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## SDEC Partners Research Update

### Project Update: Antigenic drift of H1N1 influenza A virus in pigs with and without passive immunity

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#### Background

- The genetic and antigenic characteristics of influenza A viruses (IAV) within and between species can change over time due to antigenic shift and drift.
- Although pigs are known to play a key role in the epidemiology of IAV between species, little is known about the molecular evolution of IAV in pigs
- Suckling pigs can serve as an important source of IAV as they can be asymptotically infected and can transport the virus to multiple geographic locations at weaning.

#### Objective

The objective of this study is to evaluate the HA drift of an H1N1 IAV after infecting weaned pigs with or with maternally derived immunity

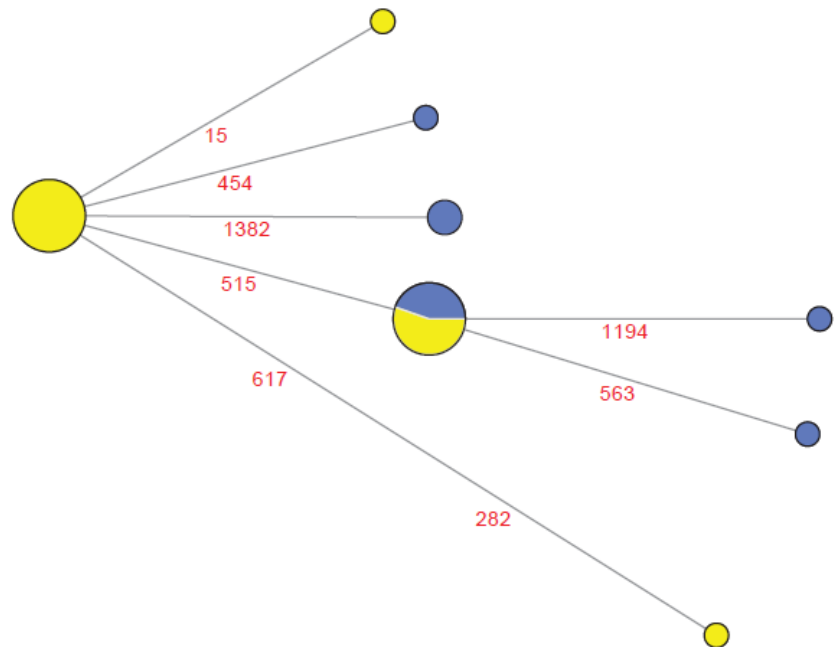


## Results

Single nucleotide polymorphisms (SNP) were identified in viral variants early after infection in pigs with and without passive immunity (Figure 1). These SNPs translated into amino acid substitutions in all three regions of the HA (signal peptide, HA1, and HA2), and were not limited to HA antigenic sites that are all located within HA1. Our results also indicate that HA antigenic changes that happened in pigs after infection were not different between pigs with passive immunity compared to pigs without passive immunity.

**Figure 1.**

Network analysis of the HA variants identified among all samples. Each circle represents a different sequence variant, and its size is proportional to the number of identical sequences (total number of sequences included in the analysis = 25). Blue and yellow indicate the sequences from pigs with and without passive immunity respectively. The numbers indicate the position where nucleotide differences were identified between sequences.



## Conclusions

- Synonymous and non-synonymous mutations were detected in pigs with and without passive immunity .
- There was no association between immune status of the pig and amino acid substitutions observed.
- The suckling pig is an important potential source of IAV genetic diversity in pigs.

## Implications

- Amino acid substitutions within antigenic sites can happen in weaned pigs with or without passive immunity shortly after infection.
- Further studies are needed to understand viral evolution and epidemiology of IAV in swine populations and the risk they represent to people.