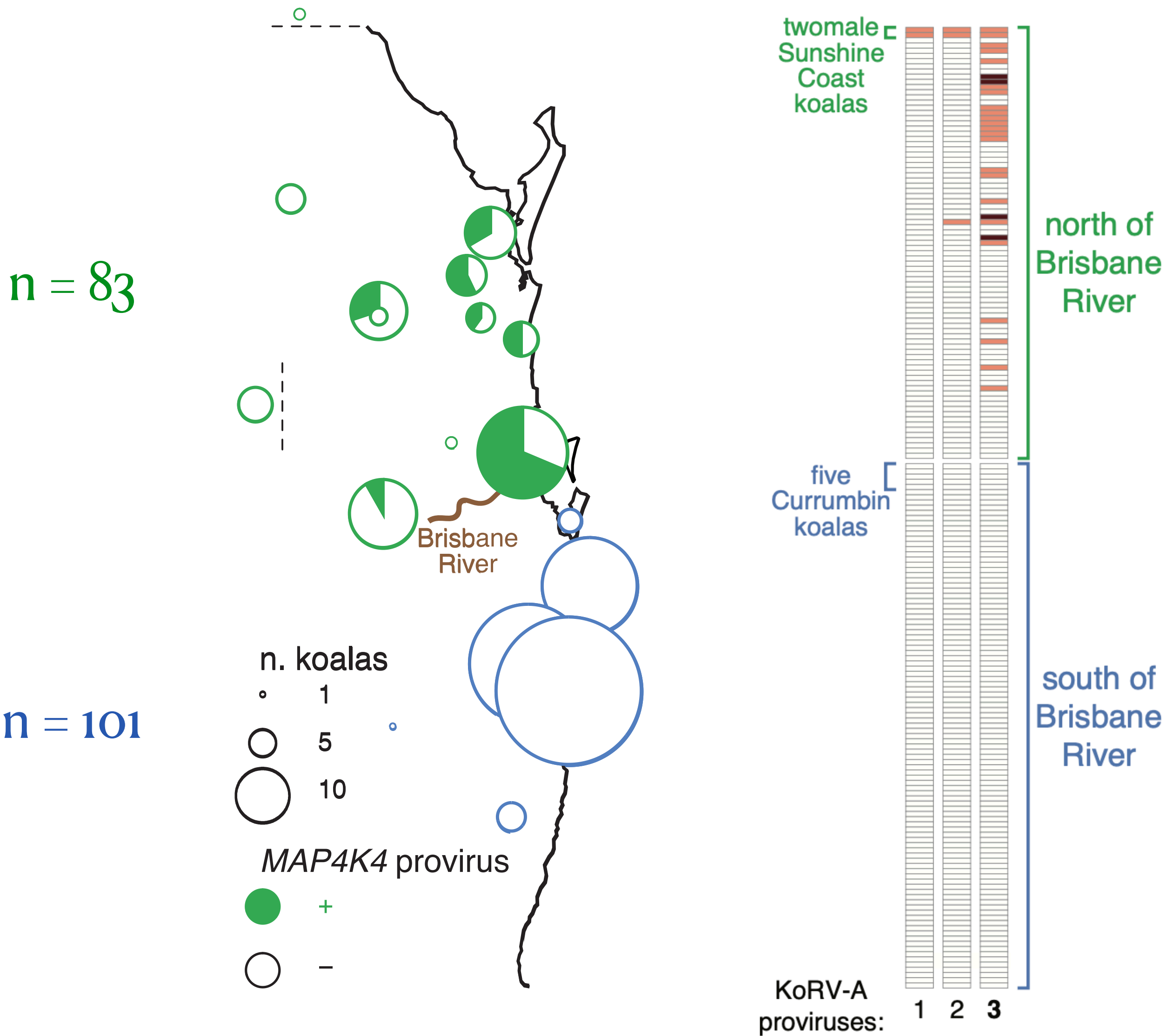
Identification of the trigger provirus for KoRV-A silencing



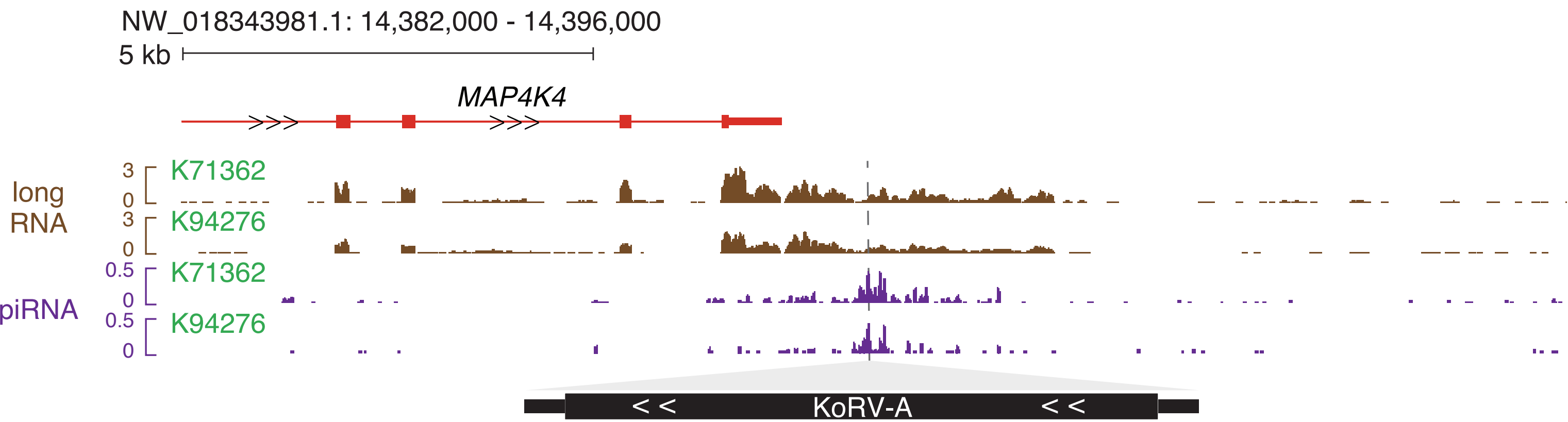
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