



European Biotechnology

ISSN 2364-2351 | A 60711 | BIOC.COM

Life Sciences and
Industry **Magazine**

Winter Edition 2019 | Volume 18 | 20 €

Interview

Peter Homberg:
The co-founder of
the ECA explains
why Europe needs
an association
for the cannabis
industry.



FREE EXCERPT

Labelling

Stamp for a new era

Gene Editing

European Court of Auditors
pushes EC to rewrite the rules

Biotextiles

How the life sciences are
changing the fashion industry

Cell Programming

Technologies go head-to-head
in the cell therapy market

BIOC.COM



Don't prepare. Just be ready.

C2MAP-2000 – 1 method, 17 mins, 95 media components

The new C2MAP-2000 automates all steps from pretreatment to measurement without any human intervention. It simplifies the workflow for optimizing cell culture conditions. There is no need to prepare. Just be ready.

Complete LCMS solution for cell culture analysis combining the C2MAP-2000 pretreatment module with ultra-fast LCMS-8060

Highly efficient through cutting culture media analysis time by 80 percent

Monitoring of up to 95 components

including amino acids, metabolites, sugars, vitamins and organic acids

Changes at a glance

with C2MAP-TRENDS viewer software visualizing temporal changes of components



European Cannabis Association: An essential step



RAINER KRUEGER (42) co-founder of the European Cannabis Association, founded his first consulting firm in 2009. Josteit & Krüger Consulting GmbH (J&K Consulting) emerged from the former JHP Consulting GmbH, in which he held various positions since 2005. Since 2013, Krüger has been the sole managing partner of J&K Consulting GmbH, and in the following years, he founded Krüger Verwaltungsgesellschaft mbH & Co KG and J&K Technology GmbH, which he runs as a managing partner.

Medical cannabis has become one of the most important economic topics in recent years! But, what makes this topic so relevant, and why is it so essential to found a European association? The legalisation of recreational and medicinal cannabis in different states has led to impressive economic progress in recent years. Through worldwide patient campaigns and global marketing strategies, the topic became a permanent information focus for social networks and politics at the end of 2018.

Even renowned trade fairs, such as Expopharm in Düsseldorf, reflect a trend that cannot be ignored. But, what can be seen behind the strategies and approaches for the production of medicinal cannabis is not conducive to the “enormous” pharmaceutical potential. The delta between potential and lived production practice is enormous and is further negatively reinforced by heterogeneous regulatory requirements. Different approval procedures and classifications of limit values, such as the THC limit within Europe and Switzerland, or the classification of CBD in Europe and North America, is only the tip of the iceberg. Throughout the last years, we confront such a complex and confusing market, that even with our experience of six years in the area of medicinal cannabis, it is challenging to maintain a balanced overview. At the beginning of this year, there were sporadic reports dealing with the topic of effects and effector systems of medicinal cannabis, but today, we can take a look at daily “success stories” for medicinal cannabis. Likewise, there is hardly any other medical topic that is supported by so much personal patient information. The potential and hope for a sustainable “green” miracle substance does not only inspire investors. It is going to be a walk on a tightrope to balance the conflicting goals of stakeholders and the resulting demand for a strong European Cannabis Association (ECA).

On the one hand, we should try to ensure the current care of the patients and to collect all the knowledge we can get, and, on the other hand, we should introduce and implement the existing basis of pharmaceutical manufacturing GMP (Good Manufacturing Practice). This is the only way to produce high quality and reproducible starting products as prescription drugs or as potential active substances, and to underpin the investigations with clinical studies. Another point is the development of standardised specifications and legal framework conditions that should be harmonised internationally. The ECA wants to address exactly this area and offer support in the areas of consulting and development of standards for the production of medicinal cannabis. In order to avoid possible patient risks, clear GACP-/GMP-guidelines must be implemented for the production of the plant, and the product quality must be checked more closely. We also need further and applied scientific research in the field of cannabinoids. Now, we possess the first basic insights, but these are not sufficient for the constantly growing field of application.

FREE EXCERPT

COVER STORY



The European Biotech Network agenda

Despite the threat of a looming climate catastrophe, low oil prices and giant industrial conglomerates hooked on fossil resources continue to stifle industrial biotech products and innovation. The European Biotechnology Network is now supporting companies in the field to help themselves with the launch of three very different projects. A label, a job market platform, and a cutting-edge climate protection project are all aimed at pushing the bioeconomy forward.

