



Laboratory of Virology
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Why a European Surveillance Network for Influenza in Pigs (ESNIP)?

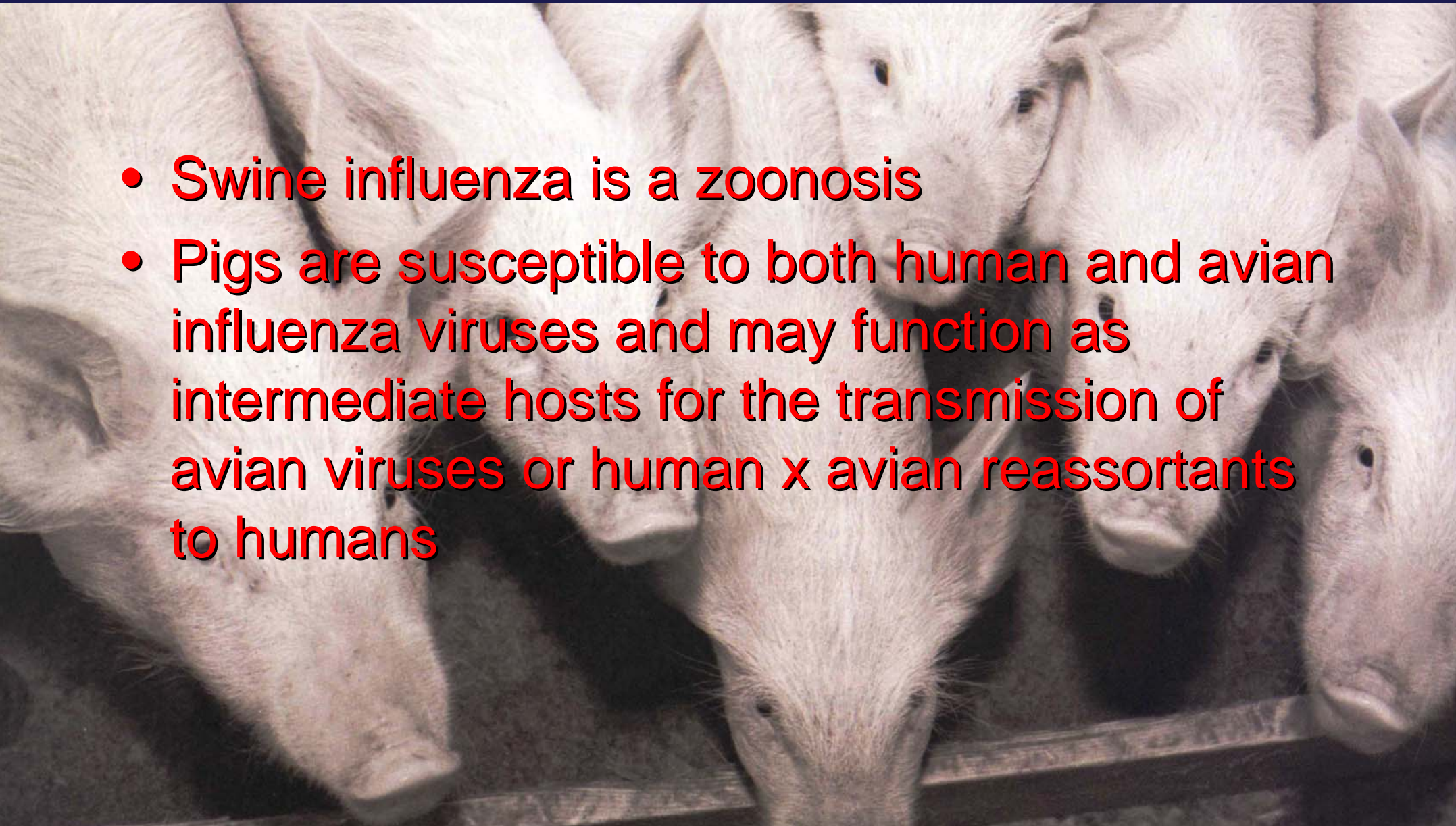
Kristien Van Reeth

About influenza in pigs

- H1N1, H3N2 and H1N2 subtypes enzootic in pigs worldwide
BUT antigenic/genetic differences between continents
- acute infection (1 week), respiratory tract only
- major cause of acute respiratory disease in pigs, though most infections are subclinical
- commercial inactivated vaccines; usually bivalent (H1N1+H3N2), one trivalent (H1N1+H3N2+H1N2)

