



Leopoldina  
Nationale Akademie  
der Wissenschaften

# Leopoldina news

5/2016

Deutsche Akademie der Naturforscher Leopoldina –  
German National Academy of Sciences

Halle, 12 October 2016

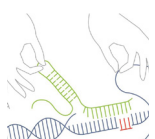


## The Sciences in Intercultural Dialogue

Annual Assembly at the Leopoldina in Halle (Saale)

INTERNATIONAL ISSUES

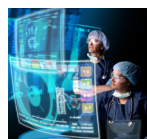
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Genome editing in  
Germany and Korea  
Joint symposium with  
partner academy

SYMPOSIUM

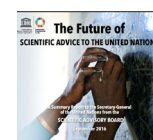
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Scientific Advisory  
Board submits report  
Researchers visit UN Secre-  
tary-General in New York

# Editorial

Dear members and friends  
of the Leopoldina,



Genome editing techniques like CRISPR-Cas9 are currently responsible for rapid changes in molecular biological re-

search. Gene modifications can now be carried out more quickly, cheaper, and in a more targeted manner. The techniques have awakened great hopes for progress in practical applications as well as in basic research.

They could bring advances in biotechnology, plant and animal breeding, and human medicine. At the same time, however, these new methods throw up a range of uncertainties. Is their application safe and ethically responsible? What side effects or interactions might they have in the short, medium and long term? These debates are important – not just among researchers, but also between science and society. We must inform the public about the opportunities offered by genome surgery and explain how it works. Our goal is to exploit the benefits of the new methods without taking avoidable risks.

As the German National Academy of Sciences, the Leopoldina brings the scientific community together with politicians and society in order to debate developments in scientific research. We made a good start on this last year by publishing a statement on genome editing and hosting several events that were open to the public – most recently, the joint symposium “Genome Editing in Germany and Korea” (see adjacent text) in Berlin. This year’s Leopoldina meeting for journalists was dedicated to the topic of genome surgery (page 6), and our Annual Assembly in 2017 will also address the issue. My hope is that the Leopoldina can work with other stakeholders to initiate close dialogue with the public, based on mutual trust, about genome editing.

I wish you a thought-provoking read.

*Ulla Bonas*



*The organisers and speakers of the joint symposium in Berlin with South Korea's National Academy of Sciences on the topic of genome editing.*

Photos: David Ausserhofer

## Spotlight on genome editing

### Joint symposium with Korean Academy of Sciences in Berlin

As part of the Leopoldina’s strategic partnership with the Korean Academy of Science and Technology (KAST), established in 2012, the two academies organise a joint symposium every year to discuss a scientific topic of relevance to society. In 2016, the Leopoldina-KAST symposium was dedicated to current developments in genome editing in Germany and Korea. Responsible for the event’s scientific coordination on the German side were Leopoldina Vice-President Prof. Ulla Bonas ML (Halle) and former Vice-Presidents Prof. Bärbel Friedrich ML (Berlin), and Prof. Ernst-Ludwig Winnacker ML (Munich).

With this event, the academies contributed to current discussions on society and science policy that were set in motion at the International Summit on Human Gene Editing in Washington, D.C. last December. The symposium is an example of how national policy recommendations – in this case the statement on “Opportunities and Limits of Genome Editing” published by the Leopoldina and its partners in September 2015 – can feed into international discourse.

A number of recognised experts from Germany gave presentations at the symposium, including Prof. Jens Boch (Hannover), Prof. Frank Buchholz (Dresden), Prof. Toni Chathomen (Freiburg), Prof. Jochen Kumlehn (Gatersleben), Prof. Ralf Kühn (Berlin) and Prof. Lennart Randau (Marburg) alongside the members of the



*Emmanuelle Charpentier gave the evening lecture at the symposium.*

organising team. They discussed the various fields of application for genome editing in plants and animals and for therapeutic purposes in humans. The latest developments in the various technologies used in genome editing were also presented at the event. Ethical and legal issues were raised in the concluding panel discussion.

