Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

Canadian Food Inspection Agency




Our vision:
To excel as a science-based regulator, trusted and respected by Canadians and the international community.

Our mission:
Dedicated to safeguarding food, animals and plants, which enhances the health and well-being of Canada's people, environment and economy.

Swine influenza surveillance in Canada

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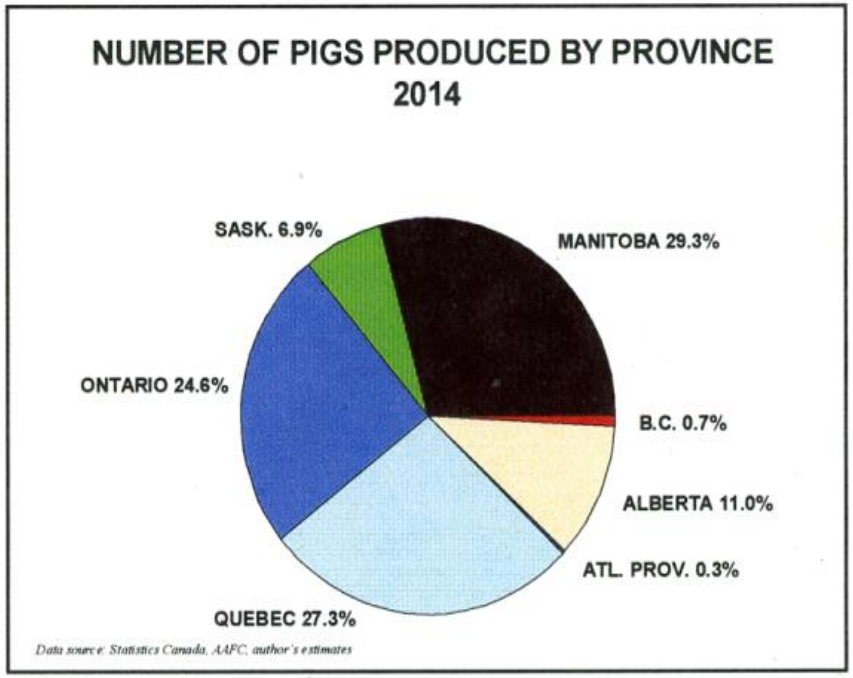
Passive surveillance of swine influenza

- Monitor novel swine influenza viruses in Canadain pigs
- Contributors:
  - Manitoba Agriculture, Food and Rural Initiatives (MAFRI), Winnipeg, Manitoba
  - Veterinary Diagnostics and Epidemiological surveillance complex (MAPAQ) and Bio-Vet, Saint-Hyacinthe, Quebec
  - Animal Health Laboratory (AHL), Guelph, Ontario

