



## IMPRINT

### **Responsible for content under the terms of press legislations**

Dr. Kathrin Rübberdt

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DECHEMA

Gesellschaft für Chemische Technik und Biotechnologie e.V.

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### **Disclaimer**

This brochure contains contents of third parties. These are unsolicited information of our members. DECHEMA assumes no liability or guarantee for the actuality, accuracy and completeness of this information.

### **Layout**

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Wächtersbach

2<sup>nd</sup> edition

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### **Cooperation and knowledge transfer – VBU** *Association of German Biotechnology Companies*

**Dr. Gunter Festel**  
Chairman of the Board of VBU

Every new business opportunity means contacting new people. That's what VBU is for: Germany's first association of biotechnology enterprises has always been dedicated to assist companies in finding the right partners and overcoming potential barriers to communication and understanding. On the following pages, you will find profiles of a range of VBU member companies seeking cooperations and partners to conquer interesting new markets. Explore the opportunities and get in touch with these highly innovative entrepreneurs!

In Germany and abroad, VBU is catalysing international cooperations: We organize topical events – conferences, webinars, delegation trips and joint stands on national and international trade fairs and congresses – as the perfect framework for developing ideas into projects. Another service is products2come (p2c), the online partnering and technology transfer event for the life sciences. p2c is connecting innovators from the life sciences and helps you to find cooperation partners and to bring your discoveries, inventions and products to market.

I personally recommend the VBU as a platform for mutual exchanges of ideas on process innovations as a basis to realize current and future business prospects.

Explore the opportunities and find more information at [www.v-b-u.org](http://www.v-b-u.org).



## A powerful network for information and communication

VBU, the Vereinigung Deutscher Biotechnologie-Unternehmen (Association of German Biotechnology Companies) is a union of companies involved in biotechnology and related sectors. Our members come from the fields of biotechnology, pharmaceutical technology, bioinformatics, diagnostics, medical devices and laboratory technology. VBU is a platform for cooperation, communication and information.

Since VBU is an integral part of DECHEMA Gesellschaft für Chemische Technik und Biotechnologie e.V. (Society for Chemical Engineering and Biotechnology) VBU members can benefit from DECHEMA's prolific range of services and can delegate their staff to its scientific committees. There the dialogue between academia and industry generates publications and project proposals, attracting attention far beyond the boundaries of the professional community.

### Find more information about VBU and DECHEMA:

[www.v-b-u.org](http://www.v-b-u.org)

[www.dechema.de](http://www.dechema.de)

### Your personal contact:



**Dr. Andreas Scriba**

scriba@dechema.de

VBU – Association of German Biotechnology Companies (VBU)

Theodor-Heuss-Allee 25

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**A.KRÜSS Optronic GmbH**

Alsterdorfer Str. 276-278  
22297 Hamburg  
Germany

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Website: [www.kruess.com](http://www.kruess.com)

Contact Person: Karin Leibrock

Email: [karin.leibrock@kruess.com](mailto:karin.leibrock@kruess.com)

- 
- Specific Requests:**
- » Cooperation Partner for Research
  - » Cooperation Partner for Application Tests

**Short Company Profile:** Precision instruments made in Germany

A.KRÜSS Optronic GmbH develops and produces opto-electronic measuring instruments for quality control in various industries (food and beverage, pharmaceutical industries, chemical and petro-industries).

Our product portfolio encompasses refractometers, polarimeters, density meters, modified atmosphere testers and flame photometers. We offer fully automatic analysis systems and easy-to-link laboratory instruments according to customers' specifications. We have committed ourselves to develop reliable, high-precision and intuitive operating measuring instruments.

