

*Dear TUM friends and associates,*

**We are exposed to viruses and bacteria every day, usually without even realizing it. The human immune system is sufficiently robust to repel most attacks before we notice any adverse effects.**

Regional outbreaks of viruses such as COVID-19 are a common occurrence, yet no virus has ever dealt us such a severe blow. It is against this backdrop that we have produced this issue of *Faszination Forschung*, dedicated to virology and infection control. Although the field of medicine takes a prominent role, I am sure you will be surprised by the other angles and research approaches that TUM scientists have adopted in their efforts to investigate these topic areas.

TUM virologist Prof. Ulrike Protzer has been researching the hepatitis B virus for years. The virus can lead to a chronic, incurable infection. While newborn babies in Germany are vaccinated against hepatitis B, in many parts of the world, this is simply not possible. Consequently, Protzer is developing a therapeutic vaccination that aims to cure people already infected with the virus.

Prof. Andreas Pichlmair is investigating viruses at the molecular level. His interest lies in identifying which proteins are required for a virus to interact with human host cells. Pichlmair is also analyzing whether newly discovered biologically relevant signal pathways also come into play in other diseases for which effective medications already exist. If so, this could significantly accelerate the development of new therapeutic compounds.

If the immune system is unable to get a handle on infections or tumors, it switches into a lower functional state. Prof. Dietmar Zehn has identified the TOX protein as the molecular circuit breaker that causes the immune system to switch between active and reduced functional states. The ability to systematically reactivate exhausted immune cells would pave the way for new treatment approaches for both chronic infections and tumors.

Viruses require host cells in order to reproduce – something Dr. Jennifer Altomonte hopes to exploit in order to turn viruses into a weapon against cancer. Her team has produced a hybrid virus in the lab that multiplies in tumor cells and destroys them.

Unlike viruses, bacterial infectious diseases can be treated effectively with antibiotics. Bacteria, however, are increasingly developing resistances against such substances. Chemical



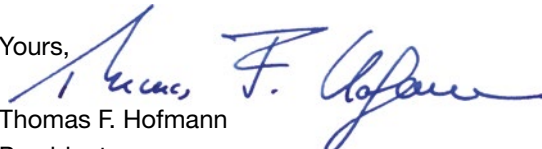
scientist Prof. Stephan A. Sieber has discovered a substance capable of combating dangerous multiresistant germs. A team of students has also taken up the fight against multi-resistant germs. They have developed a new method by which to produce bacteriophages – viruses that attack and kill bacteria. The concept won several awards at the international 2018 iGEM Competition. Today, the team hopes to bring their production process to market by founding a company.

Prof. Clarissa Prazeres da Costa conducts research into infectious diseases that are almost unheard of in affluent, industrial nations. Worm infections lead to digestive problems, anemia, and severe growth and development disorders in children. The parasites release molecules that actively inhibit the immune response in order to keep their host alive for as long as possible. Exactly how this mechanism works is the question Prof. da Costa is striving to answer.

Prof. Alena Buyx emphasizes the importance of listening to voices other than virologists and epidemiologists during a viral pandemic. In her work, the medical ethicist has observed that people are prepared to act in solidarity with others in times of crisis.

This new issue of *Faszination Forschung* is an emphatic reminder that, through their basic research, scientists and researchers at TUM are making outstanding contributions to the health and wellbeing of all humanity.

Yours,

  
Thomas F. Hofmann  
President