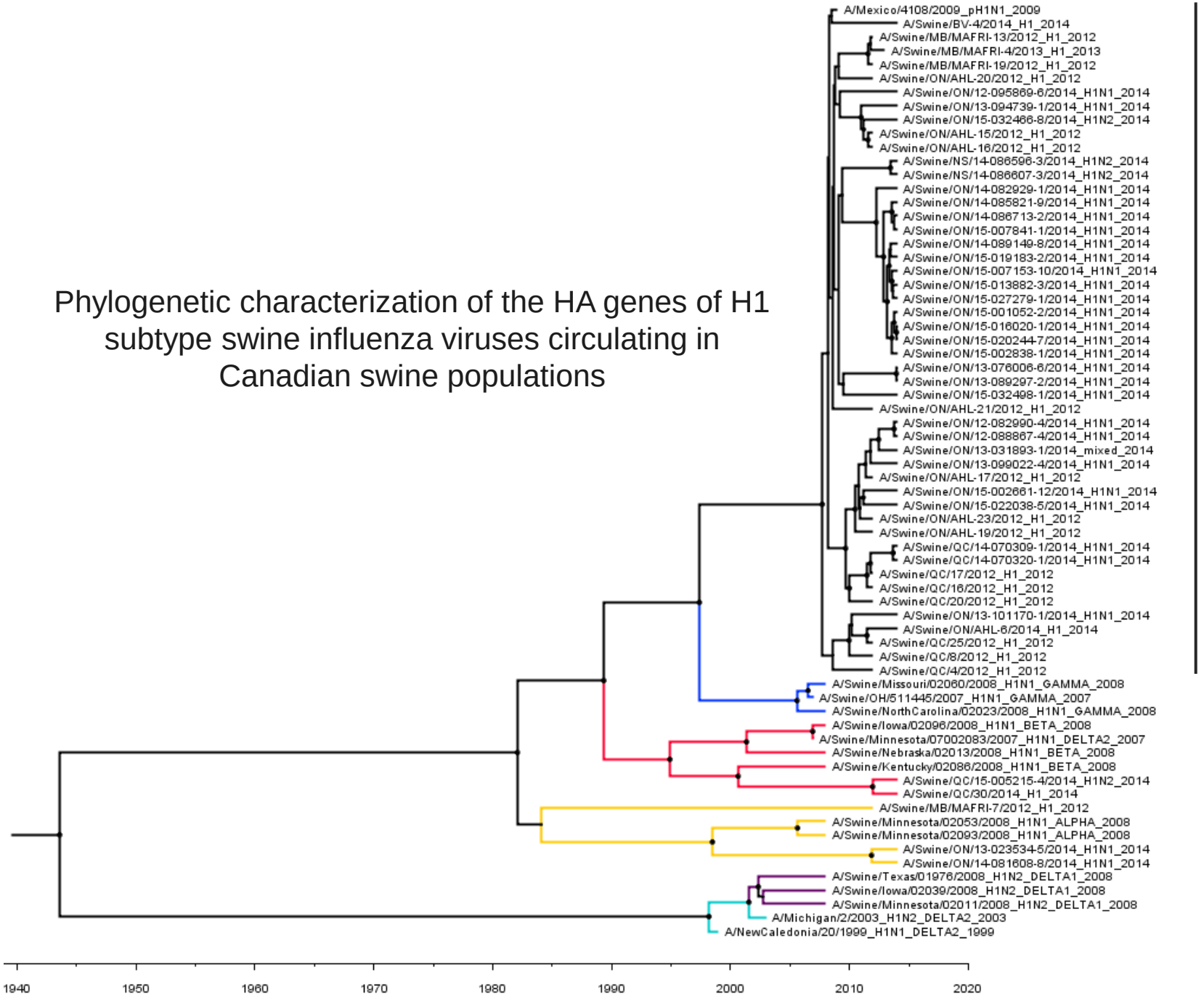
Pig production in Canada



Passive surveillance of swine influenza

	H1			
Province	**H1**	**pH1**	**Beta**	**Alpha**
Ontario	**33**	**32**	**-**	**1**
Quebec	**12**	**10**	**2**	**-**
Manitoba	**4**	**3**	**-**	**1**
Total	**49**	**45**	**2**	**2**

Phylogenetic characterization of the HA genes of H1 subtype swine influenza viruses circulating in Canadian swine populations