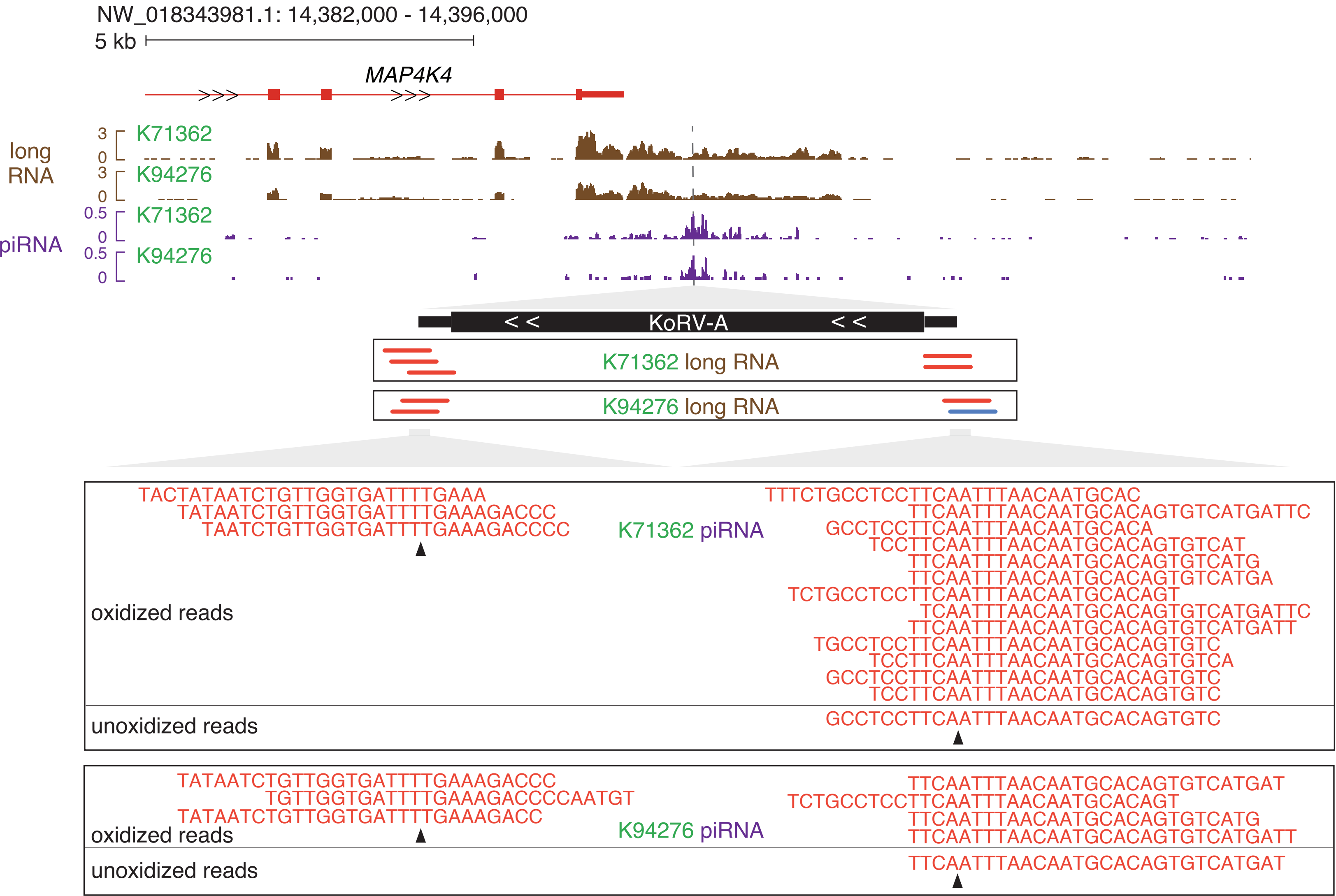
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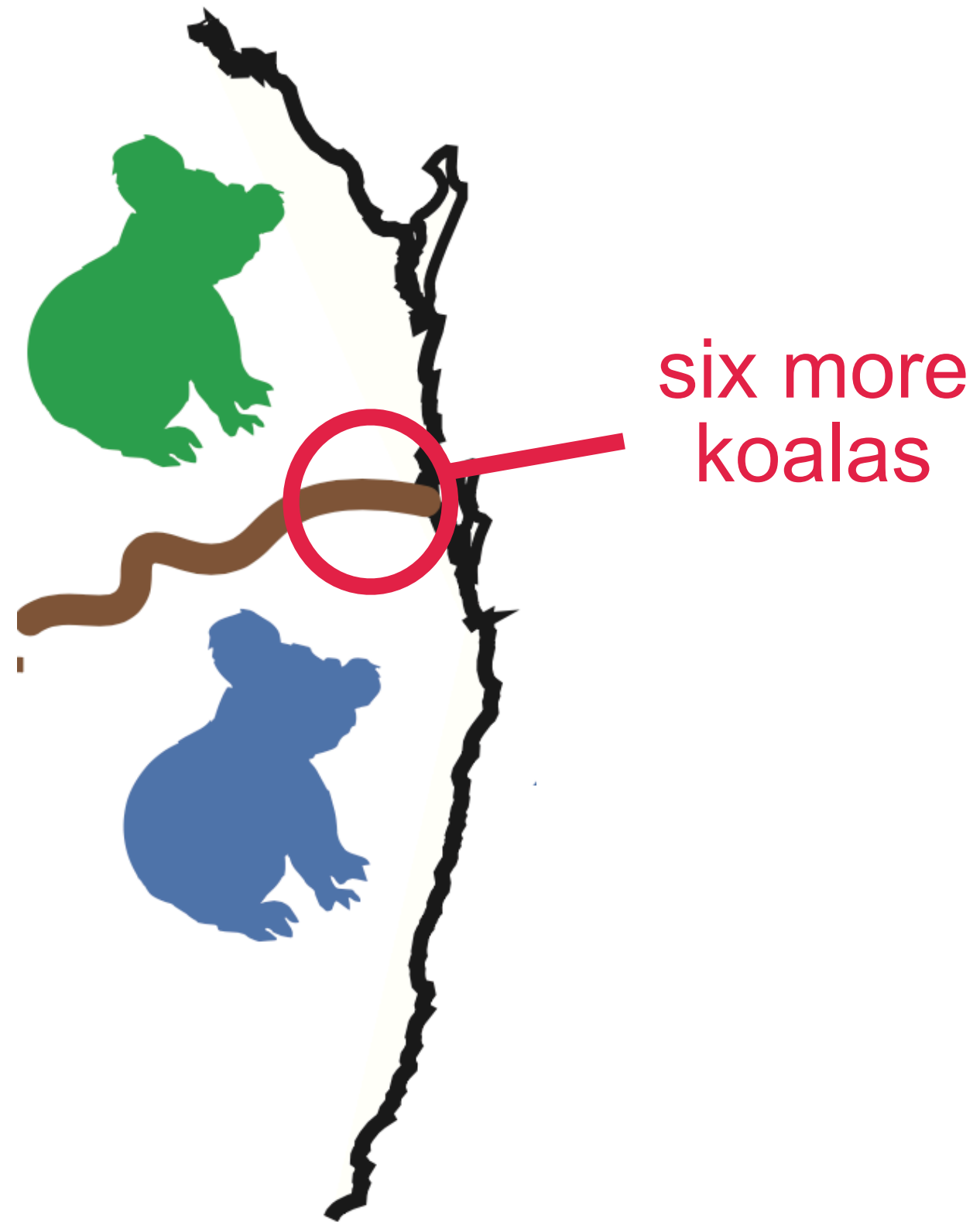


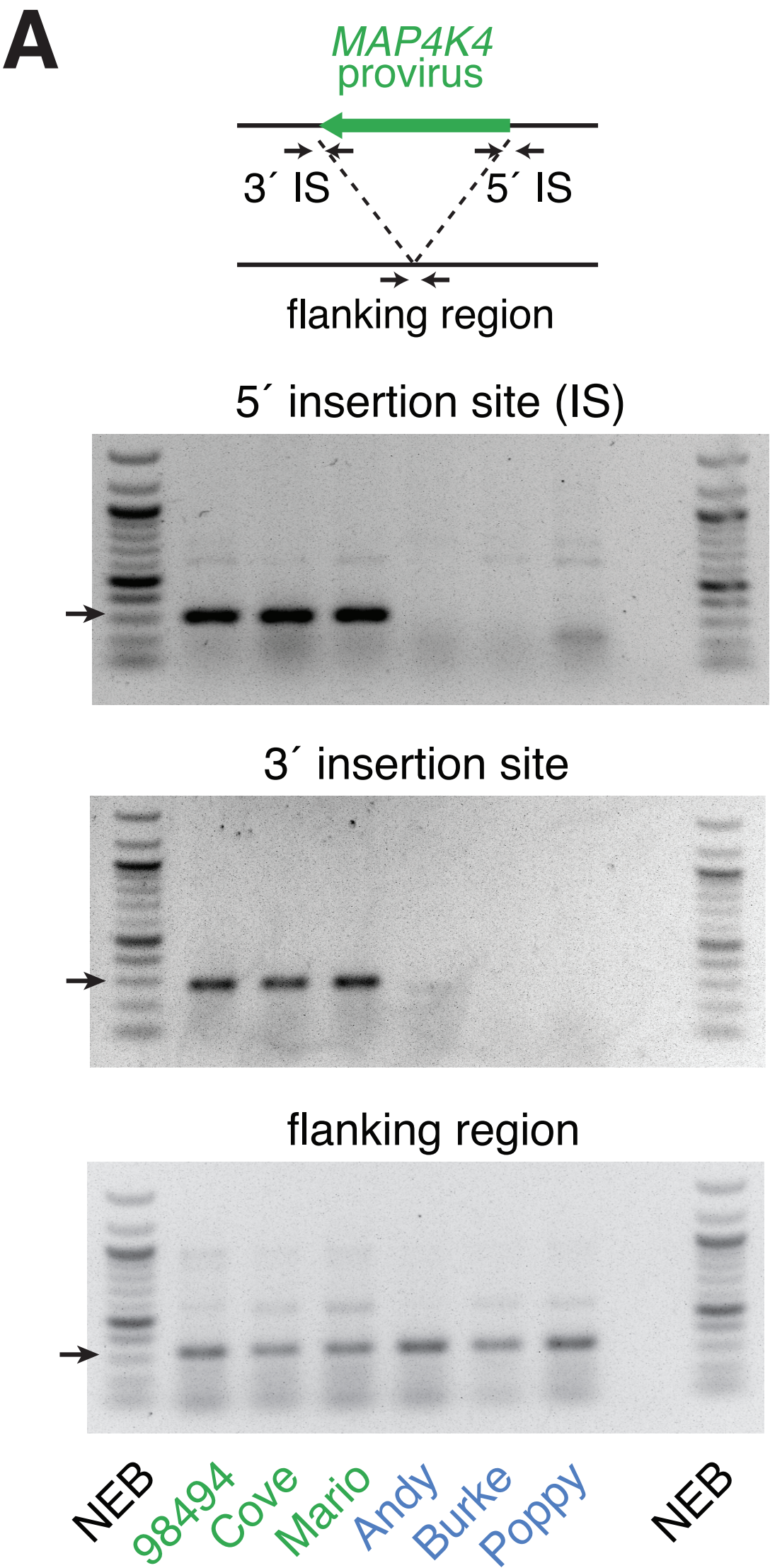
