

JOANNOVUM

The Magazine for Technological Innovation
Edition 02/2022

Focus on Human
Technology and Medicine



SMART HEALTH WITH SMART TECHNOLOGIES

A circular icon containing a stylized representation of a laboratory flask, a test tube, and a circuit board, symbolizing the intersection of technology and medicine.

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EDITORIAL

This edition of our magazine is dedicated to the core questions surrounding the topic of “Human Technology and Medicine”. Our experts in the two research units COREMED and HEALTH are in the foreground and will present the latest news from their research activities. Around 80 experts at JOANNEUM RESEARCH conduct research in these fields in our laboratories together with interdisciplinary national and international partners from science and industry on the future challenges in the field of healthcare. JOANNEUM RESEARCH is an interdisciplinary provider of total solutions in the fields of medicine, pharmaceuticals, medical technology, and digitalisation in healthcare. Medicine and technology unite with the goal of making everyday life more liveable and easier. The focus is on people’s needs.



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Heinz Mayer
CEO
JOANNEUM RESEARCH

The best possible medical care of patients requires the increased use of innovative procedures in diagnostics and therapy. There is hardly any other discipline where research and development have a greater significance than in medicine.

We all grow older, but how can we grow older healthily? And if we should fall ill, what can be done to help us make a rapid recovery? These are the questions that concern and affect us all. JOANNEUM RESEARCH, with its research in the fields of healthy ageing, personalised medicine, and digitalisation, makes a significant contribution towards supplying answers to these core questions. Digitalisation is not only changing healthcare, but also revolutionising it by creating new possibilities of diagnosis and treatment, simplifying communication, control, and individualisation to increase the efficiency of a clinic’s daily routine and care.

This edition of JOANNOVUM is also dedicated to AI in medicine, the digitalisation of a clinic’s daily workload, research that gets under your skin - from wafer-thin measurement plasters to wound healing - sustainable ageing and smart geriatrics, as well as fat and its positive influence on the healing process.

The future of medicine has already begun - JOANNEUM RESEARCH is at the forefront!

Enjoy reading this edition!

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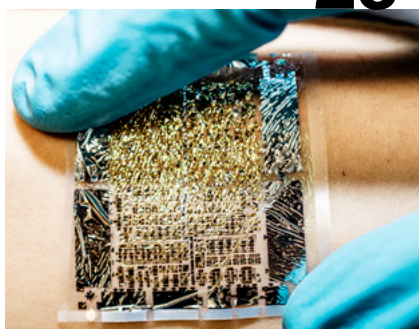
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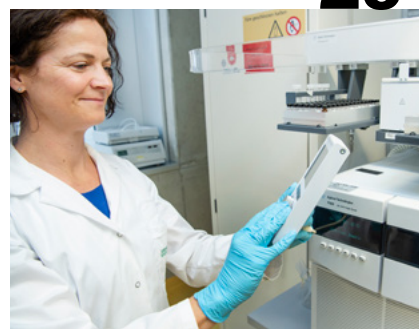
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Sustainable Ageing

Better to shape the future than to suffer it.

Lars-Peter Kamolz at the entrance to COREMED, a part of the Graz Centre for Knowledge and Technology Transfer located at Stiftingtalstraße 2.

Research that gets under your skin. That is the slogan at CORE-MED, the centre for regenerative medicine. Wound healing is one of Lars-Peter Kamolz's fields of research. The institute director at COREMED and surgeon at the Medical University of Graz works intensively on all aspects of ageing and also on management and networking. The networker cooperates with other institutes at JO-ANNEUM RESEARCH and also with external facilities to tackle projects and find solutions.

TEXT: RENATE BUCHGRABER

Alongside wound healing and regenerative medicine, your research work involves sustainable ageing. Can you explain this to us? Sustainable ageing is a creative expression that has been carefully crafted. In my view, it is healthy ageing in a sustainable context, in a sustainable society. Anti-ageing, a phrase coined by marketing, used to be the “in” thing. However, in reality, we are not against ageing. The idea is that people age healthily so that they can live at home for as long as possible.

So, what exactly is ageing? Ageing is a progressive and irreversible biological process that gradually leads to the loss of normal organ function and ends with death. There are a wide range of theories answering the question as to why organisms age at all, but currently there is no scientifically accepted and comprehensive answer. The inflamm-ageing model is also of interest for ageing, which releases chronic inflammatory processes by ageing in the body – not only in the skin, but also in organs.

What challenges do you see for the healthcare system to enable sustainable ageing? In the long term, not only will diagnostics and treatment be important, but also the aftercare: How patients are cared for in their context once they leave the hospital. It is also necessary to apply it earlier to prevent illness. This makes the scope of sustainable and healthy ageing even larger. People can only age well if everything else around them works well. Families used to live together in large units and the younger ones cared for the older generation. However nowadays, the younger generation often move to urban areas and the older generation remain in rural areas and are often alone.

If we want to achieve something in the field of sustainable ageing, we will have to think bigger. It is an opportunity to help shape the future.

– Lars-Peter Kamolz

Life expectancy is increasing, for women it is 83.9 years and for men 79.1 years. What about quality of life at the same time? On average, people are getting older. The problem is that the last 10 to 15 years are spent in average to poor health. On the one hand, the quality of life is relatively low, on the other, age-related illnesses place the most burden on society. The goal is not that people can get much older. It is mainly that the period of average and poor health is shortened.

How can we shape our own lives to ensure that grow old healthily? We differentiate between primary and secondary ageing: A baby that is born today can get to be 120 years old. Secondary ageing consists of what we do to not achieve that age such as little exercise and too much food. A positive contribution to healthy ageing is a healthy lifestyle with exerci-

se, dieting and red wine – enjoyed with moderation. There are indications that certain medication (rapalogs) can prolong life and healthy nutrition with spermidines that promote the cellular cleansing process (autophagy). Sustainable ageing goes a step further and analyses what influence the environment and the context have on ageing. Another initiative speaks of one health that considers the health of humans, animals, and plants to be inseparably connected to each other. Healthy ageing is only possible in a sustainable context in a sustainable society.

What influence do cities have on sustainable ageing? According to forecasts published by the United Nations, almost 70% of the world's population will live in urban spaces by 2050. There is a huge difference between our cities and mega-metropolises. Our cities are slowly changing from industrial cities to service cities and knowledge societies. We can plan cities much better than mega-metropolises that have to deal with annual growth rates of 2 million inhabitants.

And Graz? Graz is obviously not growing as fast as cities in South America or Asia. We have the advantage that we can try out new city concepts such as healthy ageing in sustainable contexts. The relevant questions here concern local recreation, green spaces, and more or fewer city streets. During hot spells, where the temperature at night does not fall as easily as it does in rural areas, there are concepts to combat this with vertical greening and the like.

How can people be motivated to avoid unhealthy behaviour? I think the most important thing is that we start by showing how important healthy nutrition and exercise is as early as possible in Kindergarten or at school with simple and easy-to-understand messages. The upcoming youth are more aware in certain areas. Fast food is still popular, but there are many who follow vegan and vegetarian lifestyles. There is much to do regarding the promotion of health competence and literacy so that people can make conscious decisions about their health. There is a widening social gap.



Lars-Peter Kamolz at the Fifteen Seconds Festival in Lendhafen: "You are only old if you prefer thinking about the past rather than the future".



Photo: JOANNELM RESEARCH

„We need to recreate cross-generational cooperation and not live anonymous lives in apartment blocks“

brain. Sports such as dancing are extremely good, even as a preventative measure against dementia. An important factor is to keep your mind active up to old age since the brain is just like a muscle and needs to be trained: Repeatedly dealing with new and completely different things – it doesn't have to be dancing.

We don't always have everything under our own control ... Of course, every one of us can have bad luck or have an accident. Then it is difficult if you suffer from something that you cannot influence. However, with ageing, we do have the possibility to make great strides in one direction or another with exercise and nutrition. I would rather shape the future than suffer it. I think it is really important to listen to yourself and recognize warning signals. But not to be a hypochondriac. A human is a unit consisting of body, mind, and spirit. It is important to be content and have the desire for "more", but this doesn't have to be money.

