Landcare Research
Manaaki Whenua

ministry of science + innovation
TE PŪNAHA HIHIENGA WHAIAKEA

Using next-generation molecular approaches to uncover cryptic disease-causing agents in native wildlife

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TE RŌPU TAIAO RONGOA O AOTEAROA

Department of Conservation
Te Papa Atawhai

Acknowledgements

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Keven Drew (LCR)

Catriona MacLeod (LCR)

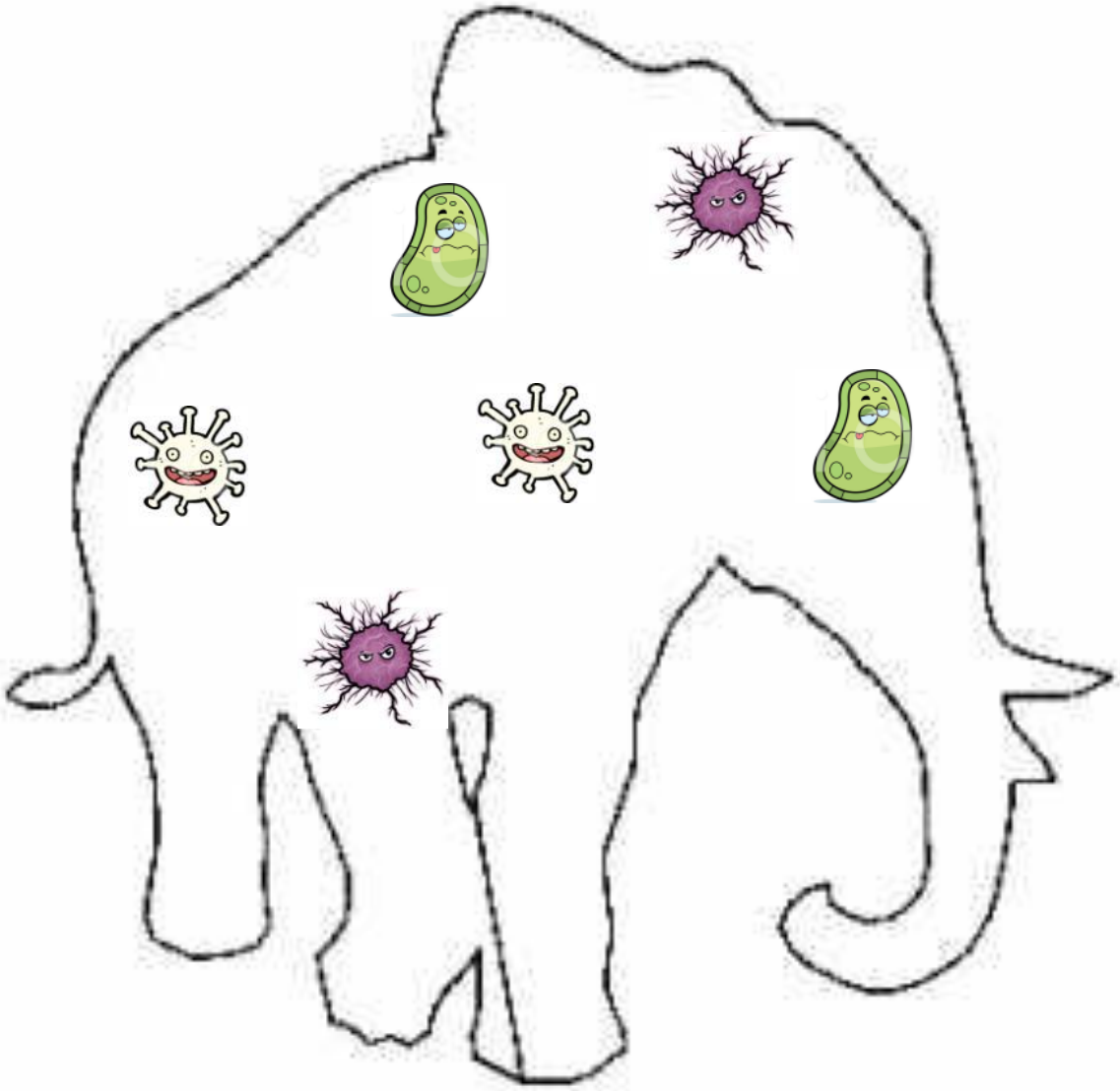
Amy Whitehead (University of Melbourne)

David Pulford (MPI)

NeSI

New Zealand eScience Infrastructure

Pathogen discovery



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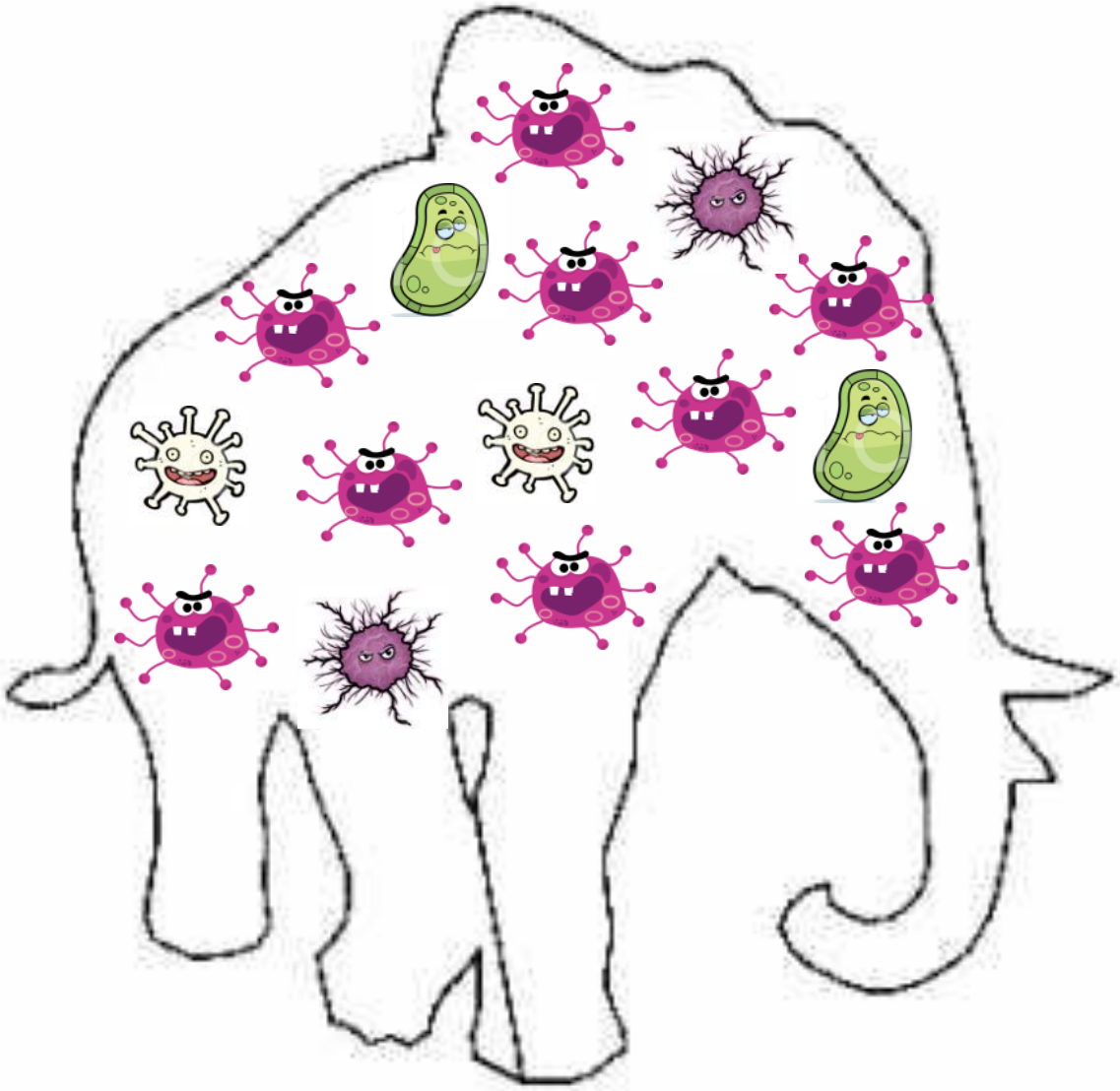

