Wissenschaft im Dialog

MS Wissenschaft 2026

exhibit texts in English

Eine Initiative des Bundesministeriums für Forschung, Technologie und Raumfahrt

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Contents

Welcome on board MS Wissenschaft!

Good health – both for ourselves and for others – is probably the thing we value most. In Science Year 2026 – Medicine of the Future we will find out how researchers are already shaping the medicine of tomorrow with their new ideas and pioneering solutions. They are developing innovative technologies with the aim of making diagnosis more precise and treatment more effective.

How do the tiniest building blocks in our bodies influence our health?

Which new technologies can enhance our physical and mental health?

How can we shape the world so that as many people as possible can have a healthy life?

Have a look around and find out.

You too can be a medical researcher

The exhibition allows you to explore the medicine of the future from three different perspectives: from the tiniest processes taking place in our cells and the interaction of our bodies and minds with technology to the social and environmental aspects of health.

Take a task card, visit our research stations and experiment for yourself.

Inside the body

Delve into hidden processes

Inside the body the smallest forces often have a big impact. Scientists' understanding of what exactly happens in our cells and how drugs can be used in a more targeted way is improving all the time. The medicine of the future aims to treat disease as early, precisely and individually as possible – or best of all, to keep us from falling ill in the first place. What kind of cancer treatment is gentlest on our healthy cells? What properties will the active agents of tomorrow have? And will we be able to prevent cancer through vaccinations? Have a look around and find out.

1. Technicolour cells

What is that shining under the microscope?

Researchers working on the medicine of the future often need to make microscopic things visible, for example, the different types of cells found in a piece of tissue measuring only one millimetre. To do this, they use a clever trick: they select a protein unique to each cell type and colour it with a fluorescent dye – neon green, bright red or light blue, for instance. Under the microscope they use light waves of different lengths to illuminate each dye and then photograph it. When these photos are superimposed, they generate an image of the tissue sample showing each cell type in a different luminescent colour. This method can also be used to visualise different structures within a cell. Which image do you like best?

Charité University Hospital Berlin

At Charité University Hospital Berlin more than 5,700 scientists and doctors spend each day working on medical advances, while more than 10,000 students are training here as doctors, dentists, health scientists and nurses. According to the Times Higher Education Rankings, the Charité is one of the world's top thirty medical faculties.

2. Healthy aging? Child's play

Will we soon all live to be 100?

Aging is a natural part of life. But how we age is influenced by both internal and external factors.

In this game you can find out what is good for your body and what is harmful. In the game (just like in real life!) there are healthy habits, such as getting enough exercise and eating a healthy diet, but also unhealthy ones, such as too much stress or smoking.

The aim of the game is learn more about the positive and negative factors that affect your health – and then to use this knowledge in real life to ensure you age more healthily.

Leibniz Institute on Aging – Fritz Lipmann Institute (FLI)

The Leibniz Institute on Aging – Fritz Lipmann Institute (FLI) in Jena is a research facility of the Leibniz Association.

3. Arm yourself against cancer!

HPV vaccination: a little prick for long-lasting protection!

Here's a way to lower your cancer risk. Visit the interactive station to find out how prevention can protect your health.

The game is played in four niches where you can find answers to important questions: What is the HP virus and what does it have to do with cancer? Which parts of our bodies can it affect? How does the HPV vaccination reduce the risk? Why is it important for girls AND boys to get vaccinated? How else can I reduce my risk of getting cancer?

Equipped with the right information you can become a health pro. The greater the number of girls and boys who get vaccinated against HPV, the more cancers can be prevented: cancer of the cervix, penis, vagina and anus as well as cancers of the mouth and throat. Arm yourself against cancer!

German Cancer Research Center (DKFZ)

This exhibit is a joint project of the German Cancer Research Center (DKFZ) and the German cancer charity Deutsche Krebshilfe (DKH). Their mission is to understand cancer better and to prevent and treat it more effectively and thus make the medicine of the future more preventive. Educators, virologists, prevention experts and doctors were all involved in developing the exhibit.

4. Harnessing super powers to combat cancer

What is CAR-T cell therapy?

