

Animal Health Laboratory & Zoonotic Pathogens

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Animal Health Laboratory

- Overview of AHL
- Zoonotic pathogens identified at the AHL



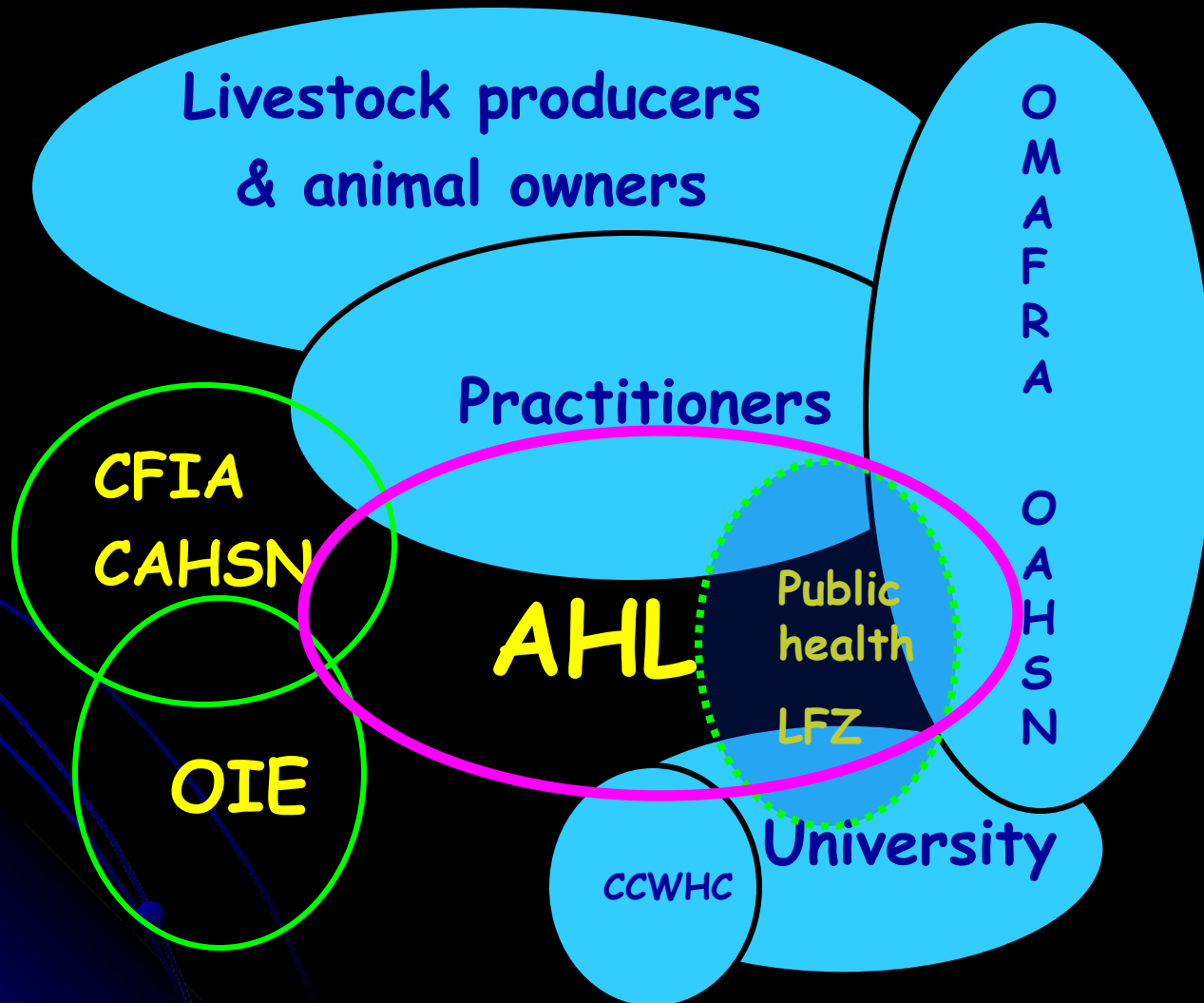
Animal Health Laboratory

Expertise

- 2 DVM PhD virologists
- 2 DVM DVSc/PhD microbiologists/molecular biologist
- 7 pathologists are ACVP board certified
- 1 avian pathologist ACPV board certified
- 2 clinical pathologists
- qualified technical staff

