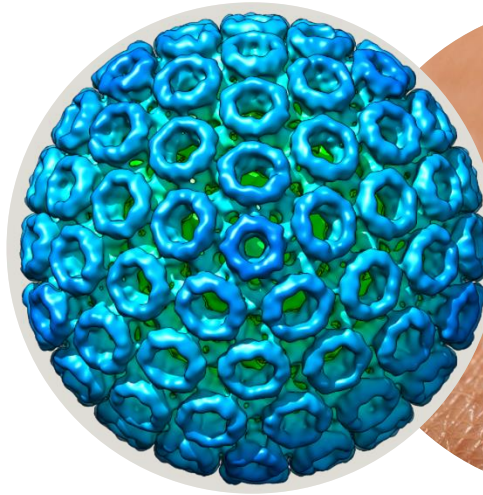


Insect-overdraagbare zoönosen

Wat kunnen we verwachten en hoe kunnen we ons voorbereiden?

Jeroen Kortekaas, 12^{de} Nationale Symposium Zoönosen



Wageningen Bioveterinary Research



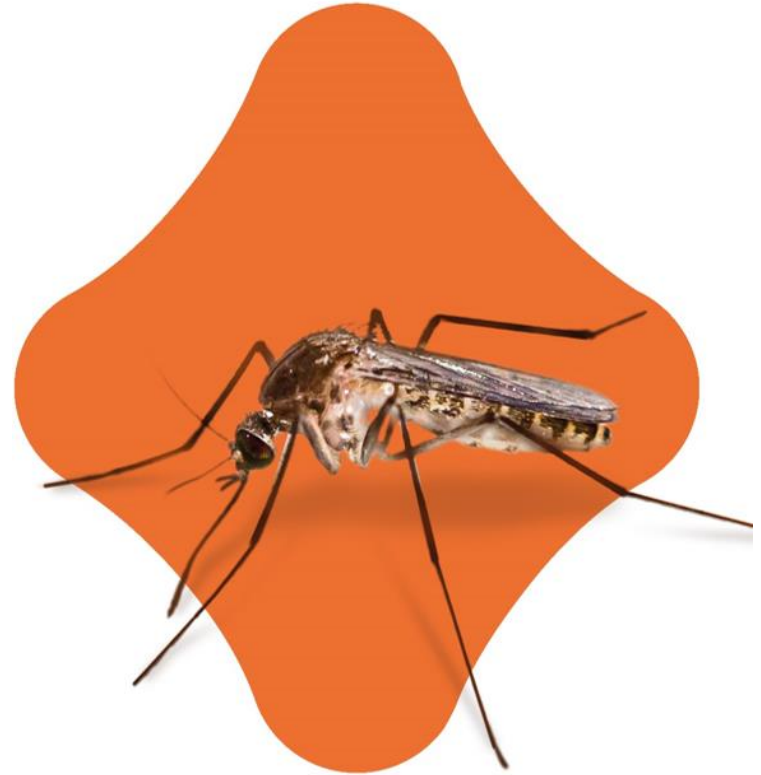
Arbovirus onderzoek in associatie met vectoren en natuurlijke gastheren @WUR



WUR is partner van NCOH



**netherlands
centre for
one health**



WHO Blueprint list of priority diseases

- Ebola and Marburg hemorrhagic disease
- Lassa fever
- Middle East Respiratory Syndrome (MERS)
- Severe Acute Respiratory Syndrome (SARS)
- Nipah and Hendra
- Zika
- Crimean-Congo haemorrhagic fever
- Severe fever with thrombocytopenia syndrome
- Rift Valley fever
- Disease X