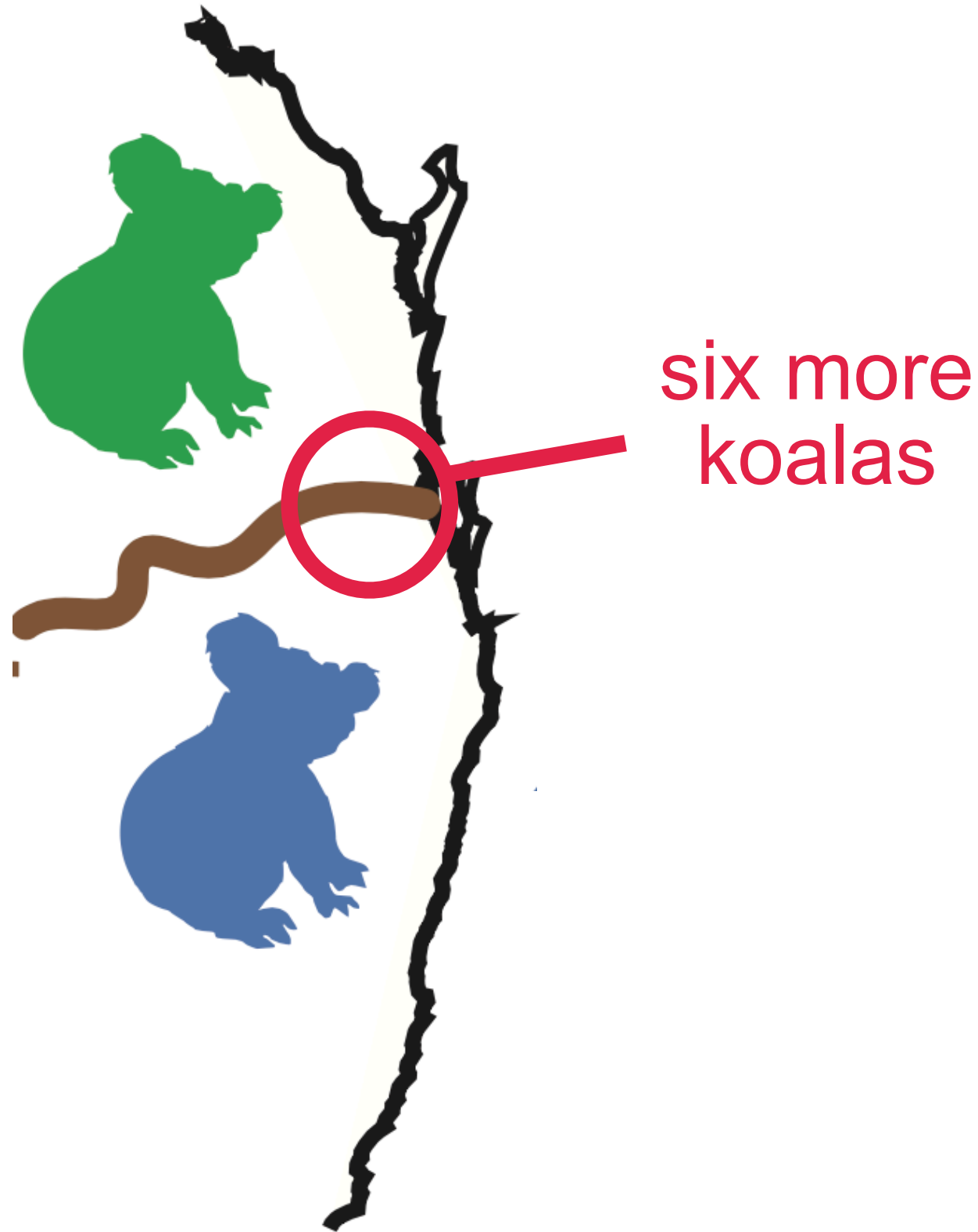
The trigger provirus is in the 3'UTR of a gene

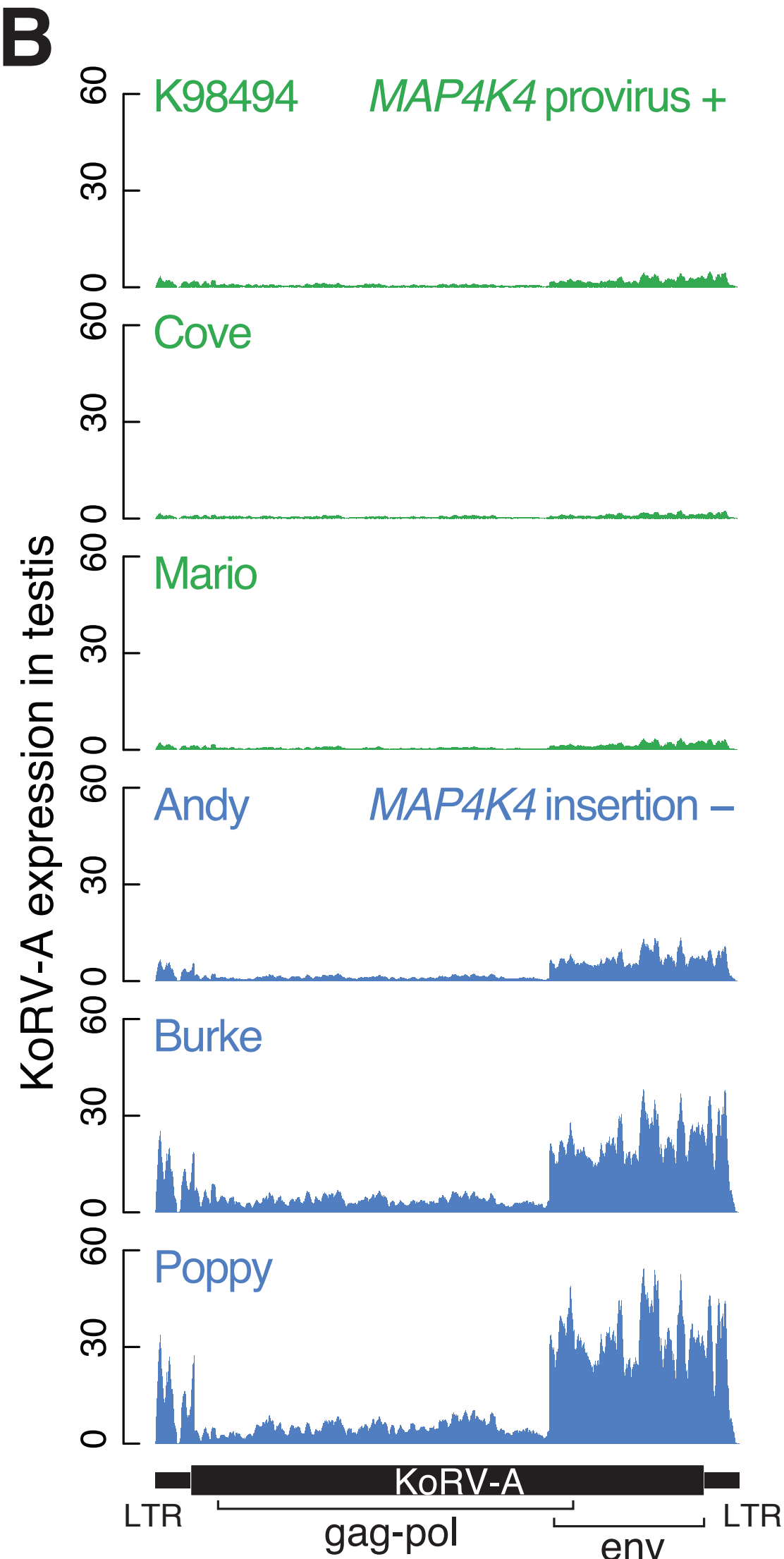
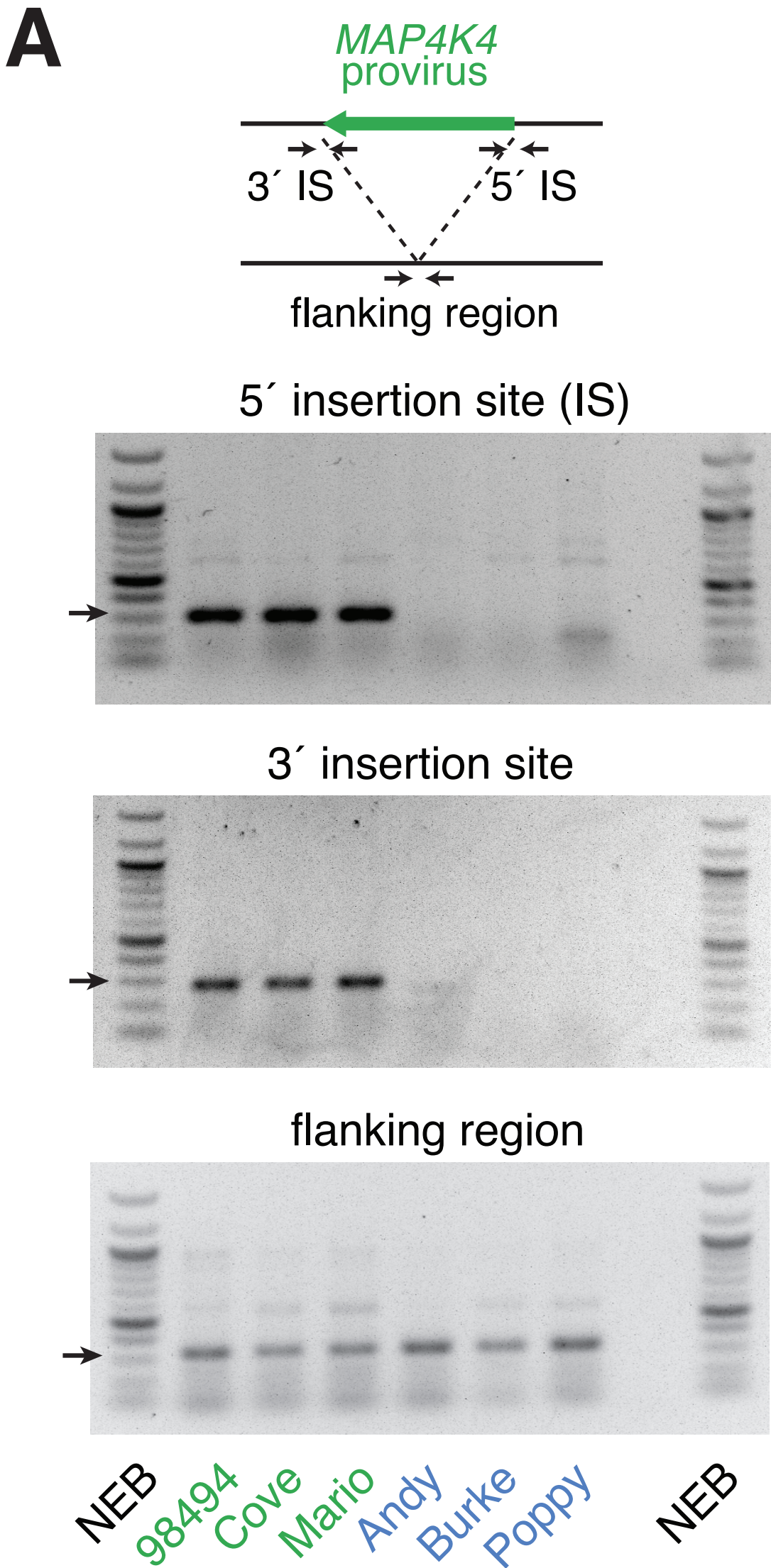
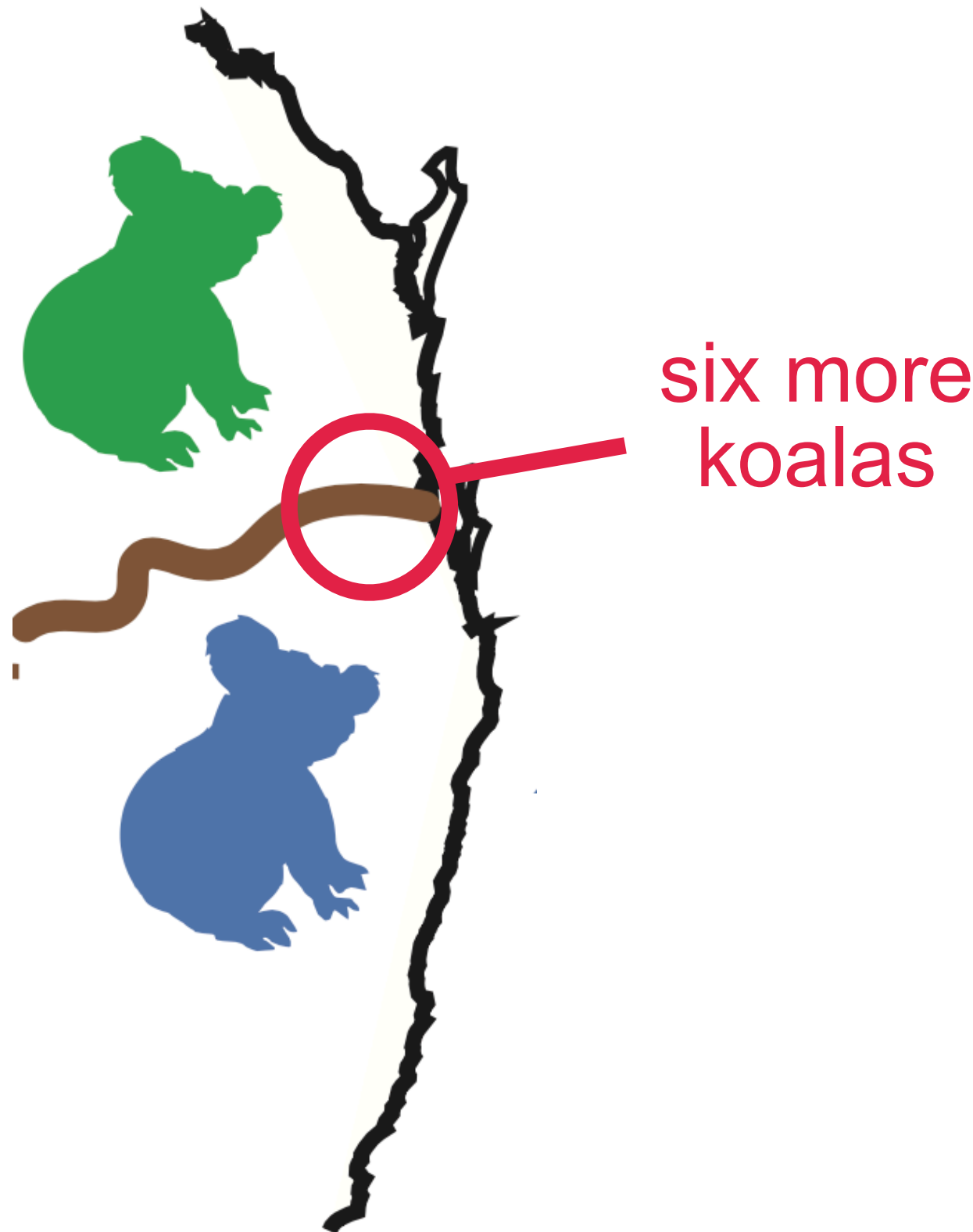