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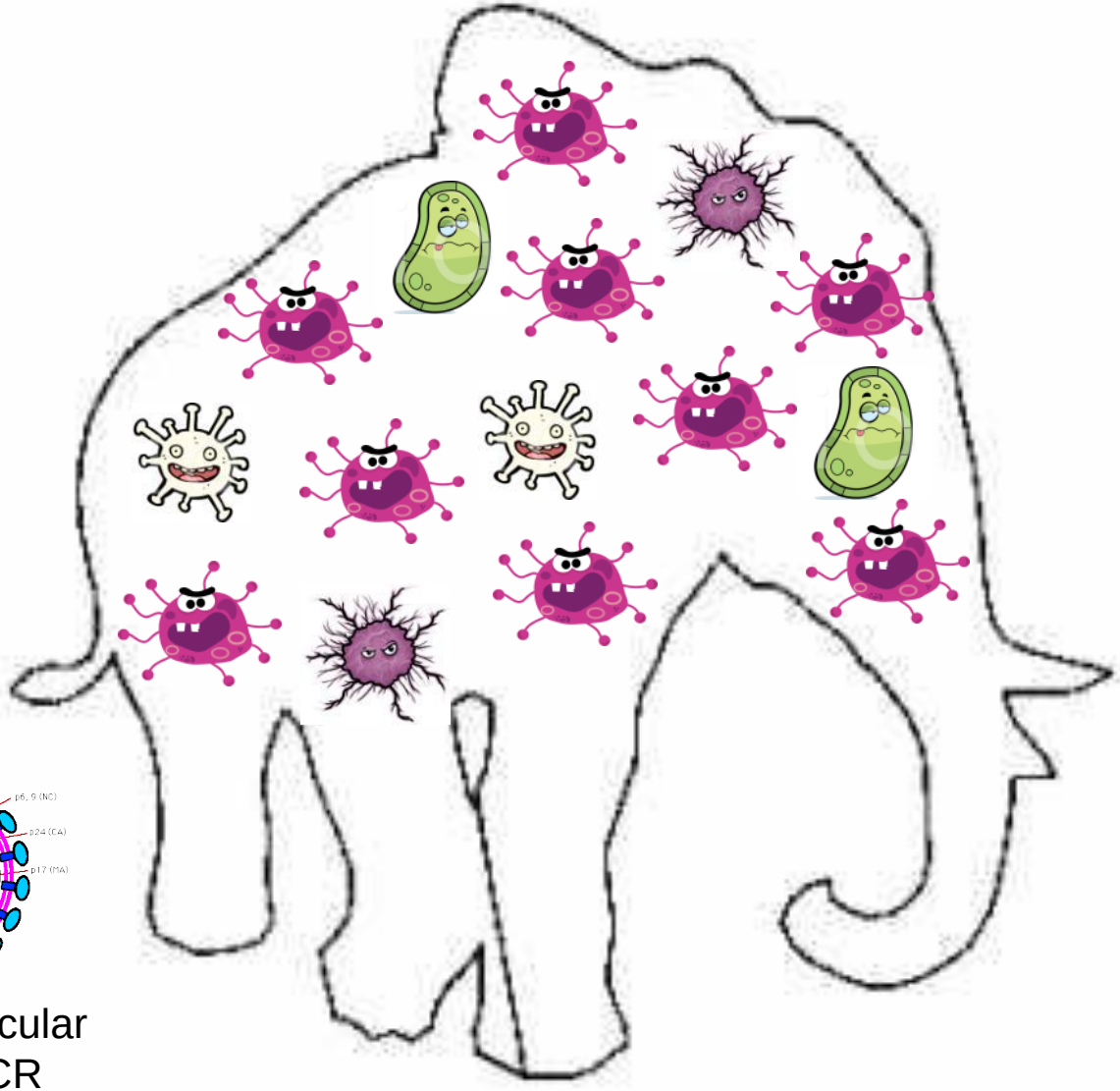
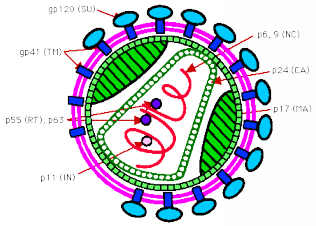
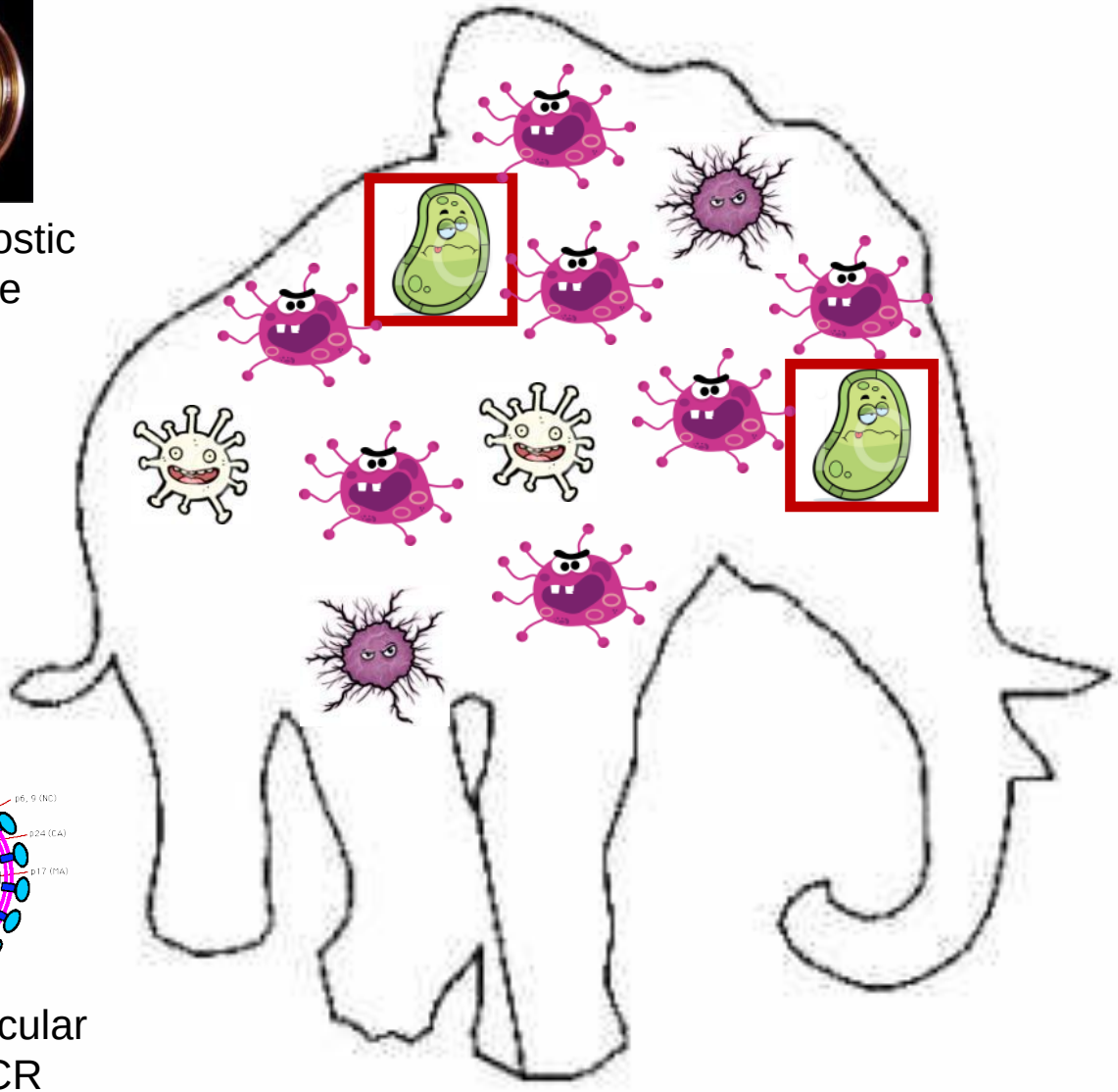