INSIGHT EUROPE

- 6** Antimicrobial resistance: European Court of Auditors and BEAM Alliance call for rapid action
- 9** Regulating the European market for medicinal cannabis
- 10** Interview:
Peter Homberg, Dentons LCC,
Co-founder of the European
Cannabis Association
- 12** Council presses European
Commission to decide on rules
for genome editing

ECONOMY

- 22** EMA News
- 23** Market commentary
- 24** Euro Biotech Stocks
- 27** Update on clinical trials
- 30** Interview:
Ready for the next step in growth
Dámaso Molero Sánchez, CEO,
3P Biopharmaceuticals LC, Noáin,
Spain

31 Circular bioeconomy fund set to close at €250m in Q1/2020

32 Diagnostics – liquid health check turns to proteins to predict health risks

33 Biosimilars: Germany set to introduce automatic substitution

REGIONAL NEWS

- 62** Northern Europe:
Sweden, Denmark, Norway,
Iceland and Finland
- 64** Western Europe:
France, Belgium, the Netherlands
and the UK
- 66** Central Europe:
Germany, Switzerland and Austria
- 68** Southern Europe:
Italy, Spain and Slovenia
- 70** Eastern Europe:
The Czech Republic, Hungary,
Slovakia, Croatia and Poland

SCIENCE & TECHNOLOGY

- 72** Transposase set to replace genome editing tools and viral vectors
- 73** Liver fibrosis shield;
Epilepsy gene therapy
- 74** New vectors; Malaria targets
- 75** Interview: Jennifer Molloy,
University of Cambridge, UK

SERVICE

- 40** Biopeople
- 77** News from the SBA
- 79** Company index
- 80** New products
- 81** Events
- 82** Encore

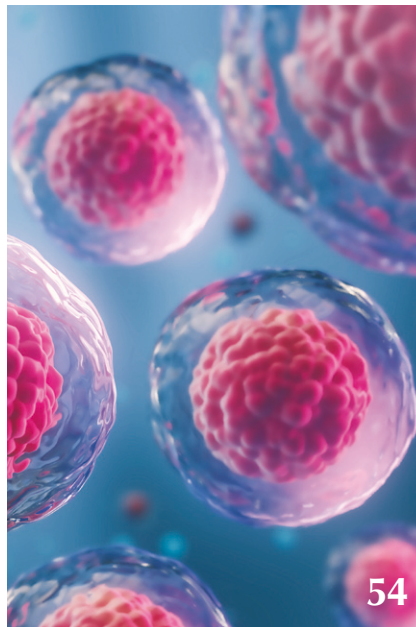
BIOFASHION

Greener fashion

Enzymes have been used widely for years to bleach textiles or shrink wool, but the clothing sector remains one of the world's most polluting industries. Fashion labels are now turning increasingly to sustainable biofabrication and biotech-inspired methods to lower the environmental footprint of their products – and help improve the industry's image.



CELL PROGRAMMING



Manufacturing 2.0

Dreams of simple, reliable and scalable processes in the much-hyped markets for cell therapy and drug discovery have generated demand for cost-effective manufacturing methods. A growing number of companies are now trying to coax induced pluripotent stem cells (iPSCs) into the specific cells needed for clinical trials and models.

EDITORIAL

Sustainability ahead

For years, the European Commission and European Investment Bank (see p. 31) have made clear commitments to set up a circular bioeconomy. Bio-based processes have been the financing focus of the EU's innovation programme Horizon 2020, as well as a newly created, EIB-led EU circular bioeconomy fund (ECBF), which is shooting to close at €250m.

Pure biotech-based solutions have suffered from political resistance to co-finance demonstration-scale plants and eliminate subsidies for oil-consuming manufacturing industries. Now, the market appears to be striking back.

At the European Forum of Industrial Biotechnology in Brussels, designers presented collections made by biotech, among them clothes made with microbially produced spider silk, mycelium-born viscose and leather substitutes, and bacterial dyes. What the products have in common is that they are aimed at closing the circularity loop to produce nearly zero waste.

Furthermore, the European Biotechnology Network (EBN) is set to present a new sustainability label and CO₂ compensation scheme. In an era of high-tech biologisation in industrial manufacturing, the toolbox now includes synthetic biology, tank-based production, and genetic engineering.

