



Leopoldina  
Nationale Akademie  
der Wissenschaften

# Leopoldina news

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German National Academy of Sciences

Halle, 8 June 2015



## G7 academies advise the summit

Statements on the Future of the Oceans, Neglected Tropical Diseases and Antimicrobial Resistance are handed to Chancellor Angela Merkel

POLICY ADVICE

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Statement on plant genetic engineering  
Leopoldina warns against imposing cultivation ban

INTERNATIONAL

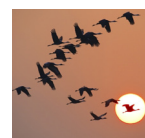
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# Editorial

Dear members and friends  
of the Leopoldina,



Plant genetic engineering is a highly controversial topic in Germany. Fears about the potentially harmful effects of genetically modified plants on our health and our environment have led to a de facto halt in cultivation. Researchers in Germany can no longer carry out the field trials that are so important for research. Germany is currently discussing whether it should apply a national cultivation ban or allow each state to decide its own regulations.

At the same time, new molecular methods are bringing a new dimension to the discussion. Methods such as the CRISPR-Cas technique make it possible to modify genes in a highly targeted way, without leaving any traces of so-called "gene ferries" in the genetic material of the modified organism. As a result, cultivars produced in this way cannot be distinguished from crops produced from conventional breeding.

In light of this situation, the Leopoldina, acatech, and the Union of the German Academies have published a statement on plant genetic engineering (see page 3). In it, they speak out against a blanket ban on genetically modified plants. I hope that this statement will contribute towards making the debate about plant genetic engineering more objective. We must, of course, take consumers' worries very seriously, and respecting their needs will require the introduction of extensive labelling requirements. We do not intend to tell consumers what to think and how to act. Instead, our continuing goal is to offer scientifically founded advice that can persuade society of the usefulness and the necessity of research in this area.

We wish you a thought-provoking read!

*Jörg Hacker*



The „G7-Dialogue Forum - Science Conference“ at the Allianz Forum building on Berlin's Pariser Platz.

photo: Christof Rieken

## Impact on our daily lives

### G7 Dialogue Forum: Lively debates at the Science Conference on the topics addressed in the G7 academies' statements

Advising the G7 heads of state and government is one of the core functions of the Leopoldina's international policy advice. In collaboration with the national science academies of the G7 countries, it identifies the science-related topics that relate to the G7 summit agenda but expand the political focus. In 2015, the Leopoldina was responsible for coordinating the discussions and drafting the recommendations. Three action-oriented statements on the future of the oceans, neglected and poverty-related diseases, and antimicrobial resistance were drafted in coordination with policymakers and scientists.

As the German National Academy of Sciences, the Leopoldina was also asked to make the voice of science heard in the dialogue with civil society that Federal Chancellor Angela Merkel initiated as part of Germany's G7 presidency. In the "G7 Dialogue Forum – Science Conference" in late April, scientists presented their views on the topics addressed in the statements. Experts from India, Kenya, Russia, the Netherlands and Switzerland provided an international perspective that extended beyond the G7 framework. The lively debate between the speakers and audience members, which included numerous NGO representatives, illustrated the relevan-

ce of the three topics in question and the high level of interest generated. This was not only the case for antibiotic resistance, which is becoming a major topic of discussion among society; it became clear that rising acidity levels and temperatures of the oceans and neglected tropical diseases are also having a direct impact on our daily lives.

At the start of the conference, Leopoldina President Prof. Jörg Hacker passed on the national academies' recommendations to Chancellor Merkel. She explained the extent to which policymakers rely on scientific input, and how it is incorporated into the G7 political process. The academies' recommendations came at the right time, she said. In the closing panel, the scientific perspective was broadened to include politics and industry: Dr Georg Schütte, State Secretary at the Federal Ministry of Education and Research, explained how the recommendations are being adopted by the government, and Prof. Andreas Barner, Stifterverband President and chairman of the board of managing directors at Boehringer Ingelheim, shed light on the potential synergies between public and industrial research. (mkk/rn)

■ INFORMATION ON G7 ACADEMIES



*Cultivars created using molecular breeding methods cannot be distinguished from crops produced from conventional breeding.*

photo: cw

## Helping shape plant genetic engineering in Germany

Statement by academies warns against imposing cultivation ban on genetically modified plants

The cultivation of genetically modified plants has been increasing steadily since the mid-1990s. These plants differ from the original cultivars in that genes have either been deliberately introduced into them, or their existing genes have been deliberately modified. The changes might be made in order to increase the nutritional value of the plant products or to make the plants more resistant. Genetically modified organisms (GMOs) were grown on 13 percent of the world's farmland last year. Scientific studies show that GMOs can increase yields, boost income for farmers, and reduce the use of insecticides.

