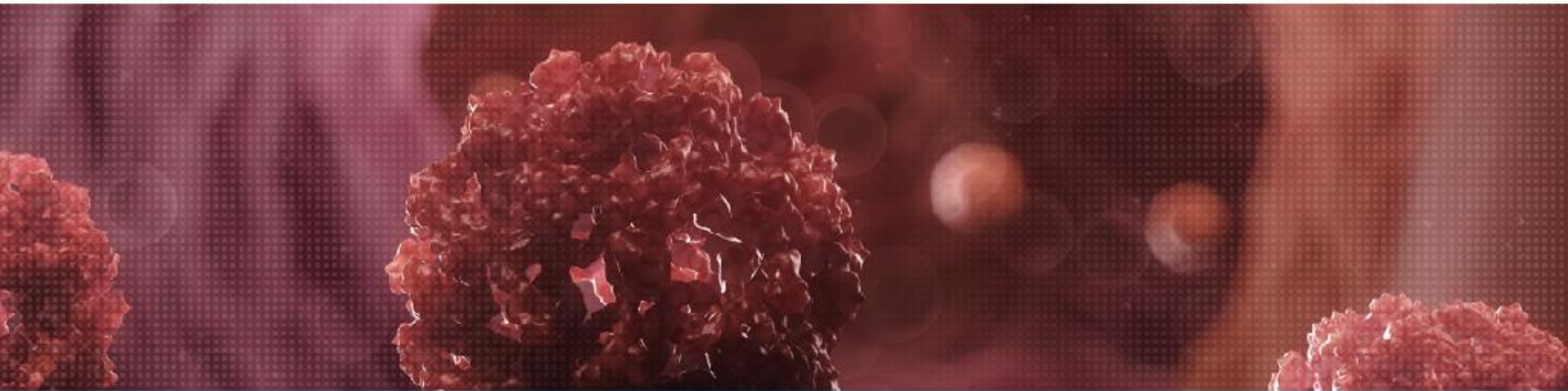


Erasmus MC



Viroscience lab

WHERE SKILLS MEET TO STUDY & PROTECT



The virologist as researcher

Thomas Langerak, PhD-candidate

Department of Viroscience, Erasmus MC, Rotterdam, the Netherlands

Zika virus epidemic 2015-2016



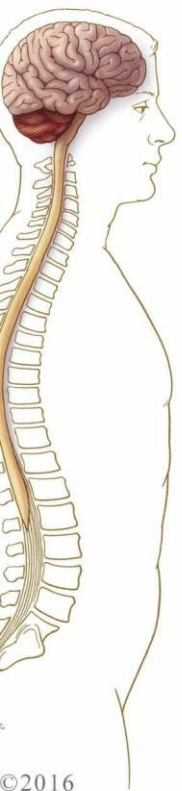
Zika virus infection symptoms



- \pm 80% asymptomatic
- Symptoms
 - Fever
 - Skin rash
 - Conjunctivitis
 - Arthralgia
 - Headache
- Incubation period: 3-5 days
- Symptoms last for 2-7 days