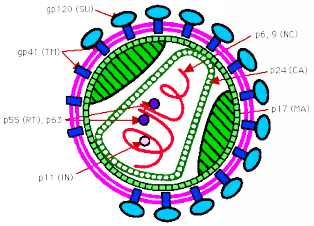


Specific molecular test e.g. PCR

Pathogen discovery

Group diagnostic
e.g. culture





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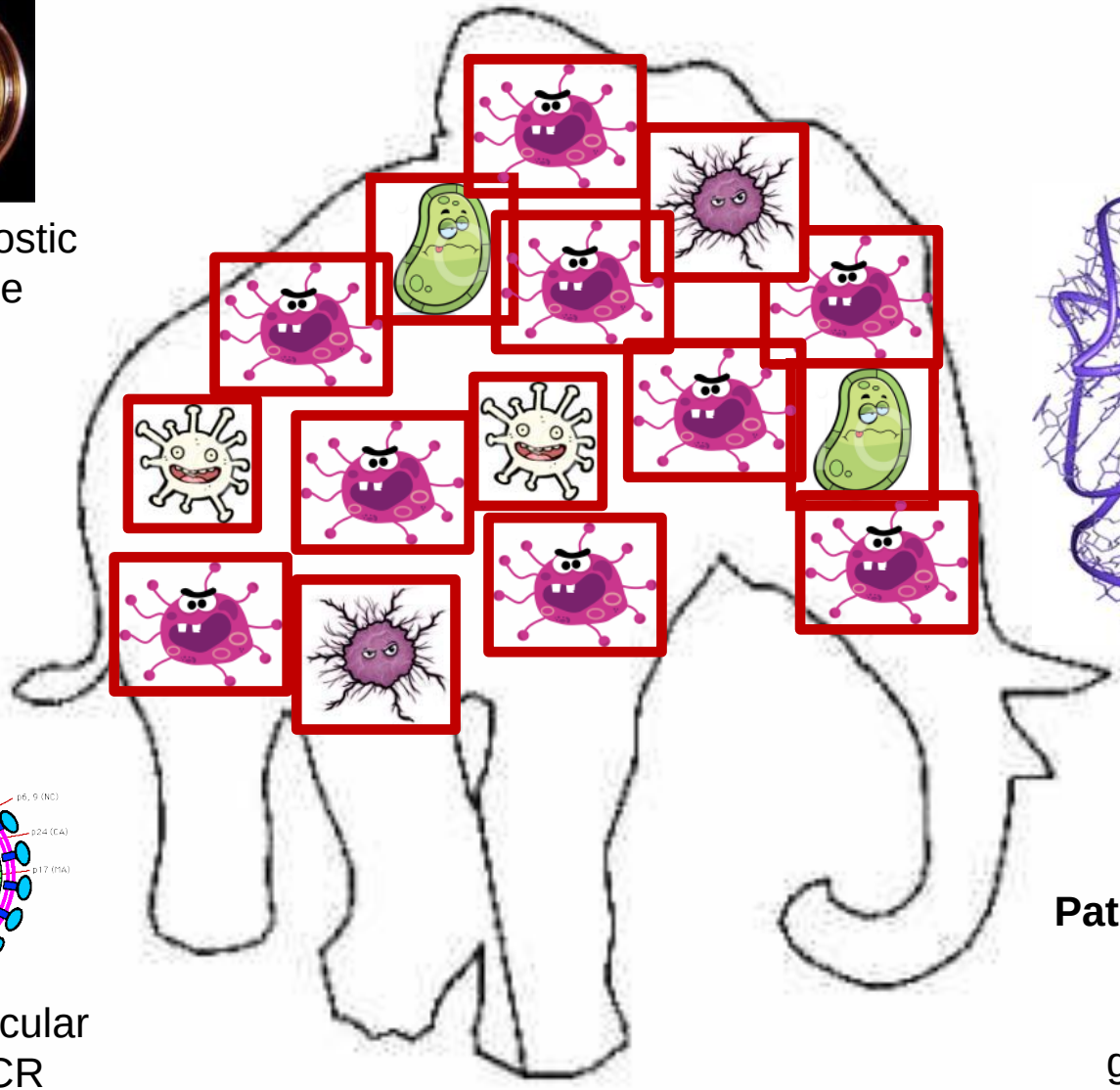

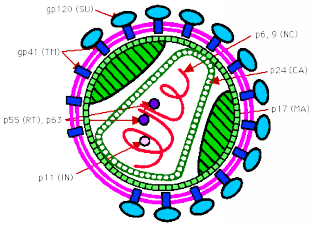

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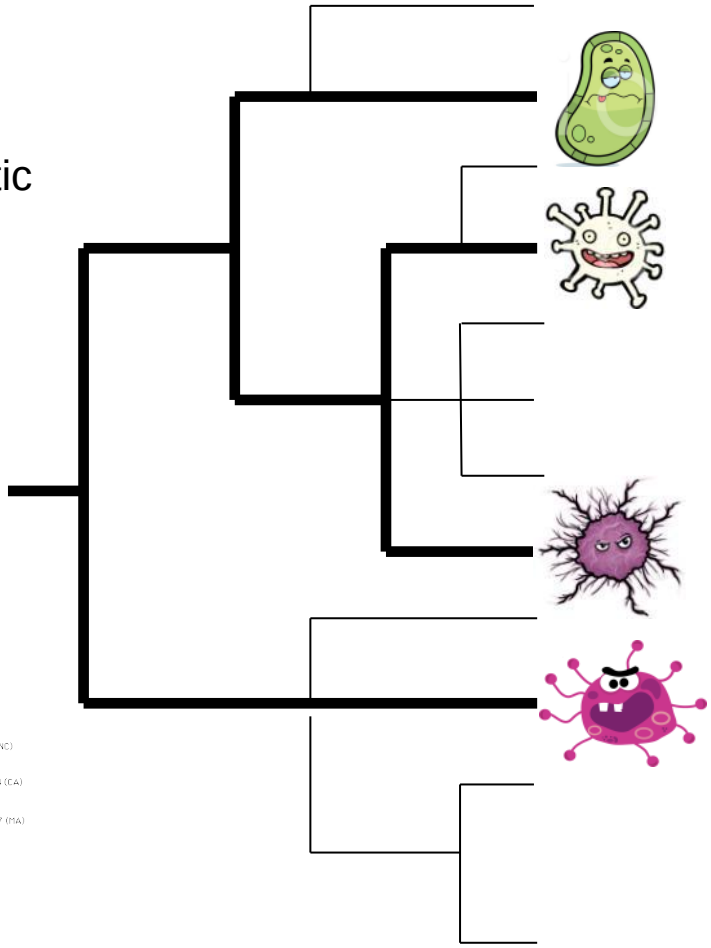

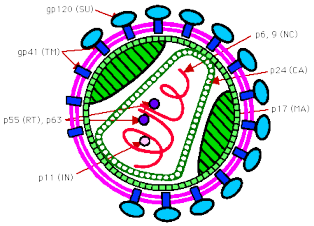

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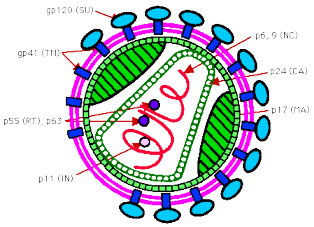

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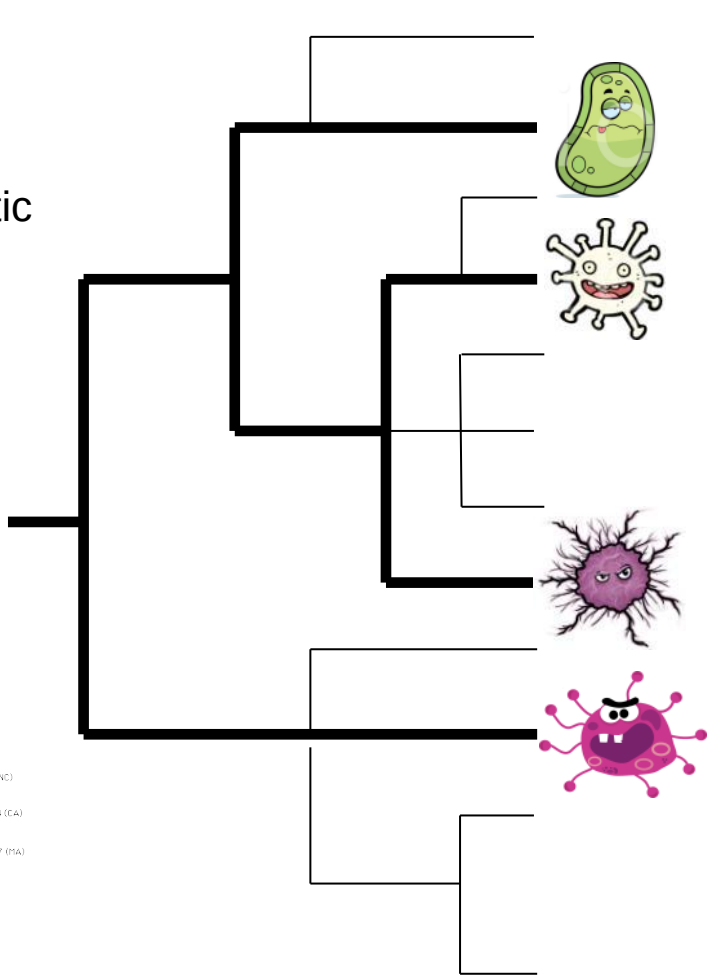

BENIGN

PATHOGENIC

Pathogen Discovery
Procedures to
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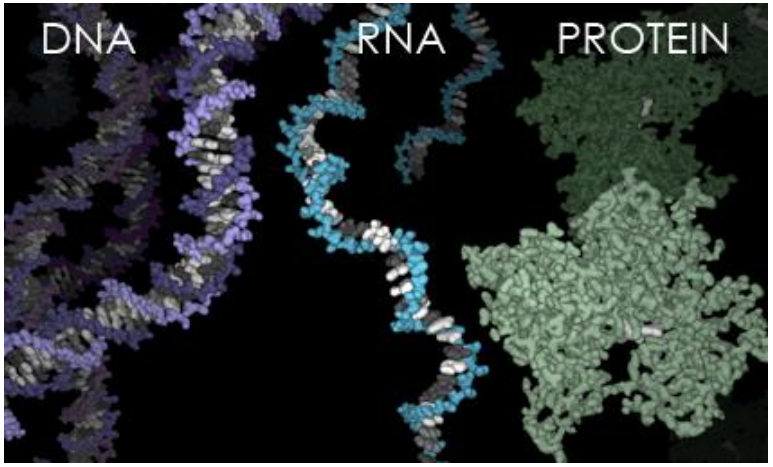
What does it involve?