Multiple
accreditations
AAVLD, ISO

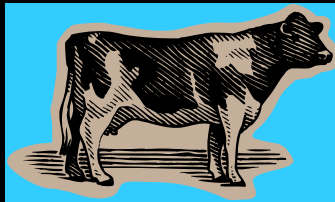
Stakeholders & Partners



Submissions

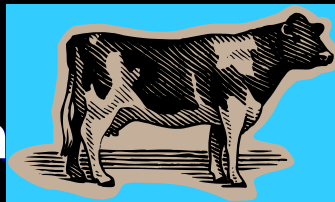
Tissues/fluids/entire animal

- individual animal



OR

- many animals on an individual premise



- Pathology
- Bacteriology
- Avian or Mammalian Virology
- Molecular Biology
- Mycoplasmaology
- Clinical Pathology
- Serology
- Toxicology
- Parasitology

Testing & Surveillance

Diagnostic Cases

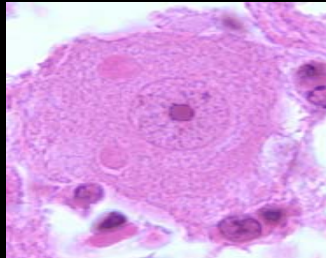
- > 400 tests available
- > 45,000 cases
- >750,000 procedures
- > 2000 occurrences of zoonotic pathogens identified on average annually
- 23,000 occurrences of zoonotic pathogens since 1998

Trends

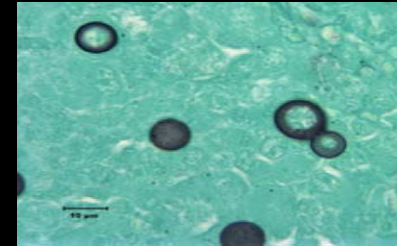
- Computerized data retrievable to 1988
- New & emerging animal diseases or pathogens
- Trends in endemic agents/diseases
- Targeted surveillance eg. Avian Influenza, **TSEs**
- Antimicrobial resistance