In a statement published on 26 March, the German National Academy of Sciences Leopoldina, acatech – the National Academy of Science and Engineering, and the Union of the German Academies of Sciences and Humanities recommend that future risk assessments of new cultivars should be primarily based on the specific characteristics of the plants rather than on the process that produced them. The academies speak out against scientifically unfounded blanket bans on growing GMOs and strongly recommend case-by-case scientific evaluations.

The statement comes in response to

the global trend towards increased cultivation of GMOs, which contrasts with the political and legal situation in Germany, where field trials and commercial cultivation of genetically modified crops are no longer taking place. Since April 2015, the EU has allowed its member states to decide for themselves whether to introduce national cultivation bans or limits on GMOs. Germany is currently discussing whether it should apply a national ban or allow each state to decide for itself.

It is, however, questionable whether the regulations under European law and the German Genetic Engineering Act (GenTG), which are linked to specific types of genetic modification, are still appropriate. A number of new molecular methods, such as the CRISPR-Cas technique, mean that it is now possible to modify genes in a highly targeted way. The cultivars created using molecular breeding methods cannot always be distinguished – either genetically or on the basis of their new characteristics – from crops produced from conventional breeding. Similar plants can also be produced using standard breeding methods, but the process is much less efficient and takes much longer.

This lack of scope for differentiation

shows that the GenTG's process-specific approach to regulation is inappropriate. A regulation that primarily aims to ensure organisms are safe for the environment and for health should focus on the characteristics of those organisms and not on the breeding processes that produced them.

Germany plays a leading role in biological safety research. Field trials are crucial to this work. The academies believe that the situation in Germany poses an acute threat to freedom of research and general freedom of action, and thus to the potential that research into genetically engineered crop plants might bring. They say the bans currently being considered will make this field of research unattractive to scientists in Germany, causing them to move abroad and the country to lose an entire research segment that is key to its industrial development. Furthermore, German researchers will be excluded from international research programmes into novel molecular genetic breeding methods and thus lose the opportunity to help ensure these technologies are used responsibly in the future. (jf)

■ THE PAPER CAN BE FOUND HERE

## Fourth “dive” focuses on infection research

New seminar programme for journalists ranges from measles to Ebola via antibiotic resistance

The measles outbreak in Germany, the Ebola epidemic in West Africa, global flu pandemics – these issues continue to re-surface in the media time and again. And the greater the spread of an infectious pathogen, the greater the media interest. Journalists are no longer asking simply about vaccines, symptoms and numbers of cases. Instead, they are asking complex questions about pathogenic viruses and bacteria, healthcare, WHO regulations, serum production and climate change. This shift in perspective means that topics that are usually discussed in the science pages are now entering areas such as business, politics and local affairs, thereby reaching journalists who are not experts on infectious diseases, infection research and clinical infectiology.

The fourth seminar programme for journalists organised by the Robert Bosch Stiftung and the Leopoldina addresses the issue of “Infectious diseases – What biomedicine is researching and what it is achieving”. From November, 15 selected journalists working in areas unrelated to science and research will be taking part in the “Diving into Science” seminar pro-



*The third seminar programme for journalists is currently underway. In one of the seminars, the participants were given the opportunity to view the plant gene bank at the Leibniz Institute of Plant Genetics and Crop Plant Research in Gatersleben.*

photo: Markus Scholz

gramme. Over a period of two years, they will attend four seminars, where they will get to familiarise themselves with the latest trends in infection research, epidemiology and biomedicine. The seminars take place at renowned scientific institutions, including the Robert Koch Institute and the Institut Pasteur, whe-

re participants will gain unique insights into research activities, meet leading scientists, forge contacts, promote research, and discuss science journalism methods. The Leopoldina’s expertise is proving particularly useful in putting together the event programme. (dw)