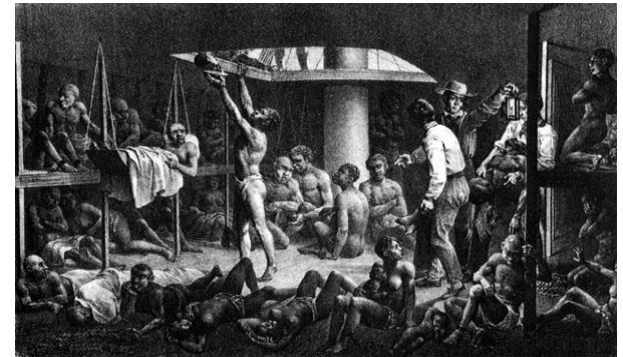
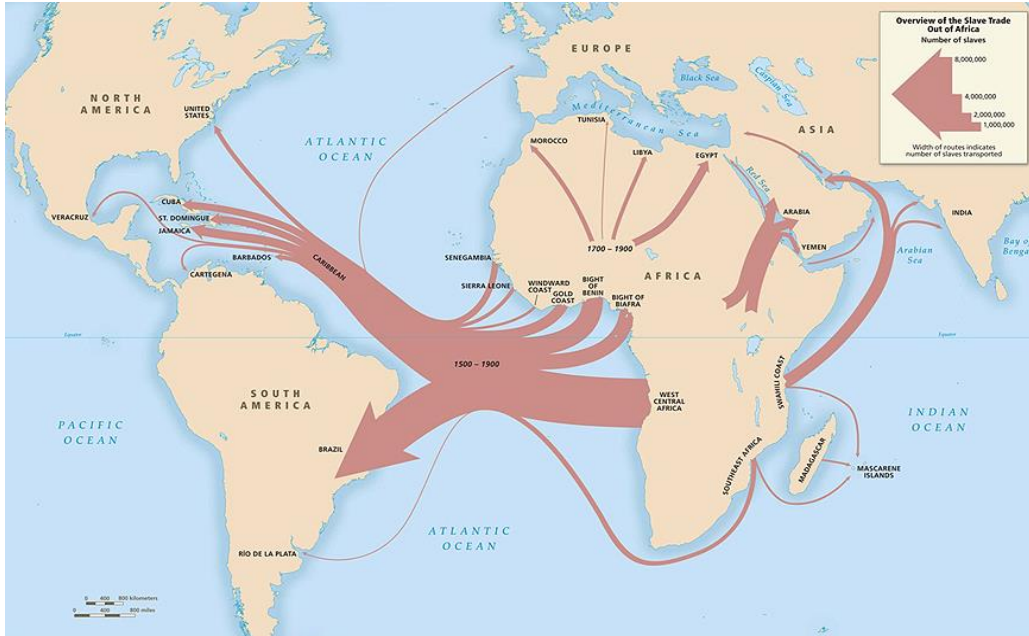