Categories of Zoonotic Pathogens Identified at AHL

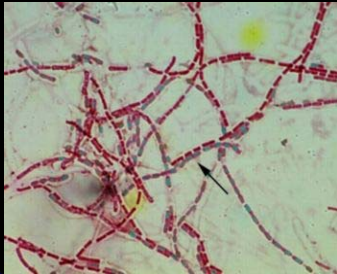
Virus



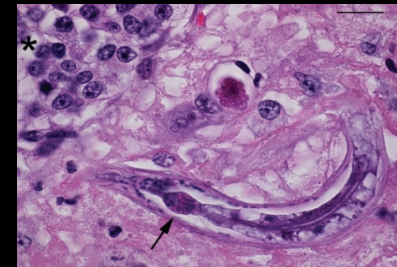
Fungi



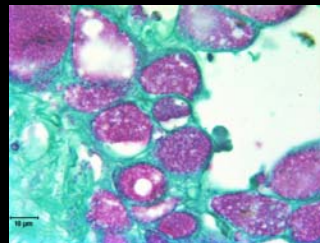
Bacteria



Parasites

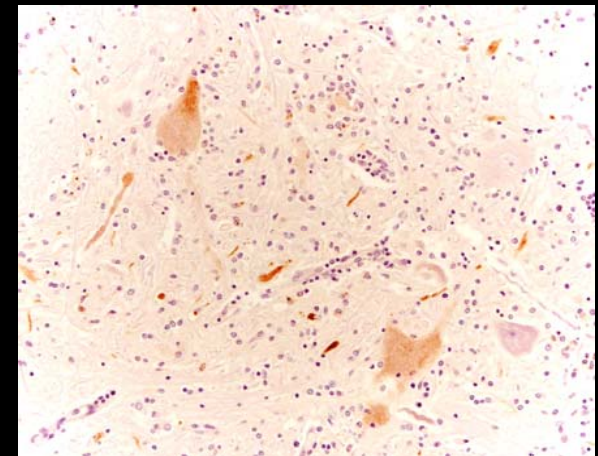


Rickettsia & Chlamydophila

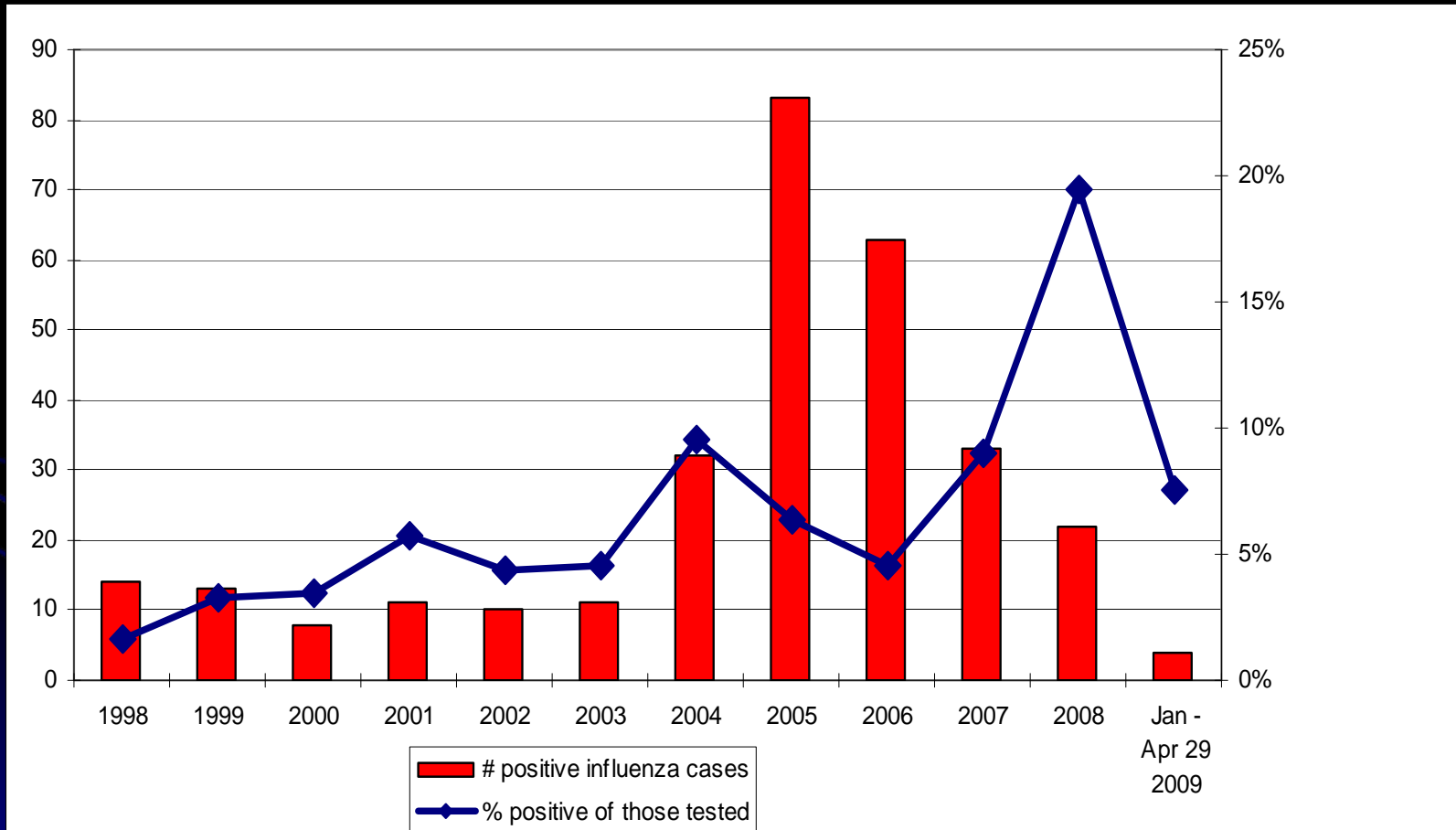


Viral Zoonotic Pathogens

	1998 - 2008
Rabies	13
Eastern equine encephalitis virus	24
West Nile virus	797
Parapoxvirus	44