Your body has its own self-defence mechanism: the immune system. Its job is to be constantly on the look-out for dangerous invaders and damaged cells. Sometimes, however, the immune system fails to identify cancer cells because they are masters of camouflage. This is where CAR-T cell therapy can help. It uses the body's own defensive cells, so-called T cells. These are extracted from patients' blood and genetically modified in the lab to give them a recognition mechanism (a receptor) with which they can track down and precisely identify cancer cells. T cells endowed with these "super powers" are then returned to the body, where they hunt down cancer cells and destroy them.

Würzburg University Hospital, Fraunhofer Institute for Cell Therapy and Immunology (IZI)

The Chair for Cellular Immunotherapy at the Medicine II department at Würzburg University Hospital is a research centre for CAR-T cell therapy. It is further developing this technology in a joint project with the Fraunhofer Institute for Cell Therapy and Immunology (IZI). The exhibit was created by the Games Engineering Group at the Chair for Human-Computer Interaction at Julius Maximilian University Würzburg.

5. Live materials in action

Getting the body to make its own medicine – right where it's needed

Live therapeutic materials are an innovative way of administering drugs. They act like a pharmacy within the body that automatically refills itself and never runs out. The method uses bacteria that behave like tiny bio factories continually producing and directly administering active agents.

The first station is all about the eye. Embark on a journey through the history of contact lenses – from simple sight aids to modern medical technology. Meet the "live contact lens" and discover what live therapeutic materials can do for our eyes. At the second station we take a look behind the scenes. Discover bio factories and find out how living materials are produced and how they can be used to treat diseases more effectively.

INM – Leibniz Institute for New Materials

INM engineers create new materials from chemical and biological building blocks to overcome frontiers in functionality, performance and sustainability. Together with the Leibniz ScienceCampus "Living Therapeutic Materials", the Saarland-Campus is engineering living therapeutic materials. The exhibit and the research are additionally supported by the German Research Foundation Priority Programme 2451.

6. From soil to pharmacy

Antibiotics from soil bacteria

The more often we use antibiotics, the less effective they become. The reason is that over time bacteria become resistant. This means they are no longer susceptible to the active agent. To ensure that antibiotics remain effective in the future, we urgently need new active agents that can cope with bacterial resistance. Myxobacteria, which are found in the soil, can be helpful in finding such agents. They produce substances with natural antibacterial properties which they use to hunt other bacteria for food. The idea is that if myxobacteria are able to use these natural substances to combat bacteria in the soil, we might be able to use the same molecules to fight bacterial infections in humans.

Helmholtz Institute for Pharmaceutical Research Saarland (HIPS), Helmholtz Centre for Infection Research

At the Helmholtz Institute for Pharmaceutical Research Saarland (HIPS), scientists are seeking new agents to treat infectious diseases. To this end they are developing new experimental and computer-based methods to identify drug candidates and to optimise them for treating humans.

7. In search of the “magic bullet”

A miracle cure against germs?

The term “magic bullet” denotes a drug that systematically targets pathogens without harming the patient.

The medicine of the future will use computer analyses and automated tests to discover new ways of attacking pathogens – from chemical agents to biological molecules that bond with specific parts of a cell, such as proteins and RNAs. Using this approach, innovative strategies can be developed to combat resistance to antibiotics. Another central method is phagentherapy. Phagens are viruses that systematically eliminate bacteria. They are considered a promising solution to the problem of bacterial resistance. Modern mRNA concepts and tailor-made phagens are among the most important innovations in this area of research. Our exhibit shows how these technologies work.

Philipps University Marburg, ProLOEWE, Chemikum Marburg e.V., GRK 2937 Research Training Group Microbial Nucleotide Metabolism (MiNu), Max Planck Institute for Terrestrial Microbiology

This exhibit was developed together with the Department of Pharmacy in Marburg, the German Research Foundation-funded Training Group GRK 2937 “Microbial Nucleotide Metabolism”, from LOEWE-funded projects and supported by ProLOEWE, the LOEWE research initiatives network.

8. How to build a mini heart

Find out how organ-on-a-chip technology functions

New active agents for drugs usually have to be tested on animals. Quite apart from the ethical issues surrounding animal experiments, this poses another problem too: the findings cannot always be transferred one-to-one to humans.

Organ-on-a-chip technology makes it possible to test drugs on "human models". Using tiny plastic blocks we simulate the building blocks of real human organs and use them to observe processes taking place in the body.