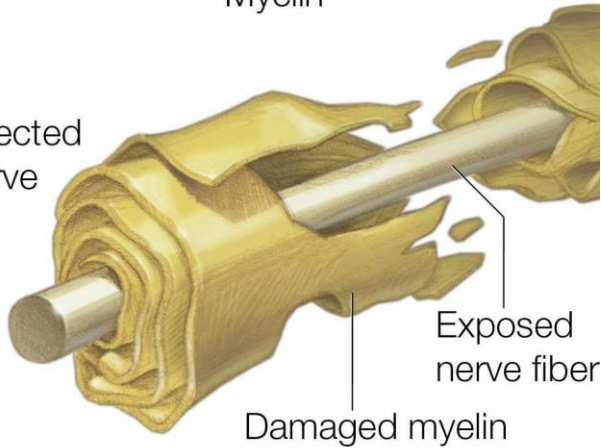
Complication Zika virus



Normal nerve



Affected nerve



Guillain-Barre Syndrome

©2016
MAYO

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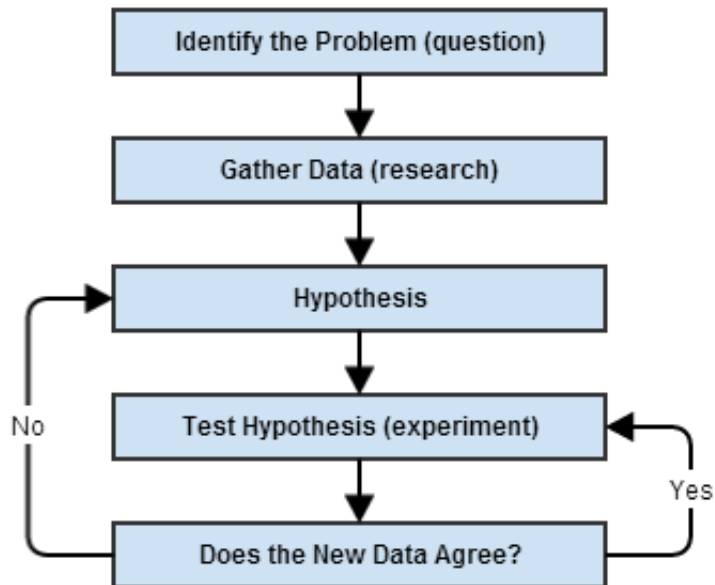


Zika virus anno 2021



- Little to no circulation of Zika virus worldwide
- Herd immunity? How long is this lasting?
- What if there would be a new Zika virus outbreak:
 - No vaccine is available
 - No medication is available
 - Many unanswered question and incompletely understood mechanisms of complications
- It remains important to study Zika virus

How to perform experimental research?



Problem + question

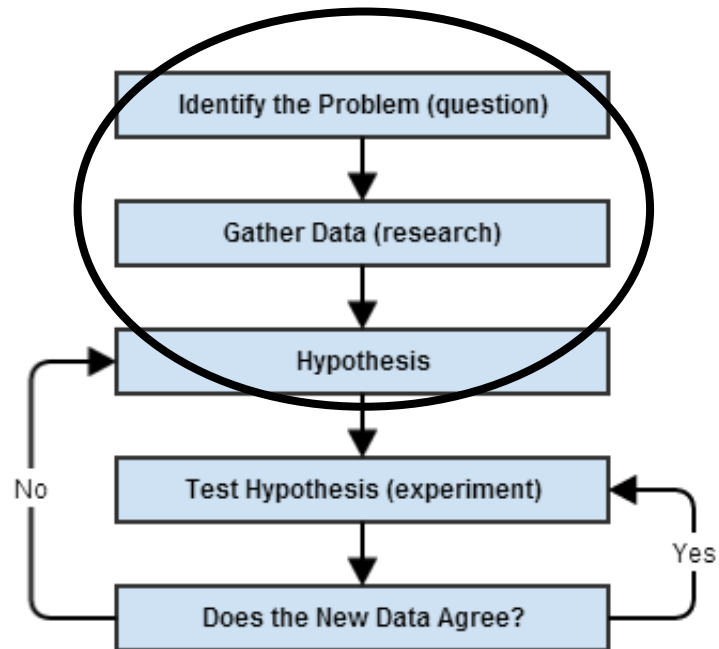


- Zika virus infection during pregnancy can lead to severe congenital malformations
- These malformations seem to be more prevalent in certain regions such as the north-east of Brazil → risk factor?
- Could presence of dengue virus antibodies be a risk factor?