- » Refractometers
- » Polarimeters
- » Density Meters
- » Flame Photometers
- » Melting Point-Meters
- » Modified Atmosphere Testers
- » Microscopes
- » Spectroscopes
- » Spectrometers
- » Cold Light Sources



### **Adolf Kühner AG**

Dinkelbergstrasse 1  
4127 Birsfelden  
Switzerland

Phone: +41 61 319 93 93

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Website: [www.kuhner.com](http://www.kuhner.com)

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Email: [ssandmeier@kuhner.com](mailto:ssandmeier@kuhner.com)

Number of Employees: 35

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#### **Specific Requests:** Partners:

LBTC – Ecole polytechnique Fédérale de Lausanne, Switzerland  
AVT.BioVT, RWTH Aachen, Germany  
Enzyscreen BV, Leiden, The Netherlands  
ExcellGene SA, Monthey, Switzerland

**Short Company Profile:** Kuhner AG is the leading developer and manufacturer of shaking machines for the international market. This family business, founded in 1949 by Mr Adolf Kühner, is now lead by his son Markus Kühner. From bench top shakers to large scale industrial shakers, Kuhner offers machines of the highest quality. The “Kuhner shaker” name stands for functionality, reliability and durability. Kuhner designs and builds many components in-house and guarantees them for 5 years. All processes are SN EN ISO 9001 certified.

Kuhner fosters close contact with research and development departments in notable universities and companies. We constantly investigate new developments looking for opportunities to further optimise the design and performance of our shakers.

Kuhner offers a personal service for customers including product information and support, as well as free applications advice and on-site visits.



**Apogenix GmbH**

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Contact Person: Jennifer Mogk, Manager Finance & PR

Email: [jennifer.mogk@apogenix.com](mailto:jennifer.mogk@apogenix.com)

Number of Employees: 30

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**Specific Requests:** Apogenix is interested in collaborations with academic and industrial partners to broaden the therapeutic potential of its drug candidates as well as their subsequent commercialization.

**Short Company Profile:** Apogenix develops innovative protein therapeutics for the treatment of cancer and other malignant diseases. These proteins target critical pathways involved in the growth, migration, and apoptosis of diseased cells and could thus transform the treatment of oncological and hematological diseases.

The company's lead drug candidate APG101 has demonstrated a statistically significant efficacy in a controlled phase II trial in recurrent glioblastoma, the most frequent and aggressive brain tumor – only six years after the first publication of preclinical data that laid the foundation for the use of APG101 to treat this devastating disease. APG101 is currently being evaluated in a phase I trial for the treatment of myelodysplastic syndromes (MDS) – a stem cell disorder that can lead to severe anemia. APG101's unique mode of action supports its significant potential for the treatment of other solid tumors beyond glioblastoma.

Apogenix' highly qualified scientific team has also developed a proprietary technology platform for the development of novel fusion proteins. These fusion proteins offer clear therapeutic advantages over other biologics such as antibodies and have the potential for broad application in oncology. Apogenix has successfully out-licensed its first program based on this technology platform – APG880 and derivatives – to a large pharmaceutical company.



**ARTES Biotechnology GmbH**

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Germany

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Contact Person: Dr. Melanie Piontek

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Number of Employees: 24

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**Short Company Profile:** ARTES Biotechnology is a well established contract R&D partner for the pharmaceutical and chemical industry. Our business is focused mainly on two areas:

- » development and transfer of virus-like particle (VLP) based vaccines
- » development and transfer of recombinant production cell lines and processes based on efficient and high yield microbial expression platforms

Our technology and know-how, secured by own IP, exclusive licenses and trade secrets, is used for the establishment of reliable and competitive processes for innovative targets.

Our team, having more than 20 years experience in commercial project management in contract research, is able to provide tailor-made recombinant production processes for the most efficient solution. We are experts in gene expression trouble-shooting and in the set-up of manufacturing processes. cGMP manufacturing and full analytics in accordance with international guidelines are warranted in collaboration with our partner companies.

