SIV Discussion – WI Extension

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Introduction

- I volunteered to give this presentation, so I am biased to our Merck's product (MaxiVac Excell® 5.0)
- However, other killed SIV products will be effective
- Personal brief introduction
- Educate and inform you about the complexities of SIV and some of its challenges
- Formulate a plan for your 4-H swine group
- Answer questions (immediately or at the end)

MaxiVac Excell® 5.0

- More SIV strains than any other commercially available SIV vaccine
  - Cassette technology
- Most up-to-date H1N2-like strain
  - 2006 vs pre-2002
  - Presently, it is still “old”
  - Will be updated in the future
- Safe in pregnant sows
- Most animals are vaccinated in the fall and then boostered 3 weeks before farrowing
  - Gives passive immunity to baby pigs

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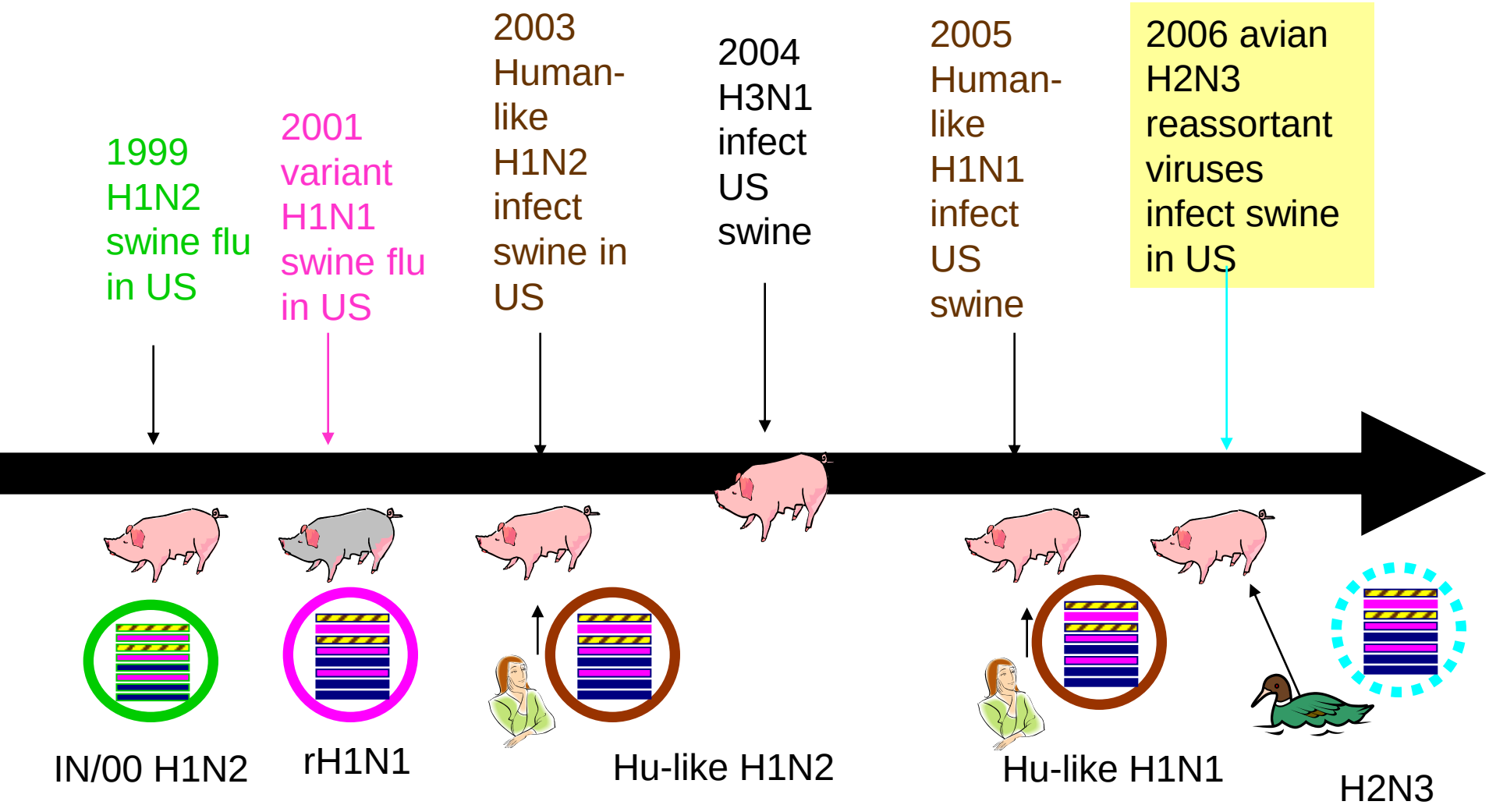
U.S. Swine Influenza Timeline