pH1

H1-γ

H1-β

H1-α

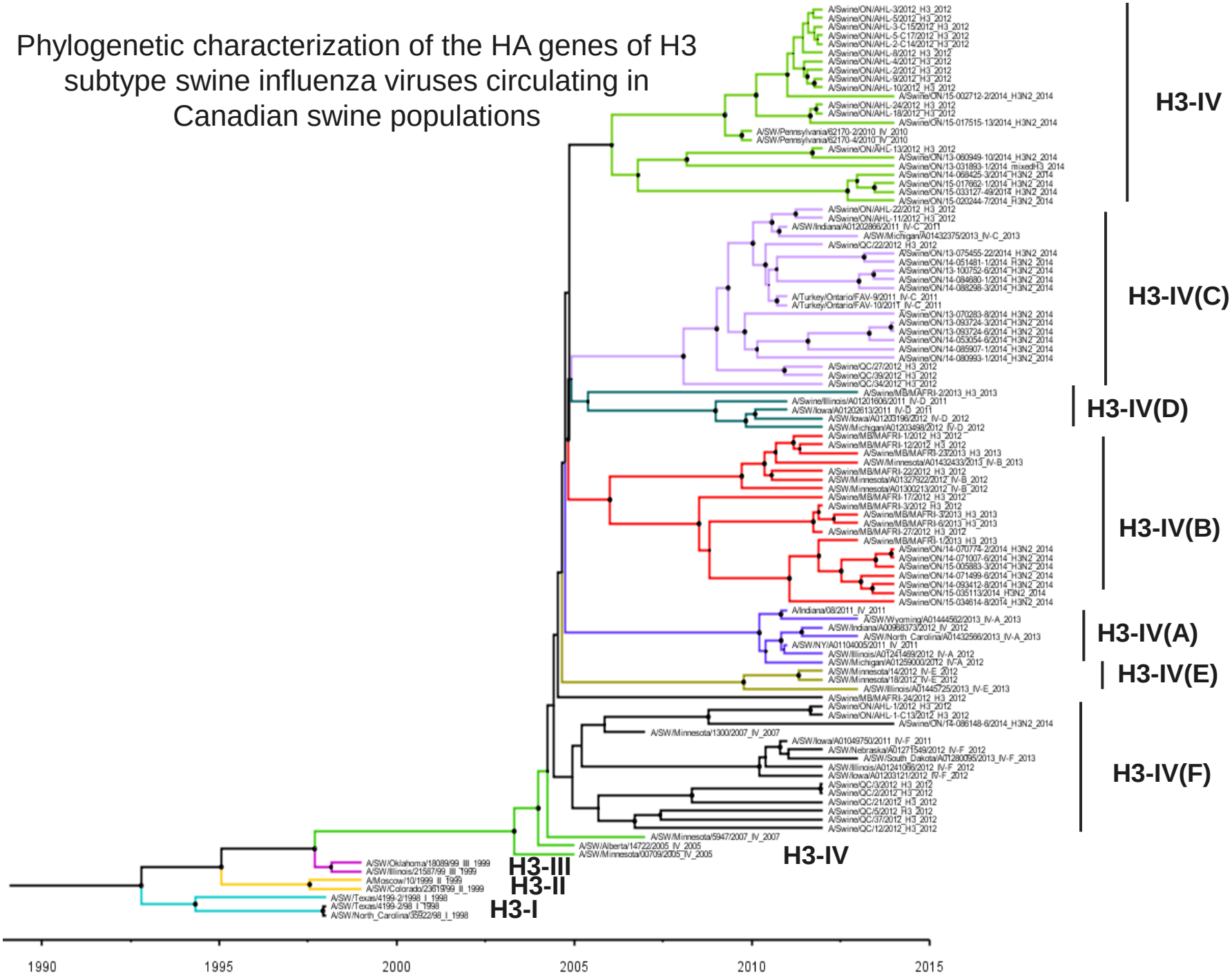
H1-δ1

H1-δ2

Passive surveillance of swine influenza

	H3				
Province	**H3**	**IV**	**IV-C**	**IV-B**	**IV-F**
Ontario	**46**	**21**	**15**	**7**	**3**
Quebec	**10**	**-**	**4**	**-**	**6**
Manitoba	**11**	**-**	**-**	**10**	**1**
Total	**67**	**21**	**19**	**17**	**10**

Phylogenetic characterization of the HA genes of H3 subtype swine influenza viruses circulating in Canadian swine populations