About influenza in pigs

- Swine influenza is a zoonosis
- Pigs are susceptible to both human and avian influenza viruses and may function as intermediate hosts for the transmission of avian viruses or human x avian reassortants to humans



Swine influenza situation in 1999

- antigenic drift in H3N2 SIVs from The Netherlands and Belgium reported by some researchers, not by others
- emergence of a novel H1N2 reassortant (with human-like HA) in the UK
- sudden change in SI epidemiology in the US: H3N2 widespread since 1998
- detection of H5 and H9 avian influenza viruses in humans in Hong Kong; growing concerns about potential role of pigs as intermediate hosts

ESNIP 1

- Concerted Action, January 2001 - March 2004
- EC contribution 269 984 Euros
- Coordinator Guus Koch, CIDC-Lelystad, The Netherlands
- 14 partners from 10 European countries including 2 reference labs for human influenza,

3 industrial partners



Major realisations of ESNIP1

- standardization of protocols
- selection of reference virus strains, production of reference sera
- establishment of a central virus bank and an electronic database
- antigenic & genetic characterisation of some recent isolates
- preliminary picture of prevalence of different SIV subtypes in different countries

Serological survey in sows 2002-03

Country	% sows with HI antibodies to		
	H1N1	H3N2	H1N2
Belgium	80.8	53.8	57.8
Germany	70.8	58.6	32.1
Italy	46.4	41.7	13.8
Spain	38.5	38.0	52.8
Ireland	17.8	4.2	0.6
Czech Republic	11.7	0.1	3.0
Poland	8.0	0	0

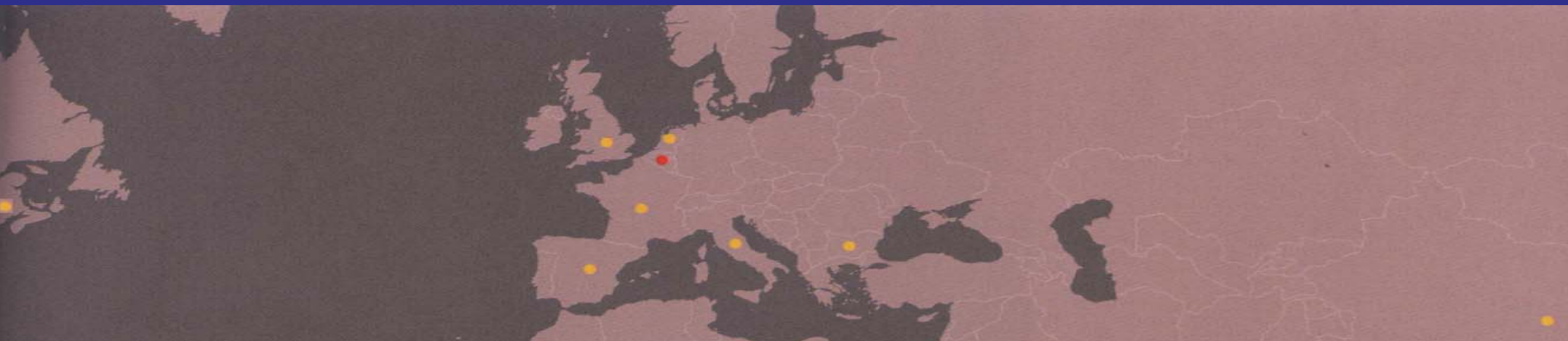
Influenza and other Respiratory Viruses 2008, in press

We started to exchange information and thoughts
on SIV and to speak the same language