Influenza Identified in Swine



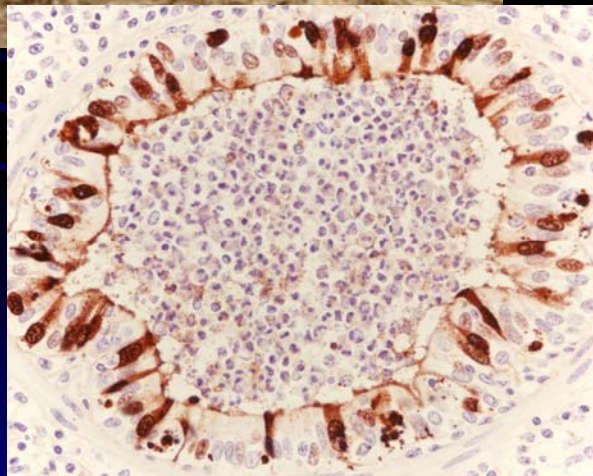
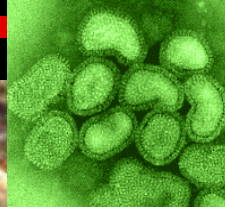
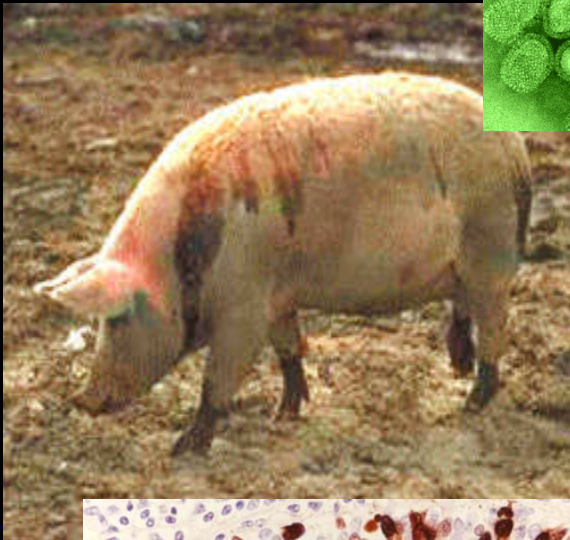
*case = positive on one or more of virus isolation, PCR, ELISA, IHC, FAT

Influenza Identified in Swine

Year	# Isolates	Influenza type					
		H1N1*	H1N2	H3N2	H3N3	H4N6	Influenza A/Untyped
1998	13	12					1
1999	9	7		1		1	
2000	6	6					
2001	12	9		1	2		
2002	12	9					3
2003	8	7	1				
2004	14	11	1				2
2005	66	16		32			18
2006	51	31		18			2
2007	37	13	4	16	0	0	3
2008	19	5		10			4
Jan - Apr 27 2009	4			4			

* Not the 2009 pandemic H1N1

Reassortant Influenza Viruses AHL



Wholly human

- H3N2 (1997)
- H1N2 (2003,2004)

Wholly avian

- H4N6 (1999)
- H3N3 (2001)

Human-swine

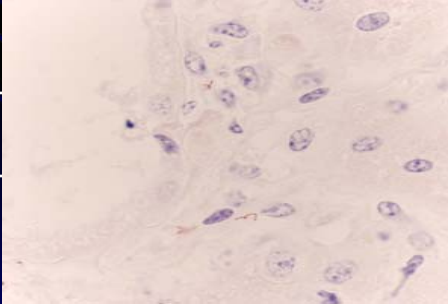
- H1N1* (2003;2004) (not current pandemic virus)
- H1N2 (2003;2004)