Question + Hypothesis



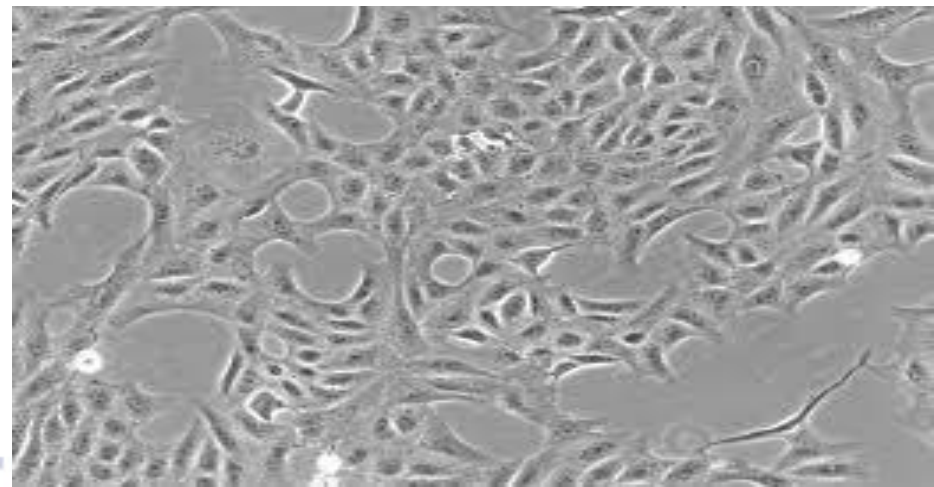
- **Research question:** What are risk factors for transmission of Zika virus from mother to child during pregnancy?
- **Hypothesis:** The presence of dengue virus antibodies can increase the chance of transmission of Zika virus from mother to child via antibody dependent enhancement (see blog @ Viruskenner.nl)



Experiment design

- *In vitro* experiment → outside the body (often using cells)
- *In vivo* experiment → inside of the body (often animal experiments)
- Clinical studies → with humans (e.g. vaccination studies)

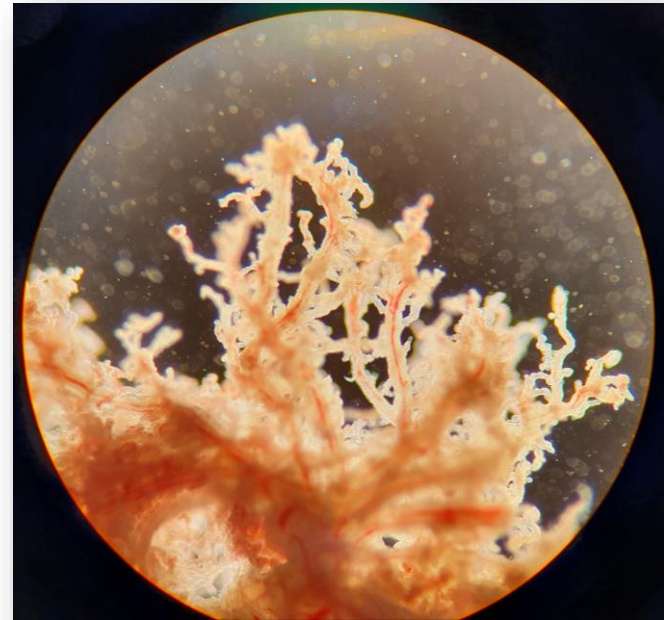
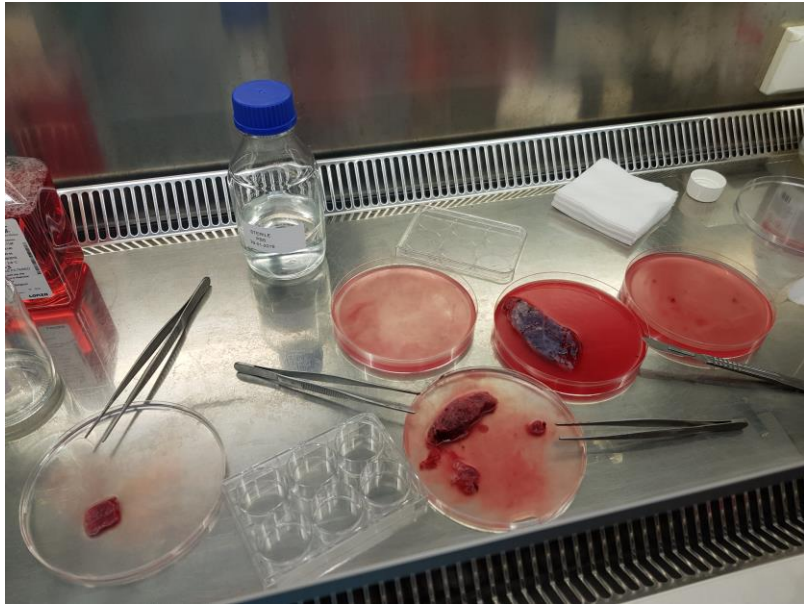
- Consider what is realistic, possible and sufficient to answer your research question