Courtesy Dr. Marie Gramer, U of MN

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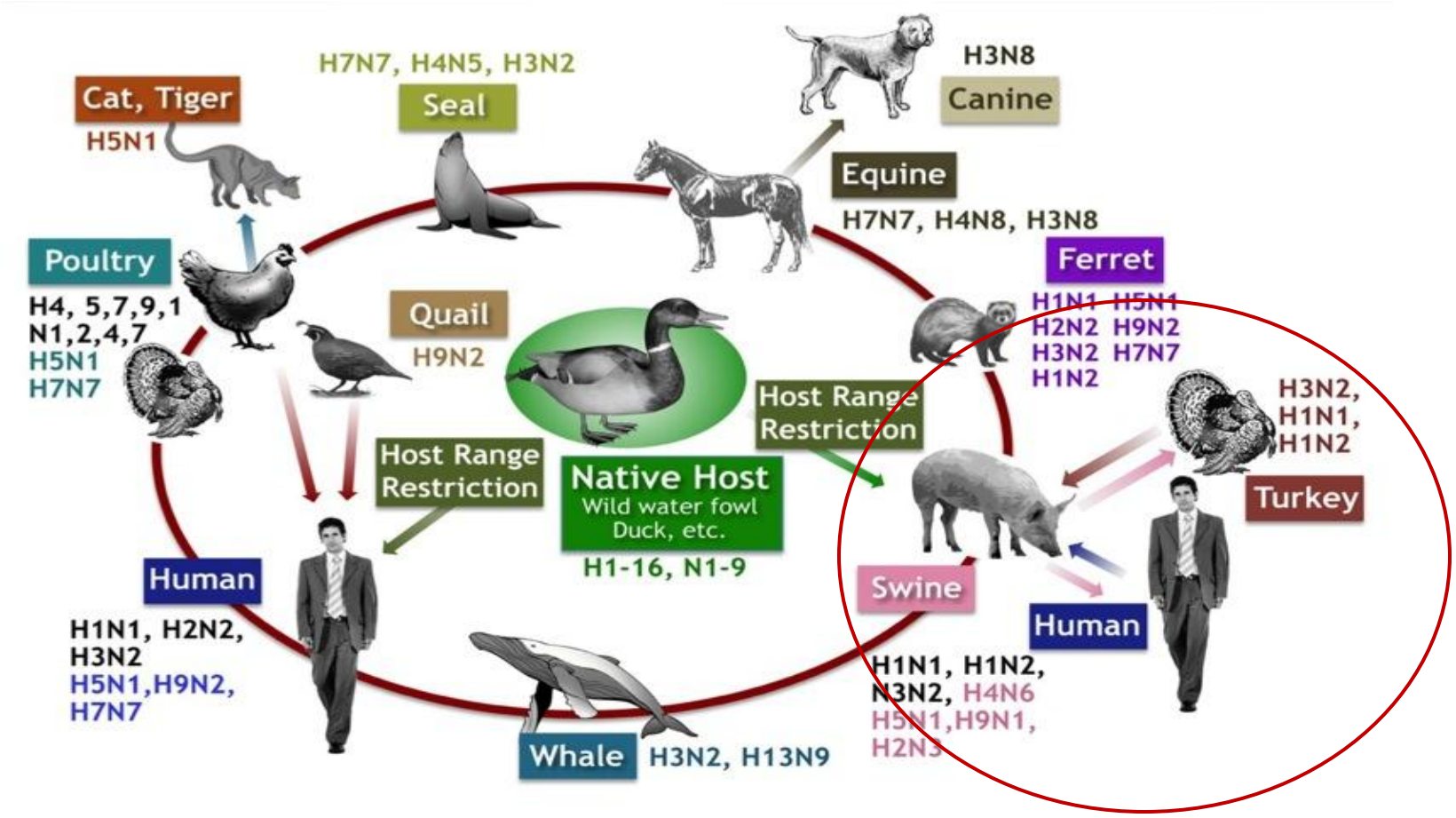
It all starts with wild water fowl:



