

# Philipps-Universität Marburg

## Institute of Virology

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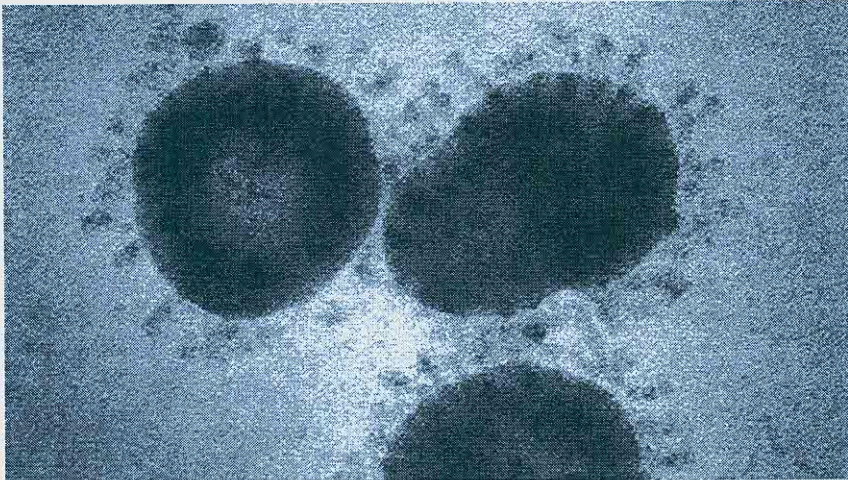
VĂN PHÒNG CHÍNH PHỦ
<b>CÔNG VĂN ĐẾN</b>
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The Institute of Virology at the University of Marburg is engaged in the research of viral infections, which are mainly characterized by the pathogen exchange between animals and humans. The Institute has one of the only two high-security laboratories in the Federal Republic of Germany to carry out work on dangerous viruses. Thus, there is a university competence center in Marburg, which is a unique selling proposition in diagnostics and research of highly infectious diseases both nationally and internationally. In addition to the tasks in teaching, the institute carries out virus diagnostic examinations for the University Hospital Gießen and Marburg (UKGM) and external consignors.

When emerging viruses cause severe diseases, the rapid development of vaccines and antivirals against these pathogens becomes critical. Some newly emerging viruses are very dangerous and necessitate the highest of biosafety levels for research and development purposes. DZIF scientists have a biosafety level (BSL) 4 laboratory at the Philipps-Universität Marburg's at their disposal where they can test the efficacy of emergency vaccines and immune responses to these vaccine candidates, amongst other things. Their findings form an important basis for further studies. The Marburg researchers have been involved in clinical trial testing of vaccines against the Ebola virus and the MERS coronavirus.

Jan 28 2020  
Interview

## Coronavirus research is being carried out at top speed



Coronaviruses (colored transmission electron microscopy image).

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**The first suspected case in Germany has been confirmed. Professor Stephan Becker, virologist at the University of Marburg and coordinator of the DZIF (German Center for Infection Research (DZIF) research area “Emerging Infections” reports on the research work into the 2019-nCoV coronavirus which is underway at the DZIF.**

*People are worried. Could the coronavirus spread in Germany in the same way as it is spreading in China at the moment?*

Professor Becker: We are quite well prepared for outbreaks such as the current coronavirus outbreak. We have already been able to implement a standard diagnostic test to reliably test for the novel coronavirus in patient materials. This enables rapid quarantine measures and treatment of patients in isolation units which can restrict the further spreading of the virus. This test was developed by DZIF scientists at Charité Berlin shortly after the outbreak in China. It enables a differential diagnosis to distinguish patients with coronavirus infection from flu cases. Since flu causes similar symptoms as the novel corona virus, such differentiation is important.

*With flu, patients can get a vaccine and thus protect themselves from it. Is a vaccine in sight for coronavirus?*

Professor Becker: We are currently working on a vaccine for the new coronavirus at the DZIF. As a result of the research that has been carried out on a MERS vaccine, also a coronavirus, we have a good basis for this work. Nevertheless, developing a

# Justus Liebig University Gießen

## Medical Virology

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Current research activities focus on the biology, evolution and pathogenesis of nidoviruses (corona-, toro-, arteri-, mesoni- and roniviruses). The main goal of our studies is to obtain a comprehensive understanding of the factors and molecular mechanisms involved in nidoviral RNA synthesis, gene expression and pathogenesis in specific hosts. Information derived from these studies is used to develop new prophylactic and therapeutic strategies to combat respiratory, gastrointestinal and/or systemic infections caused by human and animal nidoviruses. We are particularly interested in the functional and structural characterisation of the nidoviral replication complex and its main functional subunits, such as RNA polymerases, endo- and exoribonucleases, proteases, helicases, methyltransferases, RNA-binding proteins as well as viral factors that inhibit or obviate host antiviral responses. Over the past few years, a number of enzymatic activities and complex regulatory mechanisms have been identified that are unique to this group of viruses. Some of these factors appear to be required for the replication and maintenance of the exceptionally large RNA genomes of corona- and related viruses (30 kb) and have been suggested to keep the error rate of the viral RNA-dependent RNA polymerase at a relatively low level compared to most other RNA viruses.

## Press Release

Justus Liebig University Giessen

No. 27 - 12 February 2020

### **New" coronavirus belongs to the same species as the SARS coronavirus**

Study with participation of the Giessen Institute of Medical Virology confirms close genetic relationship - Official designation as SARS coronavirus 2, however, does not allow any statement on the virulence of the virus and the clinical course of infections

The coronavirus responsible for the current epidemic of respiratory diseases belongs on a taxonomic level to the same virus species as the causative agent of the SARS outbreak in 2002/2003: Severe acute respiratory syndrome-related coronavirus. This is confirmed by sequence analyses in which Prof. Dr. John Ziebuhr from the Institute of Medical Virology at the Justus Liebig University of Gießen (JLU) was involved. Due to the close phylogenetic relationship to the other viruses of this species, the "new" virus is now officially assigned to this species and named "severe acute respiratory syndrome coronavirus 2" (short: SARS coronavirus 2, SARS-CoV-2). Prof. Ziebuhr has been head of the Coronaviridae Study Group of the International Committee for the Taxonomy of Viruses (ICTV) since 2014, which is responsible for the analysis and taxonomic classification of all newly discovered coronaviruses.

"It is extremely important to stress that the genetic similarity of the two viruses - i.e. the SARS coronavirus from 2003 and the SARS coronavirus 2 now circulating - in no way allows the conclusion to be drawn that the two viruses behave in a comparable or even identical manner when infected in humans," emphasises Prof. Ziebuhr. "The clinical course of SARS-CoV-2 infections, the transmissibility of the virus and the virulence properties may even differ considerably. The close genetic relationship therefore says nothing about the actual exposure to the virus".

On 11 February 2020, the World Health Organisation (WHO) announced that the disease caused by SARS-CoV-2 has been given the name COVID-19. Within only two decades, SARS-CoV-2 has once again transmitted a SARS-CoV-like virus to humans. This supports the assumption that certain variants of this species are particularly capable of spreading from their natural hosts in different bat species to humans - possibly with the involvement of previously unknown intermediate hosts - and subsequently from human to human. "Future research activities should therefore not be restricted to individual viruses that are pathogenic for humans, but should focus on the entire virus species, including its numerous variants in various other host animals," said Prof. Ziebuhr describing another conclusion that the scientists draw from their study. The species Severe acute respiratory syndrome-related coronavirus also includes a large number of other mammalian coronaviruses such as bats.

A manuscript describing the sequence analysis and the scientific basis for the classification of the "new" coronavirus is currently being prepared for publication by a