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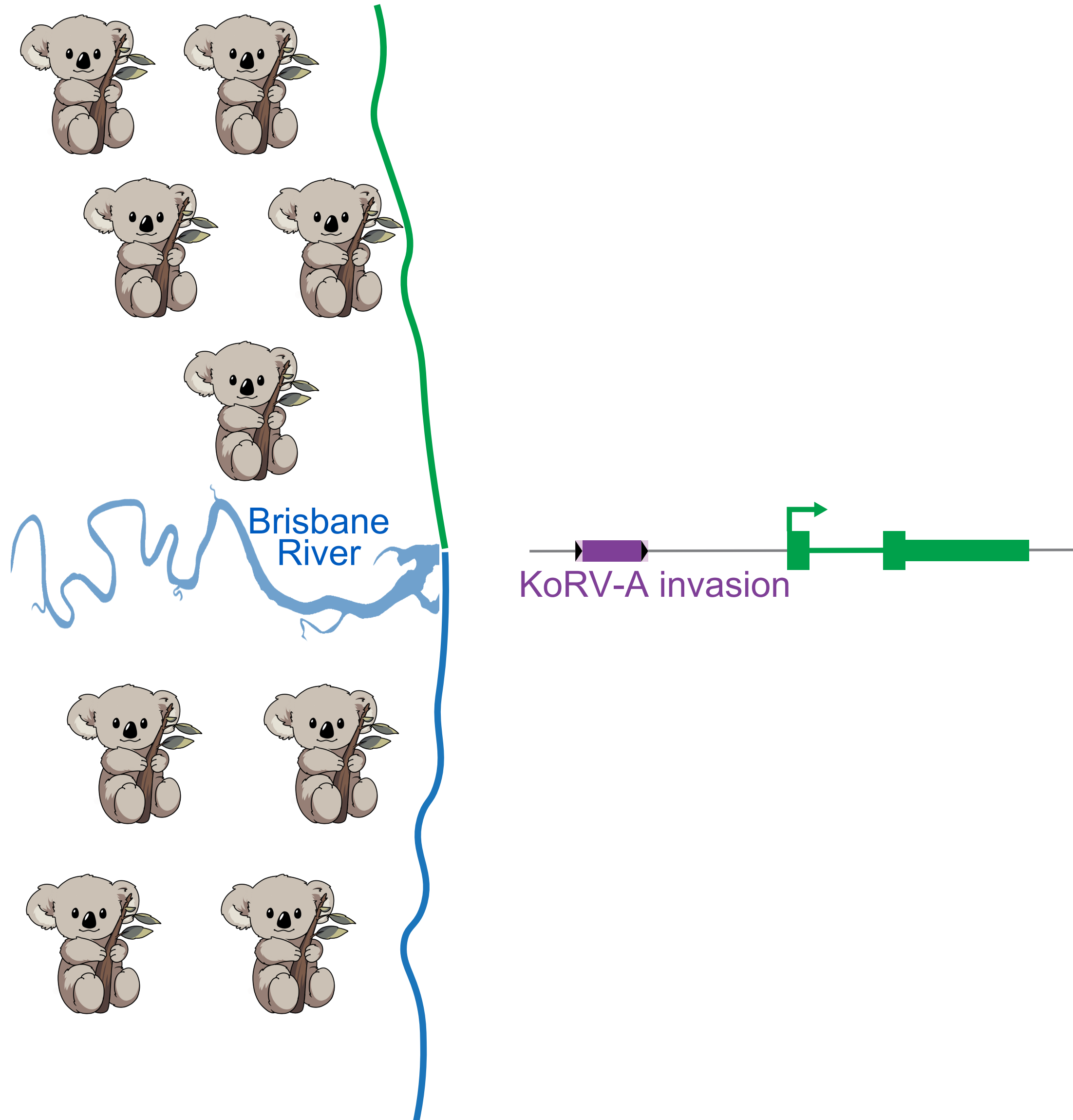






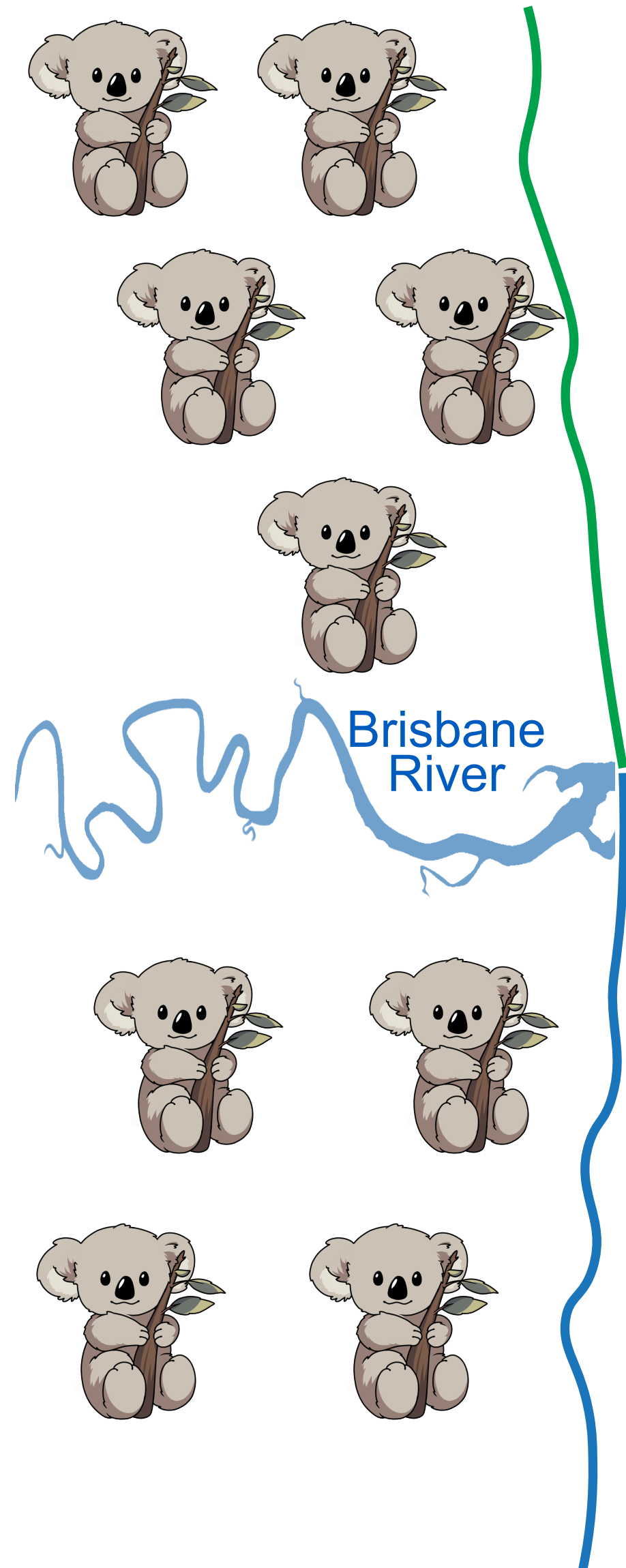