Adapted from : http://www.medicalecology.org/diseases/influenza/influenza.htm#sec3

Slide compliments of Dr. Amy Vincent ARS-NADC

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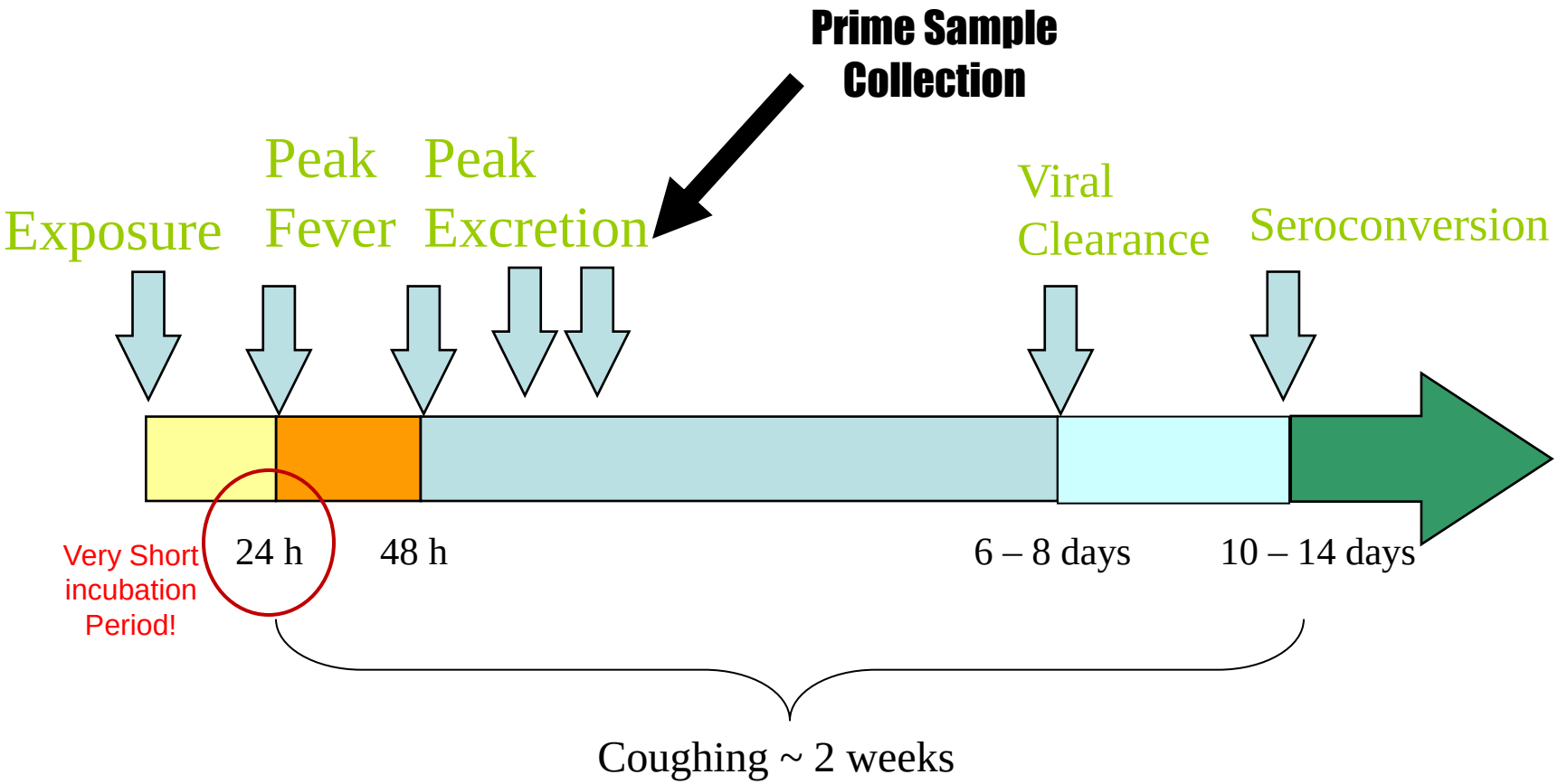
Infection risks increase with time



