

Viruses can also take hold in the body. In some people, for example, hepatitis virus infections become chronic, with viruses persisting in the liver. To help, the RESIST team is investigating how the immune system can be stimulated to eliminate hepatitis B viruses. The team is also developing a hepatitis C vaccine and exploring how the hepatitis D virus manages to bypass the immune system.

The RESIST team is also looking for ways to protect people from the consequences of chronic infection with herpes viruses. In susceptible people, these viruses can trigger serious skin diseases such as shingles, damage the nervous system and cause cancers. In addition, they can be life-threatening for unborn children during pregnancy.

Adenoviruses, which can trigger dangerous diseases of the respiratory tract, the gastrointestinal tract and the eye, are also a focus of RESIST. Here, the researchers are looking for new inhibitors.

“ At the heart of RESIST are the patients. We want to help them more effectively – by closely integrating cutting-edge basic research and clinical science. ”

RESIST Spokesperson: Professor Dr Thomas Schulz

#### Contact

RESIST Cluster of Excellence  
Hannover Medical School  
Carl-Neuberg-Strasse 1, 30625 Hannover, Germany  
Telephone: +49 511 532 4107  
E-mail: [RESIST@mh-hannover.de](mailto:RESIST@mh-hannover.de)  
[www.RESIST-cluster.de](http://www.RESIST-cluster.de)

#### RESIST institutions:



#### RESIST collaborating partners:



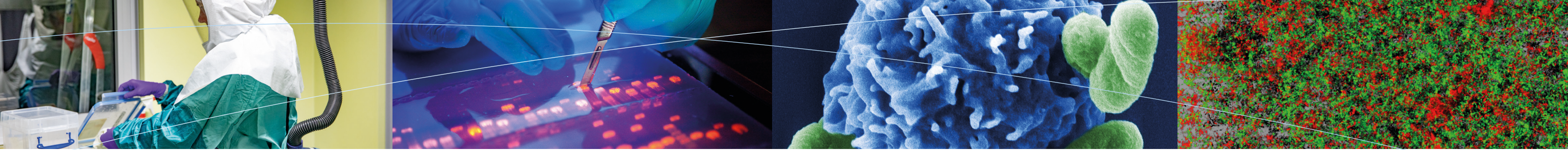
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# RESIST

Research to help  
the most vulnerable







## Excellent science for people who are particularly susceptible to infections

Some people only become mildly ill when they catch viral or bacterial infections, but others are affected much more severely. Why do infections progress so differently and how can individual therapies be developed? These are the questions the team of the RESIST Cluster of Excellence is addressing.

People who are particularly susceptible to infections include newborns, seniors and people with a weakened immune system. The Corona pandemic has clearly shown how important it is to understand differing susceptibility to infections better, in order to protect individuals as much as possible. RESIST research, therefore, also revolves around SARS-CoV-2.

RESIST receives around 32 million euros of funding from the German Research Foundation (DFG) as part of the Excellence Strategy of the federal and state governments. The Cluster is made up of more than 50 interdisciplinary teams, combining clinical and scientific research in a unique way. Within the framework of RESIST, seven new professorships have also been created.

## What part do genes play?

What role does the human genome play in susceptibility to infection? How does it influence the reproduction of viruses and defense against them? These are the questions the RESIST team is investigating – so that we can better predict how severe an infection might be in each individual affected person and thus conclude which therapy is best for them. In addition, people who are at a particular risk of infection should be able to be protected at an early stage – for example through vaccination.

This can be important for survival, for example, in the case of the cold virus RSV, which can cause severe respiratory infections in small children. The chickenpox virus and other herpes viruses can also cause serious illnesses.

RESIST also investigates the genetic causes of severe congenital immunodeficiencies as well as the question of what role the immune system plays in susceptibility to infection.

## What part does the immune system play?

The RESIST team is investigating the extent to which susceptibility to infections is due to the immune system and what possibilities this opens up for prevention as well as therapy.

In the case of premature babies, the focus is on the interaction with the developing microbiome – i.e. the totality of all microorganisms that settle in the body. This is because these “train” the immune system and could possibly be used therapeutically after birth to promote immune maturation and thus prevent life-threatening diseases.

In older people, the RESIST team focuses, among other things, on flu viruses and chickenpox viruses, which can cause shingles. With them, the topic of vaccinations is also a focus of interest, as it is still unclear why these often do not work in advanced age.

## How do bacteria and viruses manage to remain in the body?

Some disease-causing bacteria or viruses can literally colonise the human body. They live permanently in the lungs, in the liver or on implants, for example. Such chronic infections are a major problem.

For example, in the lungs of people suffering from cystic fibrosis microbial communities (biofilms) form, in which disease-causing bacteria are protected from the immune system and the action of antibiotics. Implants can also be colonised by biofilms.

But how can the bacteria living in biofilms survive and why are they so resistant to therapeutics? The RESIST team is investigating these questions by examining the underlying mechanisms. The aim is to predict the severity of an infection and antibiotic tolerance, and to develop new drugs. RESIST is also investigating the extent to which the bacteria's genes influence the course of the disease.