What is your vision for a sustainable and healthy society in the future? To close ranks a certain degree so that we can all grow old together. I hope that certain values in our society gain more traction and egotism is reduced. Values such as friendliness, contentment, and sharing certain things with other people. We need to be more aware of how we talk to each other, meet each other, and live with people and neighbours. How and where will we live with each other in the future? Will the generations after us find a world worth living in, a peaceful coexistence? Peace, democracy, and freedom of speech? When I was a child, I used to say that when I was older, I wanted to be a good middle-class citizen. ■

The ageing population is a challenge. How can the provision of medicine cover the higher demand caused by age-related illnesses? I think it will work out fine because we are rethinking the system. One goal is to strengthen health competence as early as possible so that people deal with their health themselves. The amount of medical knowledge is currently doubling every two months and alongside people, we also need digital solutions that support us. Digital systems can filter out which support measures we need for diagnosis and treatment quickly and efficiently. During Corona, we learned that people are treated by people and not by beds and equipment. We do not deal with chronic and poorly healing wounds for nothing. Looking at how the age numbers are developing; we can see that the number of those who suffer from them will increase.

I read in an interview a few years ago that gratitude is important for you. Is this still the case? Absolutely. It is very important to be grateful and content with what we have. Even seeing how good we have it when just a few kilometres away the health system does not function or there is war. This doesn't mean that we shouldn't always strive for improvement but be aware of what went well. I once received the tip to think of what went well and what was particularly good during the day before going to bed and not what didn't work out. It is a different way of falling asleep than devoting yourself to despair.

What else can we do to keep healthy and to remain mentally agile? Healthy nutrition and exercise are important factors. Exercise has a positive influence on every organ, even on the

Digital Health?

COMMENTARY BY THOMAS PIEBER

The concept of “digitalisation in healthcare” has raised high hopes that the many current problems faced by healthcare systems can be tempered by the gradual introduction of digitalisation. There are thousands of new apps covering health, nutrition, lifestyle, interpretation of symptoms, and many questions surrounding the topic of health.

The “digital fever curve” is entering hospitals and the analysis of large databases enables an improved understanding of previously unrecognised connections. Some optimists regard digitalisation as the last great step for our health system to become modern, functional, customer-oriented, and effective. Is this just hype or is there really an opportunity that digitalisation will result in long-term improvements in the healthcare system?

Before answering this question, several important aspects must be noted: It is undisputed that digital systems and solutions for medical devices and medical products make the relevance of digitalisation visible and tangible. For example, it is now probably inconceivable that a diagnostic institute could exist without digital output of images or automatic image analysis. This development can also be observed in laboratory medicine; automatic analysis systems have taken over complex workflows that used to be done manually.

However, if we consider the crucial process steps during the treatment of ill people, then we quickly recognize that these treatment steps consist of strong and deep interactions between two people: the patient and the attending person. This interaction needs a lot more than just an exchange of information. The perception of the “whole person” and not just individual laboratory values or numbers determine the outcome of this process. And yet, or perhaps this is the very reason, the “bottom up” digitalisation of these processes reveals a unique opportunity to improve the system.

The first innovative, digital products were developed by HEALTH, for example the digitalisation of the treatment process with insulin, or the standardisation of the complex medical and logistical procedure surrounding an operation. The digitalisation of such processes permits the necessary interaction during treatment to be supported, standardised, accelerated, made transparent, and more useful for secondary analysis. This enables the focus of the attending person to be placed on the previously mentioned complex interaction of two people and also made traceable. The winners on the market will be those who understand the core processes in the field of medicine and also the methods of digitalisation. ■



Thomas Pieber is the director of HEALTH, Head of Endocrinology and Metabolism at the Meduni Graz and Scientific Head of CBmed GmbH.

Fat tissue is not only present in connective tissue but also in many places in the body. However, research into the function of fat cells in other skin layers has not been completed.

TEXT: ELKE ZENZ

Fat cells influence the skin's healing process. How fat cells achieve this is as yet unknown.

WHAT DO ADIPOCYTES DO?

A research team at COREMED is conducting intensive studies to improve their understanding of wounds and thus optimize healing processes. A new approach to support this is the use of fat cells, or adipocytes. The team around Petra Kotzbeck gained the insight that fat cells have an influence on the healing process.

Petra Kotzbeck has been with JOANNEUM RESEARCH since 2018 and is vice-director and research group leader at COREMED as well as recently becoming assistant professor at the Medical University of Graz. The team is researching within the scope of the FFG project AdipoWound to discover the role that fat cells play in the healing process. "I have always dealt with fat metabolism in my research work and worked with fat cells, which are surprisingly versatile. Fatty tissue exists almost everywhere in the body and also around organs. Fat is not necessarily bad and has many positive functions as long as the person remains close to a normal weight", Kotzbeck enthuses about the generally unpopular and feared tissue.

What are these functions that fat cells have in the body? They regulate glucose and fat metabolism, control the appetite and the immune system: they are indeed essential. This rethink occurred in the middle of the 1990s when the hormone leptin was discovered that is secreted by the fatty tissue in proportion to its mass.

One of the functions of leptin is to control the appetite in the brain. The problem with obesity is that the signals transmitted by leptin are no longer propagated. Kotzbeck called the consequence of this as leptin resistance.

Now we also know that fat is important for wound healing. But how? Fatty deposits not only exist in connective tissues but also in other skin layers. Their function there is not entirely well researched. Studies show that fat cells, for example, are found around hair follicles and are responsible for their growth. They protect them and have an anti-bacterial function. In a way, they provide first aid when skin is injured.

During the AdipoWound project, the researchers observed that fat cells collect around hyper-inflammatory wounds. During the healing process, cells wander from the bottom up or from the periphery in (migration) and fill up the damaged tissue. "It turned out that in wounds that did not heal well, cell migration had not functioned properly. There is a sudden emergence of adipocyte depots. So, fat does play a role", Kotzbeck explains. This results in new treatment options for people who suffer from chronic wounds. Those chronic wounds for example that are influenced by age, diabetes, or high blood pressure show disproportional levels of inflammation. Treatment sometimes lasts for years, and the suffering factor is extremely high. ■



Petra Kotzbeck leads the COREMED research group "Technologies for Tissue Regeneration" and is assistant professor at the Med-Uni Graz.

Smart Geriatrics Close to People

TEXT: ELKE ZENZ

The reason artificial intelligence can be applied in medicine is because a group of dedicated people have been using intelligent data gathering for the past 15 years. In geriatric medicine, new methods are achieving top results and the claim for pure quality assurance has been extended to the intelligent networking of data. Peter Mrak and Georg Pinter, pioneers in this field, spoke about the background to this at the congress organised by the Austrian Society for Geriatrics and Gerontology (ÖGGG) with Klaus Donsa (HEALTH).

The existing data warehouse and web-based system BARS (Benchmarking and Reporting Service) is used in Austria and Germany for quality assurance both in planning and research in the health service. The system was used by medical expert personnel in both countries to conduct a structured survey aimed at gaining standardised real-world data from the fields of geriatrics, diabetes, cardiovascular diseases, and hepatitis C.

How did the idea of using intelligent data gathering to improve geriatric treatments come about? MRAK: Right from the start, the gathering of data actually began at HEALTH. The idea was to improve the complex treatment of chronically ill diabetics. With Thomas Pieber, we began to create a kind of checklist and soon recognised the process gains that would bring to the treatment. The idea was to follow a treatment path from A to Z, make it verifiable, and thus improve the patient's individual treatment. We used data management programs to do this. Around 20 years ago, and inspired by a lecture given by Thomas Pieber, we also used this approach for geriatrics. In a working group, we introduced benchmarking in geriatrics.

When was this? MRAK: We started de-

velopment in 2005 and it was implemented in 2008. The group, which included Georg Pinter, has stayed together since then. The hospital operating companies, such as KABEG, were obviously interested in structuring data and a suitable budget was available for the further development of the benchmarking system. In 2009, a prototype of BARS was available with which numerous departments used and delivered data. In the meantime, the data pool with its almost 150,000 datasets is used for scientific theses and the representation of quality assurance. // PINTER: The system developed in a similar way in Carinthia, while in Austria, geriatrics was mainly restructured. At the time, we defined a base dataset for geriatrics that has hardly changed.