AMPLIFICATION

EXTRACTION



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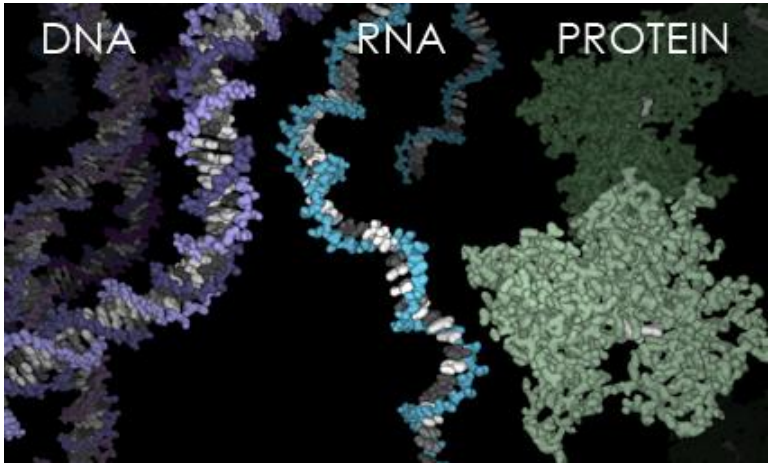

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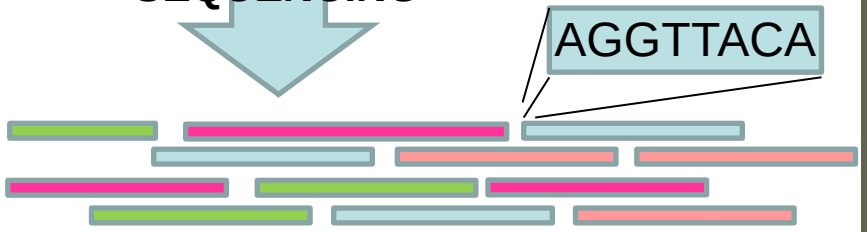

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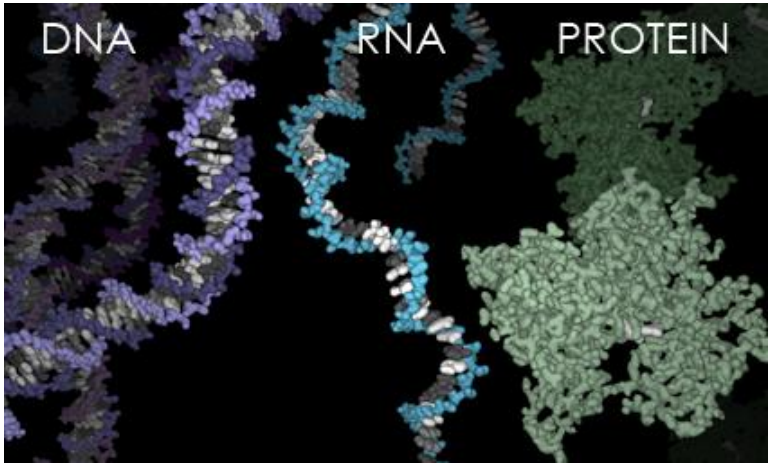

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'CONTIGS'

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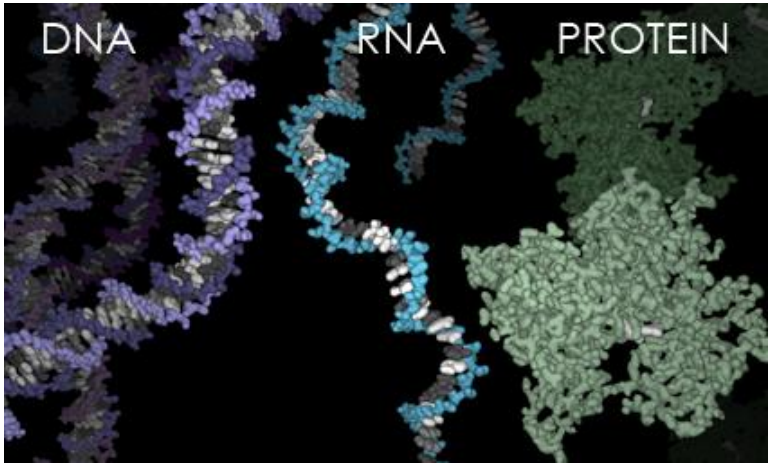

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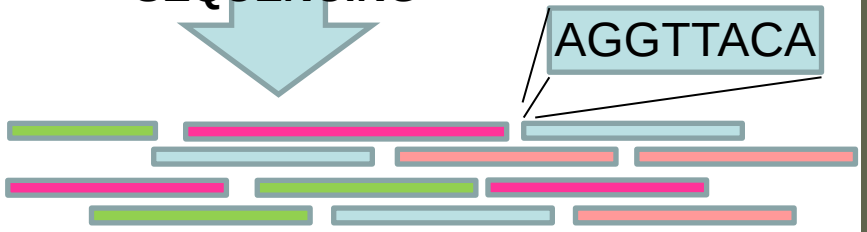

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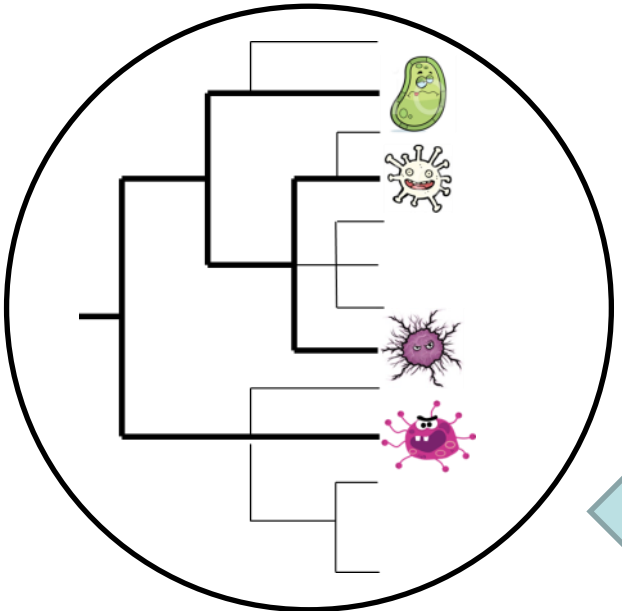


Exudative cloacitis in kakapo

Inflammation of the cloaca observed in several individuals.

Can become lesioned with associated bacterial growth.

Can cause infertility and potentially death.

Exudative cloacitis in kakapo

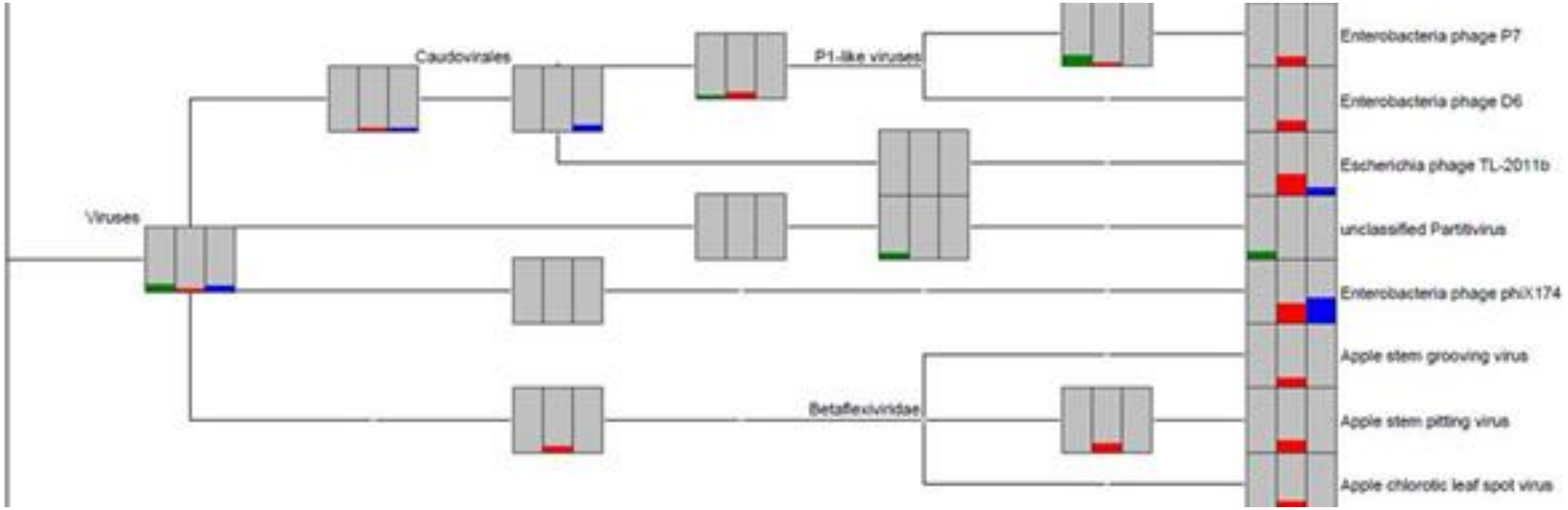
Need to identify cause to guide both treatment and preventive management.

Bacteria present bacteria (principally *Escherichia coli* and Enterococcus spp.) are common intestinal inhabitants.

Underlying viral cause?

Exudative cloacitis in kakapo

Preliminary investigation of faecal material from one diseased individual, compared to a pooled sample of material from non-diseased individuals.