ARTES' offer at a glance

- » development and selection of microbial production strain for vaccines or proteins
- » fermentation and downstream process development suitable for up-scaling and cGMP
- » analytics of the target in accordance to the GMP guidelines
- » host cell protein assay
- » supply of protein preparations
- » large scale cGMP production



### **ASPIRAS Project Consulting in Pharma and Biotech GbR**

Am Rosengarten 29  
55131 Mainz  
Germany

Phone: +49 6131 995304

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Website: [www.aspiras.de](http://www.aspiras.de)

Contact Person: Cathrin Pauly

Email: [pauly@aspiras.de](mailto:pauly@aspiras.de)



Number of Employees: 4

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**Specific Requests:** In the course of projects with our customers there are often requests regarding co-operations. Therefore we are grateful if you contact us with detailed offers for a co-operation.

**Short Company Profile:** The interdisciplinary team of ASPIRAS is offering knowhow for the following issues:

- » Project and portfolio evaluation
- » Business development concepts
- » Business planning
- » Market potential evaluation
- » Strategy development
- » Management of product development projects based on EMA and FDA regulations
- » Medical-scientific services
- » Qualified Person in Germany § 14 AMG (with qualification according to § 15 AMG)
- » Information Officer in Germany according to § 74a AMG

The ASPIRAS offer is aimed at German and international pharmaceutical and biotechnology companies active in the area of pharmaceuticals or diagnostics. Scientists are supported by ASPIRAS for business start-up activities and economic exploitation of their inventions. M&A consultants, venture capital firms and banks can profit from the specialist knowhow of ASPIRAS in the pharmaceutical and biotechnological area.



### **Bayer HealthCare AG**

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Germany

Phone: +49 (0)214 30-1

Website: [www.healthcare.bayer.com](http://www.healthcare.bayer.com)

Number of Employees: 60,700

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**Short Company Profile:** The Bayer Group is a global enterprise with core competencies in the fields of health care, agriculture and high-tech materials. Bayer HealthCare, a subgroup of Bayer AG with annual sales of around EUR 20.0 billion (2014), is one of the world's leading, innovative companies in the healthcare and medical products industry and is based in Leverkusen, Germany. The company combines the global activities of the Animal Health, Consumer Care, Medical Care and Pharmaceuticals divisions. Bayer HealthCare's aim is to discover, develop, manufacture and market products that will improve human and animal health worldwide. Bayer HealthCare has a global workforce of 60,700 employees (Dec 31, 2014) and is represented in more than 100 countries. More information is available at [www.healthcare.bayer.com](http://www.healthcare.bayer.com).



### **bbi-biotech GmbH**

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Germany

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Number of Employees: 12

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- Specific Requests:**
- » Further Collaborations
  - » Cooperation Partner for Research

**Short Company Profile:** The brand bbi-biotech is a well-known synonym for innovative and reliable fermenters and bioreactors. The bbi-biotech GmbH offers equipment and services for all process applications within biotechnology, pharmaceutical, cosmetic and food industry.

Core issue of bbi-biotech is the innovative sampling systems bioPROBE for automatic dead-volume-free sampling of fluids to combine cultivation and downstream systems with process analytics.

bbi-biotech has developed an own portfolio of standard bioreactor systems as well as of disposable systems of 3rd party suppliers. We succeeded in the development of a modular cultivation system for all different kinds of cells and microorganisms via the joint combination of newest technologies with decades of application experience. The xCUBIO is a bioreactor toolbox with predefined modules, which are selected by your demands and which are combined quickly to your personal solution. Beside the development and production of instruments bbi is offering lectures and technical services, as well as the repowering of used bioreactors to reach the state-of-the-art technology levels.



**BCNP**  
Consultants

**BCNP Consultants GmbH**

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Germany

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Website: [www.bcnp.com](http://www.bcnp.com)

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Number of Employees: 10

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**Specific Requests:** BCNP advises and supports foreign companies on their market entry in Germany, i.e. search for cooperation partners in industry and university, search for suitable sites, foundation of German subsidiaries, financing and funding, cultural coaching, and business development.