Will the benchmarking system be used throughout Austria? PINTER: Yes, in Styria, Carinthia, Vienna and Upper Austria. Just recently, Salzburg and Burgenland have expressed interest too. Our goal is naturally to roll out the benchmarking system across all of Austria. // MRAK: Regarding the instruments used to acquire data, we can say that the items we defined in 2008 are still evident. // DONSA: That is a crucial point since it enables an optimal evaluation of data and guarantees comparability over the very long project

period. The association's work (QIGG – Quality in Geriatrics and Gerontology) and the expert level exchanges amongst the members is enormously important for in this context. PINTER: In the meantime, the system is getting old, above all in terms of technology, which is why work is continuing on its further development. This is also necessary for the scientific use and the implementation of new program features. This innovative drive has been made possible thanks to financing from the health budgets by Styria, Carinthia, and Vienna. // MRAK: The process has naturally taken a long time. The patience and focus on the part of the project managers at HEALTH has made all this possible.

When and how does artificial intelligence enter the scene? DONSA: Our goal for the further development of BARS when applying for the health budget was to keep the benchmarking system and make useful extensions to it in the form of artificial intelligence. // PINTER: Metaphorically spoken, we planted the seeds, but nothing prospered but a long time. But suddenly an extremely fast-moving situation evolved. Benchmarking means the comparison of before and after situations. Now we networked data and made sensible evaluations of it, which had the

.I.: Klaus Donsa (research group leader up to August 2022 at HEALTH) in a discussion with physicians Peter Mrak (president of QIGG – Association for Quality in Geriatrics and Gerontology) and Georg Pinter (r., Vice-president QIGG) during the congress organised by the Austrian Society for Geriatrics and Gerontology in April in Salzburg.

Photo: JOANNEUM RESEARCH



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effect on everyday geriatric life that physicians and care personnel could be immediately warned of risks such as delirium. This goes beyond being a purely administrative system. These systems will revolutionize the interpretation of data in medicine over the next 5 to 10 years. We need to process data in the future in such a way that it can be read: above all to alleviate the problem of a lack of personnel and to relieve the burden on employees.

What are the advantages for patients and for the supervising staff? Can the advantages be expressed in numbers?

DONSA: The idea is to recognize complications before they occur. In geriatrics, it is important that the patients can arrive at where they need to be. This relieves the burden on the system. In Austria, it is forecast that there will be a lack of care personnel of up to 75,000 people by 2025. This will be a challenge for us. // MRAK: In 20 years, there could be as many 80-year-olds in geriatric care as there are currently 60-year-olds. The total will be high, and this challenge cannot be mastered by geriatricians. The treatment must therefore be transferred to other departments. This requires the best risk stratification. The group at JOANNEUM RESEARCH stand united be-

hind this and are focussed on working out an optimal implementation.

Will physicians be replaceable in future with artificial intelligence?

PINTER: No, but they will receive support via networked and interpreted data. This increases the probability of correctly predicting the course of the illness or therapy. This obviously results in an enormous advantage for all people involved, but primarily for patients. The key phrase here is evidence-based medicine. // DONSA: Care must be taken to ensure the data is considered in an overall context. Hospitals are very complex systems. This means that the system must be robust and still be manageable by medical personnel even in stressful situations such as a medical emergency.

Should we be scared of growing old?

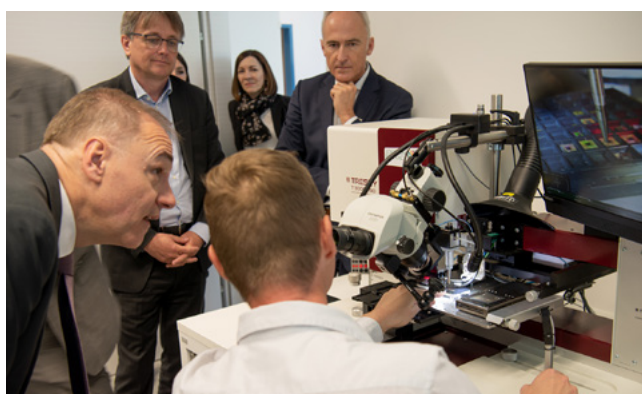
PINTER: I think that every age brings positive and negative mechanisms. The younger generation is beginning to take over and both medicine and the supply landscape will change completely. Homo Patiens has developed into Homo Ludens. But no, we don't need to be scared. Everyone can shape things: if there is too little care, we need to find new concepts. We need to change course now in order to be able to cope

with the dynamics of change, also in the future. // MRAK: But today's 60-year-olds will definitely be critical in old age. And we have to have solutions for this such as "hospital at home". This incurs creating living space as single room apartments are not very helpful. // PINTER: Perhaps we will see a rise in solidarity between the young and old. The young ones have a different approach to life and to resources. I think the way the youth are acting is very positive. I am confident that current problems will be solved in a revolutionary way, simply because it has to happen. ■

COOPERATION

The southern research axis from Burgenland, via Styria, to Carinthia will be strengthened further. To this aim, regular discussions are taking place between the research units in JOANNEUM RESEARCH and the stakeholders.

In March 2022, JR CEO Heinz Mayer and procurist Erwin Kubista welcomed Burgenland's provincial councillor Leonhard Schneemann to Graz. The goal of the meeting was to discuss technological trends and how to strengthen Burgenland as an innovative location. The provincial councillor visited the HEALTH and DIGITAL institutes.



Alle Photos: JOANNEUM RESEARCH / Rindler

On the 29th of April 2022, provincial councillor Leonhard Schneemann and Michael Gerbavits (Business Agency Burgenland) visited Heinz Mayer at the MATERIALs site in Pinkafeld. Researchers offered insights into the fields of smart connected lighting. Smart lighting can recognize when people are no longer present in a room and thus can switch off the lights. This technology thus increases efficiency and promotes environmental protection.

> TRAIL- BLAZ- ER <

**FOR BRAND NEW
DIGITAL-HEALTH-
SOLUTIONS**



TEXT: ELKE ZENZ

Franz Feichtner replaced Frank Sinner as **director of HEALTH** at the beginning of the year and now heads the HEALTH institute at the ZWT in Graz together with Thomas Pieber. He defines his role as head of institute as the **trailblazer for the scientific excellence** required to conquer **market niches**.



Photo: JOANNIDM RESEARCH / Schwarzl

> TO SCORE IN SCIENCE, YOU NEED BUDGETARY FREEDOM. <

Medical knowledge is renewing and changing itself while growing at a tremendous pace. In order to remain up to date and create space for top scientific feats needs economic stability, security, and knowledge carriers. Franz Feichtner, HEALTH's new director from the beginning of August 2022, explains his vision and where he sees the HEALTH institute in the future.

How would you define your new function?

In my role as director, I am responsible for business and operative topics. I don't see myself as a researcher or as someone who assumes the leadership of scientific topics. The scientific management of the institute lies in the hands of Thomas Pieber. Since he originated in the field of metabolic research, this topic is naturally at our core, and he is a strong driver. However, there are also other fields that we work in that are driven by our key researchers and my predecessor Frank Sinner. My job is to keep everything together and to create suitable structures and frameworks so that we function profitably and can still develop further scientifically.

Does this mean you are an advocate of dual management systems in scientific institutions?

Yes, absolutely. We see that the dual role in a leadership position, in other words the organisational, sales, and management talent in parallel to researcher spirit and scientific depth is a difficult one to beat, and not just on a management level, but also on the research group management level. I think it is best for our team if key personnel can concentrate on their core competence and less on having to do things they are not good at or that they dislike doing. Good teamwork can achieve good results and profit.

The confirmation of a researcher is scientific publication and the visibility in the community. However, it is impossible to keep the focus on this if one also has to concentrate on topics such as management, business, marketing, personnel management, or patents. Of course, exceptions confirm the rule and there are people who are indeed successful in all these aspects and can manage everything at once. However, in my experience, they are a minority. I prefer to see specialists rather than generalists.

Your goal is to create a framework in which creative and viable ideas, as well as innovative personalities, can grow.