Arboviruses

Insect-overdraagbare zoönosen

- Focus: Virussen die worden overgebracht door muggen en/of knutten





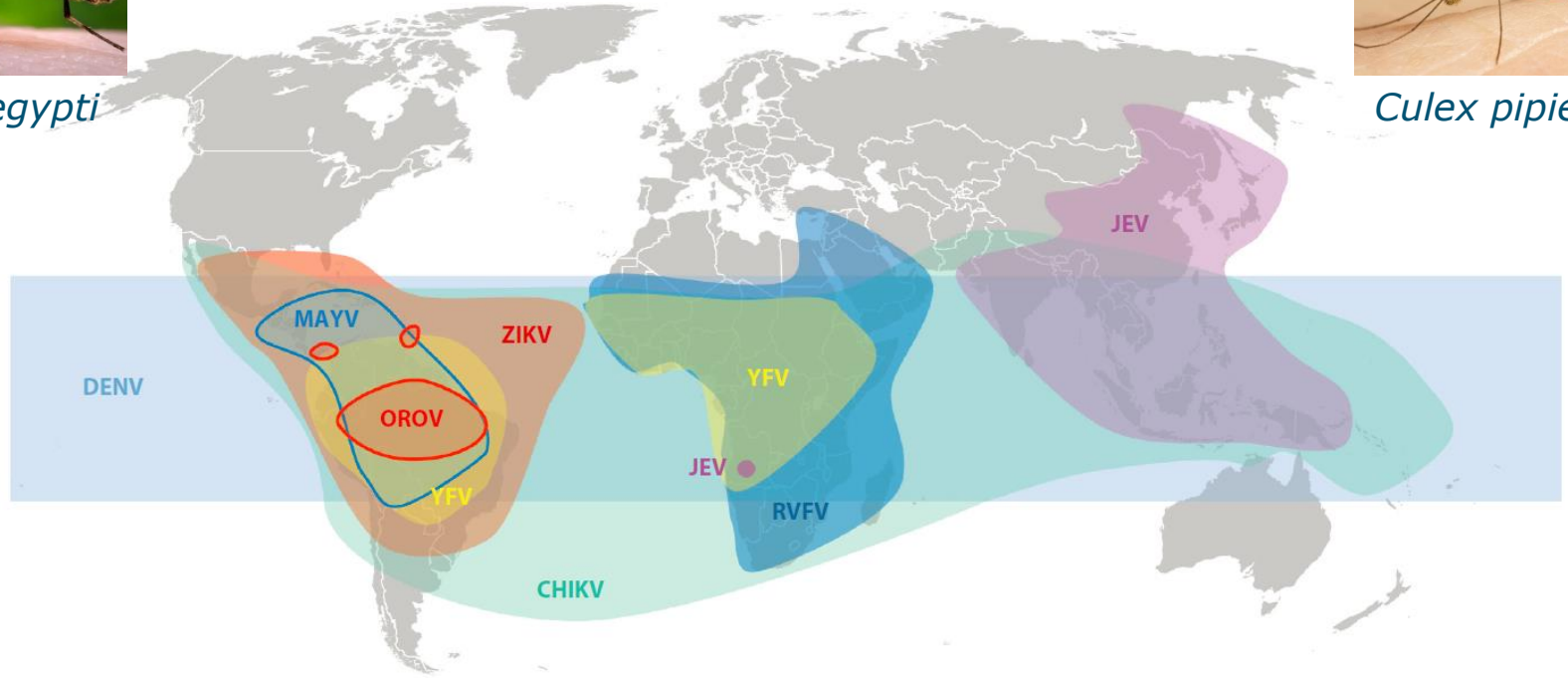




Aedes aegypti



Culex pipiens



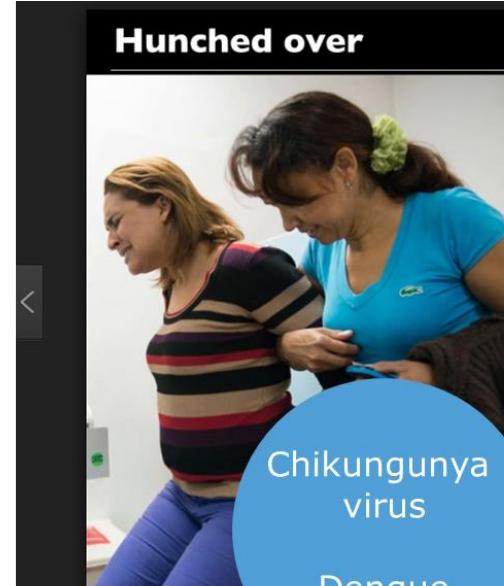
Arbovirale ziekten van de mens



Yellow
fever virus



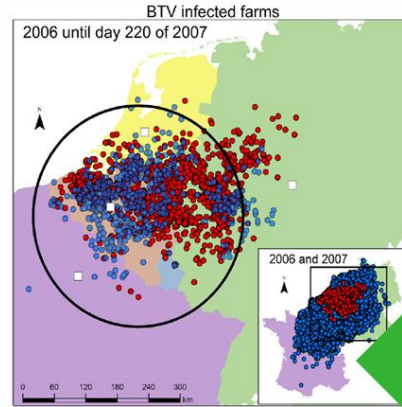
Zika virus



Chikungunya
virus

Dengue
virus

2006: Blauwtong serotype 8



Boender et al., Vet Res 2014



Afrikaanse paardenpest



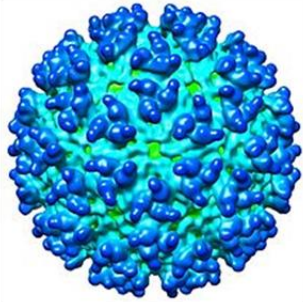
Culicoides imicola

2011: Schmallenberg virus

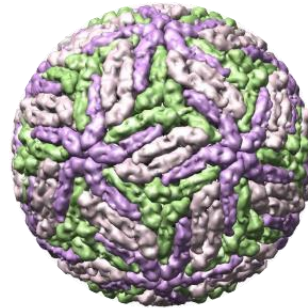


Zoönotische arbovirussen

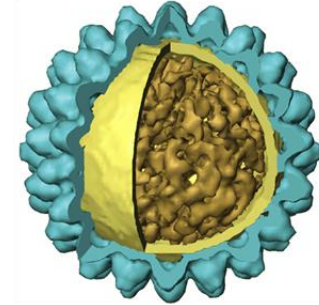
Togaviridae



Flaviviridae



Bunyavirales



2016: Usutu virus

Tienduizenden merels dood door usutuvirus

Virologie

Het usutuvirus sloeg deze zomer opnieuw toe, vooral onder merels. Niet alleen in Oost-Nederland, waar het virus in 2016 binnenkwam.

