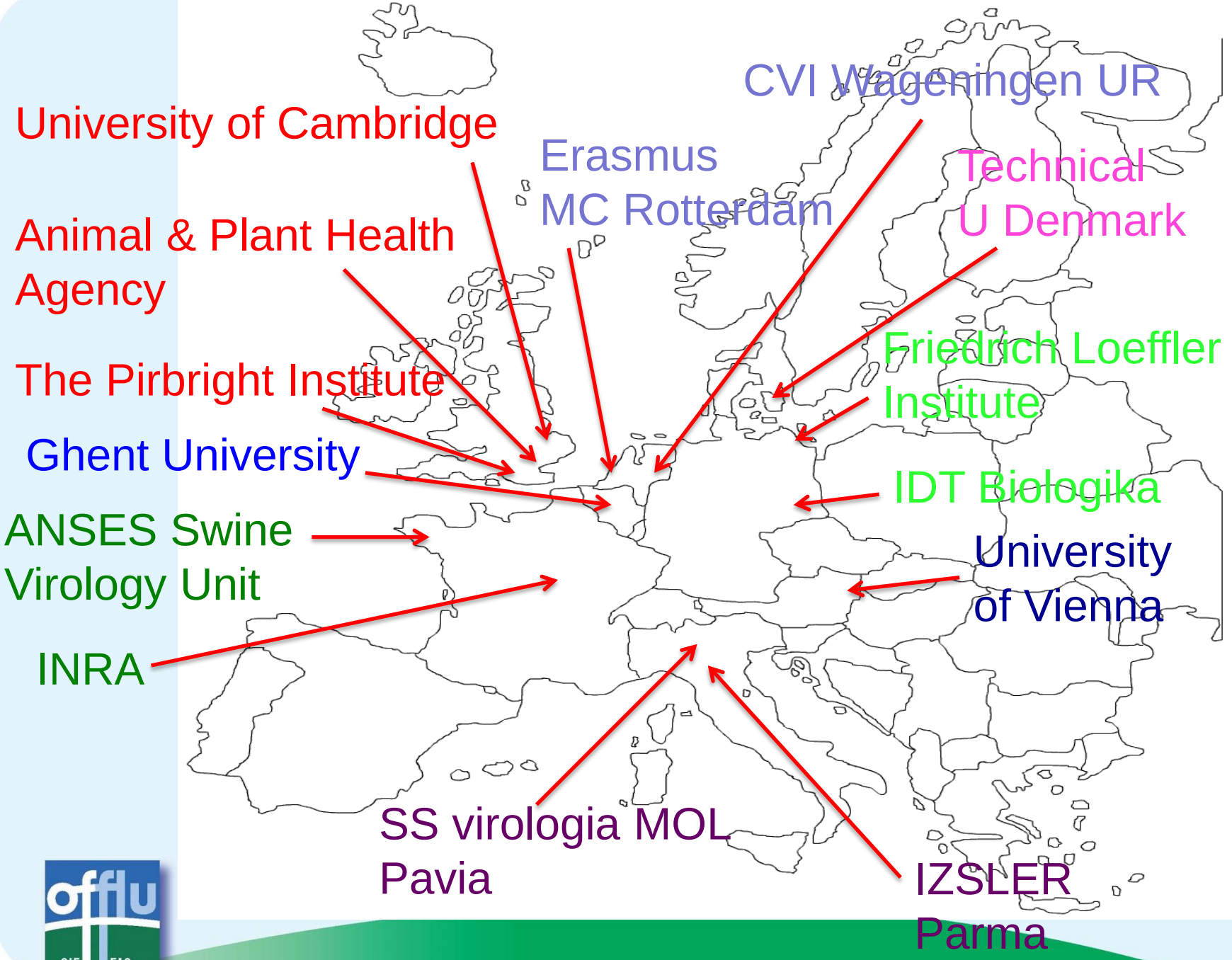
*OFFLU swine influenza virus meeting*
*27 – 28 March 2017*
*FAO Headquarters, Rome, Italy*