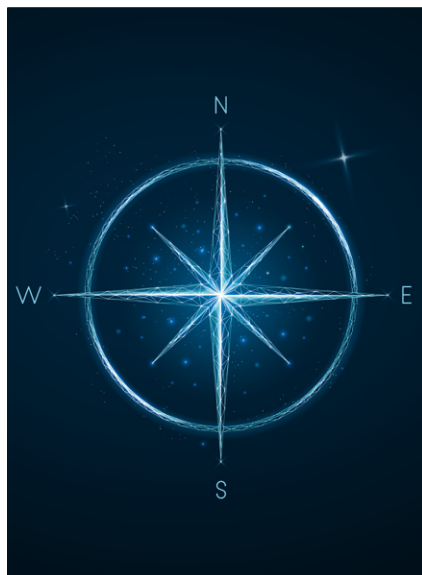
We wish our readers a sustainable Christmas, and a great start in the new year!



Thomas Gabrielczyk
Editor-in-Chief

SPECIAL EU Event Compass

- 43 Update on EU Events in H1/20
- 44 Pharmapack, Paris
- 56 AMR conference on therapeutics and diagnostics, Basel
- 48 BIO-Europe Spring, Paris
- 50 Swiss Biotech Day, Basel
- 52 International Conference on Bio-based Materials, Cologne



Pictures: Anuram/stock.adobe.com (top), zhagunov/depositphotos.com (middle), BLOCOM/AGC (right)

Italian polyamide producer Aquafil SpA's motto is 'Rescue the Oceans'. The company runs three projects to recycle nylon fibres taken from abandoned fishnets found floating in the sea. At the most recent EFIB in Brussels, the company gave a presentation on its regenerated products, which sell under the brand name Econyl™.



Setting trends with eco-fashion

BIOFABRICATION Enzymes have been used widely for years to bleach textiles or shrink wool. However, the clothing sector is one of the world's most polluting industries. And now fashion labels are turning increasingly to sustainable biofabrication and biotech-inspired methods to help lower the environmental footprint of their products.

Back in July 2017, one of the world's ecological fashion icons made a strong commitment to biotech. "This is truly a moment to celebrate technology and the future of fashion," British designer Stella McCartney said when she signed an agreement for her collection with Bolt Threads Inc, a producer of biotech-made silk. The California-based firm has engineered the complete synthesis pathway for spider silk protein in a yeast strain in order to offer a scalable, lower-cost and sustainable solution to silk-fibre manufacture.

The collaboration highlights two issues: that the €1.3tn clothing market remains unsustainable, and that consumers are hungry for social and environmental change. According to the World Wildlife Fund (WWF), the global textile industry accounts for around 20% of all industrial water pollution. The organisation's figures indicate that agricultural production of natural fibres like cotton take up 2.4% of total cropland, and it says the production of a single kilogram of cotton – enough for a t-shirt and pair of jeans – requires 20,000 litres of water. The crop also contributes to environmental degradation and global warming by consuming fertiliser, and 24% of all insecticides are sprayed on cotton acreage. The overuse of pesticides in agriculture has been linked to cancer development in associated populations. Under the aegis of the Global Fashion Agenda, well-known

fashion labels have already taken action. The industry alliance has promoted fashion sustainability since 2009. "While it's encouraging to see 12.5% of the global fashion market taking concrete action toward circular business models," says Morten Lehmann, the leadership forum's Chief Sustainability Officer, "we must ur-

gently address major roadblocks collaboratively to pave the way for a systemic shift towards circularity." He believes governments and policymakers have to play a strong role in creating a supportive regulatory framework.

Biotech and synthetic biology is increasingly showing up on the radar of large brands. The H&M Foundation's Global Change Awards, for example, are increasingly going to approaches like a recycling concept implemented by Agra-loop, which makes bio-textiles from food crop waste. The subsidiary of Circular Systems SPC has invented a closed-loop system that takes by-products from crops like oil-seed flax, hemp, sugarcane, bananas and pineapples and turns them into a biological fibre that can be used to make textiles. Driven by the trend towards sustainable fashion, more and more biotech start-ups are now turning to the fast-growing clothing market with more sustainable bio-inspired and almost wasteless cradle-to-cradle solutions.



ANIELA HOITINK
Founder, NEFFA, Soest,
The Netherlands

? How is Neffa's approach to fashion different and unique?

! MycoTEX develops tailored clothing made from compostable mushroom roots without waste. Unlike other companies, we are working on improving the whole supply chain.

Bioreactors vs. land use

Because natural fibres can't be grown quickly enough to keep up with the frenzied, low-cost demands of the fashion world, biofabrication firms are turning to bioreactor-based microbial production[...]