The introductory lecture by Prof. Jin-Soo Kim (Seoul) and the public Leopoldina Lecture by Prof. Emmanuelle Charpentier ML (Berlin) on the Friday evening were among the highlights of the symposium. Charpentier gave a lecture entitled “CRISPR-Cas9: a Game Changer in Genome Engineering: Origins and Overview” at the Saxony-Anhalt Representation to the Federation. (rn)

# The sciences in intercultural dialogue

The Leopoldina's 2016 Annual Assembly focused on an area of conflict in research

*The Leopoldina Annual Assembly on 23 and 24 September explored the sciences in intercultural dialogue. The topic offered numerous points of departure, which scientists of many different nationalities and disciplines explored during the assembly. During the public evening lecture, Prof. Jürgen Osterhammel ML (Konstanz) looked at the topic of the foes of intercultural dialogue.*

When Prof. Johanna Wanka, German Federal Minister of Education and Research, stood on stage and looked out into the auditorium, she said, "It's like we're holding a mini UN general assembly in here." She emphasized science's objective, topic-oriented approach and said it could serve as a model for cooperation between nations, cultures and religions. Rainer Robra, Minister of State for Saxony-Anhalt, added, "Working together – instead of talking over each other or even speaking out against each other – is more important now than ever." Both keynote speakers stressed that, in this sense and given the increasing complexity of the problems facing humanity today, the Leopoldina has a key role to play in providing policy advice that spans electoral terms.

## Opening lecture „Universality with the right to be different“

Prof Otfried Höffe ML also picked up on this point in his opening talk entitled "Science is the epistemic commons belonging to all of humanity". This statement re-



*Leopoldina President Jörg Hacker thanked Federal Research Minister Johanna Wanka and Saxony-Anhalt Minister of State Rainer Robra for their participation by presenting them with drawings by Halle-based artist Ullrich Bewersdorff. Wanka received a likeness of physician Carl Friedrich von Weizsäcker, while Robra took a drawing of Halle city square Friedemann-Bach-Platz back home to Magdeburg.*

Photo: Thomas Meinicke

flects the core content of the 2016 Annual Assembly, for which he served as a guiding spirit. Prof. Höffe, who is professor emeritus of philosophy at Eberhard Karls Universität Tübingen, was keen to point out both the universality of and the differences between science(s) throughout

the centuries and across cultures: "Modern sciences are like a rope plaited from many different threads." In line with this idea, the scientific talks and topics interwove to form a coherent whole.

Dr Hayat Sindi (Saudi Arabia) traced the role that the sciences have played in the

## JÜRGEN OSTERHAMMEL GIVES LECTURE ON THE OBSTACLES TO INTERCULTURAL DIALOGUE

"I'm going to play devil's advocate" – those were the words with which Prof. Jürgen Osterhammel ML (Konstanz) opened his public evening lecture during this year's Annual Assembly. In his speech on "Intercultural dialogue and its enemies", Osterhammel addressed the limits of intercultural dialogue, and the resistance and scepticism with which it is confronted. Early in his speech, Osterhammel pointed out that intercultural dialogue tends to be regarded as a peripheral topic of



historical scholarship. He went on to highlight the "five enemies of intercultural dialogue" as he sees them – in particular, the massive asymmetries in the global system. In practice, intercultural dialogue is undermined by the problem of unequal global access to scientific resources, meaning that the equality of dialogue partners that is so crucial for successful intercultural dialogue is only nominal. As Osterhammel pointed out, this inequality will not "go away by itself". (dw)

Islamic world since the eighth century. The biotechnologist – who, like Prof. Jörg Hacker ML, is a member of the Scientific Advisory Board of the UN Secretary-General (UNSAB) – spoke about the Arabic, Persian, Indian and Greek roots of modern civilisations. She also recalled the holistic approaches that Islamic scientists adopted during the Islamic Golden Age, and urged the audience to return to this perspective today.

Prof. Baichun Zhang (Beijing) and emeritus professor Kenichi Mishima (Tokyo) shed light on historical processes that provide examples of scientific transfer. Prof. Zhang focused on the technological exchange between China and Europe in the pre-industrial age, while Prof. Mishima explained the key role that European sciences played in the selective modernisation of Japan from the mid-19th century onwards. The legal discourse with which Prof. Rüdiger Wolfrum ML (Heidelberg) closed the first day focused on the tension between traditional national ideals and external ideals when it comes to developing legal frameworks in Arabic and African countries.

### Stem cell research in different cultures

Saturday's programme opened with a talk by Prof. Martin Thomas Riexinger (Aarhus) on the reception of the theory of evolution in the Islamic world from the second half of the 20th century up to today. His talk encompassed the theory's reception in the Ottoman Empire and Turkey, Egypt and the Levant, and in South Asia.