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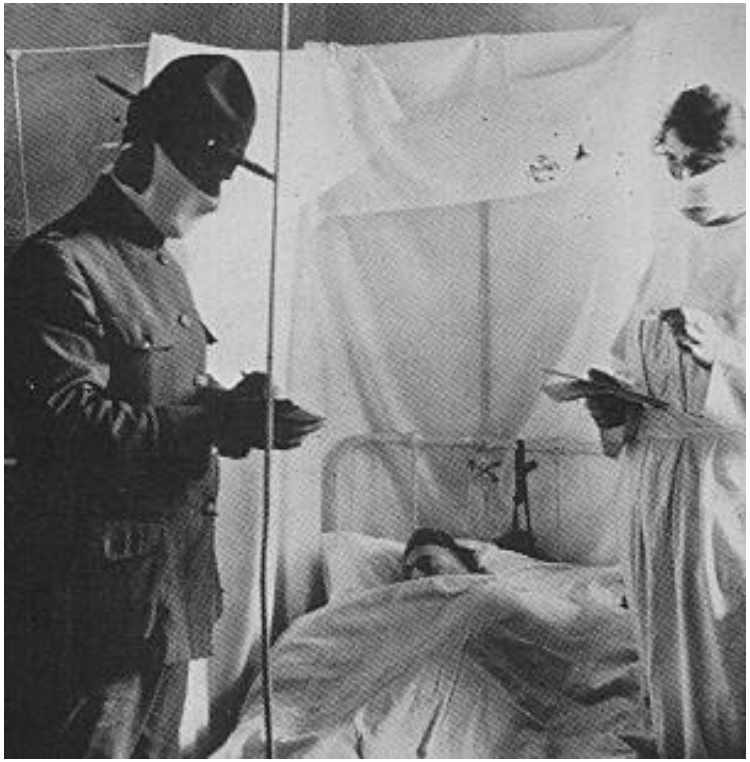
1918 *"SPANISH FLU"* PANDEMIC



(Smithsonian, January 1989)

Courtesy Dr. Steve Olsen, U of WI

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MaxiVac Excell 5.0

Strain Selection

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US H3N2 SIV Strains

Strain	Reference Virus	Prevalence	MaxiVac Excell 3/ 5.0
Cluster I	A/Sw/Texas 98	low	yes
Cluster III	A/Sw/IL/99 A/Sw/MN/449/04	low	yes[1]
Cluster IV	A/Sw/Ontario	high	yes

[1] Fleck, R. et al. Performance of MaxiVac Excell 3, a trivalent swine influenza virus vaccine, after challenge with a genetically diverse H3N2 swine influenza virus. Proceedings of the 18th IPVS Congress, Volume I, page 130.

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H1N1 SIV Strains

Strain	Reference Virus	Prevalence	MaxiVac Excell 3/ 5.0
Classical H1N1 (cH1N1)	A/Sw/WI/97	low	yes/ no
Reassortant H1N1 (rH1N1)	A/Sw/MN/02	high	yes
H1N2-like H1N1 (H1N2)	A/Sw/IN/00	high	yes
Human-like H1N1 (huH1N1)	A/Sw/On	moderate	yes

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Swine Influenza Virus

- Viral disease of swine of all ages
- Sows go off feed, abort due to high fevers, experience increased mortality due to secondary pneumonia
- Growing pigs have high fevers, reduced feed intake, pneumonia, difficulty breathing, nasal exudate, sneezing
- Serious public health disease…perception of “bad meat”
- Costly disease…loss of exports, etc

SIV Disease

- Disease (pathogen) changes rapidly, moves swiftly
- Low mortality with a high mortality
  - Strain variation
  - Other complications
- Onset is 1 to 3 days
- Ends 4 to 8 days after infection
- Disease is zoonotic (affects humans and pigs)