ESNIP 2

- Coordination Action, Jan 2006-Dec 2008
- EC contribution 300 000 euros
- Coordinator Kristien Van Reeth, UGent, Belgium
- 9 partners from Europe
 - including 2 SIV vaccine manufacturers
- 1 partner from US, 1 from Hong Kong



ESNIP 2 participants

- P1: Ghent University (UGent) **BELGIUM**
- P2: Veterinary Laboratories Agency (VLA) **UK**
- P3: Centraal Instituut voor Dierziekte Controle - Lelystad (CIDC)
THE NETHERLANDS
- P4: Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna (IZSLER) **ITALY**
- P5: Agence Française de Sécurité Sanitaire des Aliments (AFSSA) **FRANCE**
- P6: Philipps University (UNIMAR-VIRO) **GERMANY**
- P7: MERIAL, Virology Department (MERIAL) **FRANCE**
- P8: Laboratorios HIPRA S.A. (HIPRA) **SPAIN**
- P9: National Diagnostic Veterinary Research Institute (NDVRI)
BULGARIA
- P10: The University of Hong Kong (HKU) **HONG KONG**
- P11: University of Wisconsin-Madison (UW Madison) **USA**

ESNIP 2: general aims

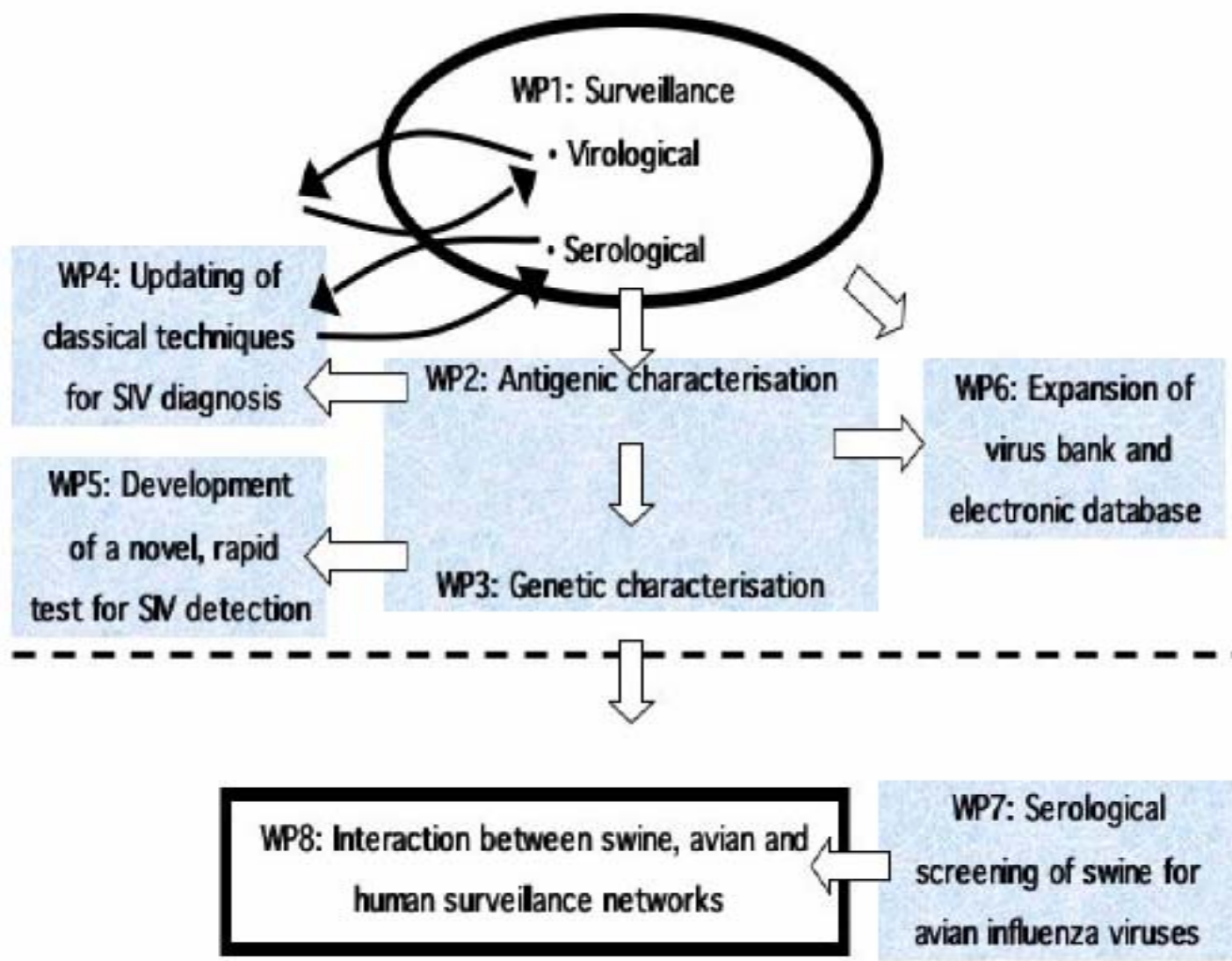
- 1) To expand knowledge of the epidemiology and evolution of swine influenza viruses in Europe with the purpose to improve the control and diagnosis of swine influenza
- 2) To gain insights into the public health risks of influenza in swine