Human-avian-swine

- H3N2 (2005)

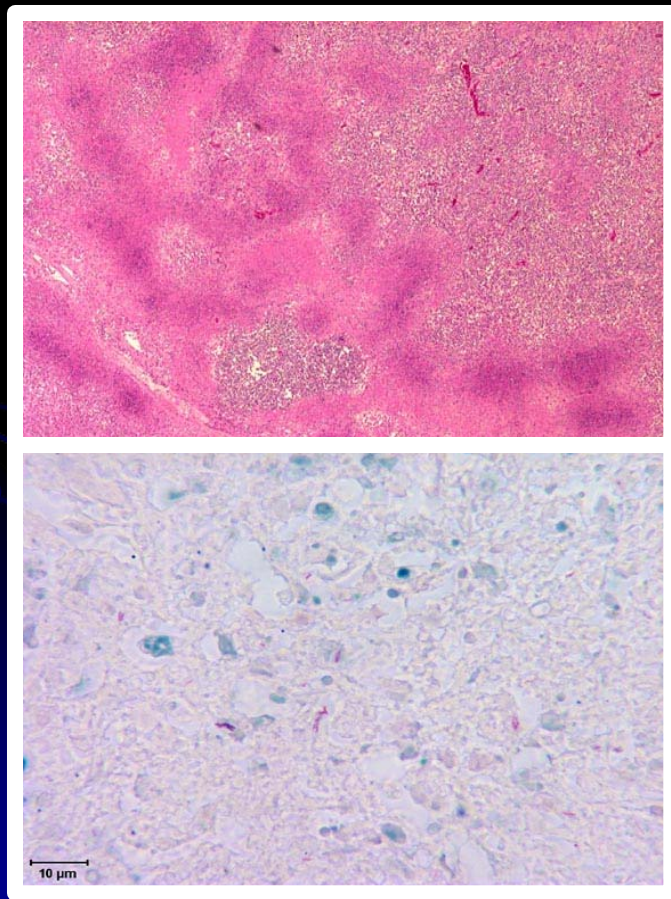
Typing at AHL and Drs. Olsen, Karasin, University of Wisconsin

Bacterial Zoonotic Pathogens

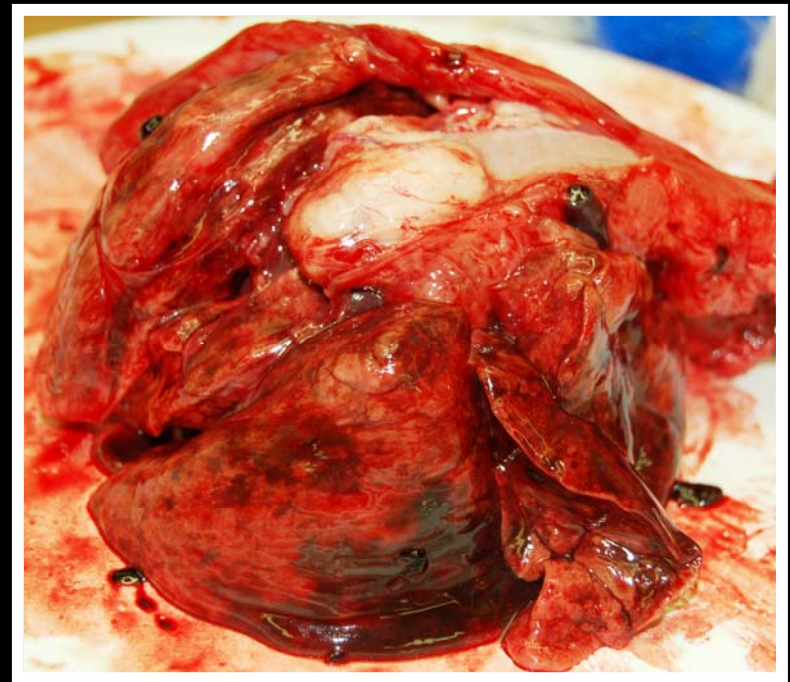
Common > 200 cases/yr	Occasional 15 - 199 cases/yr	Rare
<i>Streptococcus sp.</i> (<i>suis, canis, others</i>)	MRSA	<i>Mycobacterium tuberculosis</i>
<i>Salmonella sp.</i>	<i>B. bronchiseptica</i>	<i>Mycobacterium bovis</i>
<i>Leptospira sp.</i>	<i>Campylobacter sp.</i>	<i>Bacillus anthracis</i>
	<i>Clostridium difficile</i>	<i>Yersinia sp. (NOT pestis)</i>
	<i>Listeria monocytogenes</i>	<i>Erysipelothrix rhusiopathiae</i>
		<i>Borrelia burgdorferi</i>
		<i>Bartonella henselae</i>