How are you going to achieve this? I propose a strategy of defining and building products and services out of our research work that are amenable to commercialisation. In order to score scientific points in an international setting, we need space for creativity and a certain level of budgetary freedom. We can only achieve this if we offer products and services that are standardised in everyday research. This will allow us to create a buffer for new development to generate a market advantage. Examples of this are data management and biostatistics that originated from an internal necessity. Numerous clinical studies were needed to bring our most important technology, the open microperfusion (OFM), to this level. The resulting data, which corresponded to the defined quality criteria, now form the basis for standardised research services. I want our researchers



Photo: Jürgen Feitel

HEALTH is just 20 years young.
The team spirit is tangible and positive.
It is diversity, the source of the team's
strength, which fires up
an innovative spirit.

to be really able to conduct research. They need space and time to drive our core competence forwards, and that is research. The organisation of all that is needed should be done by people who are good at it and who want to do it. That is efficient and expedient while strengthening our expertise.

In your model, who speaks to the customers? Either the person who deals with the business development aspects of a standardised product or the person responsible for the project with the appropriate expertise. It depends on the customer.

Which topics will you focus on in the future? We are currently in a strategic process. Four large topics are crystallizing out in which we are strong and upon which we will build our future: dermatological and neurological research, research into metabolism, and a digital health laboratory. We will align our research topics with these core fields and use inhouse budgets. This will enable us to specialise and subsequently develop methods and products that we can standardise. This is the path that will make us fit for the future.

On your journey along this path, will anything be left behind? Yes. We have always had to adapt ourselves to changes in internal and external boundary conditions and, as a last consequence, this can also mean that we need to let go of certain topics. In concrete term, this means that right now we have to let go of the topic of sensors. This is in part also due to the fact that our key researcher, Martin Hajnsek, is leaving the company.

Do strategic decisions depend upon staff? Of course. Research topics are driven by people and excellent staff are our most valuable capital. In this case, not exclusively since we have not found an industrial partner who is prepared to develop a product such as a potassium sensor all the way to market readiness. It is a shame, as I am still convinced that it is a product that many people need. However, we cannot travel alone along the whole path from idea to product.

Where do you see HEALTH in an international context? We are thanks to or perhaps even because of our strong regional cooperation partners, very internationally active and recognised in dermatological, neurological, and metabolism research. In terms of business, we currently generate our largest turnover in the USA. Nationally and regionally, there are many excellent scientific cooperation, but comparatively low business turnover. We wish to increase this regional value creation in the short term and to this aim are implementing the Digital Health Lab, which is planned to spawn regional projects as a priority. In the future, we wish to work more closely

with domestic companies and partners, above all regional health service providers.

Thank you for the interview! ■

Franz Feichtner has been at JOANNEUM RESEARCH since 2005, with a short interruption, and has helped shape the institute in his many different roles. He is resolutely pursuing an exploitation strategy for HEALTH's products and services.

Photo: JOANNEUM RESEARCH / Schiwarzi

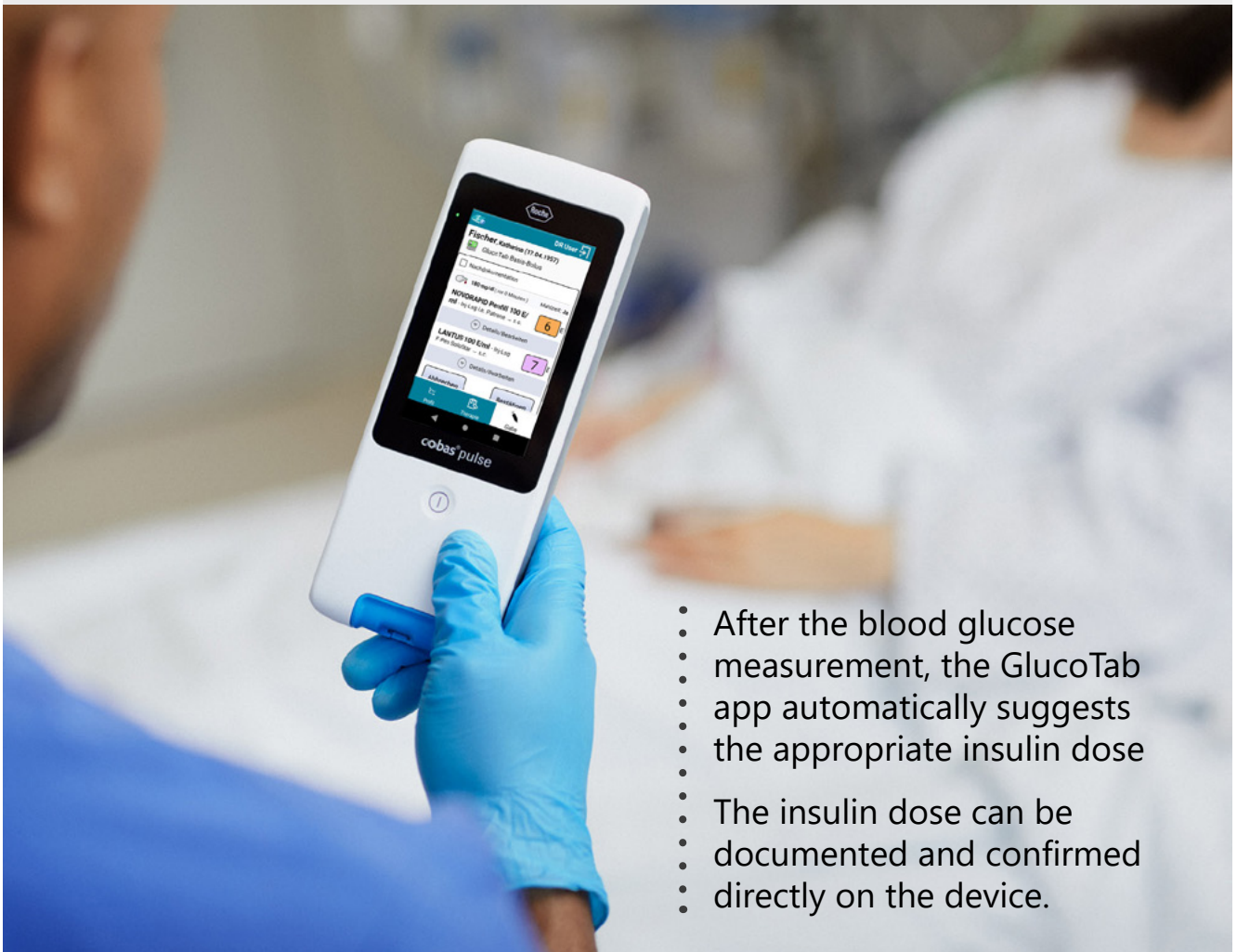




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„Through this cooperation with Roche, we have made a big step towards our vision for the digitalisation of diabetes therapy!“

— Peter Beck, CTO, decide

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Precision medicine for chronic wounds

COMMENTARY BY BARBARA WOLFF-WINISKI

In western countries alone, 20 million patients suffer from chronic wounds. Therapy is unsatisfactory, even though 2 to 5 percent of all budgets of national health systems are spent on it.

Chronic wounds such as venal or arterial ulcers, diabetic foot wounds, or bedsores are a burden on the quality of life and life expectancy of patients. Standard treatments are often unsuccessful and, so far, it has not been possible to predict therapeutic success for individual patients. In the past 15 years, no new medication has been approved.

The Viennese biotech company Akribes Biomedical has, for the first time, developed and patented a functioning biomarker platform for an effective and personalised therapy for chronic wounds. This enables individual patient wounds to be characterised and the transition from a chronic to a healing wound to be measured.

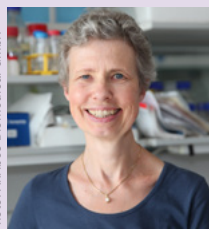
Wound fluid seeping from chronic wounds damages and kills human cells. Akribes Biomedical has identified and patented ingredients that reconstitute

normal cell growth and thus have a previously unknown potential to treat chronic wounds. The samples are currently being miniaturised down to a lab-on-a-chip format so that a diagnosis can be made possible with the smallest possible amount of patient material.