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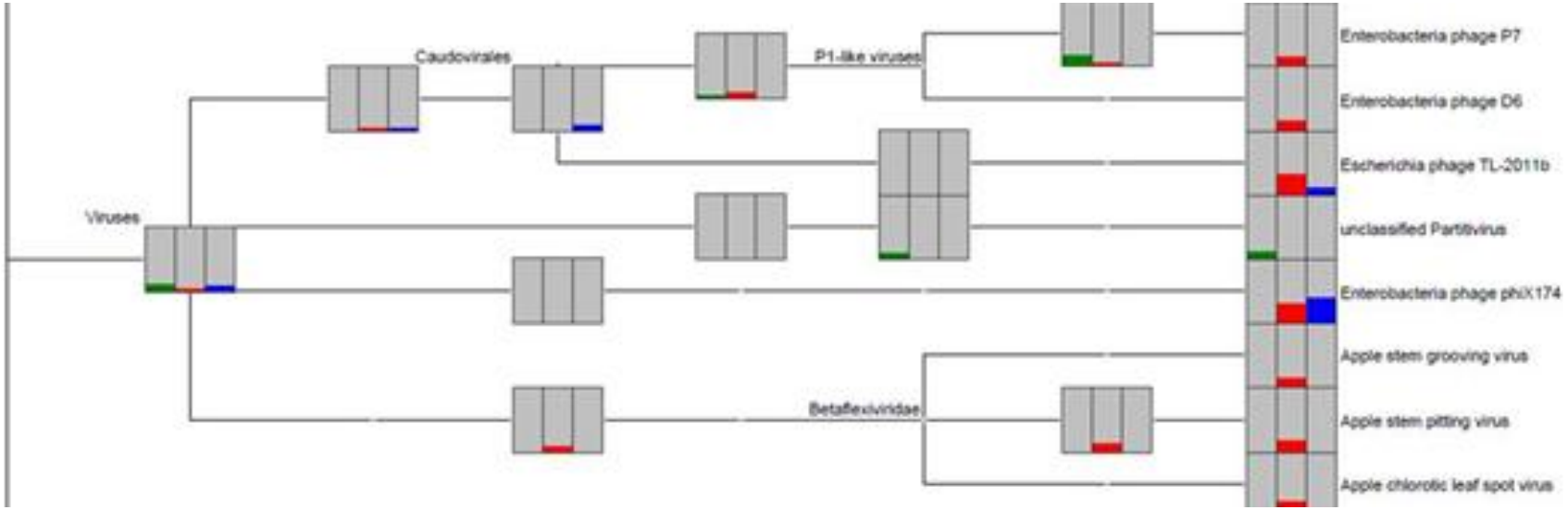

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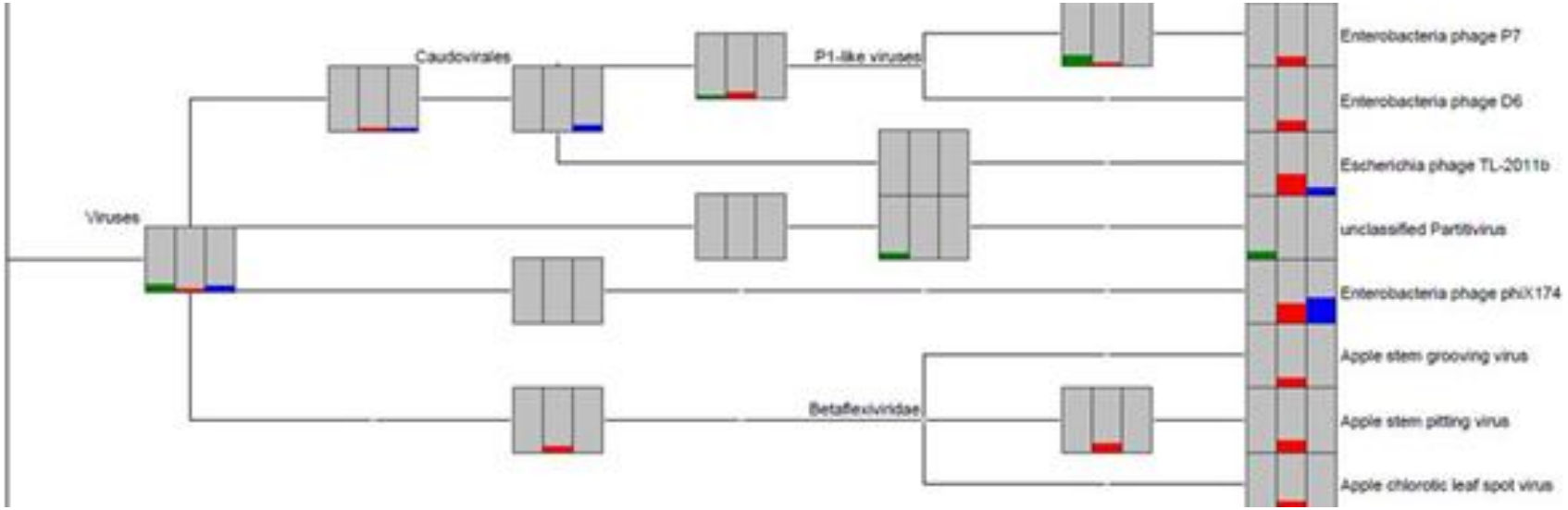

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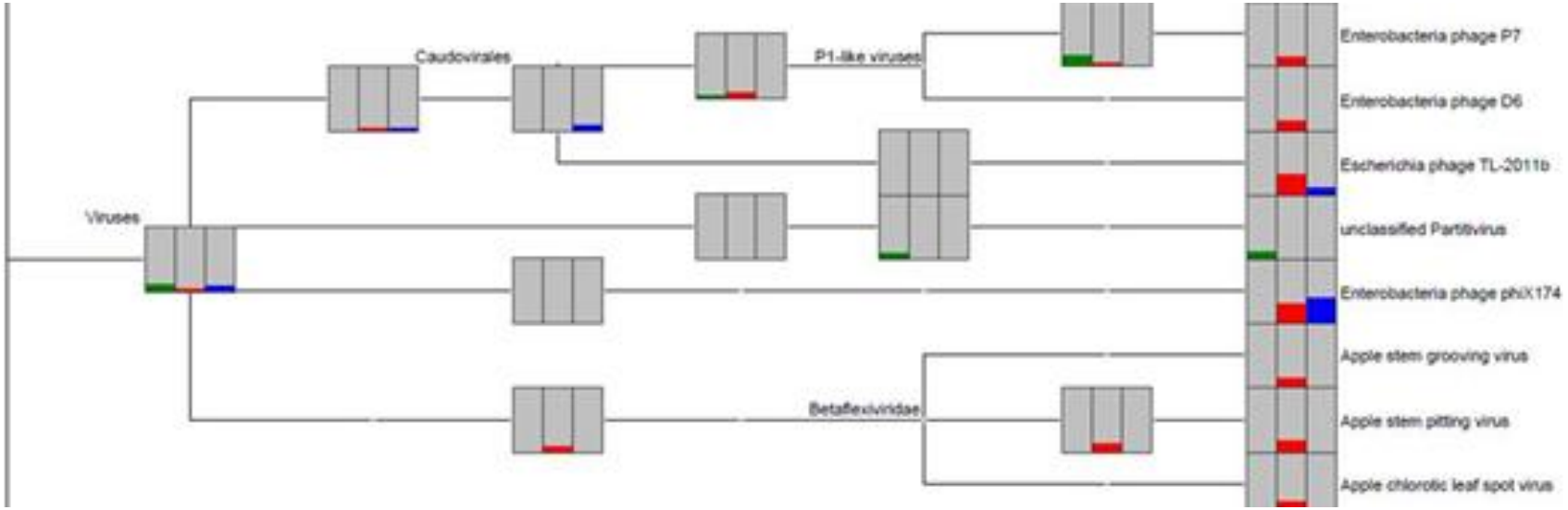