Zoonotic Mycobacterial Infections

Mycobacterium bovis
5 month old bovine

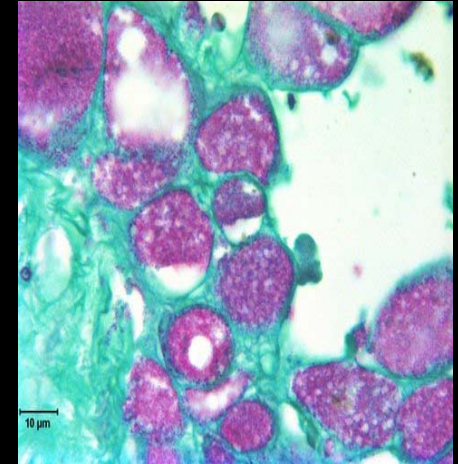
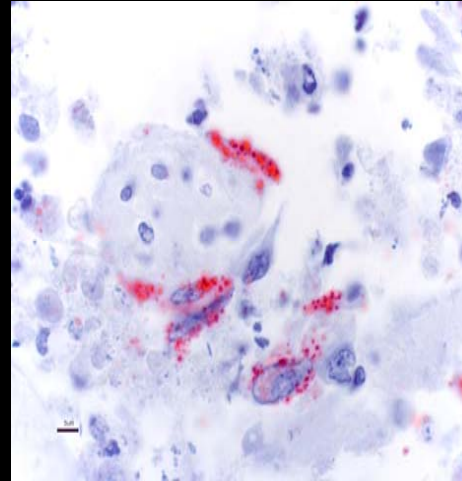


