



Slide at: https://bit.ly/NBGN_C21



Dissecting the genomic profile of persistently infecting oncolytic Newcastle disease virus (NDV) from cancer RNA-Seq data

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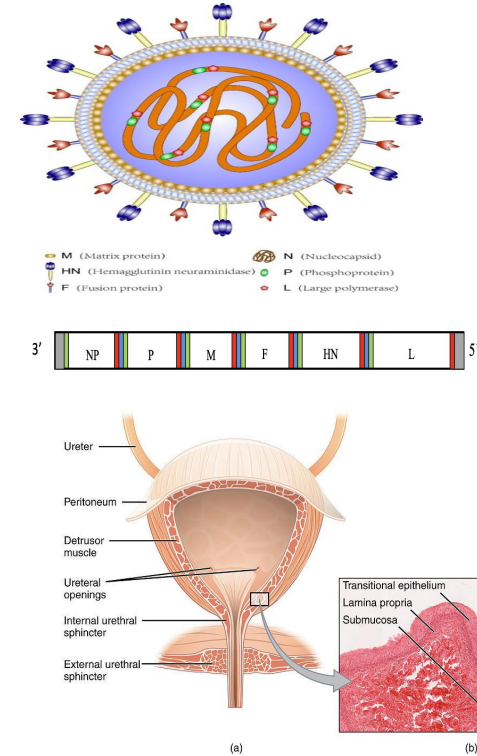
October 12, 2021



Background

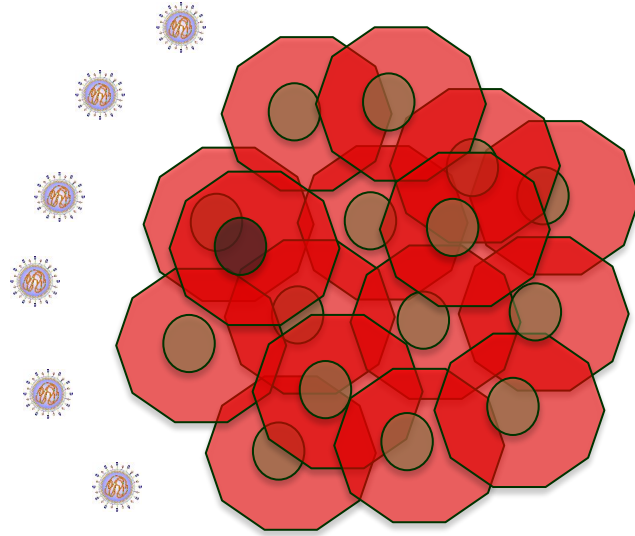
Newcastle disease virus (NDV)

- NDV ~ is an **oncolytic** virus with non-segmented negative single stranded **ssRNA(-)** genome of **15kb** size.
- It contains **six genes** which encodes six major structural proteins; 3'-NP-P-M-F-HN-L-5' (Alexander *et al.*, 1997).
- NDV selectively **replicate and kills** many different human cancer cells, including **bladder cancer**.

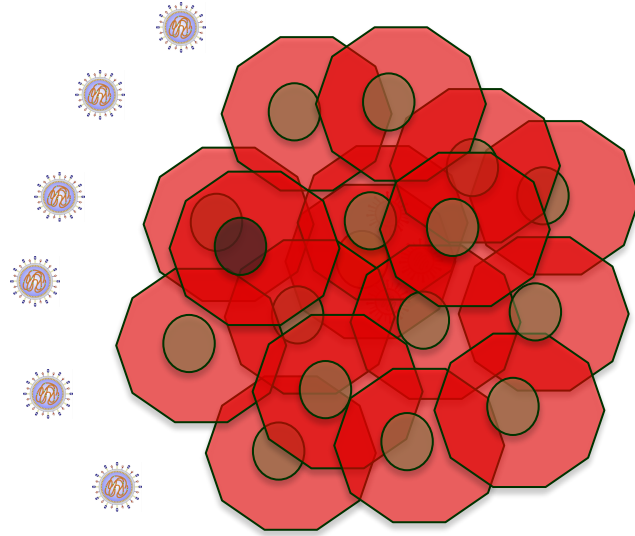


- Persistency of infection** in subpopulation of cancer cells
 - without causing cell death.