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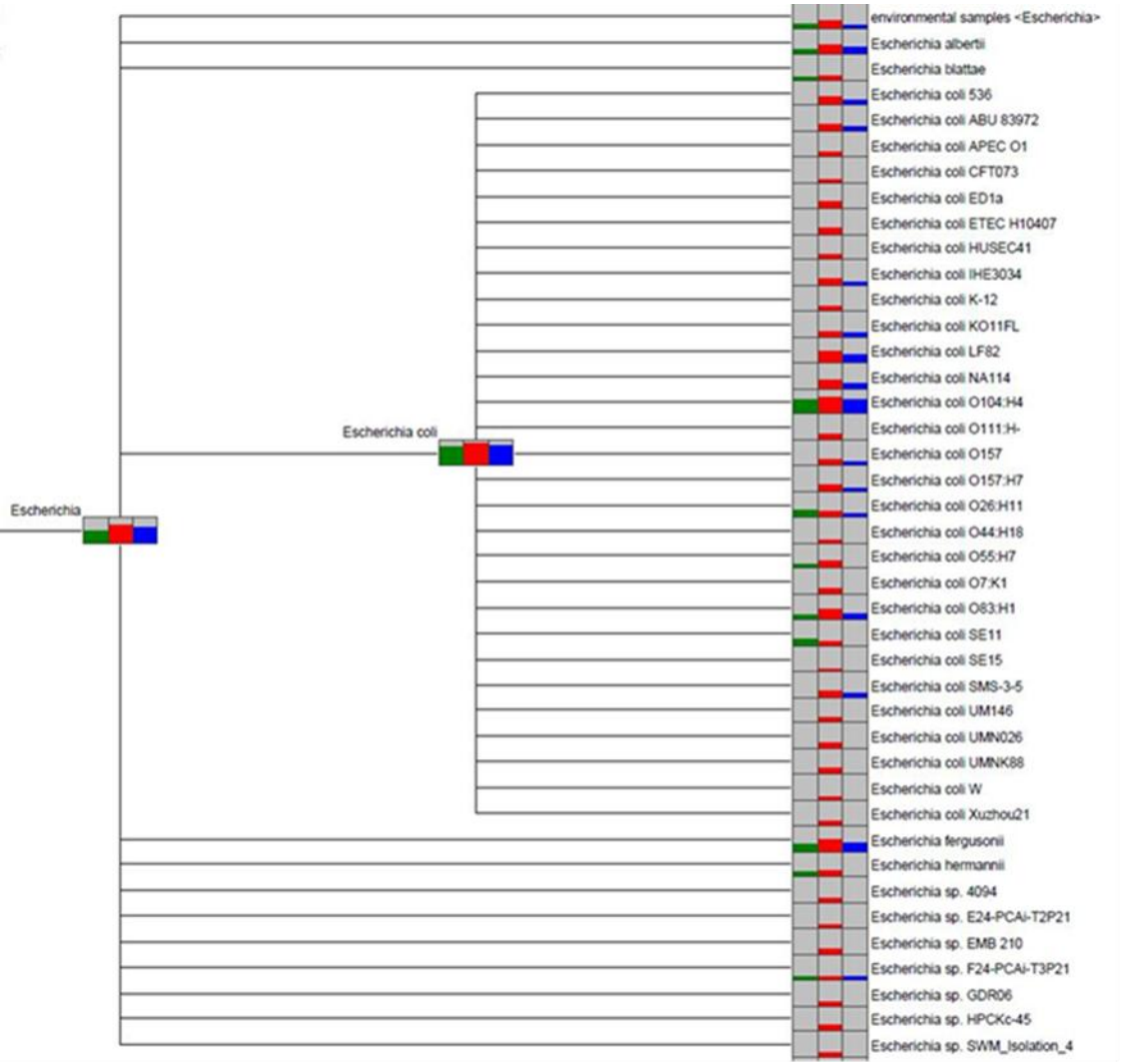
Escherichia phage TL-2011b is known to occur in *E. coli* causing food-borne disease outbreaks in people.

Exudative cloacitis in kakapo

Are there corresponding differences in genomic *E. coli* community structure?



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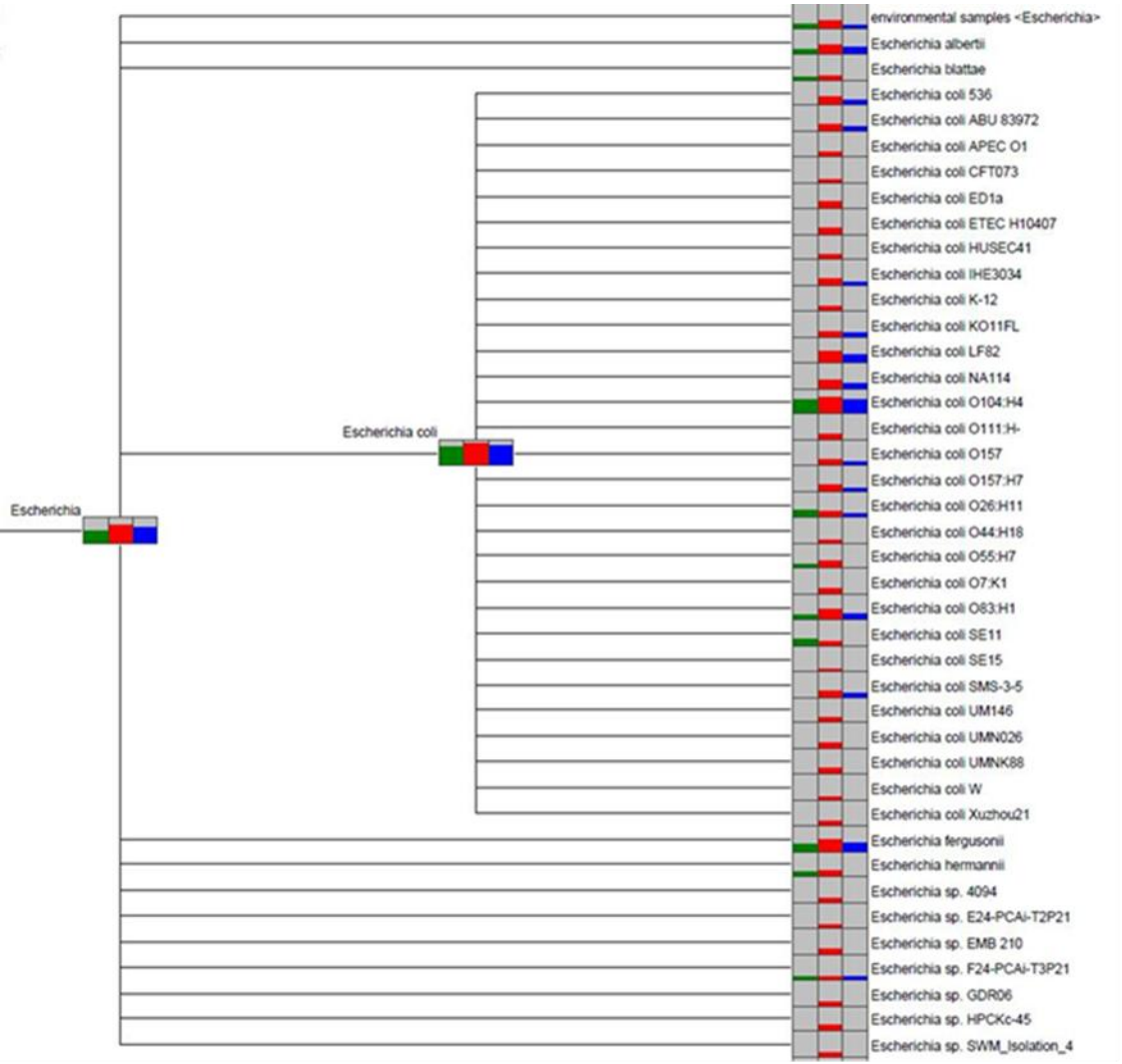

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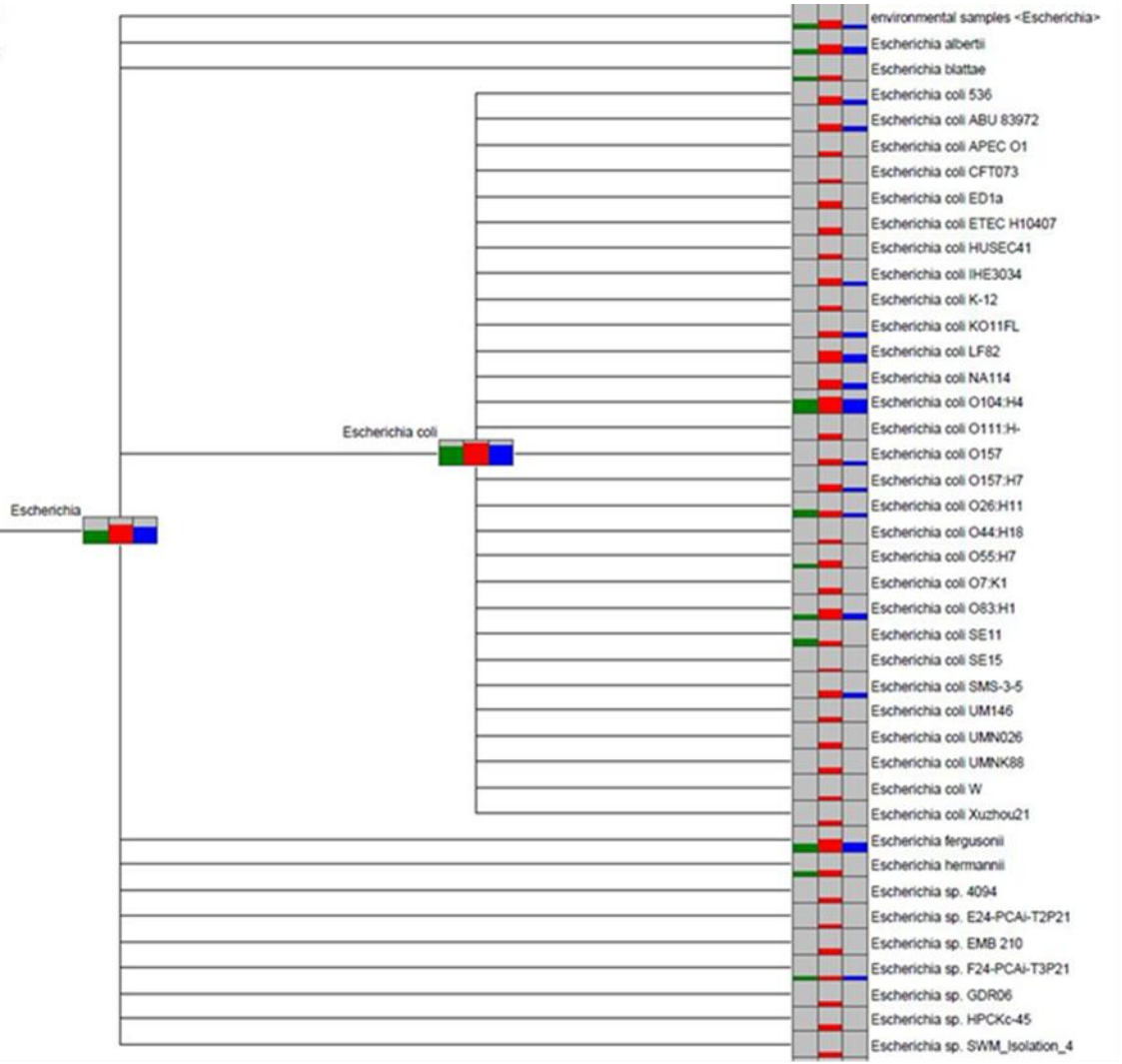