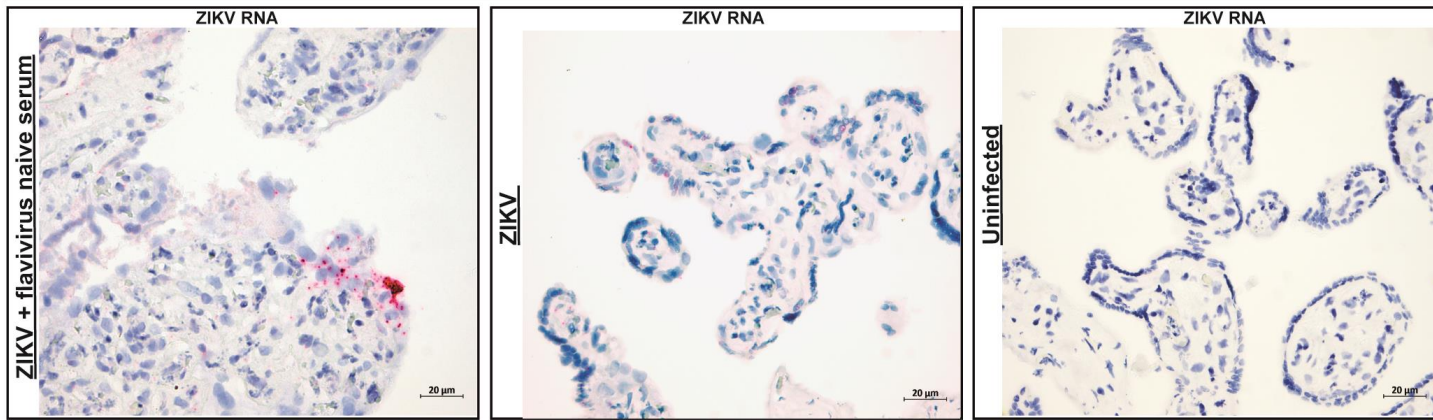
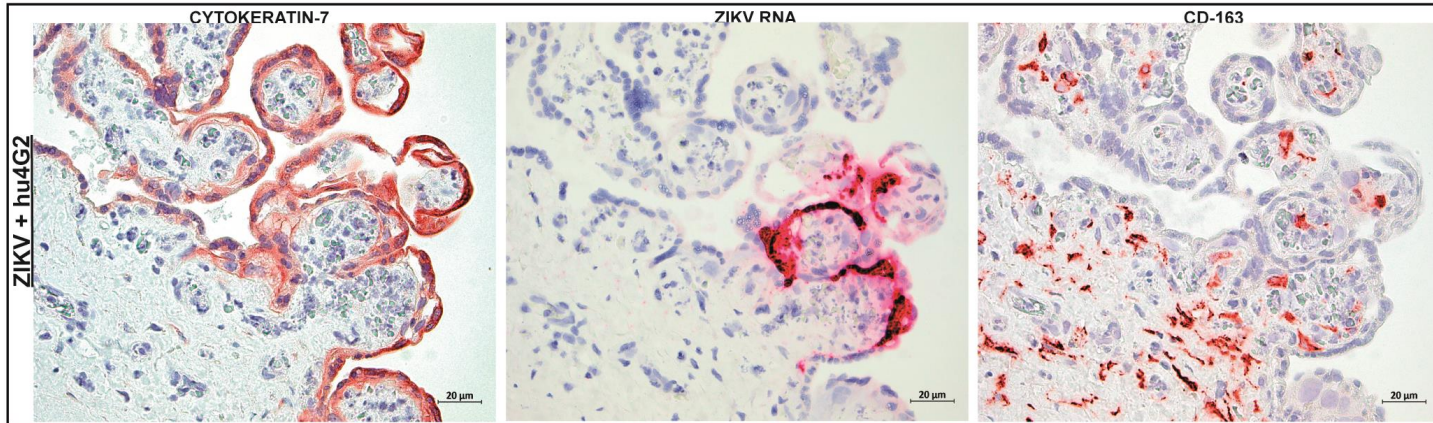