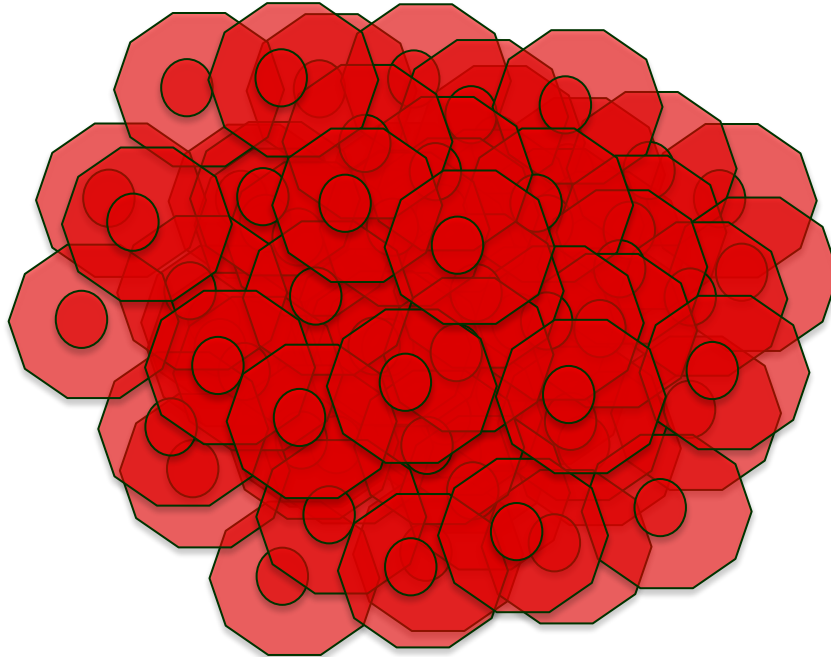
NDV mediated oncolysis

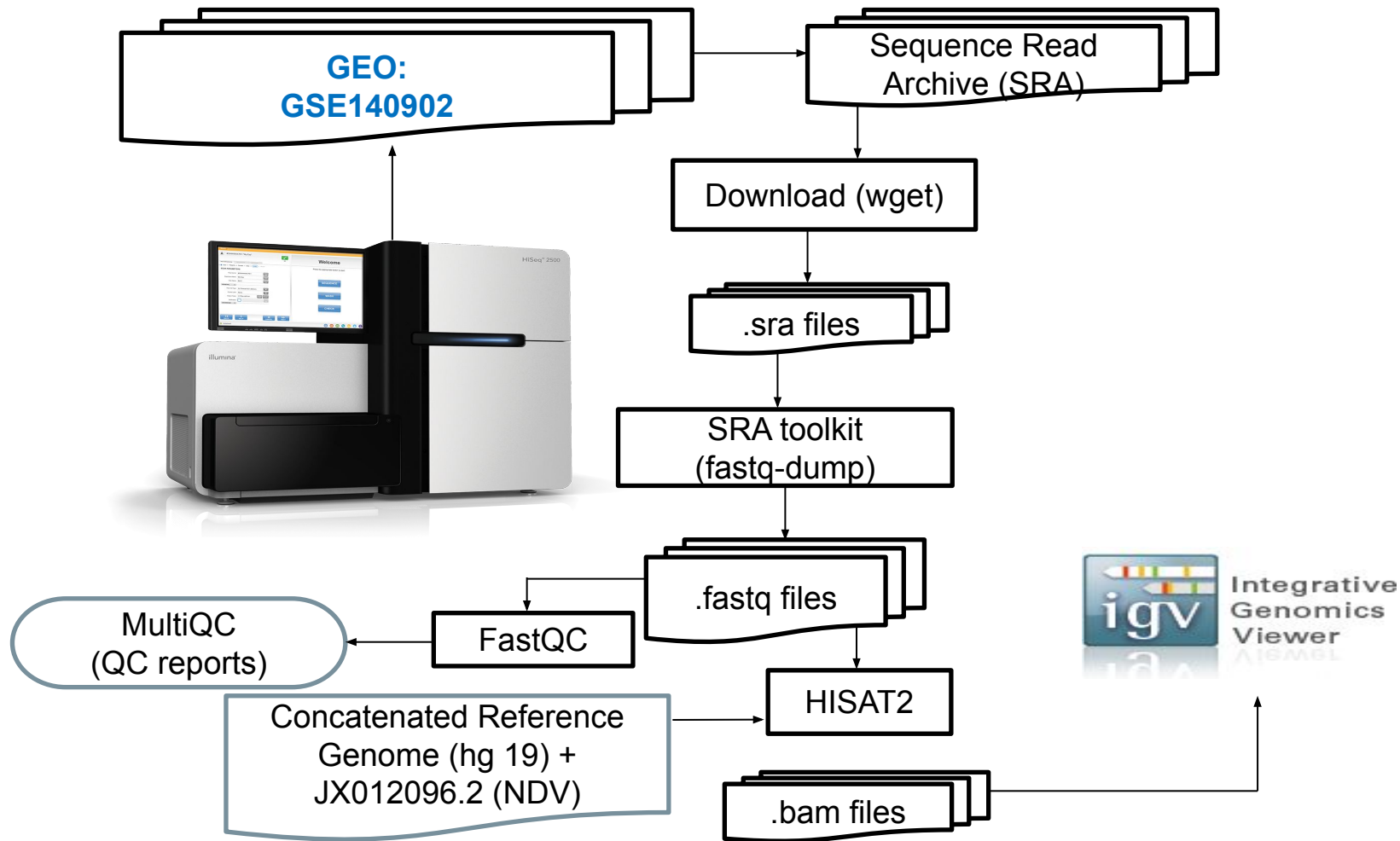


Persistent infection