Since 2013, BCNP has been contributing in the project “Bringing innovative industrial biotechnology research to the market” (IB2Market, 7th European Union’s Research Framework Programme). BCNP is part of a multinational team (Belgium, Germany, England and Italy) and responsible for business cases and business plans.

**Short Company Profile:** BCNP Consultants GmbH is an acknowledged technology consulting company specialized in the branches biotech, chemistry, nanotech and pharma (BCNP).

BCNP offers services in four areas:

1. Technology Strategy: Technology assessment and trends scouting
2. Market Intelligence: Market research and landscaping
3. Marketing Management: Strategic marketing and implementation
4. Capital Sourcing: Financing, financial planning and controlling

BCNP clients benefit from the very broad basis of natural scientific expertise of its consultants in inorganic chemistry, biochemistry, biology, biotechnology, molecular biology, polymer chemistry and business chemistry. The team is completed by an experienced finance expert and a specialist for international marketing.

BCNP consultants understand the technical, financial and market needs of their clients. The spectrum of clients ranges from university based scientists, small and medium sized corporations to big publicly traded companies as well as non-governmental organisations and foundations. BCNP is very well connected to experts and decision makers in various industries.

Since 2010, BCNP has been authorized by the Federal Ministry of Economics and Technology (BMWi) in the program BMWi-Innovationsgutscheine (go-Inno) and can help German companies in implementing innovative technologies (funding rate of 50 %).

The central location of BCNP Consultants is Frankfurt / Main. Since 2014, the company has been running an office in the German capital Berlin.



**BeOne Frankfurt GmbH**

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Contact Person: Bettina Falckenthal

Email: [bettina.falckenthal@beone-group.com](mailto:bettina.falckenthal@beone-group.com)

Number of Employees: 30 in Frankfurt / > 200 in Germany & Switzerland

**Specific Requests:** We are looking for partners that we can help to reach a sustainable level of growth. Together with you we set up scalable business processes and a suitable framework of standards and tools for you to grow in a dynamic environment. We set the basis for extended communication and understanding of your clients or suppliers needs. A solid command of not just your technical care competences but of a variety of business methods and tools will be essential for the long term success of your company. Growing in the market will draw the focus on Project Management, Requirement Management and System Engineering in order to ensure the adherence to norms with e.g. safety and security issues. Here we will guide your team. Our partners have noticed that the maturity and flexibility of their development and business processes have an impact on their long-term success and appreciate the insight we can give.

**Short Company Profile:** Consulting is Our Passion  
BeOne is a boutique consulting firm that combines process and method competence with technical expertise in a way few companies can match. Our teams enjoy working across disciplines and furthering the knowledge transfer from industry to industry. Our customers value our ability to combine technical expertise with practical knowledge of tools and methods to provide a solution that perfectly fits the current issue. The most exciting part of our job is getting to meet and talk to you in person. Why not get in touch with us to hear why we make your goals our goals and pursue them with such passion and professionalism.

We'd love to exchange ideas with you on any of the following topics:

- » System Engineering/System Architecture
- » Requirements Management: Processes, Tools, Requirements Engineering
- » Test Management: Processes and Tools
- » Documentation/Traceability according to Functional Safety Norms like IEC62304, IEC61508, ...
- » Multi-Partner-/Supplier-/Project-Management (classical or agile)
- » IT- Tool selection, SW-Development
- » Continuous Improvement: Six Sigma/KPI
- » HFE—Human Factor Engineering