Prof. Joseph Itskovitz-Eldor (Haifa) discussed a much more recent topic in his talk on stem-cell research in different cultures. He showed the extent to which legal regulations differ from country to country, and highlighted the cultural values and notions that underlie those regulations.

Prof. Andrea Bender (Bergen, Norway), who works at the interface of ethnology and cognition research, looked at how culture and language affect the way we think. She showed how behaviour and responses that we think of as universally human are not necessarily so. Cognitive psychology findings that are gathered in studies on subjects from Europe and North America are not transferrable to all cultures.



*This year's Leopoldina Annual Assembly gave plenty of opportunity for lectures, discussions and conversations – in other words for dialogue in every form.*

Photos: Markus Scholz



### Globalization as a motor of progress in historical studies?

Historian Prof. Jürgen Kocka ML (Berlin) described global-historical approaches in the humanities. He explained that they supplement traditional national history and broaden perspectives by offering comparisons with other parts of the world.

The closing panel discussion looked at cultural peculiarities in the sciences and was moderated by Jürgen Kaube (Frankfurt am Main), editor of Germany's FAZ newspaper. During the discussion, it became clear that location and cultural context absolutely influence research topics and discussions. Generally, however, the panellists agreed that science is not culturally dependent per se. (dw, jk, rg)

# Antibiotic resistance and precision diagnostics

Class III – Medicine Symposium presents a broad range of topics

Bacteria are everywhere. We humans have more bacteria cells than body cells. While we are dependent on this microbiome, bacteria can also cause disease. Since the early 20th century, bacterial infections have been treated with antibiotics. These are now one of the cornerstones of modern healthcare; without them many standard surgical interventions would be unthinkable. With increasing frequency, though, we are encountering the problem addressed by Prof. Lothar H. Wieler ML (Berlin) in his Leopoldina lecture – that of antibiotic-resistant bacteria.

Antibiotic resistance is by no means a surprising phenomenon since it is the result of natural adaptation processes that bacteria and other organisms undergo. What is unprecedented and potentially serious however, is the increase in multi-resistant bacterial strains – that is, bacteria that develop resistance to more than one antibiotic.

## Tuberculosis infections are on the rise again

Wieler cites tuberculosis as one example of what this means for society. Following identification of the tuberculosis pathogen and the development of suitable antibiotics, the incidence of the disease fell rapidly, and it appeared to have been conquered. In recent years, however, tuberculosis infections have been on the rise again – including in Germany. The likelihood of successful treatment now depends heavily on the type of tuberculosis pathogen: in patients infected with a multi-resistant strain of TB the success rate falls from 80 percent to just 30 percent.

Studies at the Charité in Berlin show that we all bear responsibility for the growing problem of resistance. After just two days in a foreign country, travellers pick up new resistance genes that they then pass on when they return to their home environment. Resistance must therefore be tackled both nationally and internationally.

In the Class III Symposium, six members of the Leopoldina spoke about their current research. Prof. Ania C. Muntau ML (Hamburg) is researching treatments for rare metabolic disorders. She uses “deep phenotyping” to study a number

## Die neuen Mitglieder der Klasse III



The new members of Class III were presented with their membership certificates on 14 July: From left: Leopoldina Secretary-General Prof. Jutta Schnitzer-Ungefug (Halle), Prof. Andreas Heinz ML (Berlin), Prof. Rupert Handgretinger ML (Tübingen), Leopoldina President Prof. Jörg Hacker ML (Halle), Prof. Ania C. Muntau ML (Hamburg), Prof. Michael Detmar ML (Zurich) und Prof. Michael Thali ML (Zurich). (jk)/Photo: Markus Scholz

of active agents in cell cultures that can cause structural changes in proteins and could potentially be used in pharmaceuticals.

Prof. Michael Thali ML (Zurich) introduced the “virtopsy” or virtual autopsy. The digital transformation of forensics makes it possible to visualise injuries in three dimensions and thus obtain more detailed information about them.

## Immunotherapy in the treatment of childhood cancers

Prof. Rupert Handgretinger ML (Tübingen) reported on the progress of immunotherapy in the treatment of childhood cancers. For example, he is developing vaccines that are individually tailored to the patient and can activate immune response in children with acute lymphatic leukaemia.