Summary: a two-phased genome response to retroviral invasion

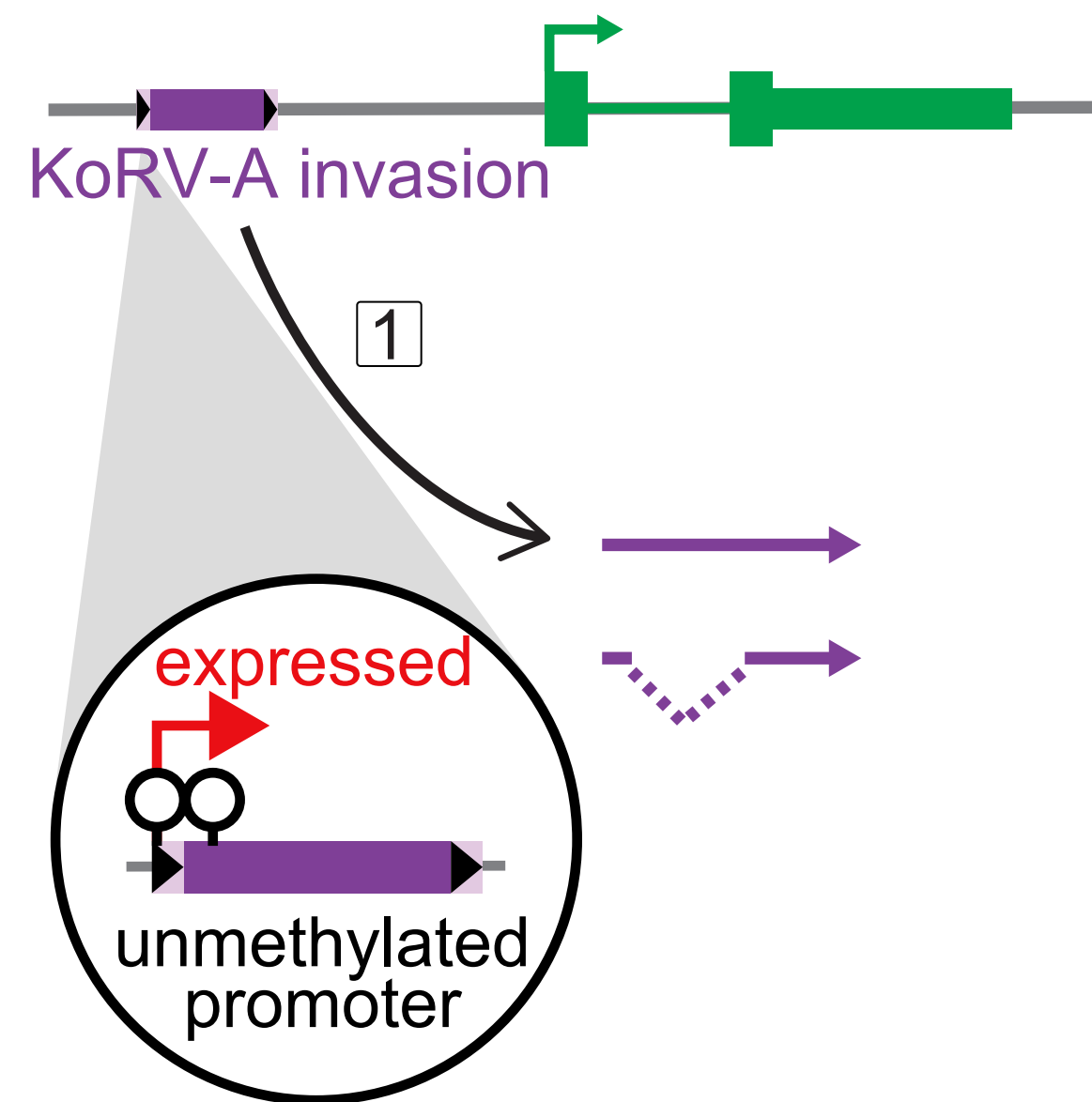


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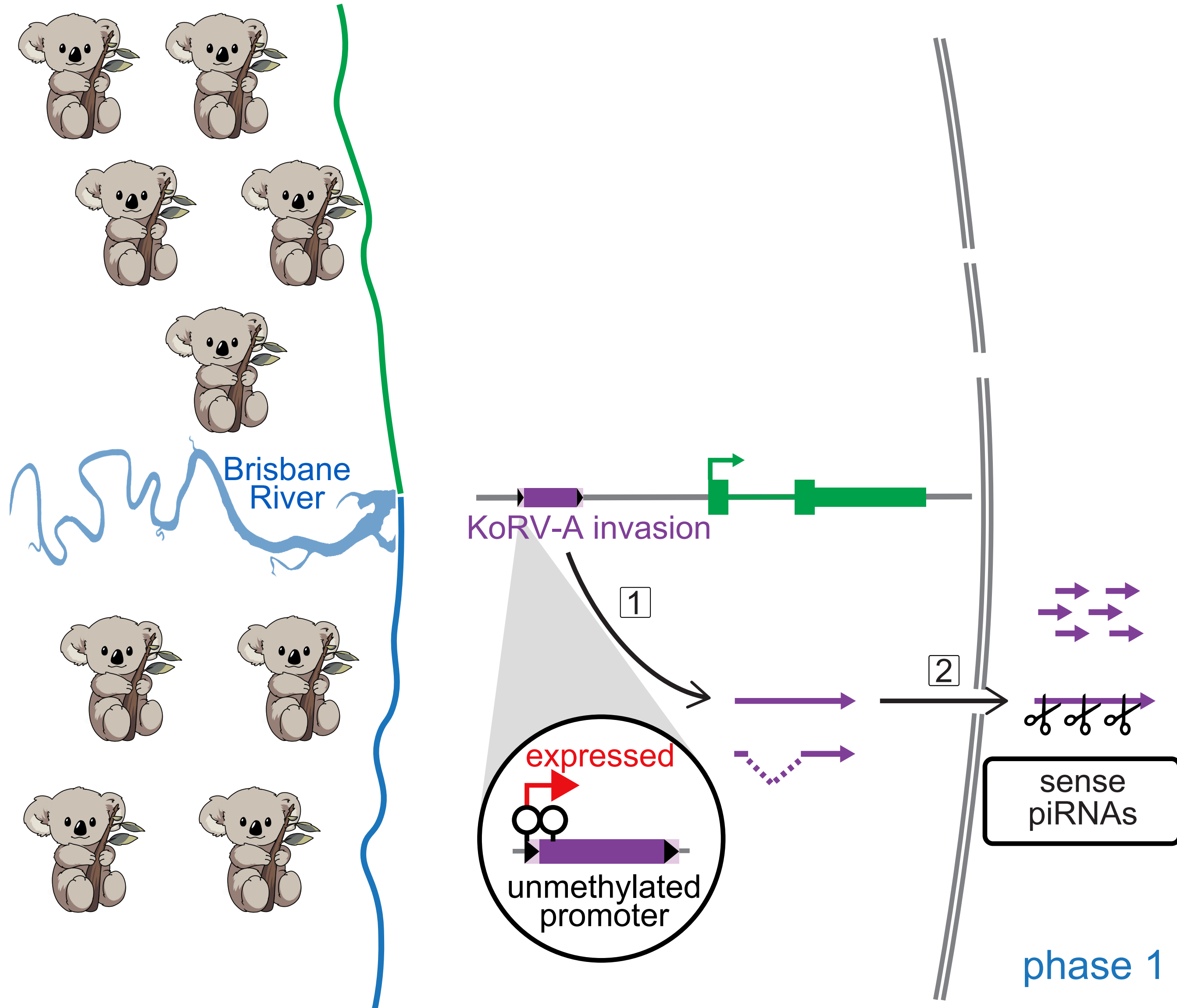