Mycobacterium tuberculosis
canine



Rickettsial Zoonotic Pathogens

	1998 - 2008
<i>Chlamydophila sp</i>	137
<i>Coxiella burnetii</i>	68

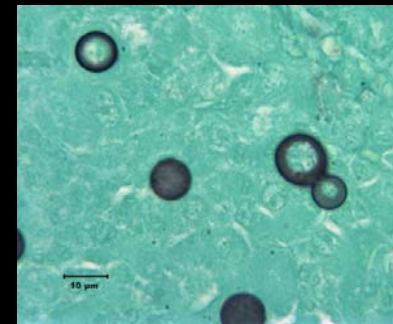


Mycotic Pathogens

Blastomyces dermatitidis

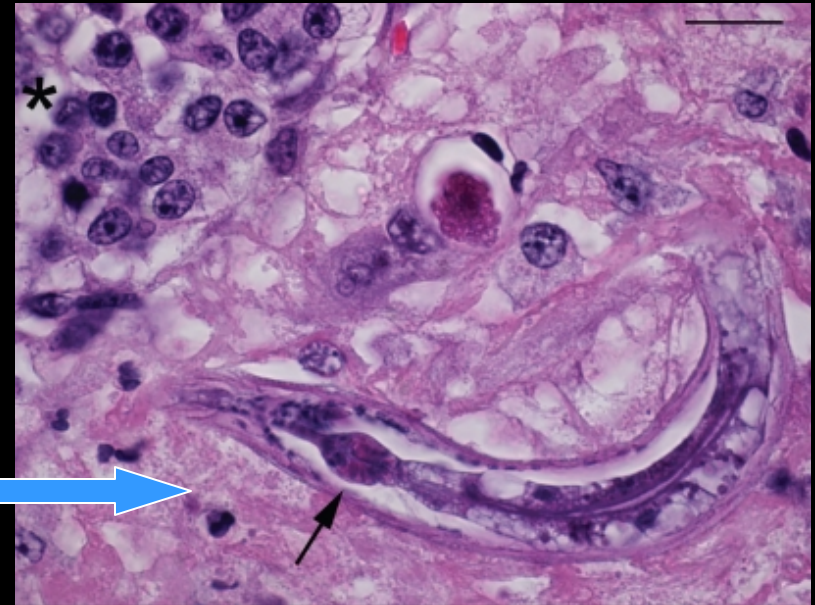
Cryptococcus neoformans

Dermatophytes



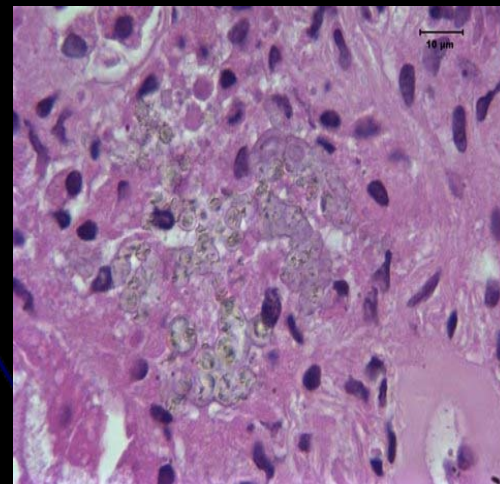
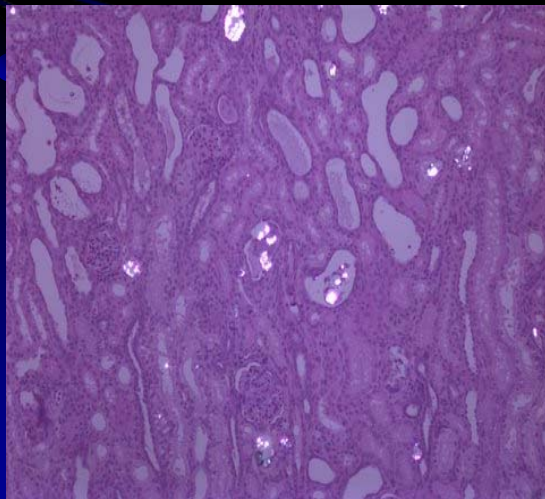
Zoonotic Parasites

- Protozoa
 - Common
 - *Cryptosporidium* sp.
 - *Toxoplasma gondii*
 - *Giardia* sp.
 - Rare
 - *Leishmania* sp.
 - *Halicephalobus gingivalis*



Toxicities & Impact on Public Health

- Withrow Park-insecticide
- Melamine cyanuric acid



Summary AHL & Zoonotic Pathogens: Opportunities and Challenges

- **History of collaboration**
 - Source of
 - Data
 - Animals as sentinels
 - Pathogens
 - **Expertise** in zoonotic pathogens
 - **Adaptable** – always new or emerging issues
 - **Identify zoonotic pathogens regularly**
 - Warning issued on report
 - **OMAFRA funding** – Surveillance, test development, emergency preparation
- **Streamline and improve reporting for policy makers:**
 - **CFIA reportable and notifiable diseases** – not all zoonotic pathogens included – link to Health?
 - **OMAFRA** – Animal Health Act is pending
 - **Ontario Health Protection and Promotion Act R.R.O. 1990, REGULATION 557 COMMUNICABLE**



References on reassortant influenza

1. Karasin et al. J Clin Microbiol 2006; 44:1123
2. Olsen et al. Emerg Inf Dis 2006; 12:1132
3. Karasin et al. Can Vet J 2000; 41:938
4. Karasin et al. J Virol 2000; 74:9322
5. Karasin et al. Virus Res 2000; 68:71

<http://ahl.uoguelph.ca>
**March issue update on
zoonotic pathogens**