MaxiVac Excell 5.0 Label Guidelines

- It is a KILLED product and will not cause disease (like human flu)
- 2.0 mL at 5 weeks of age in the neck, repeat in 3 weeks (some swellings)
- OK to go longer than 5 weeks, but should be 30 days before exhibiting at the fair (2 doses – DOI 6 months)
- 21 days withdrawal on meat
- Do not freeze
- Anaphylactic reactions can occur (treat with epinephrine)
- Store in refrigerator
- Comes in 50 and 250 dose size

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Why is SIV such a challenge?

- It is a very infectious and contagious disease
- Changes rapidly and a challenge to make commercial vaccines
- A human zoonotic disease (humans get the disease from pigs)
- Can be associated with other diseases and causes increased death losses
  - Combined with PRRS virus, it is devastating
- Your should know your own PRRS status
  - WPA provides free testing rope kits

MaxiVac Excell 5.0 Challenges
(like all SIV vaccines)

- The vaccine does not prevent disease (like human flu)
- About 60 % effective
- We vaccinate to “prevent” animals from getting SIV
- This disease is a serious human health concern (think of 1918 Spanish flu)
- Flu kills 36,000 people per year and sends over 200,000 to the hospital
- We (the swine industry) does not like ANY negative PR
- Elderly and “stressed” people are the most susceptible
- Pigs are the “mixing” vessels and disease spreads from human to pigs (more common) and pigs to humans
- The virus is capable of rapid change

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MaxiVac Excell 5.0 Fair Concerns

- It is NOT good to have sick animals at the fair
- Think of young kids going to the day care center
- Sick animals are asked to go home…not good for the student owner…disease spreads to other animals
- Antibiotics are not effective for viral disease…prevent secondary infections…then meat withdrawals
- One dose costs about 0.65 cents
- Aseptic technique for vaccination…one SS and needle
  - Order a small volume from your Veterinarian
- Think of circo virus and mycoplasma vaccinations
  - PCVM at 3 and 6 weeks of age
  - Vaccinate for erysipelas

MaxiVac Excell 5.0 Fair Concerns

- Control parasites and mange (Ivomec and Safe-Guard)
- Prevent lameness (good bedding)
- Please don’t inject yourself…be careful
- Watch out for Banamine (12 day withdrawal on meat, but they check the urine and that is zero tolerance)
- Watch out for steroids…don’t use!

SIV Disease Management

- Monitor farrowing and nursery for clinical disease (should be low)
- Sequence the virus…compare to MVE5 (check with Merck Animal Health veterinarians)
- Hard to conduct efficacy studies…costly
- Remember “in-vitro” studies vs “in-vivo”
- Contact Merck Animal Health for technical assistance

SIV Disease Management

- Designed so strains can be changed rapidly
- Think of human flu vaccines
- We expect too much from our vaccines
- Titers are “confusing”, expensive and probably not necessary…because five strains

What to submit?

- Must be acute…emergency, inform and protect others
- Should be within 24 to 48 hrs
- Acute post mortems, nasal swabs, bleed sows, piglets…rule out other disease
  - Not all has to be submitted
  - Store serum in regular freezer
  - 10 to 20 samples or more…depends
  - Individual sterile syringe and needle

How to submit?

- Preserve samples or hand carry to DL
- Send next day FedEX
- Call the DL to inform them
- Record the farm history

Difficulties with Diagnosis

- Short duration of viral shed
- Short duration of lung lesions
- Genetic drift causes difficulties in serology and PCR testing
- Antibodies from vaccines and colostrum can not be differentiated from natural exposure
- Virus is commonly found in clinically healthy populations

Diagnostic Goals

- Confirm that cause is indeed SIV
  - Not other diseases
- Determine if the virus is a new subtype or strain from previous isolates

Challenges for 4-H kids

- Small number of pigs
- Work with your local Veterinarian
- Health certificate is required 30 days before showing
- Veterinarian could vaccinate the second dose
- Two doses required three weeks apart