## Progress in dementia research

German-Israeli symposium on the latest findings in neuroscience

More and more people are facing neurodegenerative conditions such as Alzheimer’s disease and other forms of dementia. Public awareness of these conditions is increasing, particularly in countries with high life expectancies such as Germany and Israel. For patients and their families, hope now rests on advances in scientific research and the development of new drugs. The Israel Academy of Sciences and Humanities and the Leopoldina organised the “Advances in Research on Neurodegenerative Disease with a Focus on Dementias” symposium, which took place on 4 and 5 May in Halle (Saale), with a view to sharing German and Israeli research findings. This was the fourth inter-academy symposium on neurosciences. This year, it was held to mark 50 years of diploma-

tic relations between Germany and Israel. The participants discussed the latest neuroscience research findings on the treatment of Alzheimer’s disease and other dementias. They addressed a number of scientific issues in the areas of pathology – such as differential diagnoses and biomarkers – molecular biology and genetics. Strategies for treating neurodegenerative diseases were also discussed in the lectures. Around 50 scientists from Israel and Germany took part in the interdisciplinary event, which was coordinated by Prof. Peter Riederer ML and Prof. Yadin Dudai. Twenty young scientists from the two countries had the opportunity to present their research activities in poster sessions and to discuss issues with the symposium participants.



*Researchers from Israel and Germany met in Halle to present and discuss the latest research findings on dementia.*

photo: Markus Scholz

The German Neuroscience Society and the Fritz Thyssen Foundation provided financial support for the event. The next inter-academy symposium on neurosciences will take place in Israel in 2016. (jn)

# Animals as our eyes and ears

## Presentation on animal telemetry opens symposium held by Class II – Life Sciences

Can animals help us predict the weather, the spread of diseases or even volcanic eruptions? In a presentation on the eve of the Class II (Life Sciences) symposium, Prof. Martin Wikelski ML of the Max Planck Institute for Ornithology in Radolfzell talked about the potential of using telemetry to monitor animals.

Nowadays, sensors can be attached to almost any animal – from bees right up to elephants and sharks. The technology can measure the animal's physiological functions, among other things. Sensors attached to birds record and transmit information on parameters such as altitude and atmospheric pressure. This provides real-time measurement data for use in meteorology. Global movement patterns of migratory birds can, in addition to providing insights into animal biology and behaviour, also provide us with clues as to how bird flu spreads.

### Can animals give us advance warning of volcanic eruptions?

One of Prof. Wikelski's research projects is currently investigating the potential for using changes in animal activity to predict volcanic eruptions. The aim is to improve warning systems used in disaster management. The initial results are promising and are now being tested around the world. Prof. Wikelski has also led the development of a satellite-based monitoring system, which represents an important step forward for global animal telemetry. Next year will see an antennae system installed on the international space station that will make it possible to use global telemetry to monitor very small animals for the first time.

Six members of Class II presented their current research findings during the symposium. Prof. Erika von Mutius ML (Munich) conducts experiments to investigate how microbes in our environment contribute to a healthy immune system. Her results show that children who come into contact with cows or other animals very soon after birth have a lower rate of allergies and, in particular, asthma. Prof. Ruedi Aebersold ML (Zurich, Switzerland) presented methods for researching genome variability in cells. By producing

## New Members of Class II



The new members of Class II are presented with their membership certificates: From left: Leopoldina Secretary-General Prof. Jutta Schnitzer-Ungefug (Halle), Prof. Markus Aebi ML (Zurich), Prof. Frauke Melchior ML (Heidelberg), Prof. Matthias Rief ML (Munich), Prof. Angela M. Gronenborn ML (Pittsburgh), Prof. Klaus-Armin Nave ML (Göttingen), Prof. Carmen Buchrieser ML (Paris), Leopoldina President Prof. Jörg Hacker ML (Halle), Prof. Martin Wikelski ML (Radolfzell), Prof. Christian Kurts ML (Bonn), Prof. Matthias Schwab ML (Tübingen), Prof. Maarten Koornneef ML (Cologne), Prof. Rudolf Aebersold ML (Zurich), Prof. Ottoline Leyser ML (Cambridge), Prof. Karl-Peter Hopfner ML (Munich), Prof. Erika von Mutius ML (Munich), Prof. Nils Brose ML (Göttingen).