Hester van Sante  12 september 2017

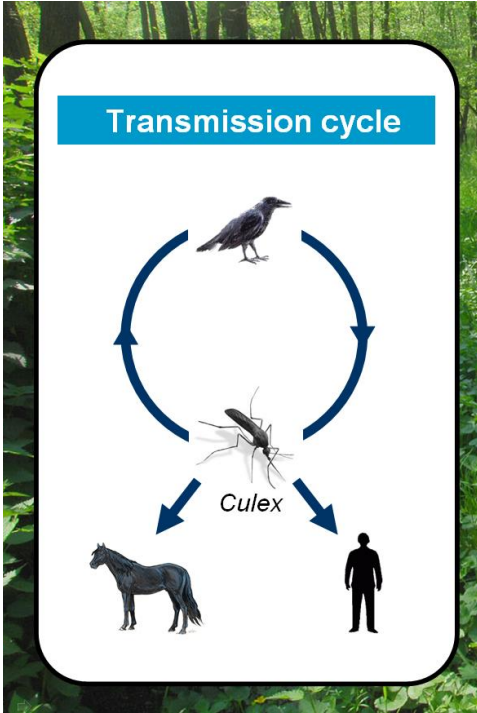


RESEARCH ARTICLE

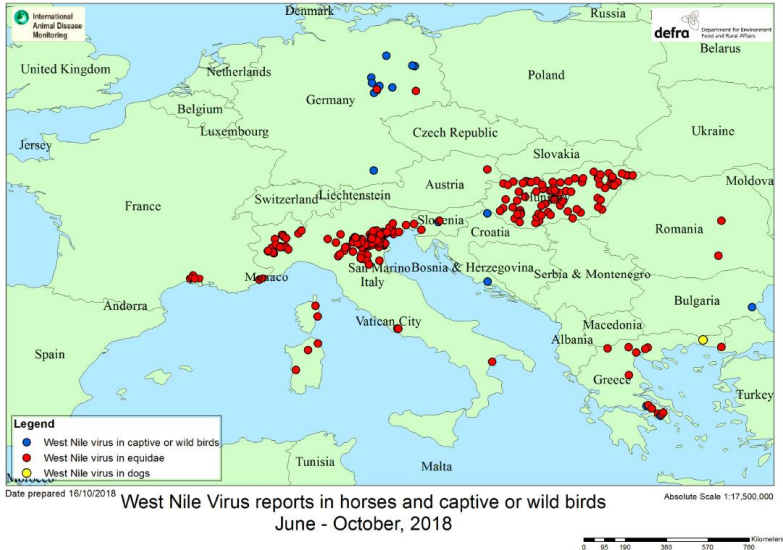
Deleterious effect of Usutu virus on human neural cells

Sara Salinas^{1*}, Orianne Constant¹, Caroline Desmetz², Jonathan Barthelemy¹, Jean-Marc Lemaître^{3,4}, Ollivier Milhavel^{3,4}, Nicolas Nagot¹, Vincent Foulongne^{1,5}, Florence E. Perrin⁶, Juan-Carlos Saiz⁷, Sylvie Lecollinet⁸, Philippe Van de Perre^{1,5}, Yannick Simonin^{1*}

West Nile virus



2018: West Nile virus in Duitsland



Import van exotische vectoren







Courtesy of Adolfo Ibáñez, CMV



Transmission of an arbovirus

Courtesy of Chantal Vogels &
Hans Smid – www.bugsinthepicture.com



Transmission of an arbovirus

Courtesy of Chantal Vogels &
Hans Smid – www.bugsinthepicture.com





RESEARCH ARTICLE

Transmission of Rift Valley fever virus from European-breed lambs to *Culex pipiens* mosquitoes

Rianka P. M. Vloet¹, Chantal B. F. Vogels², Constantianus J. M. Koenraad², Gorben P. Pijlman³, Martin Eiden⁴, Jose L. Gonzales⁵, Lucien J. M. van Keulen¹, Paul J. Wichgers Schreur¹, Jeroen Kortekaas^{1*}



RESEARCH ARTICLE

Vector competence of biting midges and mosquitoes for Shuni virus

Tim W. R. Möhlmann^{1*}, Judith Oymans^{2,3}, Paul J. Wichgers Schreur², Constantianus J. M. Koenraad¹, Jeroen Kortekaas^{2,3}, Chantal B. F. Vogels^{1a}

1 Laboratory of Entomology, Wageningen University & Research, Wageningen, The Netherlands, **2** Department of Virology, Wageningen Bioveterinary Research, Wageningen University & Research, Lelystad, The Netherlands, **3** Laboratory of Virology, Wageningen University & Research, Wageningen, The Netherlands

^a Current address: Department of Epidemiology of Microbial Diseases, Yale School of Public Health, New Haven, Connecticut, United States of America

* tim.mohlmann@wur.nl

Shuni virus (bunyavirus)

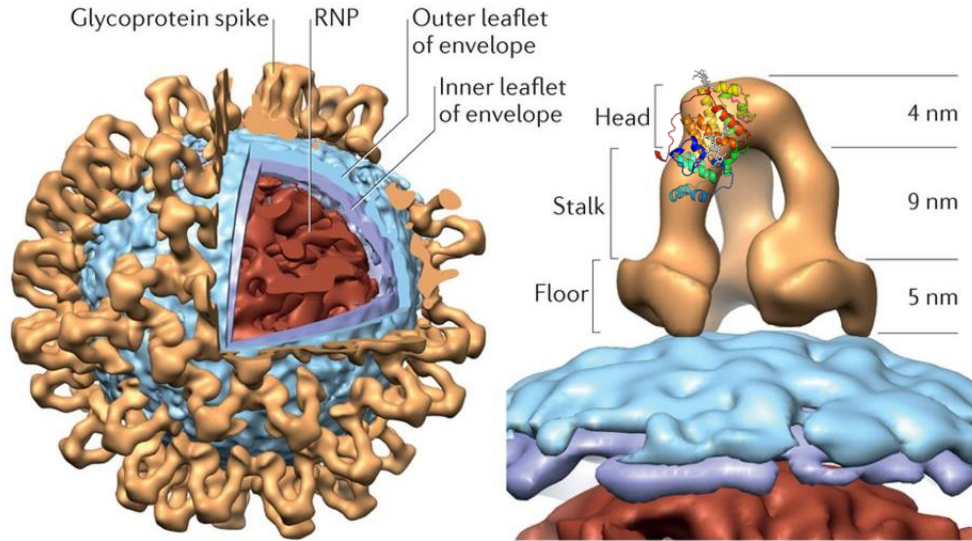
Antibodies against West Nile and Shuni Viruses in Veterinarians, South Africa