>> Read the full story in the printed issue.

BIOTECH
NATURE BASED · BIOSCIENCE FOR LIFE
THIS MAGAZINE: BIODEGRADABLE

BIOTECH
NATURE BASED · BIOSCIENCE FOR LIFE
THIS MAGAZINE: BIODEGRADABLE

The biotech boost – when, if not now?

EUROPEAN BIOTECHNOLOGY NETWORK Despite the threat of a looming climate catastrophe, low oil prices and giant industrial conglomerates addicted to fossil resources continue to stifle industrial biotechnology products and innovation. The European Biotechnology Network is now providing a foot up for companies that want to help themselves by launching three very different projects aimed at pushing the bioeconomy forward.

The European Biotechnology Network is a non-profit organisation based in Brussels that was founded in 2008 and now has around 2,000 members from every country in Europe. Among them smaller countries such as Iceland, Moldavia or Luxembourg. Larger countries like Germany and Britain count hundreds of members. For years, the network – which is staffed solely by volunteers – was mainly dedicated to grouping international research consortia. But in the past two years the organisation has been rather quiet. That is now set to change.

Three new projects it's launching are aimed at addressing gaps in the industry and, above all, sharpening the focus on the economic role biotechnology plays. They include a biotech label for B2C products, a pan-European online job market for biotechnology and life sciences, and a biotechnological climate protection project with CO₂ compensation opportunities.

"The urgent need to reinvent the global economy calls for completely new, sustainable, technological solutions. It's unacceptable that biotechnology, which is closely tied to natural cycles, has completely lost sight of that," says Andreas Mietzsch, the Network's acting Managing Director, who is an old hand in the scene and also the publisher of EUROPEAN BIOTECHNOLOGY. He finds it

hard to believe that biotech, which has been celebrated as an upcoming technology for decades, is nowadays largely ignored by politicians, industry and society as an area that is able to offer im-

portant, desperately needed alternatives for the future. Some products that are ready for market, Mietzsch says, simply don't get the support they deserve.

New biotech branding

A classic example of the shadowy role biotechnology plays in daily life is a ubiquitous product – laundry detergent. For decades, biotechnologically produced enzymes have ensured laundry comes out of the machine clean even when washed at low temperatures. Amylases in them break down starch, lipases break down fats, proteases break down proteins and cellulases break down cellulose to reduce the roughness of cotton textiles. Compared to the pre-biotech world, when laundry had to be washed at much higher temperatures, this saves a huge amount of energy, and is much more environmentally friendly in terms of wastewater as well. The problem is that even today, not a single manufacturer dares to print 'Biotech inside!' on its label. After the long-standing debate about genetic engineering in agriculture, the term remains one with associations that are less than positive for the European public.

The European Biotechnology Net- [...]




LAURA GRIESTOP
European Biotechnology Network,
Brussels

? Is CO₂ compensation the right way to promote biotechnologies?

! With the Biospheria projects, we want to support biotechnological solutions that slow down climate change. CO₂ compensation is reviled by some as a new form of medieval indulgence trading. Our response to that is – so what? It's still better than doing nothing!

» Read the full story in the printed issue.



About 12 years ago, Shinya Yamanaka published the first protocol for reprogramming somatic cells (fibroblasts) back into iPSCs, which could subsequently be expanded in culture and differentiated into any type of human cell. Extending the use of cellular reprogramming, Wernig et al. showed that through the forced expression of transcription factors, fibroblasts can be reprogrammed directly across germ layer boundaries into neurons. This transdifferentiation approach does not require passing through a stable iPSC stage. Finally, so-called forward reprogramming directly converts iPSCs into target cell types. While iPSC-based clinical trials are being pushed by the Japanese government, forward programming and transdifferentiation currently has no direct lobby.

Playing God with the fates of cells

STEM CELLS Dreams of simple, reliable and scalable processes for the much-hyped cell therapy market have generated demand for cost-effective, GMP-compliant manufacturing methods. The drug-screening market is also hungry for material that will allow the establishment of human cell disease models. A growing number of companies are now trying to coax induced pluripotent stem cells (iPSCs) into specific cells needed for clinical trials. Others are seeking the same goal through direct transdifferentiation protocols. What method will prove superior?