Failure of therapy





Analysis of NDVpi Genome by IGV

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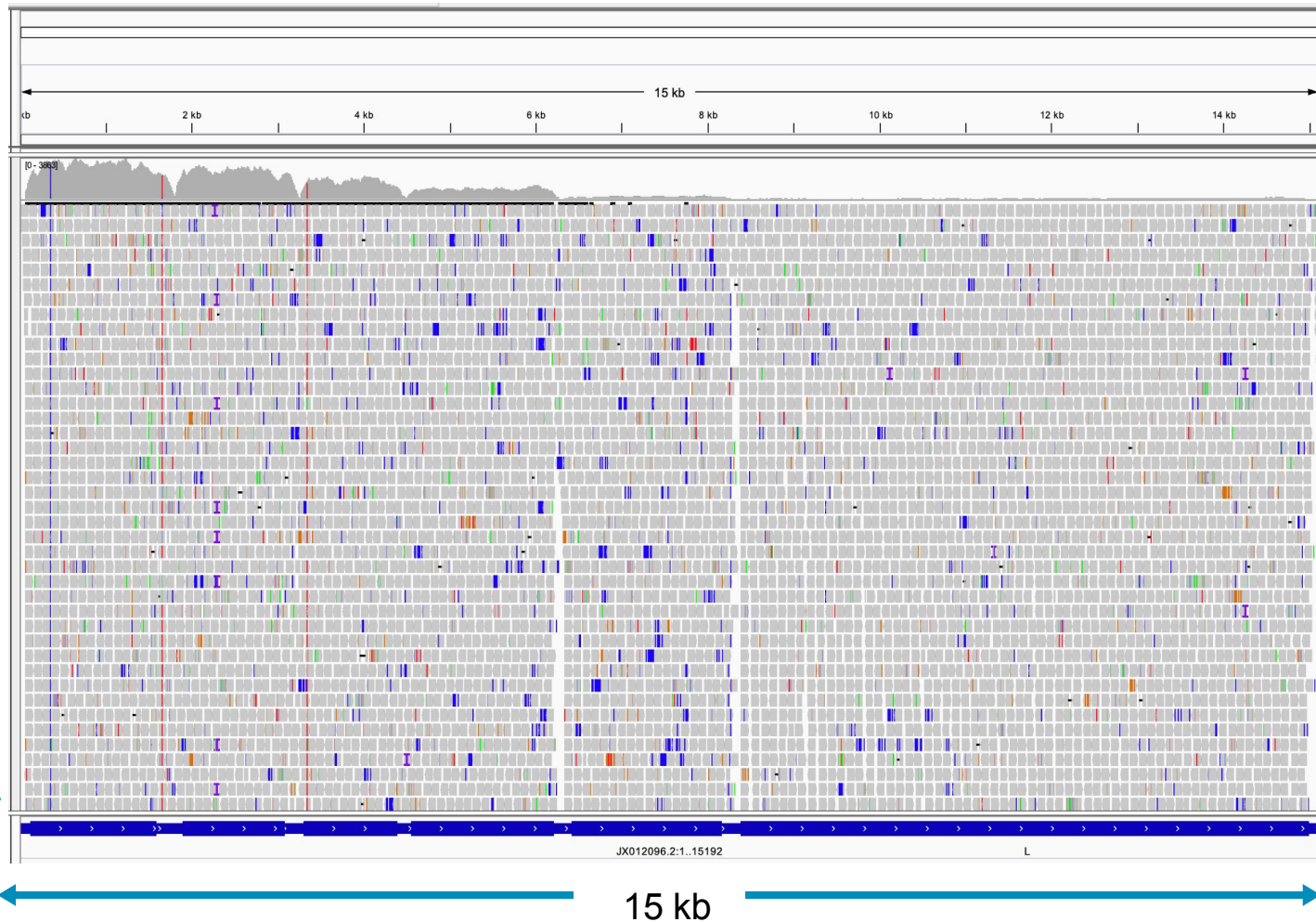