- Retrovirus invades the germline genome
- Phase 1 — Innate response



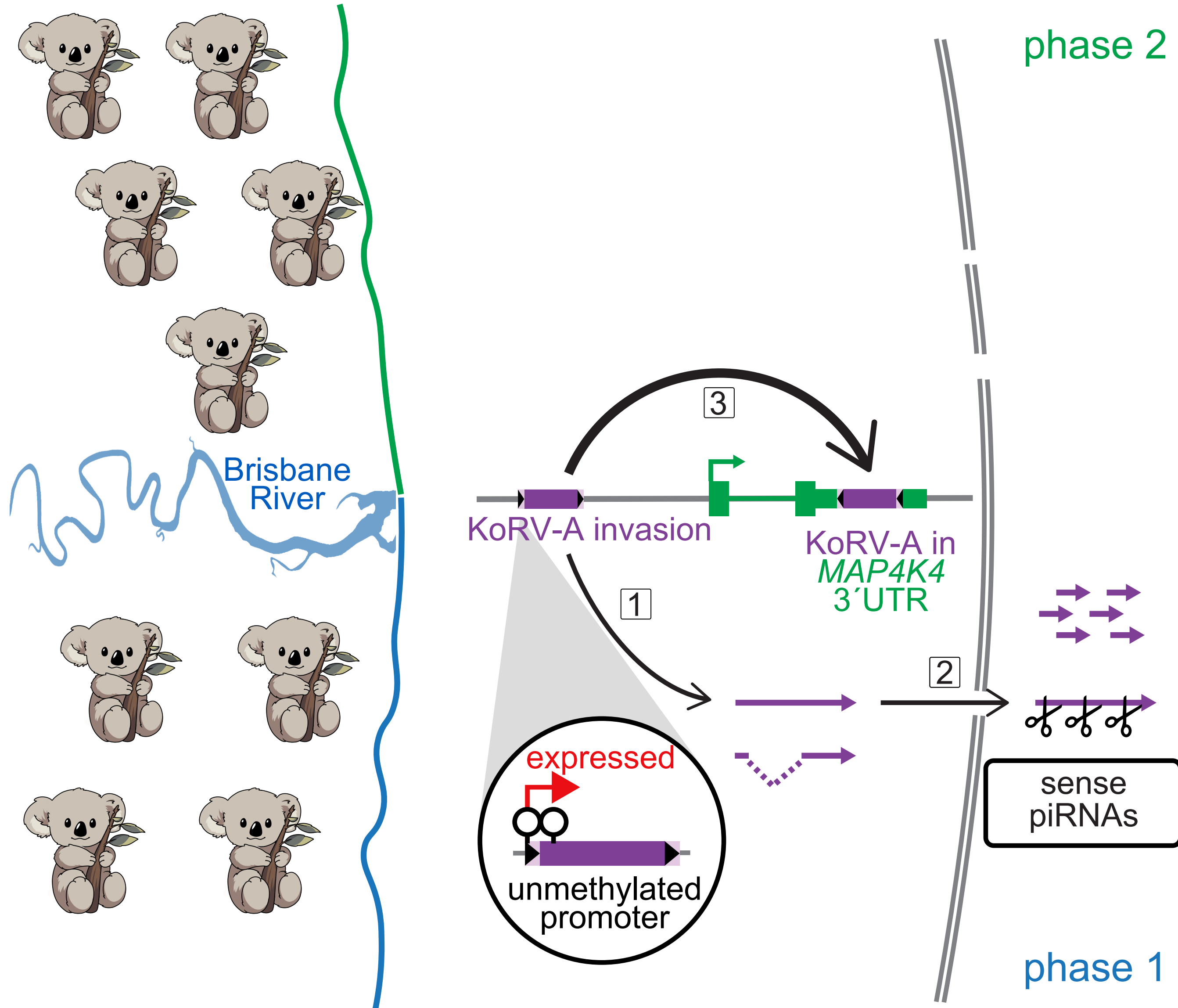
phase 1

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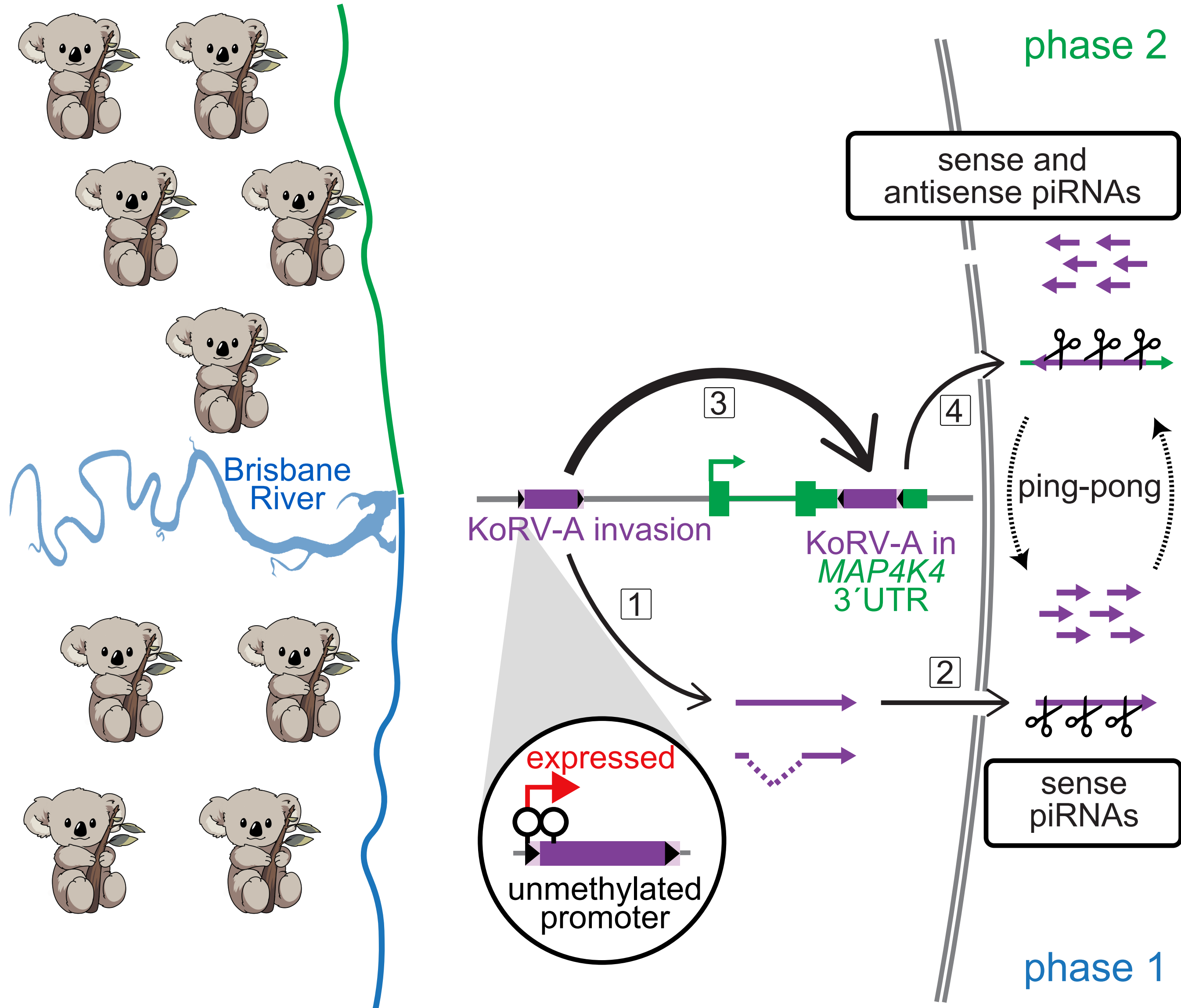