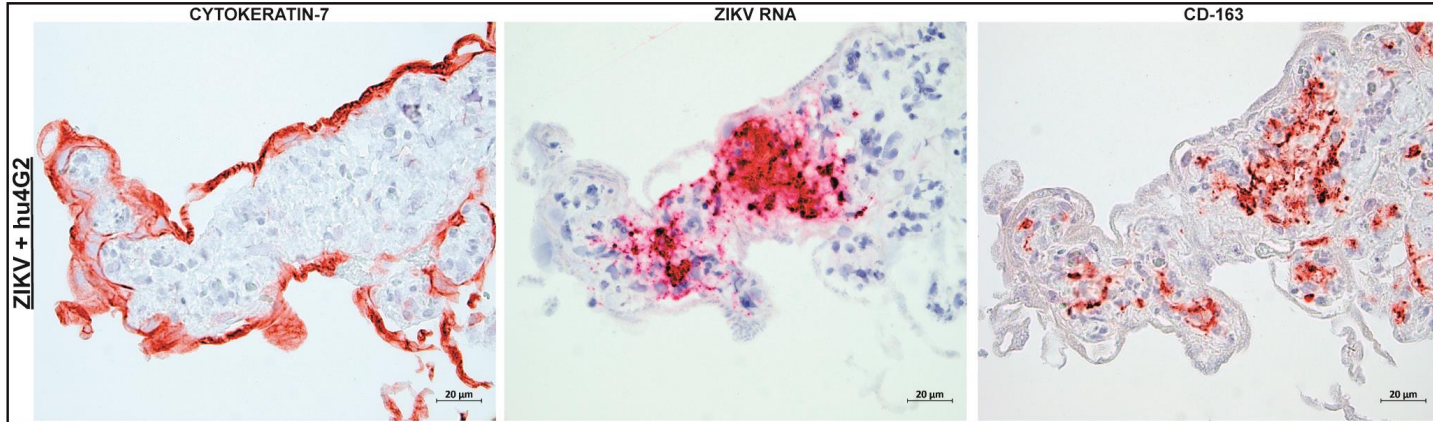
Ex vivo experiment: placenta explants