The heart chip simulates a human heart. It's made of real heart tissue that we have grown from human stem cells and can be connected to a bloodstream. Integrated sensors allow us to chart the activity of the mini heart.

Now we have a tiny model of a human heart that we can use to test drugs. The mini heart even beats! How cool is that!

3R Center Tübingen for in vitro models and alternatives to animal testing

The 3R Center Tübingen teaches scientists how to use modern methods to replace and supplement animal testing. By systematically furthering research competence we seek to enhance interdisciplinary awareness of innovative, animal-free methods in biomedical research.

9. Nano diamonds for use in cancer therapy

Cell sleuths

Cancer is still one of the leading causes of death in Germany. That's why it's important to identify cancer as early as possible and to administer targeted treatment. A new research method inserts tiny diamonds, so-called nano diamonds, into cells to measure the tiniest magnetic changes in the cells' metabolism. This measurement method is called relaxometry and is based on quantum physics. It uses the spin property of electrons as highly sensitive sensors. This enables nano diamonds to identify metabolic changes in single tumour cells and thus help to ascertain which drugs are suitable for individualised treatment.

Münster University of Applied Sciences

Münster University of Applied Sciences (FH) is studying the application of quantum technology in sensors. It uses nitrogen vacancy centres (NV centres) in diamonds to measure magnetic fields, electric current in batteries and metabolic processes in biological cells. At FH Münster the Laboratory for Quantum Technology and the Laboratory for Semi-Conductor Components and Bus Systems are collaborating in the INTERREG-Project NanoDetect.

Beyond the body

How our organs, minds and technology interact

In the medicine of the future, the body will not be viewed in isolation. After all, our bodies are constantly interacting with our direct environment, meaning they are more than just the sum of our organs.

Our psyche and lifestyle both have a role to play in diagnosis and treatment as does networking with new technologies.

Artificial intelligence can help to identify bone fractures, for example, while digital applications can provide new insights into our mental health. How, for example, can a digital twin help researchers develop personalised treatment? How do intelligent implants aid healing? Have a look around and find out.

10. Medicine of the future for musicians

What does physiotherapy have to do with music?

When musicians play their instruments they perform thousands of precise movements – often for hours on end. This can put a considerable strain on the body, causing many professional musicians to experience painful muscle and skeletal disorders. In the worst case, this can have an adverse effect on a musician's career.

This is where our research project comes in. We are trying to find out why these disorders develop, how to spot them early, systematically prevent them and treat them more effectively. To do this we are integrating specialised physiotherapy with digital health data and modern AI. In a learning healthcare system new findings flow directly back into treatments.

Working together with musicians we can create a basis for healthy music-making – a whole life long.

University of Applied Sciences Osnabrück, Institute of Music Physiology and Music Medicine, University of Music, Drama and Media, Hannover

The exhibit is based on a research project at PA.H | Lifetime.ai at the University of Applied Sciences Osnabrück in cooperation with the University of Music, Drama and Media, Hannover. Researchers from the fields of physiotherapy, music, medicine and (health-)computer sciences are working together to develop new preventive and therapeutic approaches to ensuring a healthy musical career.

11. Hammering it home!

How much force does a new hip joint require?

During hip surgery a damaged hip joint is replaced by an artificial one. The hip shaft is part of this joint. It is anchored deep in the thighbone so that the new joint remains stable and lasts for many years. This operation is tricky and requires a lot of experience. If the surgeons are too timid the prosthesis won't hold, but if they use too much force they may damage the bone. So it's important to get it just right.

The flexible spine

Scoliosis or poor posture?

The human spine is not a rigid rod of bone but a movable system comprising vertebrae, discs and small joints. It supports our body, protects the spinal cord and allows us to move in many directions – provided it is healthy.

Here you can compare three spines. They were actually made by 3D printers, but they can be moved just like real spines. The first is a healthy one, the second is curved due to scoliosis and the third has been corrected through an operation using screws and rods. Here you can see and feel how their shape, flexibility and stability differ.

University of Leipzig

The Research Centre for Research into Support and Locomotor Organs (ZESBO) is part of the Department of Orthopaedic, Trauma and Plastic Surgery at the University of Leipzig working together with the Fraunhofer Institute for Machine Tools and Forming Technology (IWU). It focuses on research projects in the field of orthopaedics and trauma surgery.