For stem cell researchers, a July press release from Takeda Pharmaceuticals sounded a little like science fiction. The Japanese pharma giant announced that the world's first CAR-T cell therapy produced from iPSCs had entered GMP development, and will be available for clinical testing by 2021. Takeda obtained the T-cell material for its 'iCARTs' under a licence agreement with Kyoto University. There, 2012 Nobel Prize laureate Shinya Yamanaka runs a clonal master iPS cell bank that's been funded with US\$250m of Japanese government funding. The goal is to create off-the-shelf cell therapies that can be tailored to patients on demand.

In 2006/07, the Japanese researcher was the first to discover which factors can reprogramme adult mouse and human cells into iPSCs – an epigenetically native stage in which progenitor cells can proliferate indefinitely, and at least theoretically differentiate into every known type of cell. If he's now managed to create CAR-Ts from iPSCs, Yamanaka would have overcome a major roadblock to current CAR-T and cell therapies: their high cost. Although the media has trumpeted the promise of cell therapies as the first few approvals are granted, it's still unclear whether patient-derived treatments really offer a path forward in business terms. After all, production costs remain very high due to the

extremely laborious, slow and only haltingly effective procedures used to produce enough GMP-compliant cell material (see EUROPEAN BIOTECHNOLOGY, Autumn 2010 edition). "The iCART programme demonstrates the value of our T-CiRA



DR. MARK KOTTER
Founder and CEO Bit Bio Ltd.,
Cambridge, UK

? What is the major bottleneck in reprogramming?

! *Reprogramming has traditionally been inefficient, with low cell yields. To overcome this hurdle, we have developed a gene engineering approach called Opti-ox. Applied to cellular reprogramming, it enables precise reprogramming of entire cultures of stem cells into any desired cell type.*

collaboration – applying iPSC technology to develop new approaches to drug discovery and creating a bridge to transfer promising programs to Takeda to accelerate them toward clinical development and therapeutic use," Yamanaka claims. The idea behind using iPSCs for cost-effective CAR-T off-the-shelf manufacturing is to expand a single genetically engineered iPS cell clone from the iPSC master bank. That could lead to a more homogeneous allogeneic therapy than one based on immunogenic donor cells – a huge business opportunity. iCART is only one of five planned first-in-human studies in the next two years that are being fed by Yamanaka's cell resource.

Building resources for cell supply

In the US and Europe, similar projects mirroring Yamanaka's clonal master iPS cell bank activities are underway. The CEO of Allogene Therapeutics Inc, David Chang, called the use of iPS cells for allogeneic therapies "the future of cell therapy" when announcing a partnership with iPSC pioneer Notch Therapeutics Inc in early November. The cooperation aims to create allogeneic CAR-T cells from iPSCs for cancer therapy. "As far as[...]

» Read the full story in the printed issue.

GFFA 2020

16.–18.1.2020 BERLIN The 12th Global Forum for Food and Agriculture (GFFA) will examine the contribution of international agricultural trade to world food security from every angle. GFFA topics: fair rules, sustainability, and promotion of agricultural development.

www.gffa-berlin.de



20.–21.1.20

Digitalization and Infectious Diseases: Improving Patient Outcome in the Age of Big Data, Basel (CH)

Info: Maressa Takahashi, University of Basel
<https://digital-id2020.ch/>

28.1.20

Zurich Life Science Day, Zurich (CH)
Info: Life Science Zurich Young Scientist Network
www.lifescience-youngscientists.uzh.ch

5.–6.2.20

Pharmapack 2020, Paris (F)
Info: UBM plc
www.pharmapackeurope.com

10.–11.2.20

5th EUCROF Conference, Amsterdam (NL)
Info: European CRO Federation (EUCROF)
www.eucrof-conference.eu

11.–12.2.20

1st International Conference on Cellulose Fibres, Cologne (DE)
Info: Dominik Vogt, nova-Institute
www.cellulose-fibres.eu/

11.–13.2.20

Digital Breeding – International Symposium of the Society for Plant Breeding, Tulln (AT)
Info: Society of Plant Breeding
<https://gpz2020.boku.ac.at/>

13.–14.2.20

Cells, Molecules & Organics – FEBS3+ LS2 Annual Meeting 2020, Zurich (CH)
Info: LS2 – Life Sciences Switzerland
<https://annual-meeting.ls2.ch/>

19.–20.2.20

13th Annual European Life Sciences CEO Forum & Exhibition, Zurich (CH)
Info: Sachs Associates
www.sachsforum.com/12elsceo-about.html