# Swine influenza virus research in Europe: what's new?

Kristien Van Reeth
Ghent University, Belgium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IZSLER Parma

# Papers Surveillance (n = 2) and Diagnostics (n = 3)

eLIFE
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RESEARCH ARTICLE

## The global antigenic diversity of swine influenza A viruses

**Nicola S Lewis[1*†], Colin A Russell[2†], Pinky Langat[3], Tavis K Anderson[4], Kathryn Berger[2], Filip Bielejec[5], David F Burke[1], Gytis Dudas[6], Judith M Fonville[1], Ron AM Fouchier[6], Paul Kellam[3], Bjorn F Koel[7‡], Philippe Lemey[5], Tung Nguyen[8], Bundit Nuansrichy[9], JS Malik Peiris[10], Takehiko Saito[11], Gaelle Simon[12], Eugene Skepner[1], Nobuhiro Takemae[11], ESNIP3 consortium, Richard J Webby[13], Kristien Van Reeth[14], Sharon M Brookes[15], Lars Larsen[16], Simon J Watson[3], Ian H Brown[15], Amy L Vincent[4]**

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# Papers Surveillance (n = 2) and Diagnostics (n = 3)

*Influenza and Other Respiratory Viruses 2016*

ORIGINAL ARTICLE

WILEY

## Rapid detection and subtyping of European swine influenza viruses in porcine clinical samples by haemagglutinin- and neuraminidase-specific tetra- and triplex real-time RT-PCRs

Dinah Henritzi[1] | Na Zhao[1] | Elke Starick[1] | Gaelle Simon[2] | Jesper S. Krog[3] | Lars Erik Larsen[3] | Scott M. Reid[4] | Ian H. Brown[4] | Chiara Chiapponi[5] | Emanuela Foni[5] | Silke Wacheck[6] | Peter Schmid[6] | Martin Beer[1] | Bernd Hoffmann[1] | Timm C. Harder[1]

SCIENTIFIC REPORTS

OPEN

## Riems influenza a typing array (RITA): An RT-qPCR-based low density array for subtyping avian and mammalian influenza a viruses

Received: 19 February 2016
Accepted: 17 May 2016
Published: 03 June 2016

Bernd Hoffmann, Donata Hoffmann, Dinah Henritzi, Martin Beer & Timm C. Harder

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# Papers Surveillance (n = 2) and Diagnostics (n = 3)

***Emerging Infectious Diseases 2016***

## Detection of Influenza D Virus among Swine and Cattle, Italy

**Chiara Chiapponi,[1] Silvia Faccini,[1] Aurora De Mattia, Laura Baioni, Ilaria Barbieri, Carlo Rosignoli, Arrigo Nigrelli, Emanuela Foni**

Author affiliations: Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia Romagna, Brescia, Italy (C. Chiapponi,

Journal of Virological Methods 243 (2017) 31–34

Contents lists available at ScienceDirect

Journal of Virological Methods

journal homepage: www.elsevier.com/locate/jviromet

Short communication

### Development and evaluation of a new Real-Time RT-PCR assay for detection of proposed influenza D virus

Silvia Faccini[a,*], Aurora De Mattia[e], Chiara Chiapponi[b,c], Ilaria Barbieri[d], Maria Beatrice Boniotti[d], Carlo Rosignoli[a], Giuliana Franzini[a], Ana Moreno[d], Emanuela Foni[b,c], Arrigo Daniele Nigrelli[a]

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[d] Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia Romagna, Brescia, Italy
[e] Bologna University, Italy