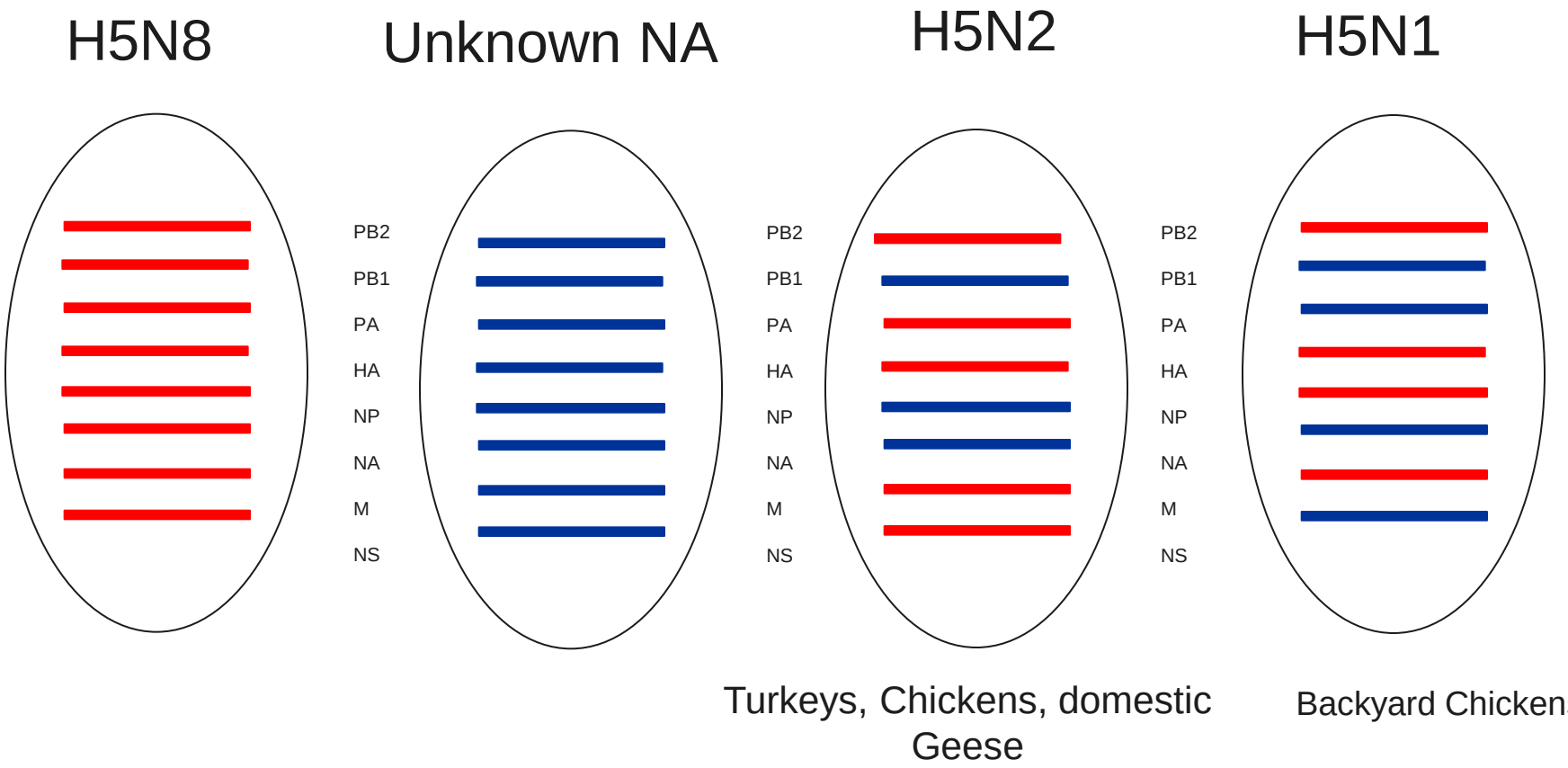


Animal Experimental Studies using Novel reassortant EA/NA HPAI H5N1 and H5N2 in pigs

- H5N2 – A/Turkey/BC/FAV-0010/2015 (H5N2)
  - 5 gene segments (PB2, PA, HA, M & NS) from EA H5N8 virus
  - 3 gene segments (PB1, NP & NS) from NA wild birds origin AI viruses

- H5N1 – A/Chicken/BC/FAV-002/2015 (FAV-002/H5N1)
  - 4 gene segments (PB2, HA, NP, M) from H5N8
  - 4 gene segments (PB1, PA, NA, NS) from North American wild bird origin AI viruses

- Identical H5N1 viruses were isolated from wild ducks in Canada and USA, but FAV-002/H5N1 had 19 AA deletions at the stalk of the NA
- In mice models - H5N2, H5N8 and H5N1 viruses moderately pathogenic, but FAV-002/H5N1 (10 PFU) – highly pathogenic.


H5N8
Unknown NA
H5N2
H5N1
PB2
PB1
PA
HA
NP
NA
M
NS
PB2
PB1
PA
HA
NP
NA
M
NS
PB2
PB1
PA
HA
NP
NA
M
NS
Turkeys, Chickens, domestic Geese
Backyard Chickens
Eurasian Gene Segments
North American Gene Segments