### **BIA Separations, GesmbH**

Europastrasse 8  
9524 Villach  
Austria

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Number of Employees: 92

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**Short Company Profile:** BIA Separations is the leading developer and manufacturer of CIM<sup>®</sup> (Convective Interaction Media) monolithic chromatographic columns intended for production, purification and analytics of large biomolecules. CIM<sup>®</sup> monolithic columns represent the new generation of chromatographic supports, distinguished for their enhanced mass transfer properties and large flow through channels. CIM<sup>®</sup> monoliths offer the ability to work at extremely high flow rates with no conformational changes of the target biomolecule. Additionally dynamic binding capacities for large biomolecules e.g. large proteins, viruses, virus-like particles, DNA are extremely high. All of these advantageous characteristics make CIM<sup>®</sup> monolithic columns the optimal chromatographic supports for purification and analytics of large biomolecules. CIM<sup>®</sup> monolithic columns produced by BIA Separations are available on all scales (from laboratory to industrial) and various chemistries (ion-exchange, affinity, HIC, HILIC, activated) and are cGMP compliant.

BIA Separations has its headquarters in Austria, a research and production facility in Slovenia, and sales offices in the US and China. The mission of the company is to develop and produce CIM<sup>®</sup> monolithic columns as well as provide research and method development services for either purification or analytics of a molecule of choice. The company also provides analytical services ranging from validation of analytical methods and processes, raw material control, stability studies and cleaning validations. Additionally the company offers help with the development of purification processes and analytical chromatographic methods by a skilled technical support group travelling all over the world, solving many complex issues.



### **Biaffin GmbH & Co KG**

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34132 Kassel  
Germany

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[www.proteinkinase.biz](http://www.proteinkinase.biz)

Contact Person: Bastian Zimmermann, PhD.

Email: [info@biaffin.com](mailto:info@biaffin.com)

Number of Employees: 7



**Short Company Profile:** Biaffin is a leading provider of bioanalytical services in biomolecular interaction analysis in Europe. The experienced team of Biaffin has expertise and knowledge in application of biosensors based on surface plasmon resonance (SPR) to kinetically characterize any pair of interacting molecules in real-time. Fully equipped with several SPR Biacore instruments Biaffin assures performance of projects in a professional and timely manner.

Biaffin's SPR services are applied in various stages of the drug development process like fragment-based and confirmatory secondary screening, hit validation and lead optimization. Furthermore, Biaffin offers SPR-based kinetic characterization, validation, stability analyses, quality control and batch to batch comparison of antibodies, biologics and biosimilars for diagnostic and therapeutic purposes. Contract research elucidating specificity, selectivity, mechanism of action and thermodynamics of a given interaction is performed as well. Besides services using SPR Biaffin offers a variety of biochemical and enzymatic assays based on e.g. microfluidic mobility shift technology (MMSA), bioluminescence, spectrophotometric methods and fluorescence polarization.

Complementary to a range of services in interaction analysis and biochemical assays Biaffin has a broad line of products serving customer's needs in kinase research and cellular signal transduction. Products are bioluminescence-based assays, recombinant proteins (kinases, phosphatases, cytokines, receptors), activators and inhibitors of cellular signaling pathways, peptide substrates and kinase and phosphospecific antibodies.



### **BIBITEC GmbH**

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Website: [www.bibitec.de](http://www.bibitec.de)

Contact Person: Prof. Dr. Dirk Lütkemeyer

Email: [dirk.luetkemeyer@bibitec.de](mailto:dirk.luetkemeyer@bibitec.de)

Number of Employees: 10

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**Short Company Profile:** BIBITEC Gesellschaft für Prozessentwicklung mbH is specialized in the production and purification of proteins (e.g. hormones, mAbs) derived from mammalian cell cultures. One major achievement was an erythropoietin (EPO) project that involved the process development and the GMP compliant production of an EPO biosimilar for use in phase III clinical trials. The entire production and purification process was successfully transferred for large-scale production leading to one of the first successful approvals of a biosimilar in Europe.

In 2012 BIBITEC became part of Nordmark Arzneimittel GmbH & Co. KG, Uetersen. In cooperation with Nordmark and other validated partners BIBITEC provides all activities from “gene to product” including cell line and process development, GMP production, fill-and-finish and analytics.