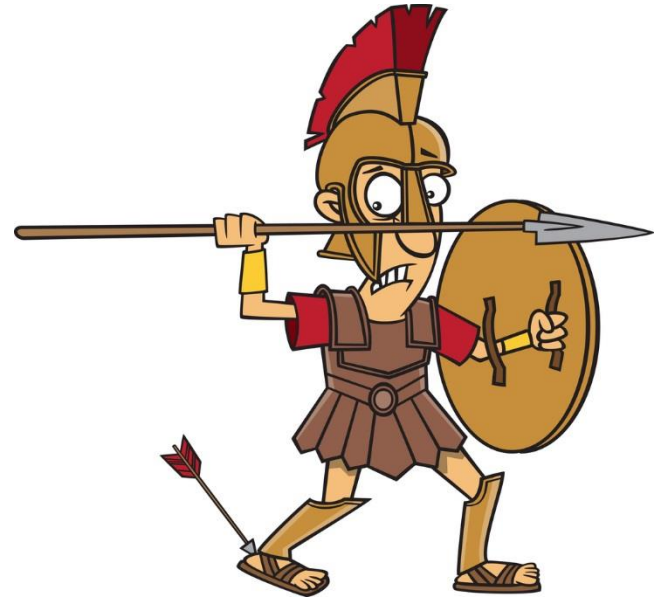


Zoonoses Anticipation and
Preparedness Initiative

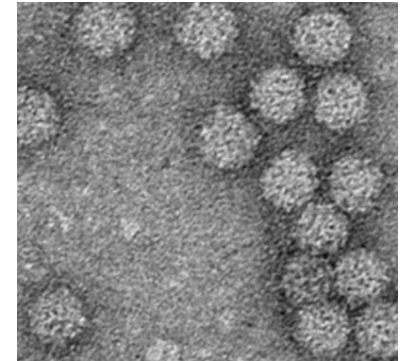
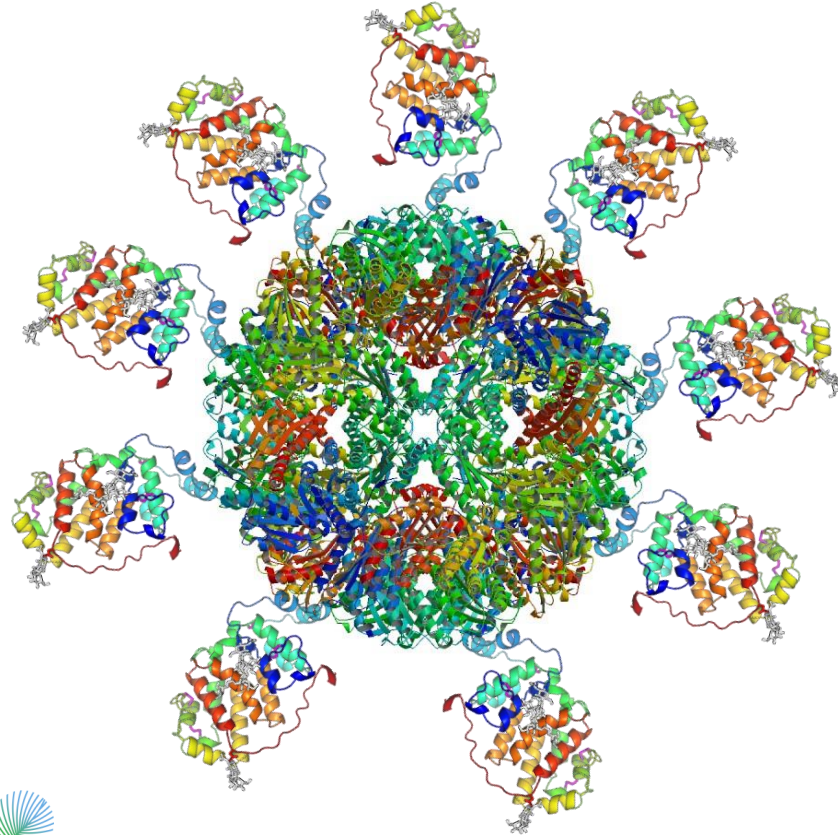
Op zoek naar de Achilles hiel van arbovirussen