photo: Markus Scholz

highly detailed “maps” of the proteins in a cell, he gains deep insights into their function. Prof. Ottoline Leyser ML (Cambridge) studies plant hormones and their role in shoot branching and flower development. Her experiments show that the hormone auxin is particularly important for branching in plants, while the hormone strigolactone has specific regulatory functions for flower development.

### The impact of vitamin D on cardiac health

Prof. Gabriele Stangl ML (Halle) reported on how vitamin D affects blood vessel function in humans. Her experiments show that both too much and too little vitamin D can cause problems for cardiac health. Prof. Peter Westhoff ML (Düsseldorf) is primarily concerned with the evolution of photosynthesis. The C4 plants that are common in the tropics are better at photosynthesis and use water and nitrogen more efficiently than the plants

that mainly grow in Northern Europe. His findings could improve photosynthesis in crops and thereby increase yields in the future. Finally, Prof. Carmen Buchrieser ML (Paris) explained the methods that *Legionella pneumophila* use to reproduce in host cells. She found that the bacteria contained a variety of proteins that are typically present in host cells. This allows the *Legionella* to go undetected by the immune system as they infiltrate the host cells and reproduce there. (hst)

# People

## Newly elected Members

- **Lorenz S. Cederbaum ML**, Heidelberg, Heidelberg University, Institute for Physical Chemistry (Chemistry Section)
- **Ulrike Diebold ML**, Vienna, TU Wien, Institute of Applied Physics (Chemistry Section)
- **Martin Hairer ML**, Coventry/UK, University of Warwick, Mathematics Institute (Mathematics Section)
- **Johannes Lelieveld ML**, Mainz, Max Planck Institute for Chemistry (Earth Sciences Section)
- **Marion Merklein ML**, Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg, Department of Mechanical Engineering (Engineering Sciences Section)
- **Franc Meyer ML**, Göttingen, Georg-August-Universität Göttingen, Institute of Inorganic Chemistry (Chemistry Section)
- **Stuart S. P. Parkin ML**, Halle, Max Planck Institute of Microstructure Physics (Physics Section)
- **Tresa M. Pollock ML**, Santa Barbara/USA, University of California Santa Barbara, Materials Department (Engineering Sciences Section)
- **Heike Riel ML**, Rüschlikon, Switzerland, IBM Research – Zürich, Science and Technology Department (Engineering Sciences Section)
- **Johanna Stachel ML**, Heidelberg, Heidelberg University, Institute for Physics (Physics Section)
- **Klement Tockner ML**, Berlin, Leibniz Institute of Freshwater Ecology and Inland Fisheries (Earth Sciences Section)



**Leopoldina**  
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### Deutsche Akademie der Naturforscher Leopoldina – Nationale Akademie der Wissenschaften

Jägerberg 1  
D-06108 Halle (Saale)  
Telefon: +49-345/4 72 39 – 800  
Telefax: +49-345/4 72 39 – 809  
presse@leopoldina.org

#### Editing:

Caroline Wichmann (cw)  
Julia Klabuhn (jk)  
Daniela Weber (dw)

#### Other Editors:

Prof. Dr. Jutta Schnitzer-Ungefug (jsu) (responsible according to the German press law)  
Prof. Dr. Dr. Gunnar Berg ML (gb)  
Luzie Schmollack (luz)  
Hannes Junker (ju)

#### Other authors in this issue:

Dr. Johannes Fritsch, Scientific Officer,

Presidential Office (jf)

Dr. Marina Koch-Krumrei, Head of International Relations Department (mkk)

Dr. Ruth Narmann, Deputy Head International Relations Department (rn)

Dr. Jan Nissen, Senior Officer, Department International Relations (jn)

Dr. Henning Steinicke, Scientific Officer, Department Science – Policy – Society (hst)

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#### Abbreviations:

ML = Member of the Leopoldina