These advances have been achieved in cooperation with renowned university clinics such as the MedUni Graz and other research institutions in Europe. For example, Akribes Biomedical is an official partner of the interdisciplinary research association SKINTEGRITY.CH, where fundamental researchers and engineers work closely together in order to improve their understanding of wound healing disturbances, to diagnose them and to devise therapy.

The laboratory was certified according to ISO 13485 in 2021. Over the next 2 years, plans are in place for the CE certification of the biomarker assays for individual wound patients and a clinical proof-of-concept study with a new ingredient discovered by Akribes with the potential for widespread application. ■

Photo: Akribes Biomedical GmbH



Barbara Wolff-Winiski is Co-CEO and CSO of Akribes Biomedical GmbH.

SUN

BLOCKER

THAT (DOESN'T) GET UNDER YOUR SKIN

TEXT: ROBIN AYDINONAT

Summer is here: We seek refreshment in an outdoor pool, in a lake, or in the sea. We carry with us our bathing costume, flip-flops, towels, a good book, and also sun blocker. Many people ask themselves whether conventional sun cream, aside from its protective effects, also has damaging effects on our organism. Nanoparticles are the source of scepticism. This is why the institute HEALTH from JOANNEUM RESEARCH is investigating whether these small particles can penetrate the skin. An EU project "Biorima", with its runtime of four years, involved HEALTH researchers in analysing whether the substance titanium oxide, which is present in many sun creams in the form of nanoparticles, can penetrate the skin. Sun cream has many known advantages: it protects us from damaging UV radiation and consequently from skin ageing and skin cancer. In so-called mineralogical sun creams, UV radiation reflects off inorganic ingredients such as titanium oxide or zinc oxide directly on the skin. There are also sun creams in this category without nanoparticles, but the cream remains visible as a white layer on the skin. No wonder, since zinc oxide is also known as zinc white and is used a pigment in paint. If you want to use cream that cannot be seen, nanoparticles are a must. Their small size between one and a hundred nanometres prevents the formation of white residue on the skin and also increase the sun protection factor.

As an alternative to mineral sun protection filters, there are also chemical sun creams. These penetrate the skin, and the cream remains invisible. However, prudence is advised: chemical sun protection can often trigger allergies more often than mineral based. The ingredients also act in a similar fashion to hormones in the body. The team around Thomas Birngruber from HEALTH used their method of open

NANOPARTICLES COULD NOT PENETRATE HEALTHY SKIN.

microperfusion (OFM) to pursue the question as to whether nanoparticles in mineral-based sun creams can pass through the skin. To check this, sun creams with nanoparticles were applied to the skin and a minimally invasive catheter was introduced under the skin. In the OFM method, carrier fluid flows in the catheter and transports any sun cream contents that made their way below the skin to the sample container. The fluid is collected there and can then be analysed. The result: no nanoparticles were able to penetrate the top skin layers. HEALTH researcher Thomas Birngruber says, "our results indicate that the titanium oxide nanoparticles in the investigated sun creams were not able to penetrate the protective barrier offered by healthy skin thus could not enter the organism." ■

Research is conducted into the processes surrounding wound healing and the effectiveness of substances using models that are tailored to the question at hand and are developed in the centre. On the one hand, there is the possibility of examining the sequence of skin reactions in fresh explants (ex vivo). On the other, tests can be conducted in three-dimensional in-vitro models that consist of at least one dermal and epidermal section. "We can grow 3-dimensional skin models in the cell culture laboratory in addition to the cultivation of ex-vivo tissue."



Laboratory for WOUND HEALING

The team at COREMED has been working on the establishment of their own laboratory since 2019. Now researchers at COREMED can offer an extended research spectrum for questions concerning wound healing. This is of interest to the pharmaceutical and MedTech industry. COREMED offers preclinical and clinical research, as well as interdisciplinary R&D services.

In the western world, around 1 to 4 percent of people suffer from chronic wounds. In Austria, the figure is estimated at being between 200,000 and 300,00 people and this number is expected to rise. It is therefore important that new therapies are researched. ■

Photo: JOANNEUM RESEARCH / SCHWARTZ



INFRASTRUCTURE



Photo: JOANNEUM RESEARCH / Schwartzl

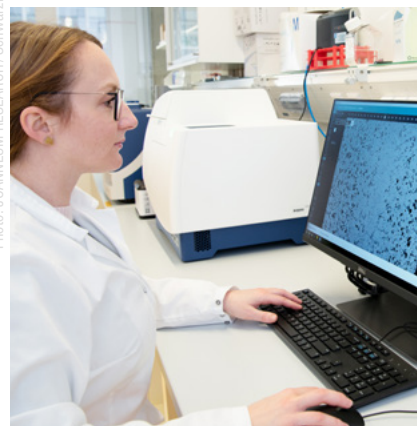
The ZWT (German acronym for Centre for Knowledge and Technology Transfer in Medicine) houses research institutes such as HEALTH and COREMED, start-ups and the biobank. This provides a valuable base for a profitable network.



Anna Schwarz is researching into the role adipocytes play in wound healing. This topic is one of the research focal points in the research group "Technology for Tissue Regeneration". She was awarded a prize from the German speaking working group for the treatment of burns.



Photo: JOANNEUM RESEARCH / Schwartzl



Petra Kotzbeck leads the research group "Technology for Tissue Regeneration". Her focus is on metabolism and its correlation to wound healing.

Wafer-thin measurement plaster

Weiz-Osaka Publication: In a cooperation with the University of Osaka, a research group has developed an ultra-thin sensor that enables the measurement of a range of vital parameters and also energy generation.

It is a necessary evil for many people: measuring blood pressure and pulse three times a day. Unfortunately, the devices used domestically are usually clumsy and uncomfortable to use due to their size, weight, and measurement procedure, which often leads to an unconsciously stressful situation for the person, and which can subsequently falsify blood pressure readings, particularly for 24-hour measurements.

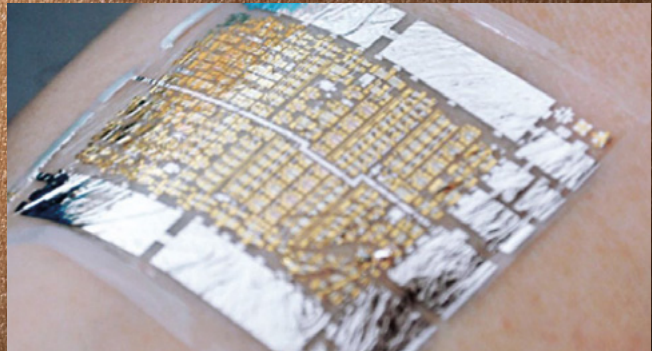
This situation motivated a research team at MATERIALS, the institute for surface technology and photonics, and their colleagues at the Osaka University to develop an electronic sensor plaster that is so thin, it is virtually imperceptible. For two years, research was conducted into a hardly noticeable and energy harvesting sensor plaster and several of the pioneering results were published in the renowned journal "Nature Communications" in 2021.

Barbara Stadlober, research group leader at MATERIALS: "Our electronic sensor plaster was able to be used as a part of the screening for lifestyle-related illnesses such as cardiovascular illness, stress factors, and sleep apnoea."

In real-time: Blood pressure measurement with a 0.0025 mm thin sensor

This is possible thanks to a sensor material with an unpronounceable name: Poly(vinylidene difluoride - trifluoroethylene), that is coated onto a wafer-thin foil connected to an electronic module weighing just a few grams.

How does this work exactly? Between two wafer-thin electrode surfaces, the P(VDF-TrFE) sensor material is applied to a carrier foil made of Parylene just 1 millionth of a metre thick. Due to its permanent electrical polarisation, it possesses a high level of sensitivity to mechanical movements, it is hence strongly piezoelectric. The crucial insight was that by avoiding a thick carrier substrate, the sensitivity could be increased manifold and we were able to measure even the smallest changes in pressure such as the variations in a human pulse beat. The thickness effect can also be easily demonstrated in simulations. Alongside the pulse rate, the sensor plaster can also provide insights into the elasticity of human blood vessels and measure blood pressure via the pulse wave speed. Particularly important: The electronic module can also transmit measurement data, for example to a smartphone. Overall, the plaster is



The plaster is 0.0025 mm thick and supplies itself with energy. This is a world first.

not more than 0.0025 mm thick. This helps it to blend in completely with the skin; it is ultra-flexible so to speak. The sensor is thus the world's first, ultra-flexible piezoelectric sensor.