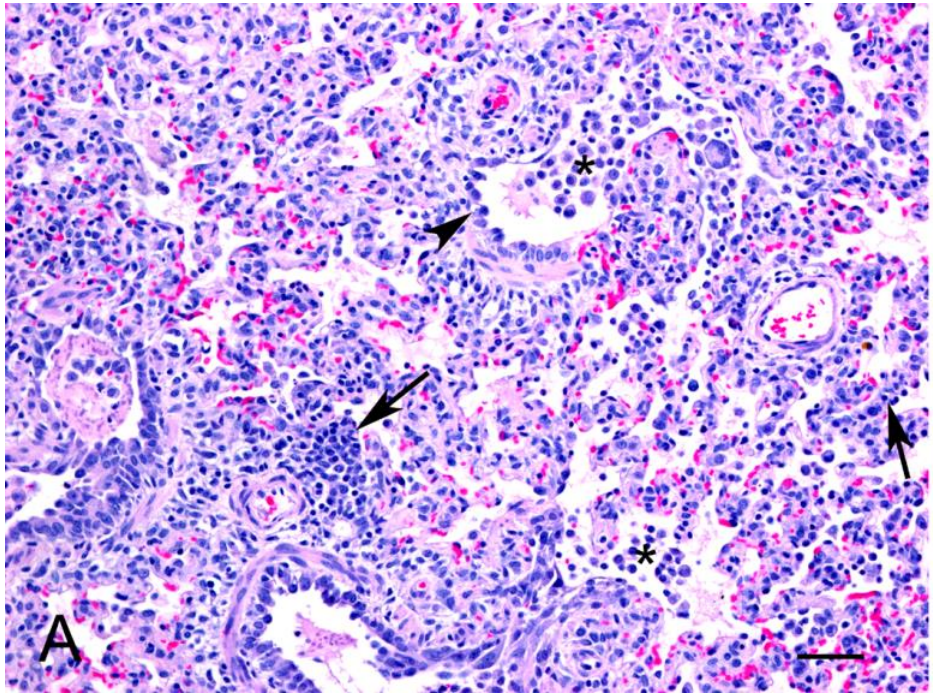
Experimental studies in pigs

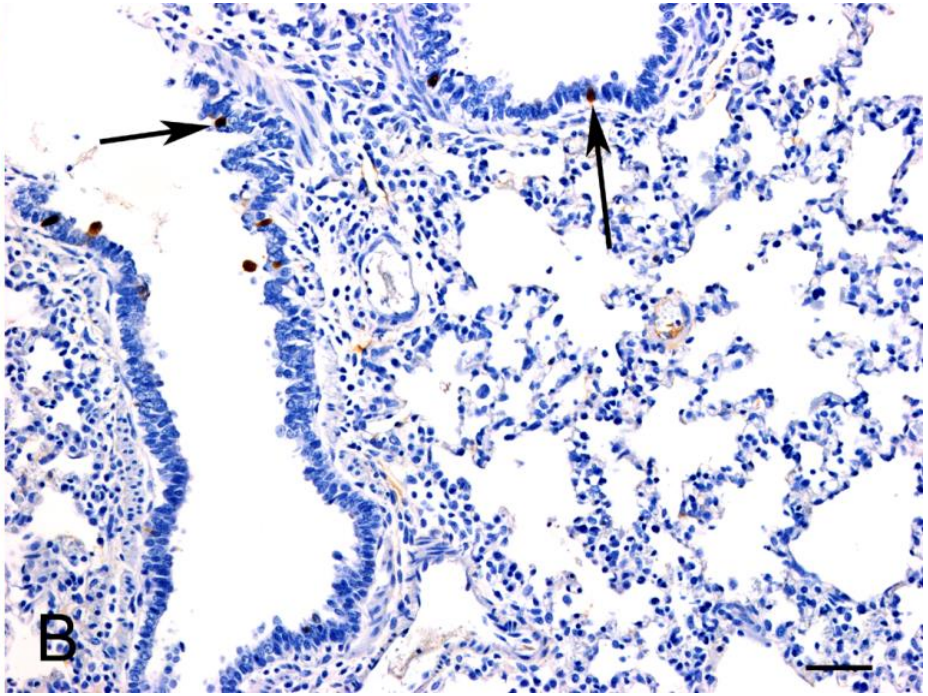
- 7 piglets were challenged by intranasal administration of 10^6 $TCID_{50}$ of FAV-002/H5N1 or FAV-010/H5N2
- Oral and nasal swabs were taken prior to inoculation and every day for six days post-inoculation (dpi)
- 1 piglet was euthanized on day 3, 4, 5, and 6 DPI & lungs were collected
- Blood was collected at 7 and 14 DPI

Experimental studies in pigs

- No clinical signs were observed in both groups of pigs
- No detectable levels of influenza A virus RNA (Ct values <35) were found by real-time RT-PCR in all oral/nasal swabs and lungs collected
- Only pigs inoculated with H5N1 were able to seroconvert based on cELISA and HI
- No microscopic lesion observed in lungs of pigs inoculated with H5N2
- Histologic lesions were observed in lungs tissues H5N1 infected pigs.

Histopathology and immunohistochemistry (IHC) findings in lungs from FAV-002/H5N1 infected pigs





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