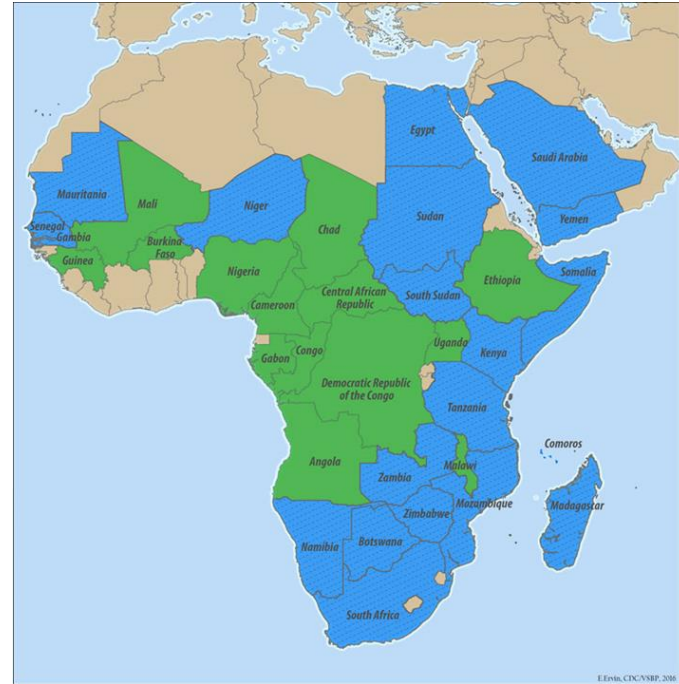
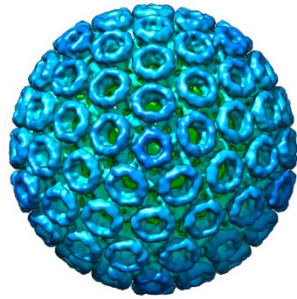
Nature Reviews | Microbiology



Vaccin platform technologie

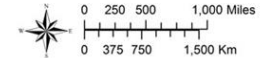


Rift Valley fever virus (RVFV, bunyavirus)



Rift Valley Fever Distribution Map

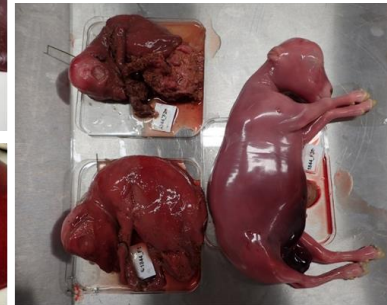
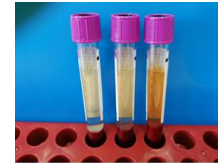
- Blue: Countries reporting endemic disease and substantial outbreaks of RVF
- Green: Countries reporting few cases, periodic isolation of virus, or serologic evidence of RVF infection
- Brown: RVF status unknown



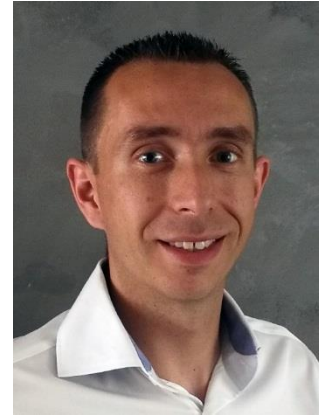
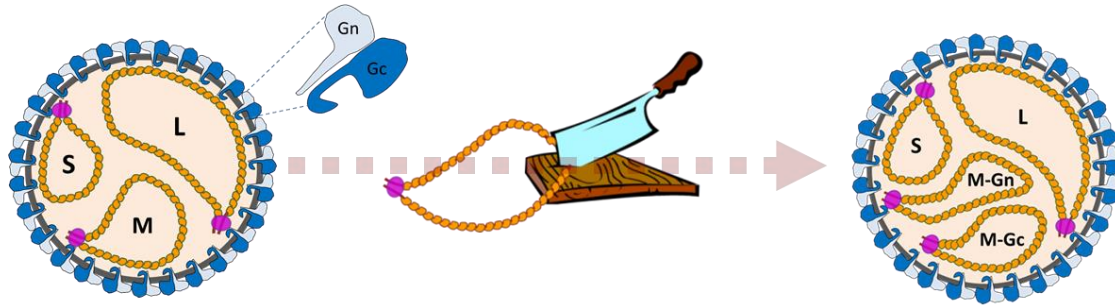
Source: CDC

Rift Valley fever

- Sterfte pasgeboren herkauwers (tot 100%)
- Abortus herkauwers (tot 100%)
- Sterfte volwassen dieren tot 40%
- Influenza-achtige ziekte in de mens
- ~1% humane gevallen ernstige complicaties
 - Encefalitis
 - Hemorrhagische koorts (fataal)