Generate energy by walking upstairs

It is particularly fascinating that the sensor plaster can also be used to generate electrical energy from biomechanical movements. However, the efficient extraction of the energy from antagonistic joint movements such as bending-stretching the knee joint requires the power gained to be rectified. To do this, researchers have developed circuits out of wafer-thin organic rectifier diodes and introduced them to the thin carrier foil; this too has never been done before. The foil was then finally prepared for the intermediate storage of the energy with a wafer-thin capacitor structure.

Barbara Stadlober explains, "Depending on the user's activity levels, around 200 mJ of energy could be harvested per day. This is enough for three daily blood pressure measurements, assuming that there is a light, low-energy electronic module for wireless data transmission. Unfortunately, these are currently extremely rare." ■

RESEARCH COOPERATION

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The Future of Medicine is the Present

COMMENTARY BY CAROLINE SCHOBER AND HELLMUT SAMONIGG

Digital tools that make use of artificial intelligence to evaluate complex health data, support medical decisions, or avoid interactions between medication; A digital twin continuously monitors our vital parameters using data from wearables and other sources and sounds the alarm long before we would even think of asking for medical advice; A home full of hardly noticeable sensors and technical helpers that ensure we can remain independent at home in old age or after an accident; Image recognition software that supports the scant number of radiologists and pathologists capable of creating radiological and histological reports; A highly automated operating theatre, robot technology in care, tools that predict an individual diagnosis, medication or health risks...

In what may sound like tomorrow's world, many aspects are already reality. Even if the current applications often do not correspond to the high standards of doctors, engineers, researchers, or patients, it is only a matter of time before the technical limitations have been overcome and the borders of what is

feasible are redrawn.

But one thing remains constant and is becoming more and more important: the person at the centre of all this activity. He or she is much more than a finely tuned machine made of flesh and blood, more than a collection of vital parameters and blood values, genetic or metabolic information of the person themselves or their tumour. Perhaps technology tends to overshadow the person and lets the facts and figures have the dominant voice. The doctor is increasingly turning into a translator and navigator in a universe of life-or-death bits and bytes. Pilots who will have to merge more than just medical expertise with highly developed empathic, social, and communicative skills, but also technical and computing understanding. Demanding that all these things are connected, is asking quite a lot. A task that doctors can only fulfil if we place particular emphasis on these skills at university, during training, in research and every single day with our patients. ■



Caroline Schober is a biochemist and molecular biologist. She has held the post of vice rector for research and international affairs at the Medical University of Graz since 2016.



Hellmut Samonigg is an oncologist and palliative doctor. He has held the post of rector at the Medical University of Graz since 2016.



Photo: JOANNEUM RESEARCH / Schwarzzi

Anita Eberl is an expert in the field of bioanalytical chemistry and, for over 15 years, has developed a range of methods for medical, pharmaceutical, and technical matters.

Really FAT

TEXT: ELKE ZENZ

One study found that even the smallest amounts of fructose or table sugar intake doubles the production of fat in the liver. The liver produces more fat with just 80 grams per day.

In 2021, a study by the University of Zürich published in the Journal of Hepatology investigated the link between the intake of sugar and the production of fat in the liver. One method behind this came from Styria: HEALTH, the INSTITUTE FOR BIOMEDICINE AND HEALTH SCIENCES at JOANNEUM RESEARCH established the necessary glycerol tracer method.

The world health organisation (WHO) recommends the reduction of free sugar intake to below 10 energy percentage points. This is equivalent to 50 grams or around 10 teaspoons of table sugar per day for an average adult with a calorie intake of 2000 kcal. "Free sugar" refers to all forms of sugar that are added to food and drink. It also includes the sugar that occurs naturally in honey, syrup, fruit juice concentrate and fruit juice. The effect of sugar intake in the body can be determined by tracer substances that are tracked in the body. This is what a Swiss team at the University of Zürich did using a method designed by JOANNEUM RESEARCH in Graz.

"The primary author made a direct request for our measurement method for the determination of lipolysis, which is the breakdown or hydrolysis of body fat to glycerol and fatty acids", HEALTH's project manager in Graz, Anita Eberl, said. The expert for bioanalytical methods explained how it works: "The test person is given a constant infusion of the "d5-glycerol" tracer. The enrichment of d5-glycerol compared to natural glycerol is determined from blood plasma samples after chemical conversion (derivatisation) using gas chromatography-mass spectrometry (GC-MS). The results of these measurements can be used to calculate the peripheral lipolysis." In simple terms, it means the path from introduced and marked substances (tracer) in the body can be followed and analysed. This enables conclusions to be drawn regarding reactions in the body.

Summary: Even small amounts of fructose or table sugar intake can double the production of fat in the liver. This has an effect on the frequency of common diseases such as type-2 diabetes, fatty liver, or obesity. ■

Good to know: 19 cubes of sugar are 100 grams of Nutella, 6 to 7 cubes in a 0.2 litre glass of orange juice, and 7 cubes in a 150-gram carton of fruit yoghurt.

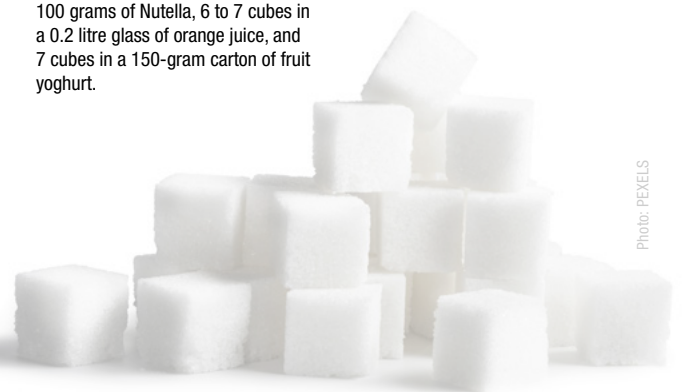


Photo: PEXELS

Award-Winning

Researcher at JOANNEUM RESEARCH publish over 200 papers every year in journals, books, and proceedings. They also give around 250 scientific talks per year and supervise 60 theses.

Here is a selection:



Photo: PEXELS

Assessment of Two Different Glucagon Assays in Healthy Individuals and Type 1 and Type 2 Diabetes Patients

Martina Brunner, Othmar Moser, Reingard Raml, Maximilian Haberlander, Beate Boulgaropoulos, Barbara Obermayer-Pietsch, Eva Svehlikova, Thomas R. Pieber, Harald Sourij | **Biomolecules**. 2022 Mar 18;12(3):466

Two different Glucagon test methods were assessed that were verified on diabetics and healthy people. Up until now, a lack of specificity and a narrow sensitivity band often led to inaccurate results and to the suspicion that diabetics show elevated levels of fasting glucagon. The availability of specific, more sensitive methods to detect intact Glucagon molecules has shown that the actual Glucagon level is lower than previously assumed. The comparison of both test procedures demonstrated the relevance of the selection of selective laboratory methods.

Optimisation of Topical Formulations Using a Combination of In Vitro Methods to Quantify the Transdermal Passive Diffusion of Drugs

Joanna Hummer, Thomas Birngruber, Frank Sinner, Leanne Page, Frank Toner, Clive S. Roper, David J. Moore, Mark B. Baker, Mila Boncheva Bettex | **Int J Pharm**. 2022 Apr 9:121737

This work investigated a new approach for the optimisation of products applied locally on the skin. In doing so, two methods are combined: open-flow-microperfusion and Franz-diffusion Cell. The result: The passive diffusion of the active ingredient Diclofenac through the dermis and subcutis does not correlate with the diffusion through the Stratum Corneum and can therefore not be predicted solely with measurements with the Franz-Diffusion Cell. The best solution for product development is therefore a combination of both methods to enable the comparison of locally applied formulation candidates and their effects on the delivery of active ingredients through all skin layers.