23.–28.2.20

World Biodiversity Forum 2020, Davos (CH)
Info: Cornelia Krug, University of Zurich
www.worldbiodiversityforum.org

27.2.20

4th European Chemistry Partnering Conference, Frankfurt am Main (DE)
Info: IHK Hessen/BCNP Consultants
<http://european-chemistry-partnering.com>

10.–12.3.20

BIOKET 2020, Lille (F)
Info: Annabelle Heyvaert, IAR – The French Biotech Cluster
www.bioket.eu

12.–13.3.20

4th AMR Conference on Novel Antimicrobials and AMR Diagnostics, Basel (CH)
Info: BIOCOM AG
<https://amr-conference.com>

12.3.20

Swiss Symposium of Lab Automation 2020, Rapperswil (CH)
Info: Doris Waldburger, Institute for Lab Automation and Mechatronics (ILT)
www.ilt.hsr.ch

17.–18.3.20

Future Health 2020, London (GB)
Info: Dawn Barclay-Ross, Future Health Expo Ltd.
www.futurehealth.global

Pharmacovigilance

29.1.2020 AMSTERDAM At the Medicines for Europe Annual Pharmacovigilance Conference, regulators and leading experts will discuss the challenges and opportunities in the field of Pharmacovigilance in 2020. They will cover topics like: globalisation, trends in compliance and inspection, and work sharing.
www.medicinesforeurope.com



23.–25.3.20

BIO-Europe Spring 2020, Paris (F)
Info: Tom Voigt, EBD Group
www.ebdgroup.com/bes

23.–25.3.20

World Bio Markets, Amsterdam (NL)
Info: Robert Wilson, Green Power Conferences
<http://worldbiomarkets.com>

23.–25.3.20

Plant Biology and Biotechnology 2020, Alboraya (E)
Info: Grace Angel, Magnus Group
<https://plantbiologyconference.com>

EuroPLX 72

9.–10.3.2020 BERLIN EuroPLX is an international platform for pharmaceutical and biopharmaceutical companies to initiate cooperations. Information exchange on new business opportunities and interaction start right after registration, concluding with the two-days conference.

www.europlx.com



24.–25.3.20

8th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry, and Polymers, Cologne (DE)
Info: Dominik Vogt, nova-Institute
www.co2-chemistry.eu/

31.3.–3.4.20

Analytica 2020, Munich (DE)
Info: Katja Stolle, Messe München GmbH
www.analytica.de

21.4.20

Swiss Biotech Day 2020, Basel (CH)
Info: Swiss Biotech Association
www.swissbiotechday.ch

27.4.–28.4.20

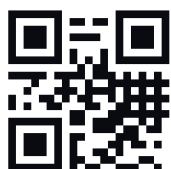
BIOVARIA 2020, Munich (DE)
Info: Ascenion GmbH
www.biovaria.org



**Innovation and
Start-up Center
Biotechnology**

Fördergesellschaft IZB mbH
Am Klopferspitz 19
82152 Planegg/Martinsried

Tel. + 49 (0)89.55 279 48-0
Fax + 49 (0)89.55 279 48-29
info@izb-online.de
www.izb-online.de



**YOU HAVE THE IDEA.
WE HAVE THE LOCATION.**

- Site: 26,000 m², S1 laboratories
- Real estate and facility management on site
- Faculty Club and conference rooms for up to 100 people
- Kindergarden (Bio Kids), Chemistry School Elhardt
- Hotel CAMPUS AT HOME
- Restaurant SEVEN AND MORE, Café Freshmaker
- On the Martinsried Campus: over 50 start-ups in the IZB, two Max Planck Institutes, ten faculties of the LMU, Clinic of the University Munich

WHERE THE FUTURE BECOMES REALITY

YOUR MODULAR **ONE-STOP-SHOP** for biopharmaceuticals

MEET US AT:

BIO-EUROPE SPRING®

March 23-25, 2020 Paris, France

BIO International Convention

June 8-11, 2020 San Diego, CA, USA

BioProduction

part of CPhI worldwide®

October 13-15, 2020 Milan, Italy

BIO-EUROPE®

October 26-28, 2020 Munich, Germany

- Cell Line Development
- Analytical Development
- Process Development and Characterization (USP and DSP)
- Formulation Development
- Process Scale-up
- Clinical DS and DP Manufacturing
- Process Validation and Commercial DS Manufacturing
- Fill & Finish (vials, PFS, cartridges, liquid and lyophilized formulations)