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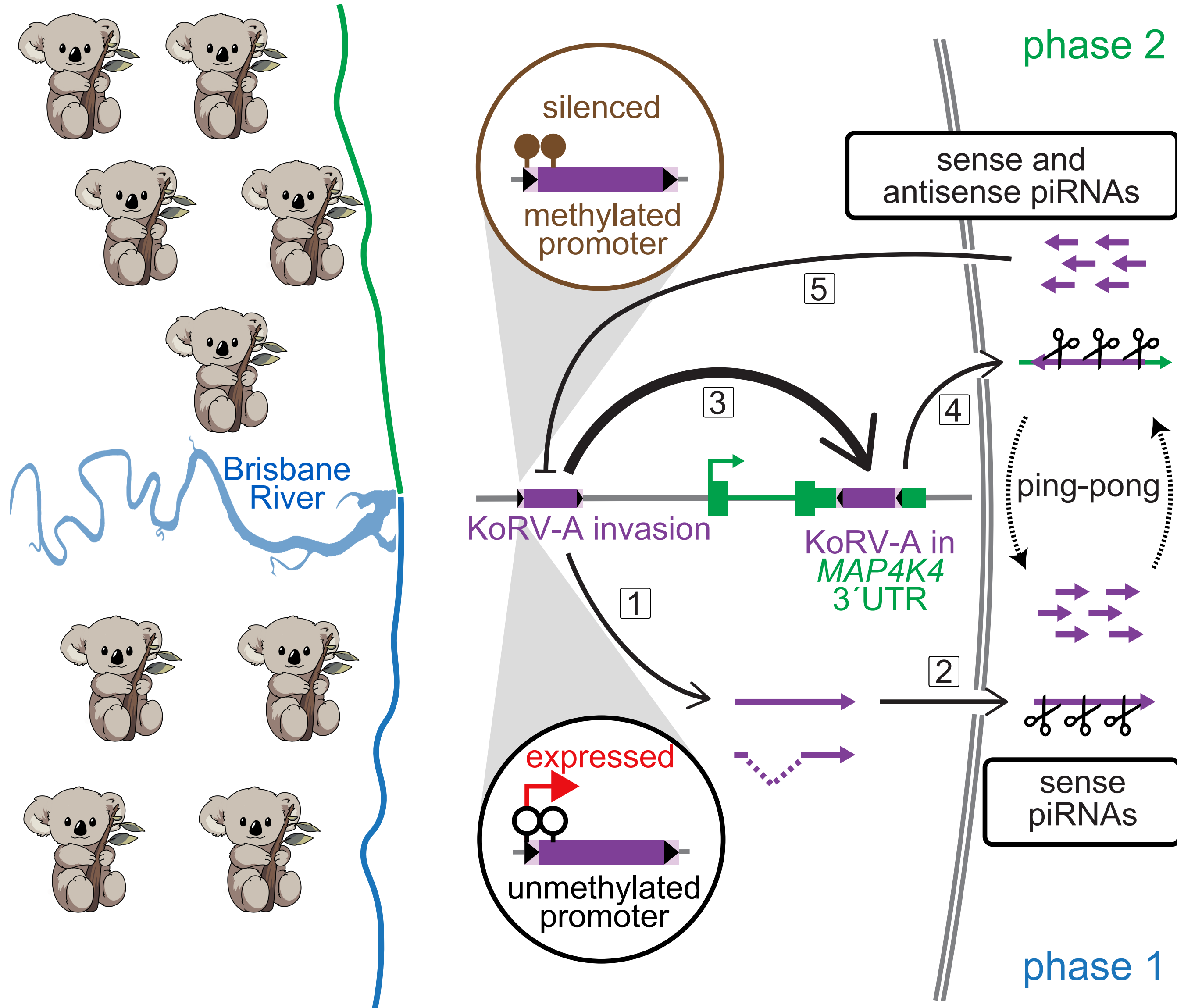
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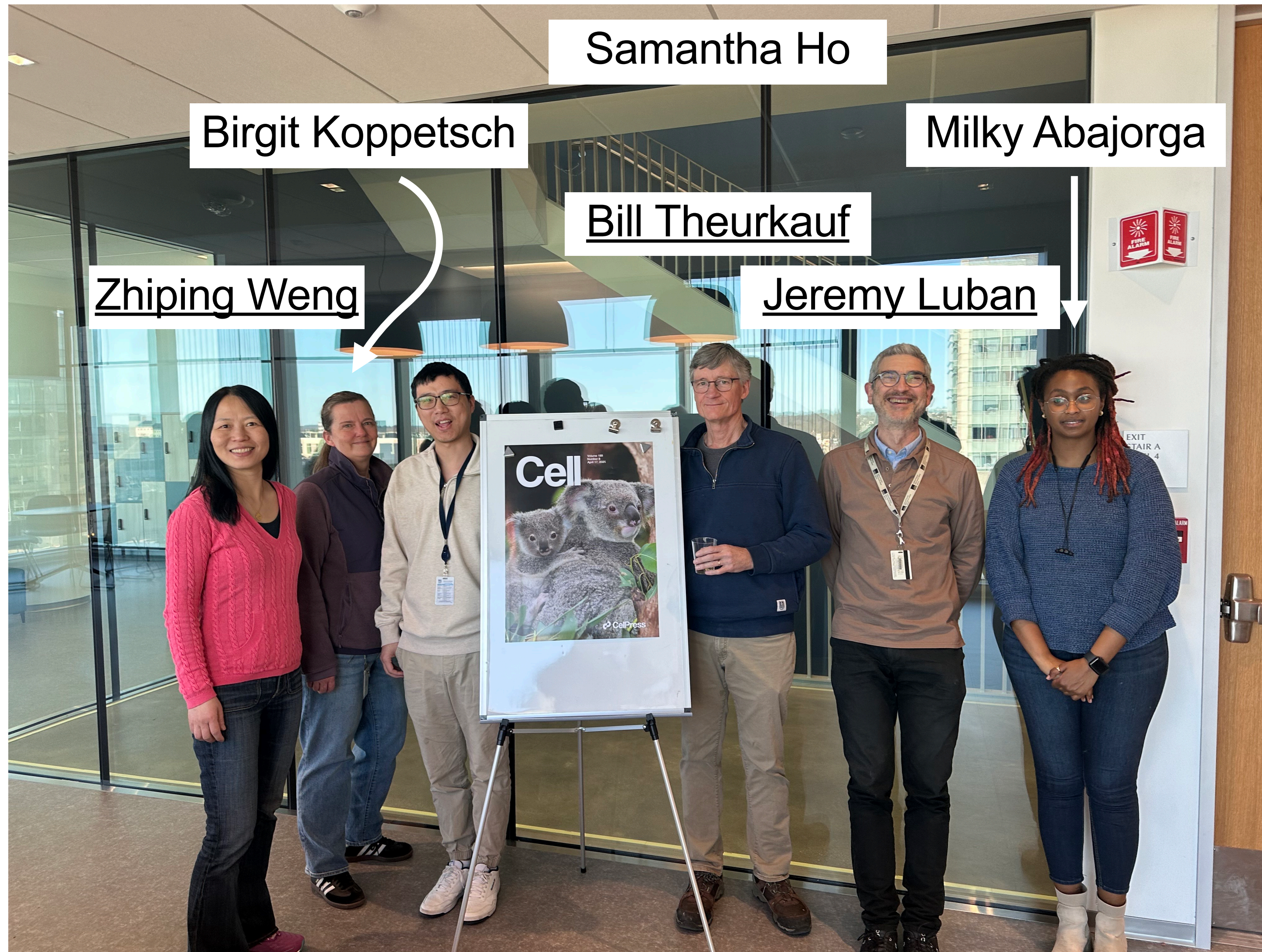
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Acknowledge



University of Queensland:

Keith Chappell
Michaela Blyton



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