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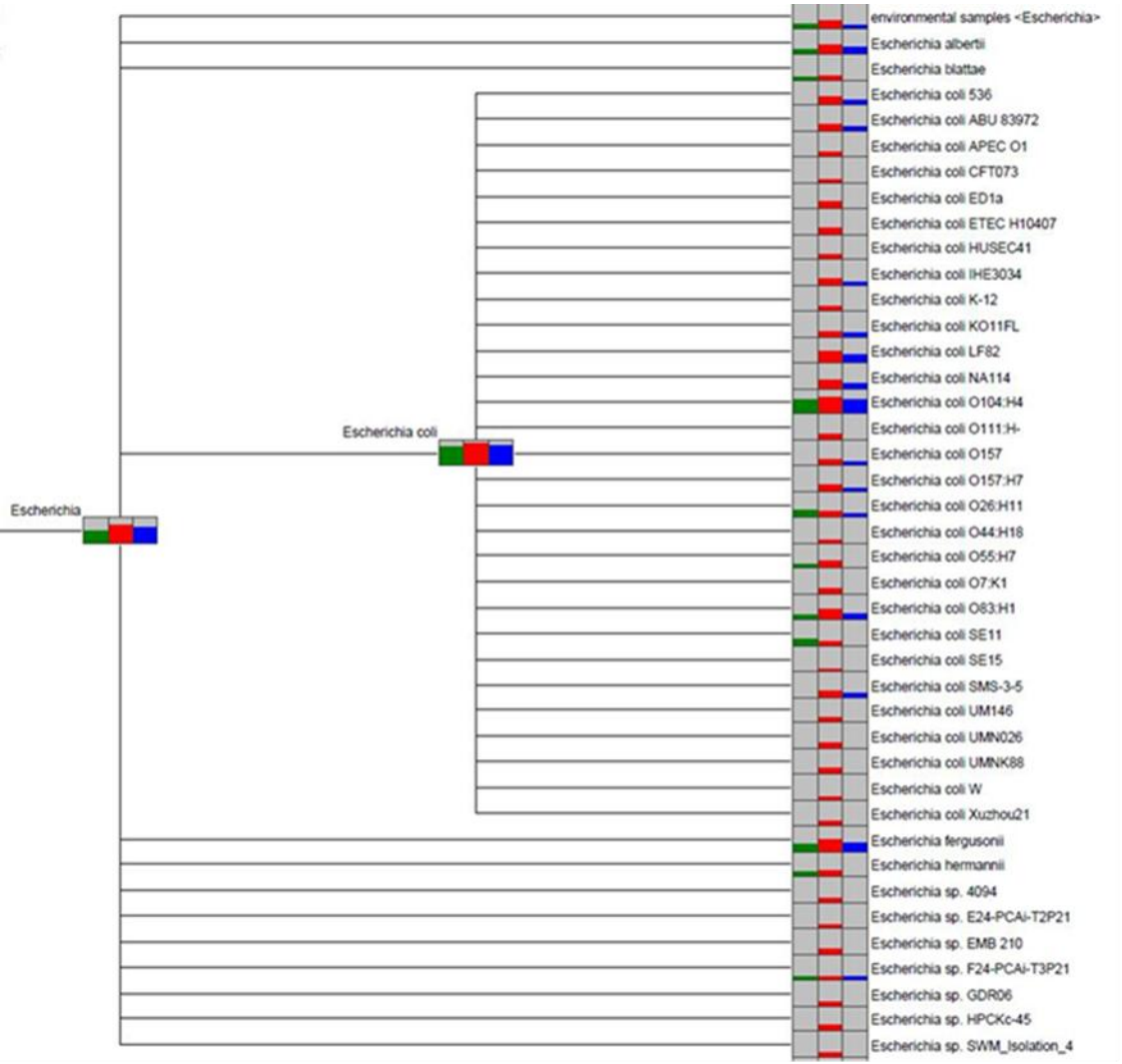

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This strain is associated with inflammatory bowel disease (Crohn's disease) in people.

Adelie penguin feather loss

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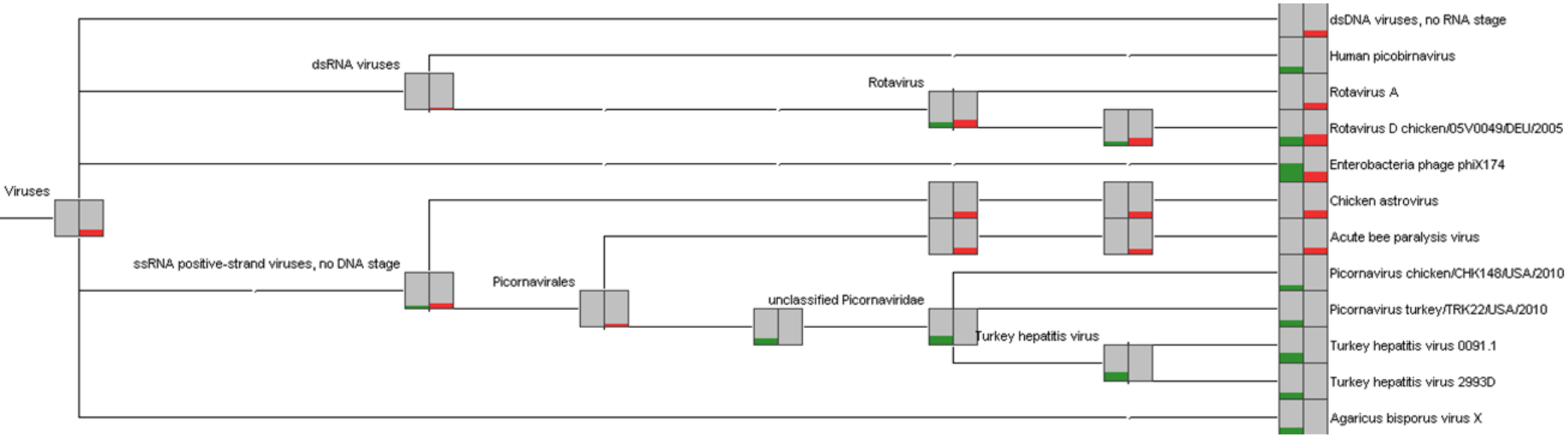
Viral community comparison between feather-loss (N = 12 individuals) and non-diseased (N = 12 individuals) pools of faecal material.



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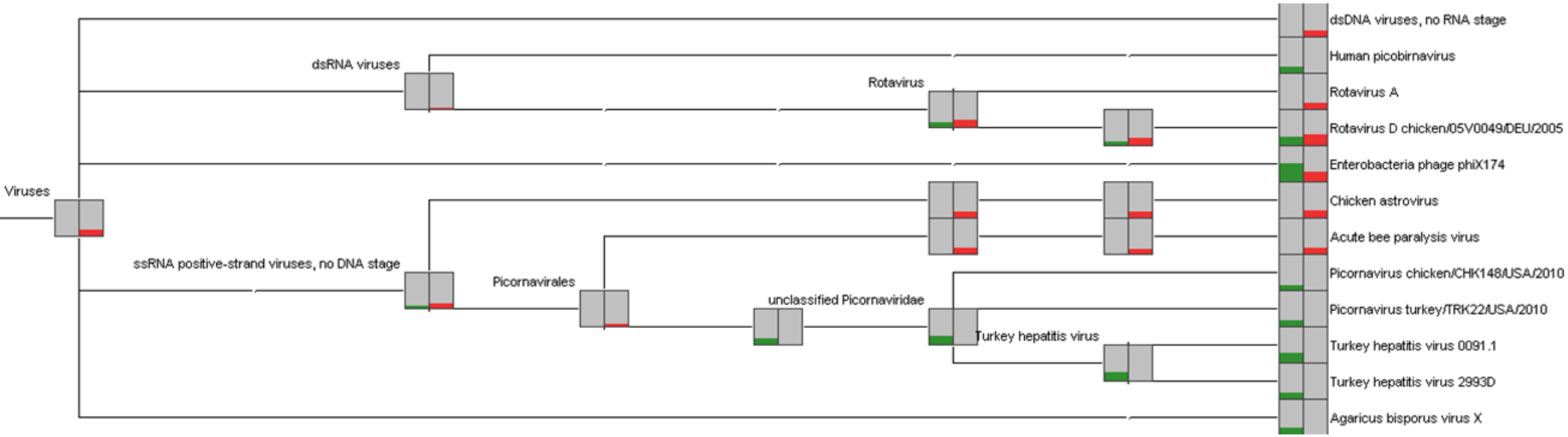

