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Pathogens associated with acute infectious canine tracheobronchitis in New Zealand

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ABSTRACT

Infectious canine tracheobronchitis (ICT) or canine infectious respiratory disease, commonly known as kennel cough, is an acute, highly contagious respiratory disease that affects the larynx, trachea, bronchi, and occasionally the parenchyma of the lower respiratory tract. Several pathogens have been implicated in ICT including viruses, bacteria and mycoplasma. Little is known about the prevalence of canine respiratory pathogens in New Zealand. Hence, the aim of this study was to identify potential respiratory pathogens from dogs that are affected by ICT in New Zealand, and compare agents found in diseased dogs to those found in healthy dogs. In house (IH) qPCR assays were developed for the detection of canine adenovirus type 2 (CAV-2), canine herpesvirus (CHV) and canine parainfluenza (CPIV).

A total of 96 dogs were sampled, including 47 healthy and 49 diseased dogs, which comprised three different groups of dogs: greyhounds, pet dogs, and working farm dogs. A questionnaire was included for each dog sampled. The samples collected were then subjected to the following tests: virus isolation, haemagglutination assay for CPIV, IH qPCR for CAV-2 and CHV, as well as IDEXX RealPCR respiratory disease panel, and bovine respiratory coronavirus ELISA to detect antibody to canine respiratory coronavirus (CRCoV).

Based on IDEXX qPCR, CPIV (7.3%), *Bordetella bronchiseptica* (7.3%) and *Mycoplasma cynos* (17.0%) were the most common agents detected in samples from diseased dogs, whereas CAV-2 (10.6%) was the most common pathogen amongst healthy dogs. Based on IH qPCR, CAV-2 infection was very common among all dogs sampled, with 34/47 (72%) positive diseased dogs and 37/47 (78.6%) positive healthy dogs.

A total of 47/92 (51%) of dogs were positive for CRCoV antibodies, including 32/46 (69.6%) of diseased dogs and 14/46 (30.4%) of healthy dogs. In addition, acute serum samples from diseased dogs were significantly more likely to be positive for CRCoV antibodies compared to sera from healthy dogs (RR 5.22, CI 1.972, 14.115, $p=0.0003$).

The results of this study suggest that CRCoV, *M.cynos* and potentially CPIV may have a role in ICT in New Zealand, however further investigation is required to support these findings. In addition, if one excluded dogs positive for CAV-2 (as there was no difference in levels of detection of this virus between healthy and diseased dogs), then only 13/47 (27.6%) of diseased dogs were positive for at least one agent via IDEXX and IH qPCR. This suggests that

other aetiological agents, not examined in this study, may have contributed to respiratory disease in sampled dogs. Techniques such as next generation sequencing may help to identify these pathogens.

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Table of Contents

Pathogens associated with acute infectious canine tracheobronchitis in New Zealand.....	i
ABSTRACT.....	ii
ACKNOWLEDGMENTS	iv
Table of Contents.....	v
List of figures and tables:.....	x
Abbreviations.....	14
Chapter 1: Pathogens associated with the kennel cough syndrome.....	1
1.1: Introduction	1
1.2: Canine Parainfluenza (CPIV).....	2
1.2.1: General features	2
1.2.2: Replication	2
1.2.3: Pathogenesis and Clinical signs.....	3
1.2.4: Immune response	4
1.2.5: Diagnosis	4
1.2.6: Vaccination.....	5
1.2.7: Epidemiology.....	5
1.2.8: CPIV in New Zealand	6
1.3: Canine Adenovirus type 2 (CAV-2).....	7
1.3.1: General Features.....	7
1.3.2: Replication	7
1.3.3: Pathogenesis.....	8
1.3.4: Clinical signs	8
1.3.5: Immune responses.....	9
1.3.6: Diagnosis	9
1.3.7: Vaccination.....	9
1.3.8: Epidemiology.....	10
1.4: Canine Herpesvirus (CHV)	11
1.4.1: General Features.....	11
1.4.2: Pathogenesis, clinical signs, and immunopathology	11
1.4.3: Diagnosis, Treatment and Vaccination	12
1.4.4: Epidemiology.....	13
1.5: Canine Respiratory Coronavirus (CRCoV)	13
1.5.1: General Features.....	13