# Papers Transmission & Epidemiology (n = 2)

Cador et al. Vet Res (2016) 47:86
DOI 10.1186/s13567-016-0365-6

VETERINARY RESEARCH

RESEARCH ARTICLE Open Access

## Maternally-derived antibodies do not prevent transmission of swine influenza A virus between pigs

Charlie Cador[1,4*], Séverine Hervé[2,4], Mathieu Andraud[1,4], Stéphane Gorin[2,4], Frédéric Paboeuf[3,4], Nicolas Barbier[2,4], Stéphane Quéguiner[2,4], Céline Deblanc[2,4], Gaëlle Simon[2,4] and Nicolas Rose[1,4]

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INTERFACE

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Research

**Cite this article:** Pitzer VE, Aguas R, Riley S, Loeffen WLA, Wood JLN, Grenfell BT. 2016 High turnover drives prolonged persistence of influenza in managed pig herds. *J. R. Soc. Interface* **13**: 20160138.
http://dx.doi.org/10.1098/rsif.2016.0138

## High turnover drives prolonged persistence of influenza in managed pig herds

Virginia E. Pitzer[1,2], Ricardo Aguas[3], Steven Riley[3], Willie L. A. Loeffen[4], James L. N. Wood[5] and Bryan T. Grenfell[2,6]

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[6]Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ 08544, USA

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# Papers Pathogenesis (n = 3)

Transboundary and Emerging Diseases

Transboundary and Emerging Diseases

ORIGINAL ARTICLE

## Cytokine Expression at Different Stages of Influenza A(H1N1) pdm09 Virus Infection in the Porcine Lung, Using Laser Capture Microdissection

D. J. Hicks[1], M. Kelly[2], S. M. Brookes[2], B. Z. Londt[2], A. Ortiz Pelaez[3], A. Orlowska[1], I. H. Brown[2], Y. I. Spencer[1] and A. Núñez[1]

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[2] Virology Department, Animal Health and Veterinary Laboratories Agency (AHVLA), New Haw, Addlestone, Surrey, UK
[3] Centre for Epidemiology and Risk Analysis, Animal Health and Veterinary Laboratories Agency (AHVLA), New Haw, Addlestone, Surrey, UK

SCIENTIFIC REPORTS

OPEN

Received: 17 September 2015
Accepted: 01 February 2016
Published: 19 February 2016

## Late regulation of immune genes and microRNAs in circulating leukocytes in a pig model of influenza A (H1N2) infection

Louise Brogaard[1], Peter M. H. Heegaard[1], Lars E. Larsen[2], Shila Mortensen[1,*], Michael Schlegel[3], Ralf Dürrwald[3] & Kerstin Skovgaard[1]

Technical University of Denmark, Copenhagen

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# Papers Pathogenesis (n = 3)

*Journal of General Virology* (2016), **97**, 2501–2515 DOI 10.1099/jgv.0.000573

## *Mycoplasma hyopneumoniae* does not affect the interferon-related anti-viral response but predisposes the pig to a higher level of inflammation following swine influenza virus infection

Céline Deblanc,[1,2] Mario Delgado-Ortega,[3]‡ Stéphane Gorin,[1,2] Mustapha Berri,[3] Frédéric Paboeuf,[2,4] Patricia Berthon,[3] Georg Herrler,[5] François Meurens[6]†§ and Gaëlle Simon[1,2]†

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[4]ANSES, Service de Production de Porcs Assainis et d'Expérimentation, Ploufragan, France

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[6]VIDO-InterVac, University of Saskatchewan, Saskatoon, Canada

# Papers Immune response (n = 3)

***Mucosal Immunology 2016***

## The respiratory DC/macrophage network at steady-state and upon influenza infection in the swine biomedical model

P Maisonnasse[1], E Bouguyon[1], G Piton[2,3], A Ezquerra[4], C Urien[1], C Deloizy[1], M Bourge[5], J-J Leplat[2,3], G Simon[6,7], C Chevalier[1], S Vincent-Naulleau[2,3], E Crisci[8], M Montoya[8,9], I Schwartz-Cornil[1] and N Bertho[1]