NDV AF2240 Genome

Coverage indicating loci with
large number of mismatches

NDVpi Aligned reads

NDV gene



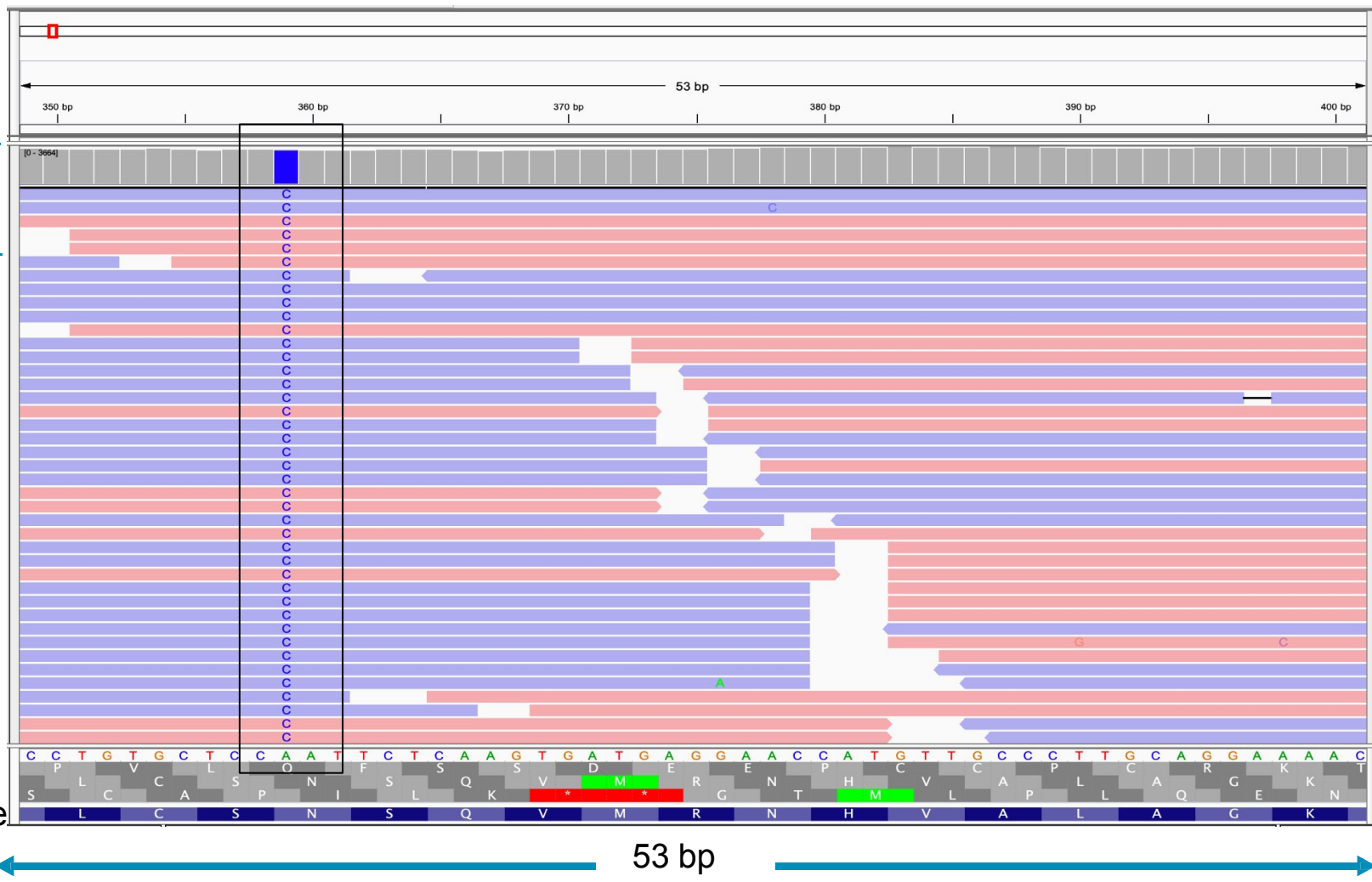
NDV
AF2240
Genome

Forward
read strand

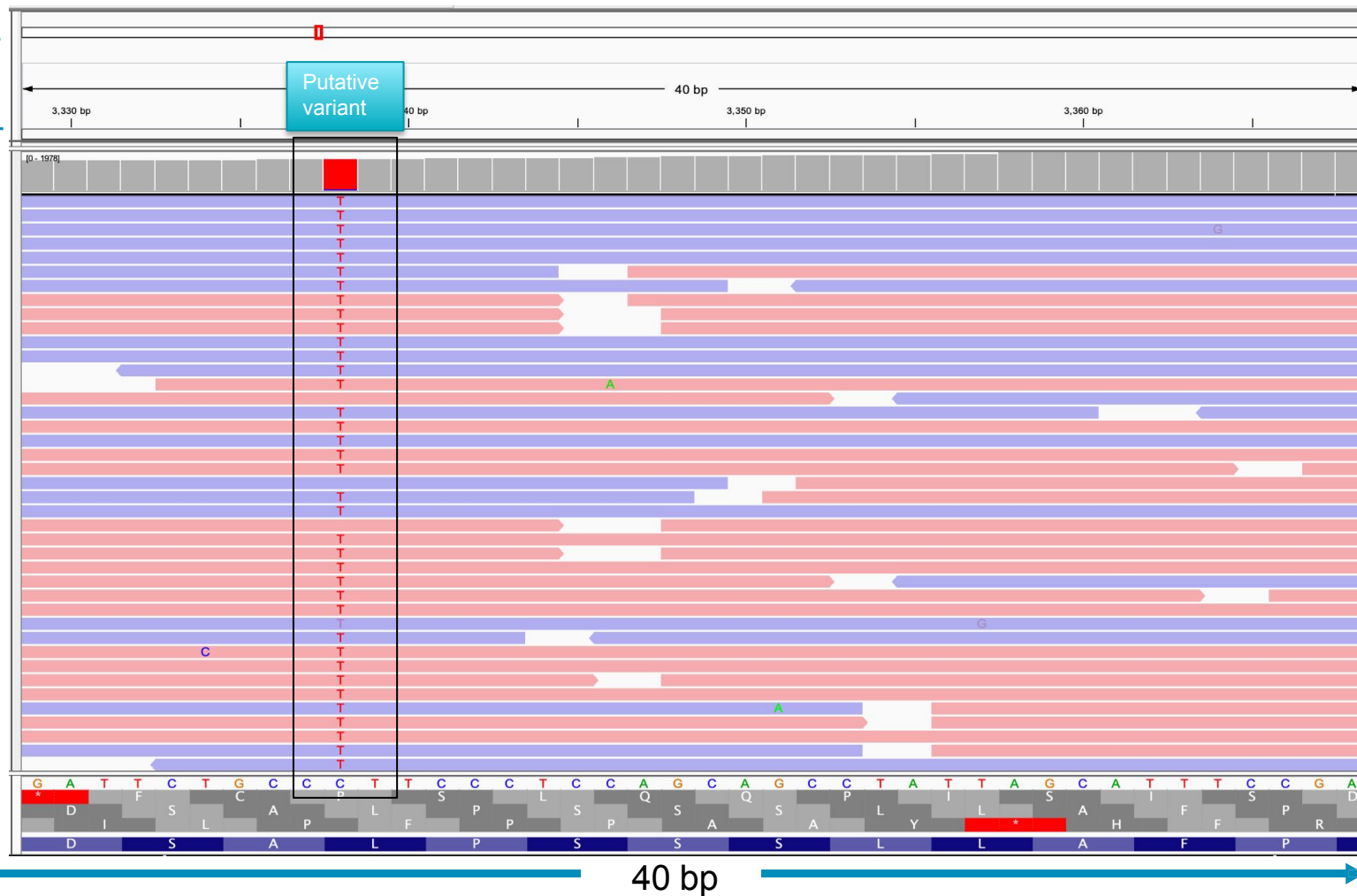
Reverse
read strand

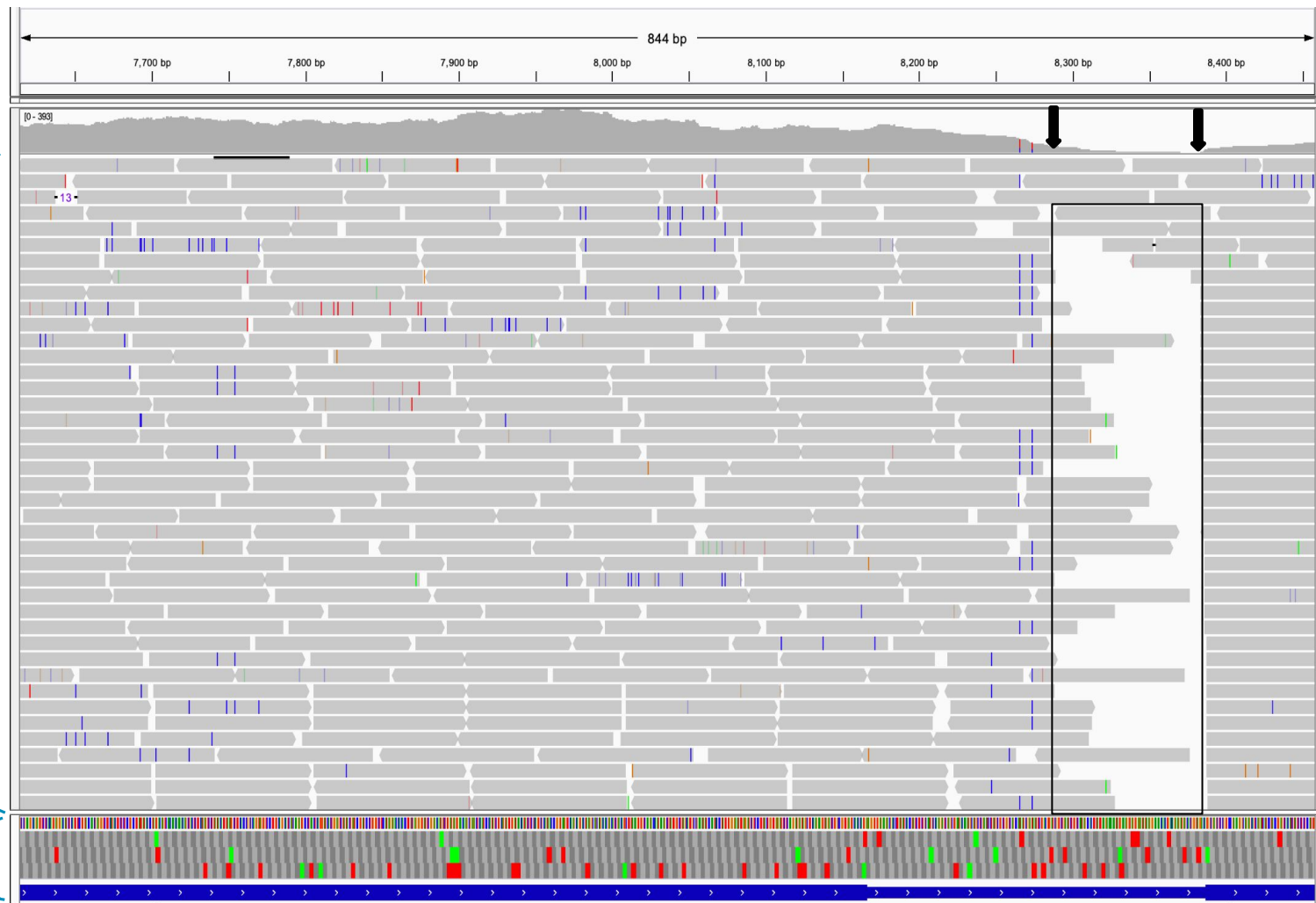