Photo: PEXELS

Effects of Spermidine Supplementation on Cognition and Biomarkers in Older Adults with Subjective Cognitive Decline: A Randomised Clinical Trial

Claudia Schwarz, Gloria S. Benson, Nora Horn, Katharina Wurdack, Ulrike Grittner, Ralph Schilling, Stefanie Märschenz, Theresa Köbe, Sebastian J. Hofer, Christoph Magnes, Slaven Stekovic, Tobias Eisenberg, Stephan J. Sigrist, Dietmar Schmitz, Miranka Wirth, Frank Madeo, Agnes Flöel | **JAMA Netw Open.** 2022;5(5):e2213875

This study was concerned with the effects of a spermidine supplementation on the memory performance of older people with subjective cognitive decline. A spermidine-rich food supplement and a placebo were taken by 100 participants for 12 months. The result of the randomised clinical study: A long-term intake of spermidine changed neither the memory performance nor the biomarkers compared to the placebo. Explorative analysis did indicate possible positive effects on verbal memory and inflammation, which will need to be validated at highest doses in future studies.



Photo: PEXELS

SAINTENS: Self-Attention and Intersample Attention Transformer for Digital Biomarker Development Using Tabular Healthcare Real World Data

Julian Gutheil, Klaus Donsa | **Stud Health Technol Inform.** 2022 May 16;293:212-220

This study introduced the new deep learning method, SAINTENS, which is used with the kind of tabular data that occurs in the real world, particularly prevalent in the health sector. A comparison was made between it and the deep learning model SAINT and other state-of-the-art machine learning methods. To this aim, tabular, geriatric data was used to predict a range of events. The result: Combined with multi-modal learning, SAINTENS and SAINT can be used to discover and develop new digital biomarkers in real data that includes tabular, textual, and image data.



Autologous Fat Grafting in Reconstructive Breast Surgery: Clinically Relevant Factors Affecting the Graft Take

Hanna Luze, Anna Schwarz, Sebastian Philipp Nischwitz, Dagmar Kolb, Kaddour Bounab, Robert Zrim, Raimund Winter, Lars-Peter Kamolz, Thomas Rappl, Petra Kotzbeck | **National Library of Medicine.** 2022

Factors were studied that influence the take of autologous fat transplants in reconstructive breast surgery. The unpredictability of transplant survival is a challenge and there is no clear consensus concerning the optimum technique. Factors were identified within the scope of a study that correlated with the withdrawal rate, for example the available average thickness of the subcutaneous fat tissue in the transplanted breast before the operation. An approximate correlation was determined relating to the number of previous transplantation sessions, body mass, and the BMI.



Photo: PEXELS

Digitaldialog Design Thinking

TEXT: ELKE ZENZ

The 90th event in the Digital Dialogue series took place as a hybrid event on the 29th of March in JOANNEUM RESEARCH's headquarters in Graz. Design Thinking is used to consider feasibility, profitability, and patient needs and to shape efficient processes. This can result in increased satisfaction, safety, and sustainability in a hospital.

A hospital is a sensitive apparatus. And yet it is important to adapt infrastructure, processes, and communication structure to current circumstances. The authors drew pictures of the possibilities to shape how a future hospital could function and offered insights into the approach to implement new processes.

Lars-Peter Kamolz projected his vision of a sustainable hospital on the wall of JOANNEUM RESEARCH's conference room.



Photo: JOANNEUM RESEARCH/Rindler



Photo: JOANNEUM RESEARCH/Rindler

HEALTH director Franz Feichtner (l.) with Christophe Vetterli (Screen), who joined in from Switzerland.



Photo: JOANNEUM RESEARCH / Rindler

From left.: Lars-Peter Kamolz (JR COREMED), Klaus Donsa (JR HEALTH), Heinz Mayer (GEF JR), Peter Tiefenbacher (LKH-Universitätsklinikum Graz) and Franz Feichtner (JR HEALTH)

In his presentation, physician and manager Lars-Peter Kamolz drew a picture of a sustainable hospital of the future. “Sustainability is not the same as environmental protection. Sustainability also includes processes, prevention, and knowledge”, Kamolz said. “The volume of medical knowledge is currently doubling every two months. How can one remain up to date?” This question and others relating to the sustainable dealing with technologies, medical devices, and equipment demand new processes. Design Thinking is a promising approach to make a hospital smart, green, and sustainable.

Christophe Vetterli von Vetterli, Roth & Partners (Schweiz) presented examples of successful process implementation using Design Thinking. “The prototyping of processes is essential in healthcare”, the innovator stated. He sees Design Thinking as a toolbox that accompanies from the initial concept to the end product and places great emphasis in his projects on prototyping and testing, “It is essential for the process’ success that all stakeholders are included. Heterogenous groups are enormously important for process optimisation. All stakeholders need to be included: from care personnel to patients”, the

Swiss said.

Peter Tiefenbacher, Quality and Risk Manager at the LKH University Clinic of Graz, described the top risks in a hospital and the resulting possible treatment mistakes. He presented the standard OP checklist as a tool to minimize risks in an OP and illustrated a patient’s path through the OP. The checklist minimizes the probability of mistakes in the OP and hence also the risk of patient suffering. And yet, the analog checklist on paper has proven itself to not be the optimum solution, which is why the digitalisation process was started.

As a consequence, Klaus Donsa, senior scientist at HEALTH, and his team developed a digital OP checklist in cooperation with the LKH University Clinic of Graz. “The positive effects of new processes are often not perceived because of acceptance issues”, Donsa said. The analog checklist did not fulfil all the needs of the users, the digital version appeared to be much more promising. “During development, we spoke to the people who were supposed to use the checklists so that we could find out where we could hit the nerve in order to ensure this safety tool is really used”, the expert explained. The event was moderated by Franz Feichtner, director of HEALTH - Institute for Biomedicine and Health Sciences.

Klaus Donsa, head of the competence groups Clinical Decision Support, introduced the implementation of Design Thinking for the development of medical software.



Photo: JOANNEUM RESEARCH / Rindler

The Digitaldialog is a series of events by Silicon Alps Clusters, which are run in cooperation with the following partners: JOANNEUM RESEARCH, FH Campus 02, IT Community Styria, and FH Kärnten. ■



Scan the code to see the 90th Digitaldialog as a video review

News Shots

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Motion Expo 2022

From the 11th to the 13th of March 2022, the Institute DIGITAL presented the new mobile mapping platform for the creation of digital twins in road infrastructure in the special exhibition Autonomous Driving and acoustic tunnel monitoring (AKUT) at the Exhibition Congress Centre in Graz. JOANNEUM RESEARCH hosted the panel discussion “Autonomous Driving in the Future” on the 12th of March, where CEO Heinz Mayer spoke of future perspectives in the field of mobility.



Photo: JOANNEUM RESEARCH



Photo: JOANNEUM RESEARCH

Career: Matthias Rütter is the new Director at DIGITAL

Matthias Rütter has been in the company since 2017 and, until now, led the research group “Image Analysis and Measurement Systems”. His vision: “Further strengthen the significance of digital innovation on regional and European levels and make the impact of our value creation more visible for customers.”

Digitalisation Success Stories

The book “Digitalisation Success Stories: Good Practices for a Digital Transformation” was published by the Research Association Digital Material Valley Styria (DVMS) and coordinated by the Austrian Society for Metallurgy and Materials (ASMET) to present the experiences and competencies that exist for SMEs. The official book presentation took place on the 19th of January 2022 in the presence of Barbara Eibinger-Miedl, the state councillor for science and representatives of organisation involved.



Photo: Fischer



Photo: Die Steiermark/Lief

STYRIAN Awards: Visionary of the Year

Silvia Russegger was awarded the STYRIAN Award as Visionary of the Year on the 16th of May 2022. The mathematician wants her research to make the lives of people with impairments possible without impairment and to develop technologies that act as a “butler”.

Situation Report Cyber Security 2022

Faced with international urgency and the publication of the current KPMG study “Cybersecurity in Austria 2022”, numerous experts and people interested in the topic were invited by JOANNEUM RESEARCH, the KPMG, and the Competence Centre “Secure Austria” for discussions in the Seifenfabrik in Graz.