Een nieuw levend-verzwakt RVF vaccin



Paul Wichgers Schreur



Veiligheid



Wichgers Schreur
et al., Vaccine 2015

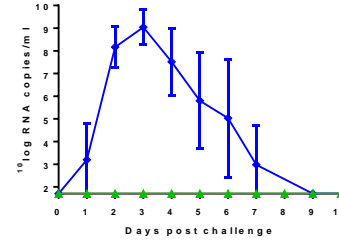
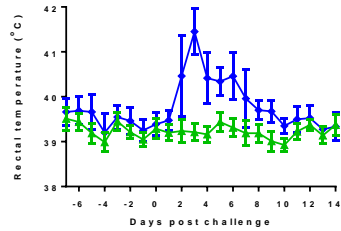


Wichgers Schreur
et al., Vaccine 2017

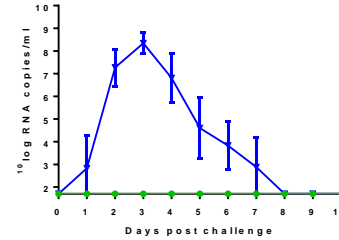
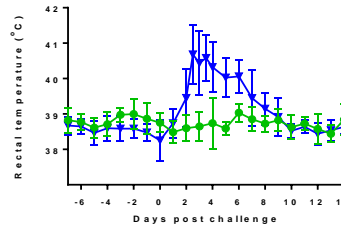


Wichgers Schreur
et al., *In prep*

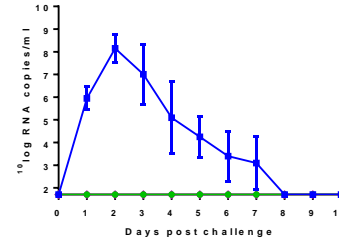
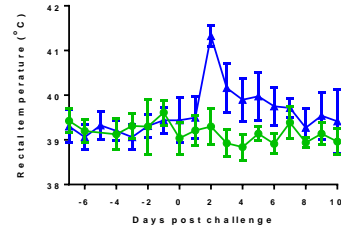
Volledige bescherming na één vaccinatie



Wichgers Schreur
et al., Vaccine 2015



Wichgers Schreur
et al., In prep



Ontwikkeling van een humaan vaccin

CEPI

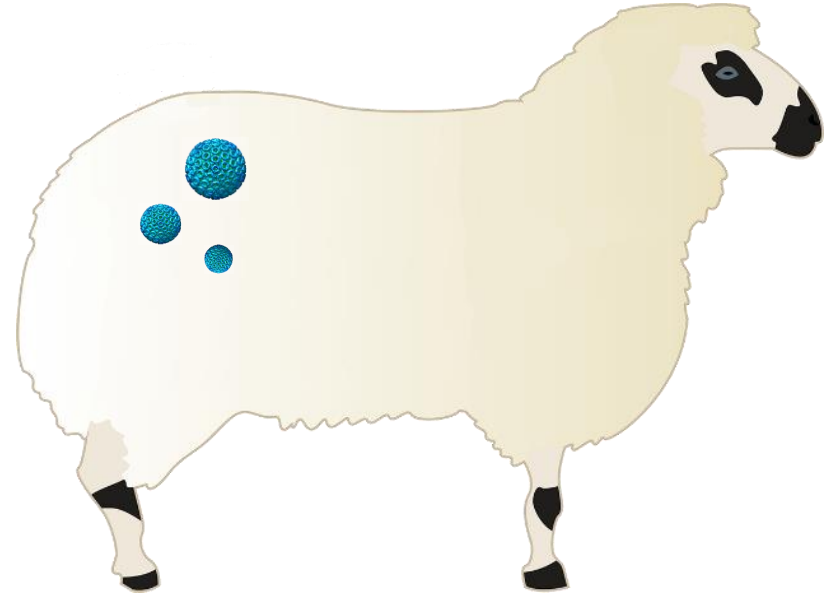
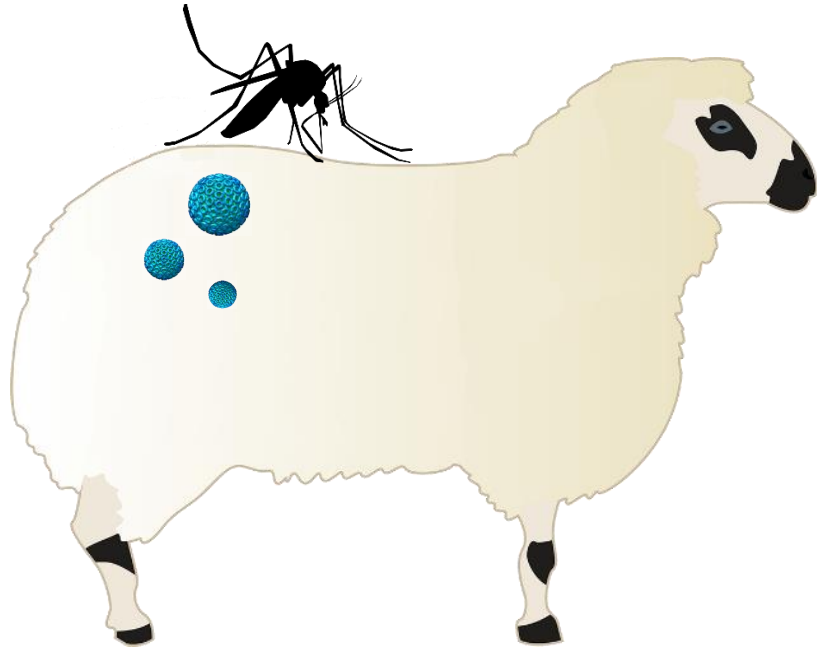
New vaccines for a safer world