INRA, France

AMERICAN SOCIETY FOR MICROBIOLOGY | Journal of Virology

## Influenza A Virus Infection in Pigs Attracts Multifunctional and Cross-Reactive T Cells to the Lung

**Stephanie C. Talker,[a] Maria Stadler,[a] Hanna C. Koinig,[b] Kerstin H. Mair,[a] Irene M. Rodríguez-Gómez,[a]* Robert Graage,[b]* Roland Zell,[c] Ralf Dürrwald,[d] Elke Starick,[e] Timm Harder,[e] Herbert Weissenböck,[f] Benjamin Lamp,[g] Sabine E. Hammer,[a] Andrea Ladinig,[b] Armin Saalmüller,[a] Wilhelm Gerner[a]**

Institute of Immunology, Department of Pathobiology, University of Veterinary Medicine, Vienna, Austria[a]; University Clinic for Swine, Department for Farm Animals and Veterinary Public Health, University of Veterinary Medicine, Vienna, Austria[b]; Department of Virology and Antiviral Therapy, Jena University Hospital, Friedrich Schiller University, Jena, Germany[c]; Viral Vaccines, Business Unit Animal Health, IDT Biologika GmbH, Dessau-Rosslau, Germany[d]; Institute of Diagnostic Virology, Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Greifswald-Insel Riems, Germany[e]; Institute of Pathology and Forensic Veterinary Medicine, Department of Pathobiology, University of Veterinary Medicine, Vienna, Austria[f]; Institute of Virology, Department of Pathobiology, University of Veterinary Medicine, Vienna, Austria[g]

# Papers Immune response (n = 3)

Hemmink *et al. Vet Res (2016) 47:103*
DOI 10.1186/s13567-016-0390-5

VETERINARY RESEARCH

RESEARCH ARTICLE Open Access

## Distinct immune responses and virus shedding in pigs following aerosol, intra-nasal and contact infection with pandemic swine influenza A virus, A(H1N1)09

Johanneke D. Hemmink[1†], Sophie B. Morgan[1†], Mario Aramouni[2,7], Helen Everett[2], Francisco J. Salguero[3], Laetitia Canini[6], Emily Porter[4], Margo Chase-Topping[6], Katy Beck[2], Ronan Mac Loughlin[5], B. Veronica Carr[1], Ian H. Brown[2], Mick Bailey[4], Mark Woolhouse[6], Sharon M. Brookes[2], Bryan Charleston[1] and Elma Tchilian[1*]

The Pirbright Institute, Pirbright, UK

# Papers Vaccination (n = 2)

*The Journal of Immunology 2016*

## Aerosol Delivery of a Candidate Universal Influenza Vaccine Reduces Viral Load in Pigs Challenged with Pandemic H1N1 Virus

**Sophie B. Morgan,*[,1] Johanneke D. Hemmink,*[,1] Emily Porter,[†] Ross Harley,[†] Holly Shelton,* Mario Aramouni,[‡] Helen E. Everett,[§] Sharon M. Brookes,[§] Michael Bailey,[†] Alain M. Townsend,[¶] Bryan Charleston,* and Elma Tchilian***

The Pirbright Institute, Pirbright, UK

# Papers Vaccination (n = 2)

***Nature Partner Journal Vaccines 2017,*** Accepted

**Heterologous prime-boost vaccination with H3N2 influenza viruses of swine favors cross-clade antibody response and protection**

Kristien Van Reeth[1], José Carlos Mancera Gracia[1], Ivan Trus[1], Lieve Sys[1], Gerwin Claes[1], Han Versnaeyen[2], Eric Cox[3], Florian Krammer[4], and Yu Qiu[5]

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# Papers Interspecies transmission (n = 2)

***PLOS ONE 2017***, accepted

Effect of serial pig passages on the adaptation of an avian H9N2 influenza virus to swine