1.5.2: Pathogenesis, Clinical signs and Immunopathology	13
1.5.3: Diagnosis, Treatment, and Vaccination	14
1.5.4: Epidemiology.....	15
1.6: Canine Influenza (CIV).....	16
1.6.1: General Features.....	16
1.6.2: Pathogenesis, Clinical signs, and Immunopathology	16
1.6.3: Diagnosis, treatment and vaccination	17
1.6.4: Epidemiology.....	18
1.7: Mammalian Reovirus (MRV)	20
1.7.1: General Features.....	20
1.7.2: Pathogenesis, Clinical signs and Immunopathology	20
1.7.3: Diagnosis, treatment, and vaccination	21
1.7.4: Epidemiology.....	21
1.8: <i>Bordetella bronchiseptica</i> :	21
1.8.1: General Features.....	21
1.8.2: Pathogenesis, clinical signs, and immunopathology	22
1.8.3: Diagnosis, treatment, and vaccination	22
1.8.4: Epidemiology.....	23
1.9: <i>Streptococcus equi subsp. zooepidemicus</i>	24
1.9.1: General features	24
1.9.2: Pathogenesis, clinical signs and immunopathology	25
1.9.3: Diagnosis, treatment and vaccination	25
1.9.4: Epidemiology.....	26
1.10: <i>Mycoplasma cynos</i>	27
1.10.1: General features	27
1.10.2: Pathogenesis, clinical signs and immunopathology	27
1.10.3: Diagnosis, treatment and vaccination	27
1.10.4: Epidemiology	28
1.11: Conclusion.....	29
1.12: Aims of the study	29
Chapter 2: Optimization and development of in-house real-time PCR assays.....	31
2.1: Introduction.....	31
2.2: CAAdV-2	33
2.2.1: Methodology.....	33

2.2.2: Results.....	37
2.3: Canine Herpesvirus (CHV)	40
2.3.1 : Methodology.....	40
2.3.2: Results.....	42
2.4: Canine Parainfluenza (CPIV).....	44
2.4.1: Methodology.....	44
2.4.2: Results.....	47
2.5: Discussion	48
2.5.1: CA ₂ V-2 qPCR IH assay	48
2.5.2: CHV IH assay.....	49
2.5.3: CPIV qPCR IH assay.....	50
2.6: Conclusion.....	51
Chapter 3: Virological survey of viruses associated with infectious canine tracheobronchitis.....	52
3.1: Introduction	52
3.2: Materials and methods.....	53
3.2.1: Animals.....	53
3.2.2: Sampling.....	55
3.2.3: Processing of samples	56
3.2.4: Virus Isolation	56
3.2.5: Haemagglutination assay (HA) for CPIV.....	57
3.2.6: Real time (q) PCR	59
3.2.7: Enzyme linked immunosorbent assay (ELISA) for canine respiratory coronavirus antibody	61
3.2.8: Statistical analyses	62
3.3: Results.....	62
3.3.1: Data distribution	62
3.3.2: Detection of live virus	66
3.3.3: IDEXX qPCR canine respiratory disease panel	66
3.3.4: In-house qPCR	70
3.3.5: Comparison of IDEXX qPCR and inhouse qPCR results	79
3.3.7: Coronavirus ELISA results.....	80
3.4 Discussion.....	89
3.4.1: Absence of live virus in samples	90
3.4.2: Canine adenovirus infections are common among New Zealand dogs.....	91

3.4.3 Canine herpesvirus circulates among New Zealand dogs but is unlikely to be important for ICT.	93
3.4.4 Canine parainfluenza virus circulates among New Zealand dogs, and may contribute to ICT.	94
3.4.5: CRCoV infection is common among New Zealand dogs and has likely contributed to ICT observed in the sampled population.	95
3.4.6: The role of other pathogens.	99
Chapter 4: General Discussion and Concluding remarks	101
Appendices.....	103
Appendix 1: Questionnaires.....	103
1.1: Questionnaire for dogs with suspected acute tracheobronchitis	103
1.2: Racing greyhound questionnaire	105
1.3: Pet dog questionnaire.....	106
1.4: Working farm dog questionnaire.....	108
Appendix 2: Database for healthy and diseased dogs	109
2.1: Diseased dogs: Signalment and medical history.....	109
2.2: Healthy dogs: Signalment and medical history.....	110
2.3: Diseased dogs: clinical signs reported	112
Appendix 3: Real time qPCR3.1 IH qPCR optimisation	113
3.1.1: CA _{AdV} -2 annealing temperature optimisation.....	113
3.1.2: CHV annealing temperature optimisation	115
3.1.3: CPIV annealing temperature optimisation	117
3.2: In-house qPCR results	118
3.2.1: CA _{AdV} -2:	118
3.2.2: CHV:.....	123
3.3: IDEXX and IH qPCR results	128
3.3.1: Diseased dogs	128
3.3.2: Healthy dogs	129
Appendix 4: CRCoV ELISA results	131
4.1: Calculation of the percentage of inhibition	131
4.2: Interpretation of results	131
4.3: CRCoV serology results: diseased dogs.....	131
4.4: CRCoV serology results: healthy dogs.....	132
4.5: Reagents and buffers used	134
4.5.1: PBS:	134

4.5.2: Electrophoresis Gel (2% TAE):.....	134
4.5.3: Electrophoresis Gel (2% TBE)	134
4.5.4: Tris/Borate/EDTA buffer (TBE Buffer) x5 (1L)	134
4.5.5: Cell culture maintenance media	134
Reference List.....	135