12. Digital twins – properly trained

What AI still has to learn

Meet Elena, a 34-year-old patient with a brain tumour. An artificial intelligence (AI) agent has been tasked with finding the best treatment for her. Normally, AI agents only scan old data and come up with findings such as: "Patients whose tumour was completely removed often subsequently suffered severe damage." The AI therefore advises the doctors to remove only part of the tumour. Yet the AI neglects to consider WHY the damage occurred. If we were to blindly trust the AI's advice, we might remove too little of the tumour tissue – with fatal consequences! The agent only identifies patterns in the data, not the root causes. It neglects a crucial piece information, which distorts the old data. Find the hidden error and teach the AI agent about the real cause and effect in order to save Elena's life!

Lamarr Institute for Machine Learning and Artificial Intelligence, TU Dortmund University, Institute for AI in Medicine, Essen University Hospital

The Lamarr Institute for Machine Learning and Artificial Intelligence at TU Dortmund University and the Institute for AI in Medicine, Essen University Hospital are collaborating on research for the medicine of tomorrow. We are developing AIs that not only recognise patterns but also understand causal links – all with the aim of making personalised treatment safer.

13. A bruise or a broken bone?

You can find out using ultrasound and AI

Imagine you have a bad fall while doing sport and your arm is hurting like crazy. Is it just bruised, or have you broken it? Until now the obvious thing to do was to go to the emergency department and have your arm X-rayed. However, too many X-rays can be dangerous, especially for young, growing bodies. Ultrasound bone exams don't involve radiation, but evaluating ultrasound images takes a lot of practice and experience. And that's precisely where AI comes in: it can find the best places to examine your arm, reliably identify a fracture and thus assist medical personnel.

Thanks to clever technology you can get a safer and faster diagnosis.

Tomorrow's medicine is already here!

University Hospital Schleswig-Holstein, University of Lübeck

The AI ultrasound project for bones is called "AUTOSAFE". It is a joint undertaking of AI professionals from the University of Lübeck, children's surgeons from UKSH in Lübeck and the Potsdam company ThinkSono. Together they are investigating how smart technology can be used to improve medicine, especially for children and young people. The project is funded by the Federal Ministry of Research, Technology and Space.

14. Active implants

Electrical impulses promote healing

Electrically active implants can support healing in many ways, in bones and cartilage, for example, but also in the brain.

The electrical impulses have a direct effect on tissue, enabling targeted treatment. The illuminated spots show you where electrical impulses are being applied. They are not strong enough for you to feel them, however.

Electrically active implants are already being used in patients. For example, pacemakers help to maintain a regular heartbeat, and deep brain stimulation can help counter movement disorders in those with Parkinson's disease. In the future, new types of implants may actively promote healing in bones and cartilage.

Collaborative Research Centre 1270 ELAINE, University of Rostock

New types of electrically active implants are being studied at the Collaborative Research Centre 1270 ELAINE, located at the University of Rostock and the University Medical Centre Rostock as well as other sites. Specialists from a variety of fields such as medicine, biology, technology, computer science, physics and material sciences are collaborating on future uses for these implants.

15. The power of expectations

Using your body's own pharmacy

Expectations have a huge impact in medicine. Our positive or negative feelings towards a treatment can influence how effective it is and significantly alter a disease's progression. Hence, any factor that can influence our expectations is important: Do I feel the doctor is competent? How well has she explained the treatment to me? Is she reassuring? Do I seem to tolerate the medication well? What experiences have others had with this treatment?

The answers to these questions shape our expectations – and these expectations influence how quickly we recover. How these factors affect what happens in our brains and bodies is an exciting area of research.

Collaborative Research Centre SFB/TRR 289 "Treatment Expectation"

With its team of over 100 researchers in Essen, Marburg and Hamburg, the Collaborative Research Centre (CRC) "Treatment Expectation" is decoding the complex mechanisms of expectation effects in medicine. The goal is to make treatment more effective and better tolerated. The CRC is sponsored by the German Research Foundation.

16. Danger of inflammation!

How does your lifestyle affect your immune system?