Part I: SIV – Questions and problems

- Limited understanding of SI epidemiology:
co-circulation of different subtypes,
differences between countries and seasons,
persistence at farm level
- Extent of antigenic drift within each subtype?
Serological cross-reactivity between circulating
strains and SIV vaccine strains?
- Extent of genetic evolution, dominant genotypes?
e.g. novel H1N1 x H1N2 reassortants reported in
France, Italy, Denmark

Part I: SIV – Questions and problems

- Diagnosis: no recommendations regarding reagents used in classical tests for serology (H1N1, H3N2 and H1N2 strains in HI) and SIV subtyping (hyperimmune sera)
- No validated tests for rapid detection (RT-PCR) of SIV on field samples, or for SIV subtyping



Part II: Public health implications – Questions and problems

- How frequent is AI virus transmission to pigs?
Can AI virus subtypes other than H1 or H3 maintain themselves in swine populations?
- No serological monitoring of European pigs for AI viruses
- No reliable serological assay for AI virus antibodies in pigs

Pigs experimentally infected with LPAI viruses have no HI antibodies with chicken RBCs, low titres with horse RBCs

Isolate	Subtype	# pigs with seroconversion at 28 DPI (titre range)	
		IPMA	HI (horse RBCs)
mallard/Alberta/119/98	H1N1	2/2 (256-1024)	2/2 (20)
mallard/Alberta/290/98	H1N1	2/2 (256)	0/2 (<10)
duck/Italy/1447/05	H1N1	2/2 (256-512)	0/2 (<10-10)
duck/Belgium/06936/05	H3N6	2/2 (256-512)	1/2 (10-20)
mallard/Alberta/279/98	H3N8	2/2 (128-256)	0/2 (10)
mallard/Alberta/169/98	H3N8	2/2 (1024)	2/2 (20)
mallard/Alberta/47/98	H4N1	1/1 (1024)	1/1 (40)
chicken/Belgium/150/99	H5N2	2/2 (512-1024)	2/2 (20)
duck/Minnesota/1525/81	H5N1	2/2 (512-2048)	1/2 (10-20)
chicken/Italy/22A/98PD	H5N9	2/2 (256-1024)	1/2 (<10-20)
chicken/Italy/1067/V99	H7N1	2/2 (1024)	1/2 (<10-40)
chicken/Belgium/818/79	H9N2	0/2 (<2)	0/2 (<10)

Part II: Public health implications – Questions and problems

- Antigenic relationships between influenza viruses in swine and in human populations?
- Little exchange of data between ESNIP and human or avian surveillance networks



European Surveillance Network
for Influenza in Pigs (ESNIP)
Minisymposium
Gent, Belgium, 4 – 5 June 2008

<http://www.esnip.ugent.be>