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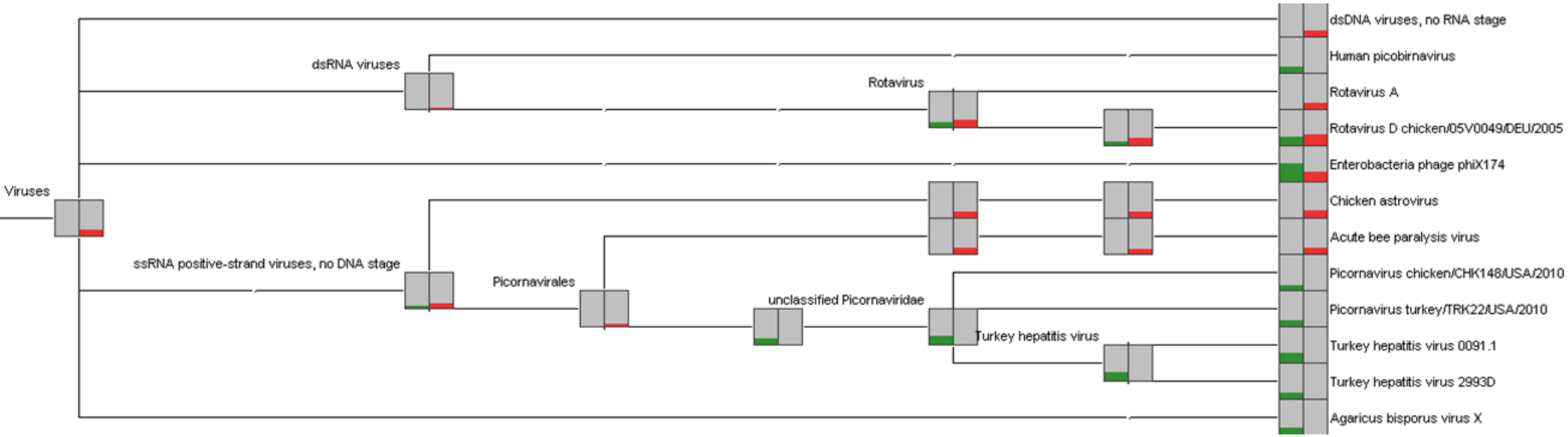

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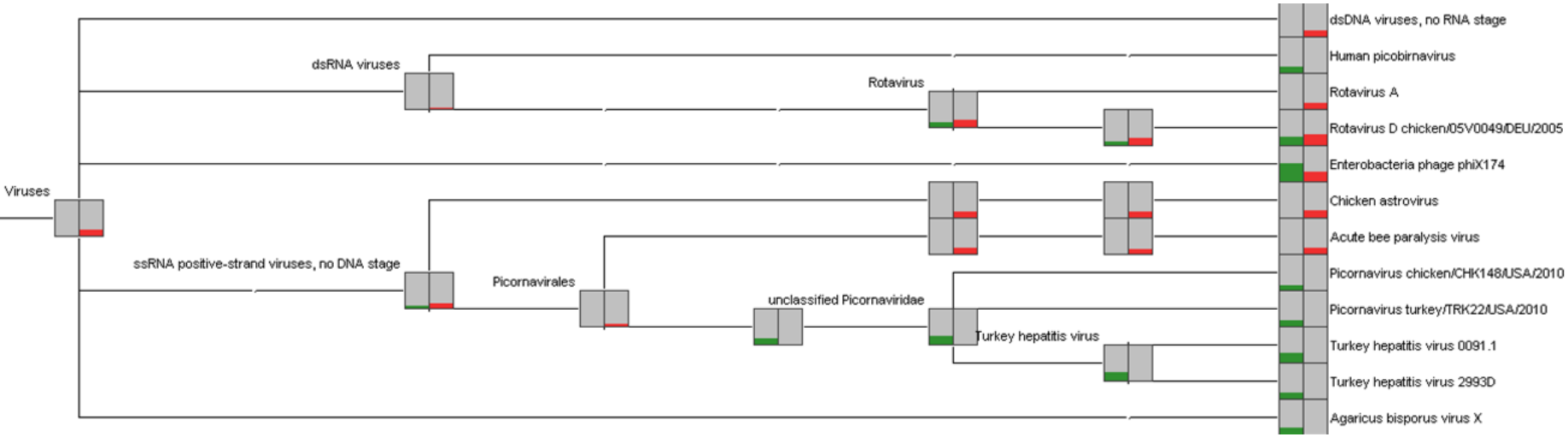

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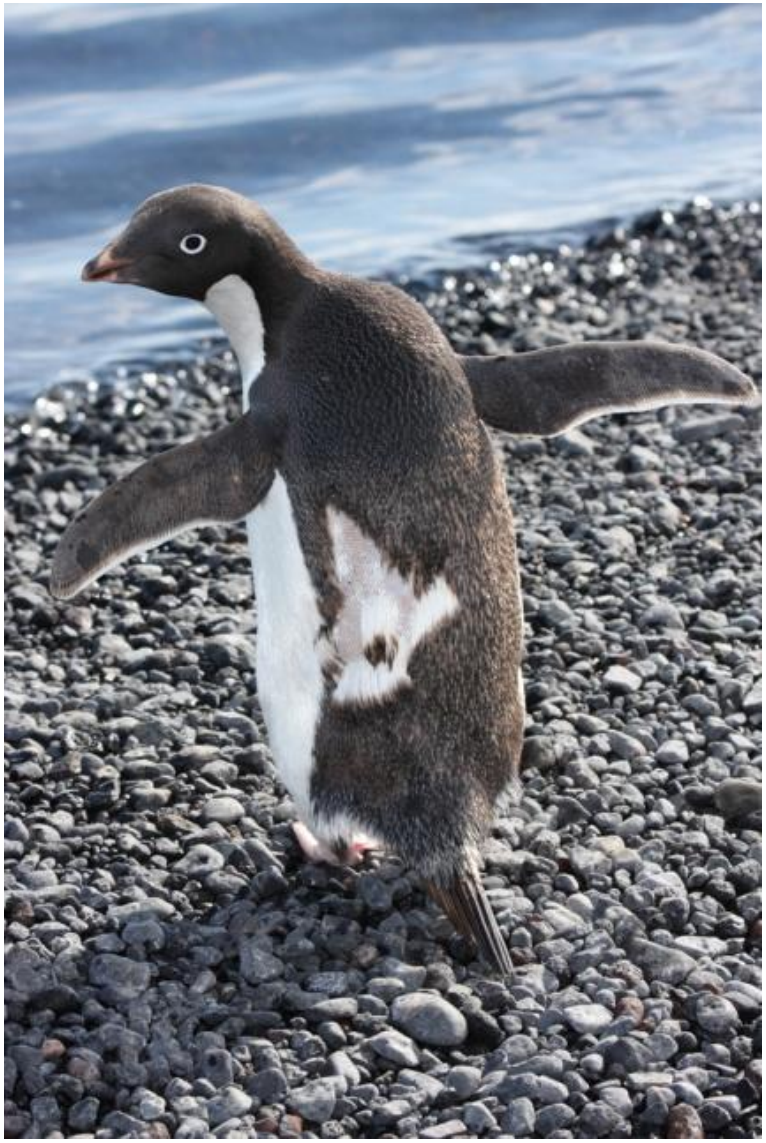
Mild cases in chickens - diarrhea, stunted growth and skin lesions.
Severe cases in immunosuppressed, under-nourished or stressed chicks – nephrosis, emaciation, and even sudden death.

Where to from here?



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- Application of capability to wildlife zoonoses (infections transmitted to people)

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- Viral agents in New Zealand bat species?
- Serological evidence for Ross River Virus exposure to Australasian Gannets at Muriwai; are they also carrying the virus over from Australia?
- Rodent-borne infections – recent increase in human cases of murine typhus; are there other agents we should be concerned about?

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- Application of capability to agricultural disease issues of concern

- Better understanding of Salmonella dynamics and causes of outbreaks?

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- Better understanding of Salmonella dynamics and causes of outbreaks?
- Viral component of Varroa mite impact on honey bees in New Zealand?
- Import contamination – e.g. is palm kernel from Malaysia contaminated with livestock diseases?


SEARCHING PRINTS
STOKES
CSI:
CRIME SCENE INVESTIGATION
TO BE CONTINUED...
NO MATCH FOUND