Prof. Michael Detmar ML (Zurich) ex-

plained the role of the lymphatic system in the spread of tumours and in autoimmune disorders. He described mechanisms that boost and control the distribution of the lymph vessels in tumours – and can therefore contribute to tumour growth.

Prof. Ulrich Gembruch ML (Bonn) spoke about what foetal surgery can achieve. It often enables abnormalities to be corrected at an early stage so that the foetus can then develop normally.

Finally, Prof. Andreas Heinz ML (Berlin) introduced his approach to the understanding of mental disorders as learned responses. The release of hormones in the brain, for example via a learned reward system, plays an important part in many mental disorders. Such a reward system can, however, be “unlearned” and this perspective opens up new opportunities for treatment. (hst)

# UN Scientific Advisory Board submits recommendations

Secretary-General Ban Ki-moon welcomes scientists at UN headquarters in New York

The UN Scientific Advisory Board (UNSAB) set up by Secretary-General Ban Ki-moon has prepared a progress report on the first three years of its existence. The report was handed to Secretary Ban at the United Nations headquarters in New York on 18 September. In the report, the board calls for science-based policy advice to be even more firmly anchored in the UN. President of the National Academy of Sciences Leopoldina, Prof. Jörg Hacker ML, and Director-General of UNESCO, Irina Bukova, who is designated Chair of the Board, were both present. Hacker was appointed ad personam to the international board, made up of 26 scientists from various disciplines.

UNSAB advises the Secretary-General and the heads of UN organisations on sustainability issues of a global dimension and brings its expertise to the topic of research and development. The interdisciplinary board is set to strengthen the interfaces between science and politics and thus ensure that current scientific findings find their way into the UN's policy and strategic discussions. Secretary Ban's personal advisory board met in Berlin for the first time in January 2014 at the invitation of the German Federal Government.



UN Secretary-General Ban Ki-moon (centre) with members of UNSAB

Photo: Christian Weidlich

The scientists have since formed several working groups and have prepared statements on issues including climate change, big data, and future scientific challenges.

Hacker's thematic focus at UNSAB is the role of science in sustainable development. The particular point of reference in the two statements coordinated by Hacker was the 2030 Agenda for Sustainable De-

velopment adopted by the UN in September 2015, which seeks to make global development more socially, environmentally and economically sustainable in order to give future generations the chance to lead fulfilling lives. The Leopoldina receives financial support from the Federal Ministry of Education and Research (BMBF) to carry out its work at UNSAB. (chw)

## Africa: Dialogue between research and business must be strengthened

"How can the transfer of knowledge between research and business in Africa be optimised?" The Leopoldina is tackling this question as part of the Science-Business-Dialogue project financed by the German Federal Ministry of Education and Research. As project partners, the Leopoldina and the Academy of Science of South Africa (ASSAf) are convinced that the lives of people in African countries could be improved if scientists and the private economic sector worked more closely together.

As part of the project, the Leopoldina and ASSAf will host a conference in Pretoria from 5 to 7 December. The goal of the conference is to effect dialogue among representatives from science, business and po-

itics. Among other topics, the event will focus on consumer-oriented research, copyright, business initiatives, and innovative financing. The conference is designed to host 100 participants, and the lectures will be complemented by workshops.

The project initiators are keen to find more participants among the members of the Leopoldina. Any members with expertise on dialogue between science and research and entrepreneurs and businesses are therefore invited to contact the Leopoldina head office. (csd)

TO FIND OUT MORE, PLEASE WRITE TO  
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CHRISTIANE.DIEHL@LEOPOLDINA.ORG

## European policy advisors meet

The European Science Open Forum (ESOF) took place in Manchester this July. The event brought the members of the informal European Science Advisory Forum (ESAF) together for the first time. The forum is made up of scientists who each represent one EU member state. Leopoldina President Prof. Jörg Hacker ML represented Germany at the meeting. The delegates discussed a series of questions relating to science-based policy advice within the European Commission. One of the goals behind these ESAF meetings is to inform member states, quickly and comprehensively, about statements and other activities relating to science-based policy advice. The second ESAF meeting takes place in December. (jh)

# People

## New Members Class III

■ **Elisabeth Binder ML**, Munich, Max Planck Institute of Psychiatry (Neurosciences Section)

■ **Claus Cursiefen ML**, Cologne, University Hospital Cologne, Ophthalmology Clinic, Eye Center Cologne (Ophthalmology, Otorhinolaryngology and Stomatology Section)