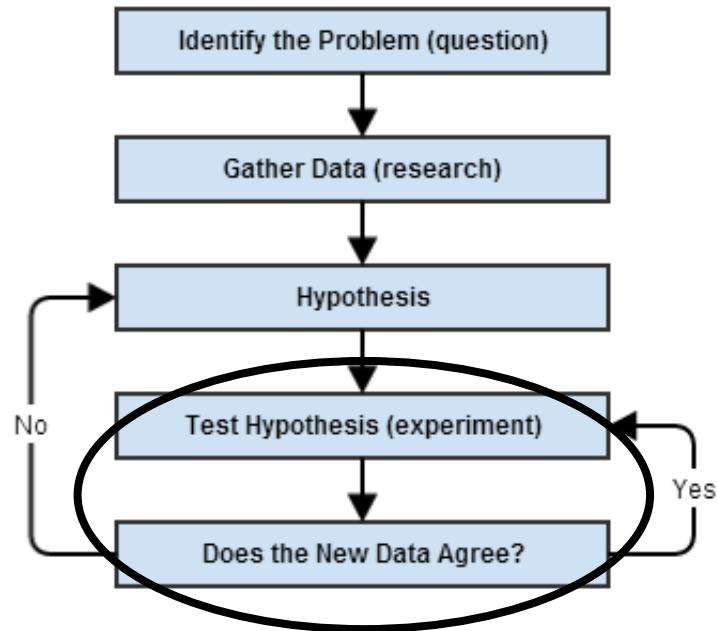


Ex vivo experiment: placenta explants



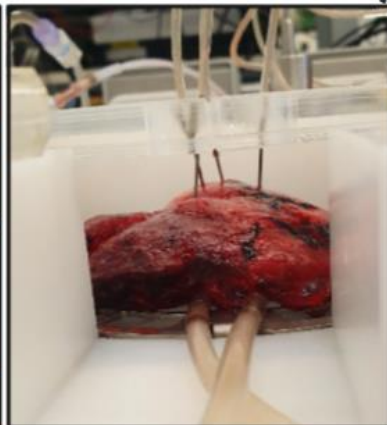
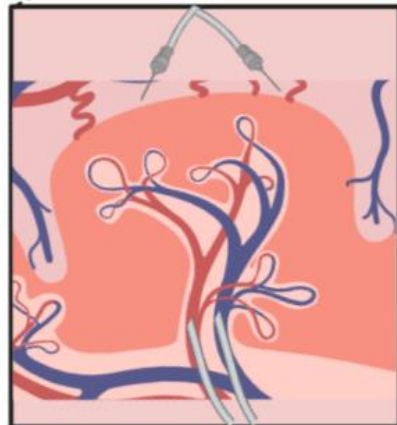
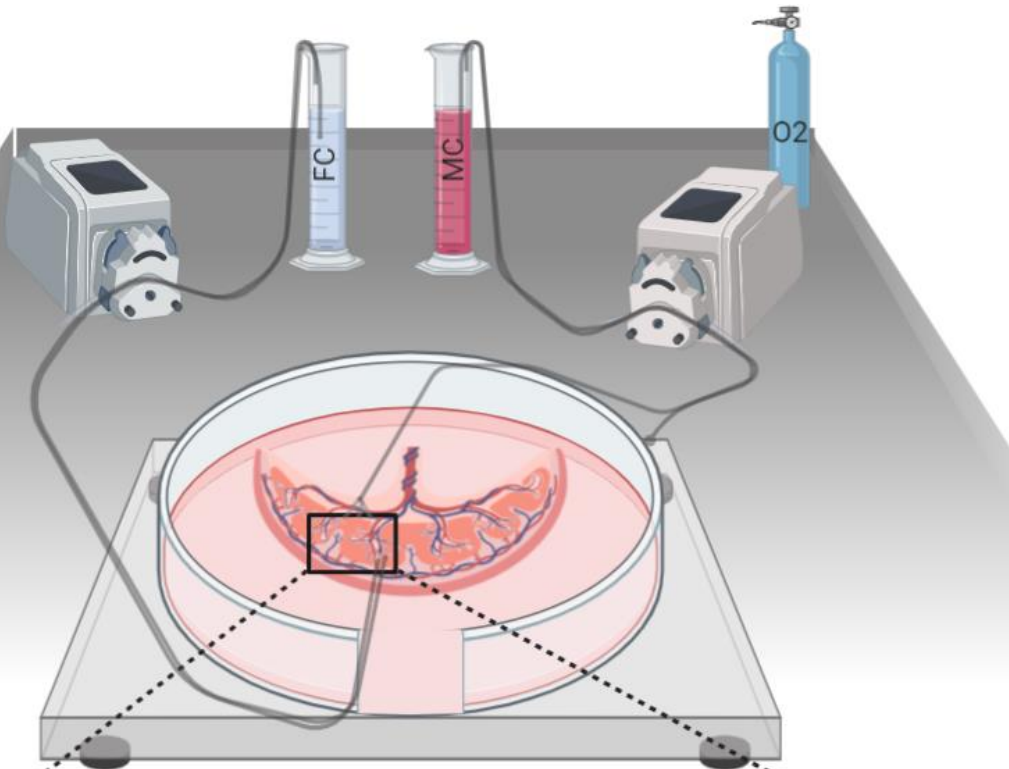
Staining for placental cells and Zika virus





Can we improve our experimental design to make the findings more representable?

Placenta perfusion model



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Take home messages

- Researching virus infection often remains important after an epidemic
- More knowledge of basal characteristics of viruses can aid to prevention or treatment against these viruses
- Important for doing experimental research with viruses is to use an experimental model/setting that is representative for the 'real life' situation

Questions?