Field Diagnostic Options

- Clinical signs
- Necropsy
  - Histology and IFA, virus isolation
- Serology
  - Limited Value
- Nasal Swabs
  - Antigen capture ELISA, PCR, virus isolation
- Oral Fluids…general welfare, think of the pigs
- Rope field testing

Diagnostics: at the Lab

- Histology: Visualize lesions associated with virus
- Imunoflourescent antibody test (IFA): associate virus with lesions
- Virus Isolation: cells or eggs
- Virus Subtyping: PCR
- Virus sequencing: generation of dendrogram

Clinical Signs

- Very high fevers (>40 C, 106F)
- Severe depression and lethargy
- Sneezing
- Coughing
- Nasal discharge
- Difficulty breathing

Clinical Signs

- Acute can be straight forward
  - High morbidity, low mortality, acute course
- Chronic is more difficult
  - Can be confused with Mycoplasma, PRRS, PCV2
  - Secondary infections alter course and mortality

Lung Tissues and Nasal swabs

- Choose the right pigs…this is huge
- Select pigs that are febrile (> 40 C, T 106)
  - Snare or restrain the pig…record rectal temperature
- Good body condition
- Coughing or sneezing
- Clear nasal discharge

Nasal swabs

- Dacron or polyester swabs, not cotton
- Wipe nose if covered with manure
- Any transport media, although viral is best
- Keep cool (refrigerate)
- Swab 10 pigs
- Blood tinged is OK

Histology

- Send a variety of formalin fixed segments that include airways (bronchi/bronchioles)
- Important to associate lesions with presence of virus
- Necrotizing bronchiolitis with peribronchial and perivascular infiltration
- Epithelial damage appears by 3 days

Histology

- Proliferative epithelial repair by 7 days in major airways
- Epithelial damage resolved by 14 days
- Viral antigen detected by IHC absent by 14 days
- Pneumonia resolved by day 21

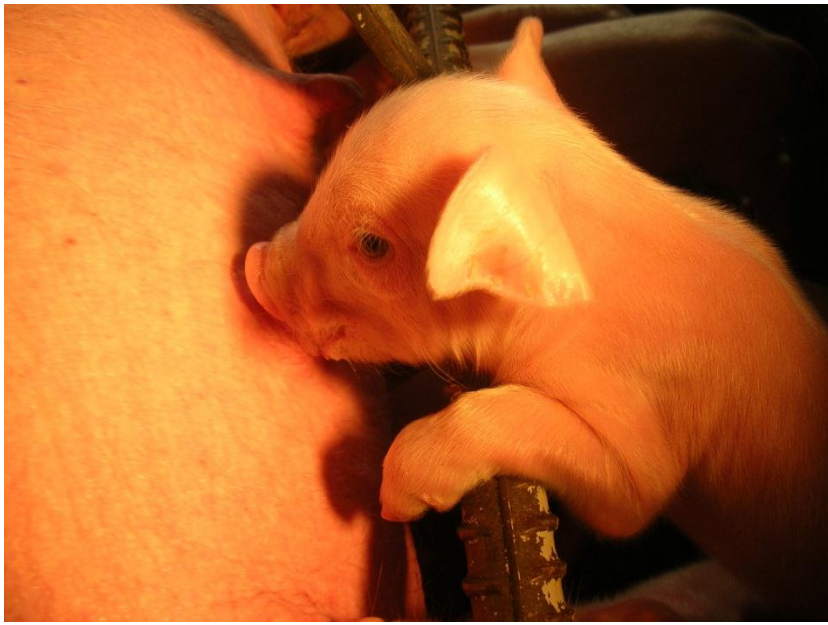
Thacker, J. Cl. Micro, 2001

PCR

- Live virus is not necessary
- Can be used on lung swabs, BAL, nasal swabs or oral fluids
- May over emphasize the importance of SIV, since low levels can be found in many apparently healthy pigs

Discussion

- Active immunity is broader spectrum than passive immunity
- If vaccine is used to provide passive immunity to suckling pigs, vaccine viruses need to match up well with field strains



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Summary

- Brief general review of Swine Influenza Virus (SIV)
- Personal biases of the disease
- Interesting facts about disease management
- Develop a plan for the kids
- I will try to answer your questions