NDV sequence

Gene



NDV AF2240
Genome



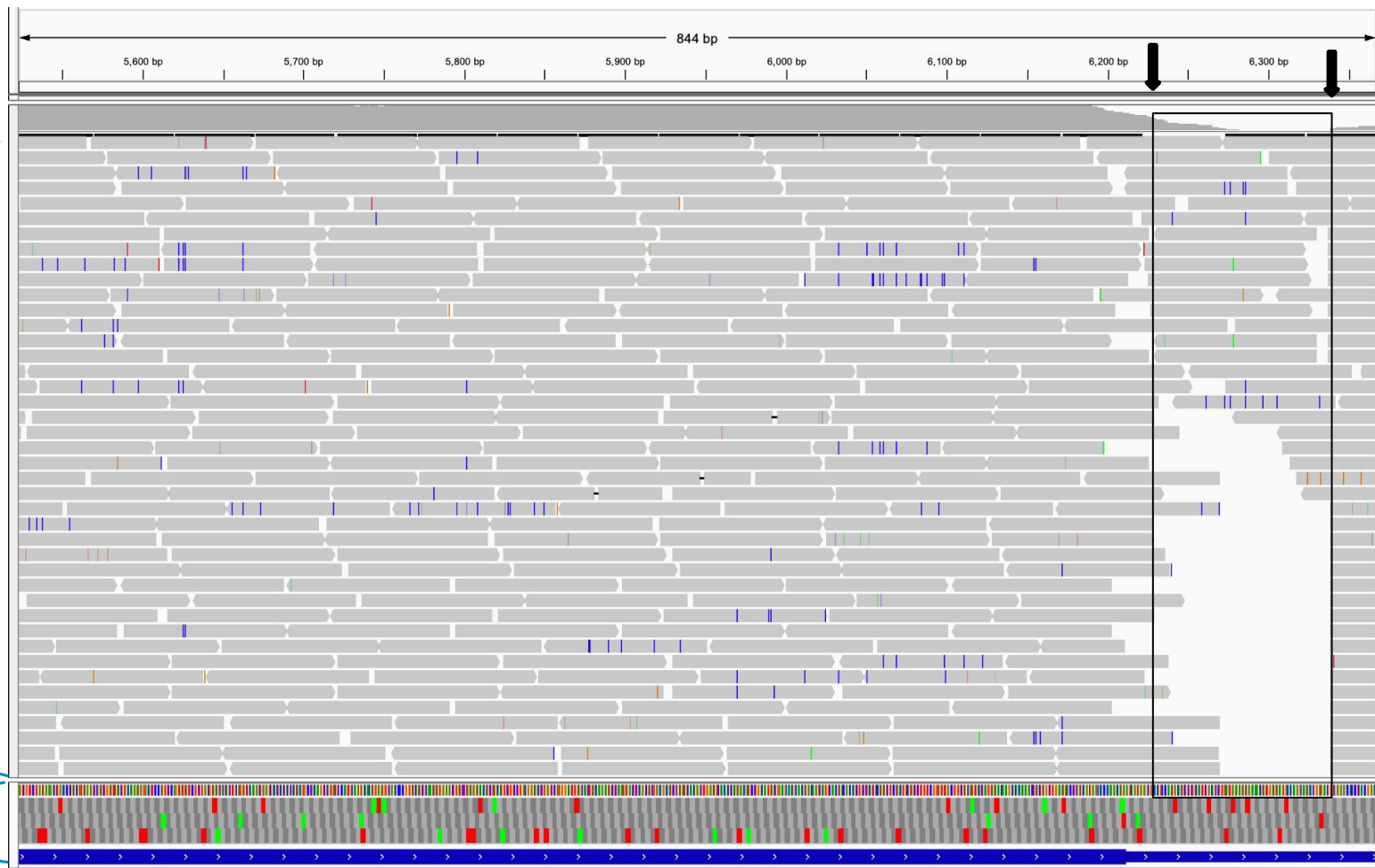


NDVpi
Aligned reads

Sequence & Gene

NDVpi
Aligned reads

Sequence & Gene



Putative variants detection

Regions	Type	Position	% G. region
NP	Mismatch	359A->C	2.4%
	Mismatch	1,653C->T	11.0%
M	Insertion	3,338C->T	22.3%
P	Insertion	2,2290 GGG	15.3%
HN	Truncation	8263 to 8390	55.1%
L	Truncation	6203 to 6342	41.4%

Conclusion

- Analysis of NDV genome (NDVpi) revealed **deletion** and **insertion regions** in **NP** and **M proteins** of the virus.
- Genome **truncations** were observed at **HN** and **L proteins regions**, *suggesting that persistent infection in bladder cancer cells causes changes in the viral genome.*
- It is not clear how this *mutational changes* occurred to bring about persistence infection in bladder cancer cells.

Acknowledgements