■ **Marion de Jong ML**, Rotterdam, Netherlands, University Medical Center Rotterdam, Erasmus MC, Dept. Nuclear Medicine (Radiology Section)

■ **Hannelore Ehrenreich ML**, Göttingen, Max Planck Institute for Experimental Medicine, Clinical Neurosciences (Neurosciences Section)

■ **Matthias Endres ML**, Berlin, Charité – Universitätsmedizin Berlin, Department of Neurology Outpatient Care (Neurosciences Section)

■ **Max Gassmann ML**, Zurich, Switzerland, University of Zurich, Institute of Veterinary Physiology (Veterinary Medicine Section)

■ **Kathleen J. Green ML**, Chicago, USA, Northwestern University Feinberg School of Medicine, Departments of Pathology and Dermatology (Internal Medicine and Dermatology Section)

■ **Benedikt Grothe ML**, Martinsried-Planegg, Ludwig-Maximilians-Universität München, Department Biology II (Neurosciences Section)

■ **Michael D. Menger ML**, Homburg, Saarland University Medical Center and the Faculty of Medicine at Saarland University, Institute for Clinical and Experimental Surgery (Surgery, Orthopaedics and Anaesthesiology Section)

■ **Ulf Müller-Ladner ML**, Bad Nauheim, Kerckhoff Clinic, Department of Rheumatology and Clinical Immunology (Internal Medicine and Dermatology Section)

■ **Pierluigi Nicotera ML**, Bonn, German Center for Neurodegenerative Diseases in the Helmholtz Association (Neurosciences Section)

■ **Andreas Rosenwald ML**, Würzburg, Ludwig-Maximilians-Universität Würzburg, Institute of Pathology (Pathology and Forensic Medicine Section)

■ **Kai Zacharowski ML**, Frankfurt am Main, University Hospital Frankfurt, Department of Anaesthesia, Intensive Care Medicine and Pain Therapy (Surgery, Orthopaedics and Anaesthesiology Section)

## Deceased Members

■ **Malcolm Chisholm ML**  
15 October 1945 to 20 November 2015 | Worthington, Ohio  
Chemistry

Malcolm Chisholm dedicated much of his scientific career to inorganic chemistry, for example metal-metal multiple bonds. He was particularly interested in metallo-organic polymers and their potential uses. Chisholm was appointed a member of the Academy in 2004.

■ **Jürgen van de Loo ML**  
14 April 1932 – 13 August 2016 | Münster

**Internal Medicine and Dermatology**  
Jürgen van de Loo was a haemostaseologist whose research focuses included leukaemia and thrombosis. His primary interest was the development of new therapeutic strategies for leukaemia. Alongside his medical work, van de Loo held important administrative positions. From 1989 to 2005 he was active in the German Council of Science and Humanities, and

he was chairman of the scientific advisory board to the German Federal Ministry of Education and Research. He was elected a member of the Leopoldina in 1993.

■ **Georg Schönmuth ML**  
27 May 1928 – 9 July 2016 | Berlin  
Agricultural and nutritional sciences

Georg Schönmuth was a nationally and internationally regarded animal breeding and genetics scientist and professor of animal breeding and animal genetics at HU Berlin for almost 40 years. His work had a lasting impact on dairy cow breeding and he was regarded as a champion of environmentally friendly milk production. Schönmuth was elected a member in 1980.

■ **Reinhard Selten ML**  
5 October 1930 – 23 August 2016 | Poznań  
Economics and Empirical Social Sciences

Reinhard Selten cast doubt on the economic concept of homo oeconomicus as a consistently rational agent. The German economist developed an alternative concept known as subgame perfect equilibria. He received the Nobel Prize in Economics in 1994 along with colleagues John Harsanyi and John Nash for their contributions to economic game theory. Selten was elected a member of the Academy in 2012.

■ **Shoji Shibata ML**  
23 October 1915 – 12 July 2016 | Tokyo  
Chemistry

Natural products chemist Shoji Shibata conducted research into lichen and fungal substances. He was particularly interested in the structure of lichen substances, which have antibiotic properties. In 1989 he was awarded the UNESCO Albert Einstein Medal in silver. Shibata was elected a member of the Leopoldina in 1969.



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## Imprint

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#### Abbreviations:

ML = Member of the Leopoldina