Lifestyle has a major impact on health. Stress, a poor diet or a lack of sleep or exercise are a daily fact of life for many people. These factors have a lasting impact on the body. The immune system can be thrown out of balance and become permanently activated. This results in chronic, low-level inflammation, also known as "metaflammation". If this remains unchecked, it can lead to non-communicable diseases – or "diseases of civilization", as they are also known. These include type 2 diabetes, cardiovascular disease and Alzheimer's. Have a look around the kiosk and learn more about how your lifestyle can influence your immune system.

Collaborative Research Centre 1454 Metaflammation and Cellular Programming, Rhenish Friedrich Wilhelm University of Bonn

The causes and ramifications of metaflammation are the subject of research at the Collaborative Research Centre 1454 "Metaflammation and Cellular Programming" at the University of Bonn. At this centre, funded by the German Research Foundation, researchers are working together to discover how lifestyle factors can change immune cells and lead to the onset of non-communicable diseases.

17. Heart (female/male/non-binary)

Why do we need gender-sensitive medicine?

Cardiovascular disease is responsible for more deaths among women than breast cancer and respiratory diseases combined. Nevertheless, the heart attack symptoms typical in men are generally viewed as the standard.

Medical personnel often diagnose heart attacks in women much later, which decreases the chance of living disease-free. Furthermore, researchers are more likely to use male study participants, since, among other reasons, women's fluctuating hormone levels can make test results more difficult to interpret. This lack of research on women's bodies is further compounded by structural factors and a failure to take into account social differences (such as differing preventive behaviour), leading to a "gender data gap". This, in turn, influences the diagnosis and treatment of cardiovascular disease in women and can also have an adverse effect on male patients. Here you can learn which phenomena contribute to the data gap and what we can do about it.

kocmoc exhibitions GmbH, Wissenschaft im Dialog gGmbH

A number of doctors are researching the gender data gap and focusing on gender-sensitive medicine. We would like to express our thanks to three of them for their guidance: Professor Sabine Oertelt-Prignione from Bielefeld University and Professor Birgit Pfaller-Eiwegger and Professor Julia Mascherbauer, both from St. Pölten University Hospital.

18.Gaming for science

Using an app to understand the brain

Our brains determine how we feel – but how exactly? The "Brain Explorer" app examines this question using short and entertaining smartphone games.

The games test various brain functions, such as how we make decisions. Research usually performed in a laboratory using elaborate procedures such as magnetic resonance tomography (MRT) can easily be carried out here in a playful and easy manner using the app. Your data enables researchers to better understand the brain – and you can find out just how smart your decisions are.

University of Tübingen, Max Planck Institute for Biological Cybernetics

The Max Planck Institute for Biological Cybernetics conducts research in the fields of neuroscience as well as theoretical and experimental psychology to determine how information is processed in the brain. Questions relating to the brain's function are answered with the aid of new technologies and computer-assisted models – with unprecedented precision. The institute is part of the Max Planck Campus Tübingen.

19. Mindful thinking

Is mindfulness a super power?

Mindful thinking can enable us to achieve an enhanced awareness not only of ourselves, but also of our environment. Current studies show that young people's mental well-being is declining due to a number of challenges, but this can be countered by mindful thinking. Qualities such as resilience, cooperation, agency and courage boost mental health and are considered key competences for a good life.

University College of Teacher Education Lower Austria

University College of Teacher Education Lower Austria carries out research into various aspects of education. The Futures Literacy project conducts research into "key competences" that can help people to shape their lives going forward.

A healthy community

Staying healthy as a society

Society and the environment both have an enormous impact on our physical and mental well-being. We ultimately need healthy societies and a healthy planet if we are to enable as many people as possible to lead healthy lives. That's why one of the greatest challenges is to shape the healthcare system of the future to make it as sustainable, just and free of prejudice as possible. How do our surroundings influence our health? What would more gender-sensitive medicine look like? And how can the medicine of the future protect our medical data? Have a look around and find out.

20. Watch out for buzzing and itching!

Why mosquito bites can be dangerous

Mosquitos offer proof of how the environment, animals and people are interconnected. This is what “One Health” and “Planetary Health” are all about. Both these concepts emphasise the interaction between people, animals and the environment and how our behaviour and decisions can influence the climate and nature. Species such as the Asian tiger mosquito, which can carry pathogens such as chikungunya, are expanding beyond their original range as a result of climate change, travel and trade. At the same time, native mosquitos can contract and pass on new pathogens such as the West Nile virus. But mosquitos are also an important part of natural ecosystems. They serve as food for other species, for example.