Coming soon: CFP3

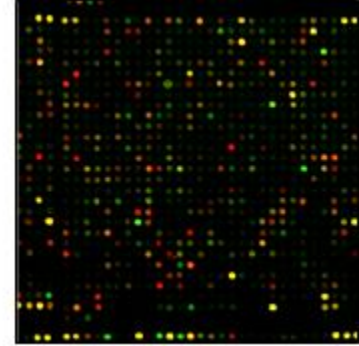
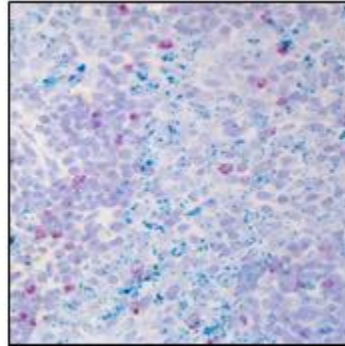
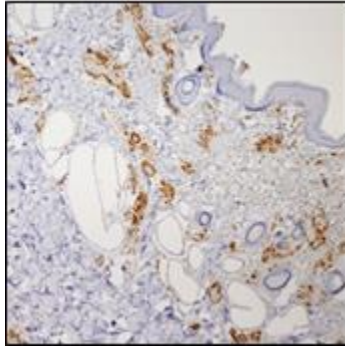
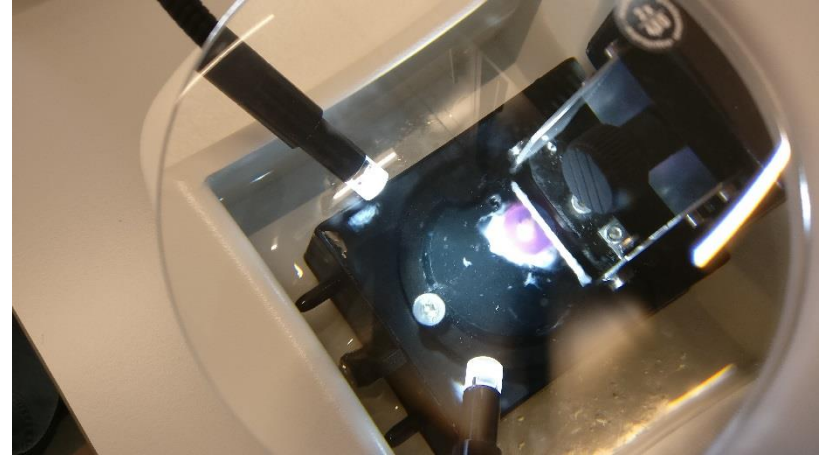
Development of human vaccine candidates against Chikungunya and Rift Valley Fever diseases

In early January, 2019, CEPI will issue its third call for proposals. This new call builds on the approach taken in CEPI's previous calls for Lassa fever, MERS-CoV, and Nipah vaccine candidates and for vaccine platform technologies. The call will focus on advancing human vaccine development against two additional pathogens: Rift Valley Fever virus and Chikungunya virus.

Innovatieve infectiemodellen



"Ex vivo" onderzoek

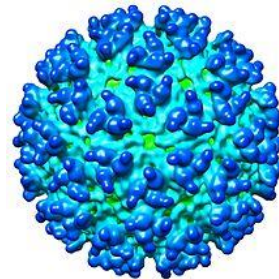
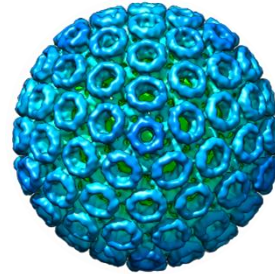


Take-home messages:

- Arbovirus uitbraken komen vaker voor en worden groter in omvang, gestimuleerd door klimaatverandering, globalisatie en toenemende populaties van mens en dier
- Voorbereiding vraagt innovaties in risk assessment en controlestrategieën!
- Partnerships:
 - Nationale initiatieven: Castellum, NCOH
 - Internationale initiatieven: CEPI, ZAPI, LEARN

Geprioriteerde insect-overdraagbare zönosen:

- Rift Valley fever virus
- Shuni virus
- West Nile virus
- Usutu
- Japanese encephalitis virus



Acknowledgements



Ministry of Economic Affairs