José Carlos Mancera Gracia, Silvie Van den Hoecke, Xavier Saelens, Kristien Van Reeth

***Nature Scientific Reports 2017***, accepted

A reassortant H9N2 influenza virus containing 2009 pandemic H1N1 internal-protein genes acquired enhanced pig-to-pig transmission after serial passages in swine

José Carlos Mancera Gracia, Silvie Van den Hoecke, Juergen A. Richt, Wenjun Ma, Xavier Saelens, Kristien Van Reeth

# Papers Public health aspects (n = 3)

***Influenza and Other Respiratory Viruses 2016***

DOI:10.1111/irv.12364
www.influenzajournal.com

Original Article

## Increased risk of A(H1N1)pdm09 influenza infection in UK pig industry workers compared to a general population cohort

**Ellen Fragaszy,[a,b,*] David A. Ishola,[a,c,*] Ian H. Brown,[d] Joanne Enstone,[e] Jonathan S. Nguyen-Van-Tam,[e] Robin Simons,[d] Alexander W. Tucker,[f] Barbara Wieland,[g,h] Susanna M. Williamson,[d] Andrew C. Hayward,[a] On behalf of the Flu Watch Group James L. N. Wood,[f] On behalf of the Combating Swine Influenza (COSI) Consortium**

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# Papers Public health aspects (n = 3)

***Eurosurveillance 2016***

RAPID COMMUNICATIONS

## Severe acute respiratory infection caused by swine influenza virus in a child necessitating extracorporeal membrane oxygenation (ECMO), the Netherlands, October 2016

PLA Fraaij [1,2], ED Wildschut [3], RJ Houmes [3], CM Swaan [4], CJ Hoebe [5,6], HCC de Jonge [7], P Tolsma [8], I de Kleer [9], SD Pas [1], BB Oude Munnink [1], MVT Phan [1], TM Bestebroer [1], RS Roosenhoff [1], JJA van Kampen [1], M Cotten [1], N Beerens [10], RAM Fouchier [1], JH van den Kerkhof [4], A Timen [4], MP Koopmans [1]
1. Department of Viroscience Erasmus MC, Rotterdam, The Netherlands . . .

***Eurosurveillance 2017***

RAPID COMMUNICATIONS

## Swine influenza A (H1N1) virus (SIV) infection requiring extracorporeal life support in an immunocompetent adult patient with indirect exposure to pigs, Italy, October 2016

F Rovida [1,2], A Piralla [1,2], FC Marzani [3], A Moreno [4], G Campanini [1], F Mojoli [3,5], M Pozzi [3], A Girello [1], C Chiapponi [6], F Vezzoli [7], P Prati [8], E Percivalle [1], A Pavan [9], M Gramegna [10], GA Iotti [3,5], F Baldanti [1,11]
1. SS Virologia Molecolare, SC Microbiologia e Virologia, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

***Eurosurveillance 2017***

LETTER

# Letter to the editor: Just a coincidence? Two severe human cases due to swine influenza (SIV) A(H1N1)v in Europe, October 2016

**C Adlhoch [1], P Penttinen [1]**
1. European Centre for Disease Prevention and Control, Solna, Sweden

***Eurosurveillance 2017***

LETTER

# Authors' reply: Two severe human cases due to swine influenza A (H1N1)v in October 2016 in Europe were chronologic coincident yet distinct events

**F Rovida [1], A Piralla [1], FC Marzani [2], A Moreno [3], G Campanini [1], F Mojoli [2 4], M Pozzi [2], A Girello [1], C Chiapponi [5], F Vezzoli [6], P Prati [7], E Percivalle [1], A Pavan [8], M Gramegna [9], GA Iotti [2 4], F Baldanti [1 10]**
1. SS Virologia Molecolare, SC Microbiologia e Virologia, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy . . .

How to maintain swine influenza virus research in an era of research budget cuts

Thank you for your collaboration and attention