Chair of Planetary & Public Health, Bayreuth Centre for Ecology and Environmental Research (BayCEER), University of Bayreuth

The University of Bayreuth is a research-oriented university campus with about 12,000 students and over 280 professors. Sustainability plays a key role in its heavily interdisciplinary research. Institutions such as the Bayreuth Centre for Ecology and Environmental Research and the Collaborative Research Centre 1357 Microplastics or degree courses such as Global Change Ecology and Environment or Climate Change and Health reinforce research work focusing on health and environmental issues.

21. Burger test

What's your favourite food?

Did you know that the health of people, animals and the ecosystem all influence one another? Scientists refer to this phenomenon as "One Health". The burger test can help you learn more about these connections.

Do you like meat and cheese, or are you a vegan? What about the ingredients in the bioreactor? Build your favourite burger and find out how your food affects your body and the environment. Patties and buns, vegetables, sauces and extras all have an impact. Here you can discover completely new things about your food. You decide what is really important to you: taste, power, or future? And what about the sour pickle on your burger?

Join in and taste One Health!

Bundeszentrum für Ernährung (National Centre for Nutrition, BZfE)

The National Centre for Nutrition is a competence and communication centre focusing on food and drink in Germany. It advocates for healthy and sustainable nutrition for all walks of life.

22. Mission: healthy city

How our surroundings influence our health

If we eat a proper diet and ensure we get a lot of exercise, we're on the right track to staying healthy. But the place we live can also affect our physical and mental well-being. How clean is the air? Are there green areas nearby? Do I feel safe? Do I have access to decent education and medical care? "Structural prevention" is the term used to refer to health-promoting changes made to our surroundings.

In this game you can design your own city and find out how changing your surroundings can influence your health. Would you rather have a park or a new block of flats? A new bike path or a parking lot? Decide what you think is important. How healthy will your city be when you are finished?

Kompetenznetzwerk Präventivmedizin Baden-Württemberg (Baden-Württemberg Preventive Medicine Competence Network)

Five medical faculties in Baden-Württemberg have joined forces to form the Preventive Medicine Competence Network (KNPM). Together we research topics relating to prevention and promoting health. Our goal is to maintain and improve the health of people in Baden-Württemberg and elsewhere.

23. Your 4D health journey

The future of precision medicine

Hello, it's me, your body... Or, more specifically, your digital reflection. I invite you to embark on a journey into yourself – and through the medicine of the future. In this game you can learn about your organs and bodily functions. Find out more about state-of-the-art options for care, diagnostics and treatment as well as how AI can be a great help in both everyday medicine and in research, too.

The key to the medicine of the future lies in 4D: drugs, diagnostics, devices and data. Frauenhofer research intelligently combines drug development, diagnostics, medical technology and data collection and processing. This exhibit will show you how this work can potentially yield precise, individualised and, most importantly, affordable medical care.

Fraunhofer Group for Health, Fraunhofer Headquarters

The Fraunhofer Society is using the 4D principle to open up entirely new medical prospects. Here, doctors, scientists, computer experts and engineers are working together at the intersections between drug development, diagnostics, medical technology and data collection and processing to develop the best treatments for cancer, Alzheimer's and other diseases and to enable people to live long, healthy lives.

24. A sticking plaster for the heart?

From concept to therapy

Your heart beats around 100,000 times a day. But what happens when it's too weak for the job? Just stick a Band-aid on it? Well, researchers from Göttingen and Lübeck thought this was a really cool idea. Their heart plaster designed to repair damaged hearts is made up of 40 million living cells. Its development from laboratory experiments to animal testing and clinical trials has taken over twenty-five years. The first clinical trials are currently under way. Researchers are initially testing the new technique on at least eight patients. Does it work? Is the dosage safe? The tests will then be extended to further patients. In the future, the plaster may grow to a size of 800 million cells That would be equivalent to at least a tenth of a human heart, which consists of six to eight billion cells.

The "Understanding Animal Experimentation" Information Initiative

Understanding Animal Experimentation aims to explain why and how researchers conduct animal testing, as well as who grants them the authority to do so. The initiative conveys facts and assessments from scientists to enable you to get an idea of what animal experimentation is all about. We invite you to take part in an open conversation about research, responsibility and new therapies.