Photo: JOANNEUM RESEARCH / Buchgraber



Photo: MICHAEL WAPPL

Awarded Women – Rose of Appreciation

In the presence of Barbara Eibinger-Miedl, the state councillor for science, JOANNEUM RESEARCH received the “Rose of Appreciation” award from the Association of Graduate Women in Austria (VAÖ) for the promotion of young female researchers. Diversity is a major part of the company and provides fertile ground for research success.

Study: Business and Innovation Space in Southern Austria 2030

A long-term study conducted by the POLICIES institute, the University of Graz, and the Institute for Business and Location Development, brought up to date numbers, data, and facts to light regarding the “Business Space Southern Austria”. The study manager for JOANNEUM RESEARCH was Eric Kirschner, who presented the most important findings during a press conference on the 21st of March. Image: f.l.t.r WK vice president Astrid Legner, Eric Kirschner and LHStv. in Gaby Schaubig.



Photo: WKK/Studiohorst

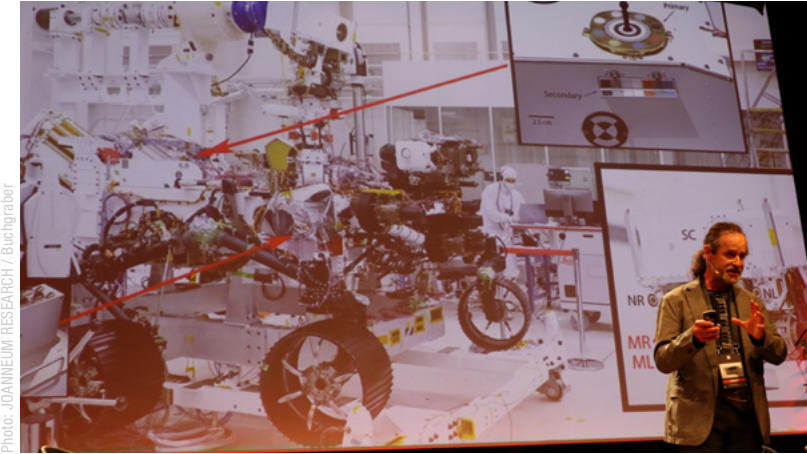


Photo: JOANNEUM RESEARCH / Buchgraber

Fifteen Seconds Festival Graz

The Fifteen Seconds Festival in Graz took place in Graz on the 9th and 10th of June. JOANNEUM RESEARCH was represented by two speakers, the space expert Gerhard Paar and the medical visionary Lars-Peter Kamolz, and an exhibition booth. Stephan Schwarzinger, expert for lifecycle analysis, informed visitors of how user experience and sustainability are connected, and how this knowledge can be used to improve a product or service's CO2 balance. Visitors were also able to make a lifestyle check.

“Access to” SFG’s Future Day

After the opening by provincial councillor Barbara Eibinger-Miedl, Oxford professor Viktor Mayer-Schönberger enthused the audience with an incendiary keynote concerning the necessary to exploit data and make it available. The slogan “Access is the future” offered a large stage for our domestic experts to present their research competence. JR procurist Helmut Wiedenhofer and COREMED director Lars- Peter Kamolz discussed matters in a range of access points and met numerous interested guests on JOANNEUM RESEARCH’s exhibition booth.



Photo: JOANNEUM RESEARCH / Buchgraber



Photo: SAL

Cooperation with Silicon Austria Labs (SAL)

The two research institutions JOANNEUM RESEARCH and Silicon Austria Labs (SAL) have signed a cooperation in the fields of material research and development, and information technology. The cooperation is intended to make further contributions towards establishing Southern Austria as a European centre for electronics. A whole bandwidth of domestic companies that deal with manufacturing and automation will profit from the cooperation. The deal is also designed to appeal to skilled professionals.

Long Night of Research

Thousands of people grasped the opportunity on the 20th of May 2022 to enjoy the long night of research. The selection of innovation was huge: Visitors could draw electronic circuits themselves, take part in a quiz to learn more about robots, experience an OP check as a doctor or as a patient, investigate the surface of the red planet, or enjoy a smoothie that prolonged life. Many renowned experts discuss the big questions about the future in the “Lendhafen”, Graz.



Photo: JOANNEUM RESEARCH / Rindler

Research from A to Z

An overview of topics concerning human technologies and medicine

Adipocytes, fat cells

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Growing old, Ageing

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Wound healing

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Ultrafast Insulins

TEXT: RENATE BUCHGRABER



Maria Ratzer: This new breed of ultrafast insulins is an important step in the development of an artificial pancreas..

For 20 years, HEALTH has been increasing the level of knowledge about diabetes and life as a diabetic. Just recently, the effectiveness of insulins were investigated and compared. In a cooperation with the Medical University of Graz, Maria Ratzer from the Institute of HEALTH demonstrated the effectiveness of an ultrafast effective insulin in a clinical study using pharmacokinetics and blood analysis. The results of the study were published in the renowned Diabetes Care Journal. "In a clinical study, we compared the company Arecor's newly developed formulation with two established insulins available on the market and checked it regarding effectiveness and safety. There are special auxiliary ingredients in this formulation that enable the insulin to be absorbed faster by the tissue", Maria Ratzer, biomedical analyst, said. "Our evaluation showed that



the presence of the new insulin could be measured in blood statistically significantly faster. Earlier effectiveness could also be achieved. This means that the blood sugar level after a meal can be brought to normal levels much earlier, whereby subsequent damage and associated illnesses can be significantly reduced", the researcher enthused. This results in more normality in a diabetic's life and can be a contribution towards more quality of life. ■

Do you have any questions?

If you are looking for a reliable partner to help with your research topics or want to know more about our technologies, please contact our institute:

COREMED

Cooperative Centre for Regenerative Medicine

info

Research that gets under your skin:
COREMED was founded as a joint initiative between JOANNEUM RESEARCH and the Medical University of Graz in order to push research and development in the field of regenerative medicine, particularly in the areas of wound healing, scar formation, and skin ageing. COREMED offers interdisciplinary total solutions in R&D services for the pharmaceutical and medical-technical industry.

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www.joanneum.at/coremed

HEALTH

Institute for Biomedicine and Health Sciences

info

HEALTH understands itself to be the adhesive between fundamental medical research and industrial applications and offers interdisciplinary total solutions and R&D services for the pharmaceutical and medical-technical industry. In a close alliance with the Medical University of Graz, our approximately 60 technical and scientific experts convert ideas and technologies from medicine, pharmaceutical science, and supply research into marketable products and services.

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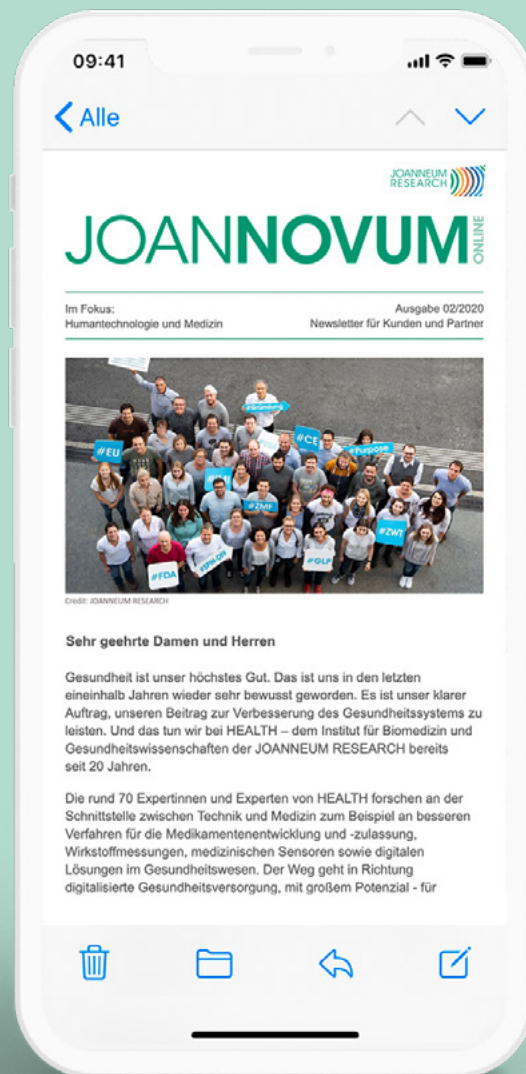
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