25. Welcome to the operating theatre of the future

The role of AI and robotics in surgery

Have you ever asked yourself what exactly happens during an operation? Enter the virtual operating theatre of the future! Here you can take control and experience at first hand how a gall bladder is removed. You can see how artificial intelligence picks up the slightest indication of disease and calmly and precisely manipulates robot arms in a way no human possibly could.

But even the best technology needs a team to control it. Get to know the people behind the surgical masks, from the professional anaesthetists to the operators controlling the robot. Discover how humans and machines work together to save lives on a daily basis.

Dresden University of Technology, Technical University of Munich

Transfer hub "6G-life²" brings together a number of disciplines to develop human-focused innovations such as collaborative robotics, teleoperations and virtual environments with the aid of 6G. They focus on networked robotics and its implementation in applications. The transfer hub directly sponsors start-ups with the aim of enhancing technological independence.

26. Your health is a puzzle

Data creates knowledge

Health is like a puzzle. A large number of small pieces of information come together to create a whole. Your health data is collected in different places: in the GP surgery, in hospital or on your smartwatch. Only when researchers combine this information can they identify connections – for your cardiovascular health, for example. Piecing the data together can improve medical care and facilitate optimal treatment. Your data privacy is ensured thanks to a series of precise legal regulatory measures.

The interlinking of health data must be anonymised, which means personal details such as name and address are removed or replaced with codes. This allows researchers to evaluate the relevant data without needing to know who the data belongs to.

National Research Data Infrastructure for Personal Health Data (NFDI4Health)

The project NFDI4Health is establishing a secure infrastructure for health data. The goal is to make research data traceable and usable to ensure it can be better linked and analysed by researchers. The project is designed to give scientists a better understanding of what keeps people healthy and what makes them ill.

27. OneBeat

Your data for everyone's health

The medicine of the future relies on our health data. Disease and symptoms, bloodwork and gene tests, diet and exercise – today we already record a wide variety of health data. Efficiently collected, ordered, and interlinked, these data have the potential in the future to facilitate the diagnosis of complex diseases, help choose the best treatments, and aid in the development of new medicines.

If our health data are to be used for scientific studies, then they must always be anonymised. Although researchers can combine an individual's various markers, for example, their age and blood sugar level, they won't know who the person is. Nevertheless, many people remain sceptical. What would you decide? Individual data protection or more health data for medical research?

This exhibit was developed by the exhibition agency Kocmoc Exhibitions GmbH, Leipzig in cooperation with Dr. phil. Tanja Müller-Jonak.

28. PulsCam

Measuring heartbeat with cameras

PulsCam shows how vital parameters can be measured using commercially available cameras –without the need for physical contact. This works because every heartbeat creates colour changes in the skin that are invisible to the human eye. These can be recorded optically and evaluated using modern image processing and AI-supported analysis. This allows physiological parameters such as heart frequency or heart rate variability to be measured without a need for sensors on the skin.

The system offers new opportunities for applications in the field of telemedicine or for monitoring patients in casualty departments or rescue vehicles, as it allows for the constant measurement of vital data without the need for physical contact.

FZI Research Center for Information Technology

The FZI Research Center for Information Technology in Karlsruhe develops technologies in the fields of transportation, health and democracy. The aim from the very beginning is to shape research in a way that yields practical applications to help businesses and improve people's everyday lives.

29. Elderbot

Using artificial intelligence to combat loneliness?

Loneliness affects many people, particularly the elderly. It can lead to serious physical illness and brings with it a heightened risk of depression, cognitive impairment and shortened life expectancy. This is where Elderbot – a digital dialogue partner for people over sixty – can help. Using artificial intelligence (AI) it listens, asks questions and offers encouragement. Elderbot is not meant to replace people or therapy. Instead, it helps the elderly to gain more confidence and social skills. It is designed to be easy to use, anonymous and suitable for use in the home. This allows it to reduce inhibition and encourage people to seek out more contact with others. But how much companionship can AI offer? And when do we need real human contact?

Max Planck Institute for Human Development

Elderbot is a joint research product of the Max Planck Institute for Human Development and the Medical Center Hamburg-Eppendorf. The chatbot is currently in the test and trial phase.