**BILFINGER**

**Bilfinger Industrietechnik Salzburg GmbH**

Bergerbräuhausstraße 31  
5020 Salzburg  
Austria

Phone: +43 662 8695-0  
Fax: +43 662 8695-994  
Website: [www.it-salzburg.bilfinger.com](http://www.it-salzburg.bilfinger.com)

Contact Person: Reinhard Maisl  
Email: [reinhard.maisl@bilfinger.com](mailto:reinhard.maisl@bilfinger.com)

Number of Employees: 260

**Short Company Profile:** It is safe to assume that if a company has enjoyed market success for decades, then it knows what it is doing. Bilfinger Industrietechnik Salzburg has 60 years of experience in plant and pipe engineering. With 260 core employees, we engineer, fabricate and assemble piping, systems and equipment for the biotechnology/pharmaceuticals industry, the semiconductor and energy sectors and general industry.

We have our own locations in Austria, Germany and Switzerland as well as regional operations in China and representative offices in South Korea and Eastern Europe, thus ensuring close proximity to our customers.

**PRODUCTS**

- » Bioreactor systems and fermentation equipment
- » Solution preparation systems
- » CIP/SIP systems
- » Ultra-pure media systems
- » Purification systems
- » Media supply and disposal
- » Waste water treatment
- » Modules and (super) skids
- » Plant equipment

**SERVICES**

- » Engineering
- » Piping
- » Automation
- » Construction
- » Commissioning
- » Service/Maintenance

**COMPETENCES**

- » Project management
- » Fabrication
- » Qualification

**INNOVATIVE BIOREACTOR LINE**

Bilfinger Industrietechnik Salzburg offers its own high quality, stainless steel bioreactor line for both microbial fermentation and cell culture. These bioreactors are available from 15 – 15,000 l and are designed in a modular way, using state-of-the-art components and a comprehensive, user-friendly software. This is supplemented with comprehensive services over the total life cycle of the system.

## Bio 4 Business

### Bio4Business

Jagdweg 3  
70569 Stuttgart  
Germany

Phone: +49 (0)711 325226

Fax: +49 (0)711 6574015

Website: [www.window-to-china.eu](http://www.window-to-china.eu)

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Email: [rolf.d.schmid@stuttgart-office.eu](mailto:rolf.d.schmid@stuttgart-office.eu)

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**Areas of Activity:** Up-to-date information on biotech in China based on Chinese databases

**Specific Requests:** Support for German companies looking for business or partners in China

**Short Company Profile:** Bio4Business has established techniques for an up-to-date assessment of biotech developments in China, including a ranking of Chinese leaders in the field. Services, mostly based on Chinese data-bases, include

- » Technology assessment
- » Evidence-based marketing tools
- » Profiling of Chinese scientists



Straubing-Sand  
**BioCampus**

**BioCampus Straubing GmbH**

Europaring 4  
94315 Straubing  
Germany

Phone: +49 (0)9421 785-150

Fax: +49 (0)9421 785-155

Website: [www.biocampus-straubing.de](http://www.biocampus-straubing.de)

Contact Person: Andreas Löffert (CEO)

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Number of Employees: 2



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**Specific Requests:** Companies interested in settlements or a touch down base in Bavaria, Germany and Europe in the fields of bioeconomy, green logistics, green chemistry and renewable raw materials.

We offer laboratory and office spaces in our business center for renewable raw materials.

**Short Company Profile:** The local authorities of Straubing (Bavaria, Germany) have founded the BioCampus Straubing GmbH in 2003 as a regional marketing and business development company. Since 2009 the aim of the public equivalent body is to manage a technology and innovation-driven cluster in the field of renewable raw materials. Straubing is the region of renewable raw materials in Bavaria and our cluster currently comprises nearly 100 partners from universities, research centres, enterprises and industry and supporting institutions. Straubing has rich agricultural (Gäuboden) and forestall (Bavarian Forrest) resources and with its Danube port and BioCubator (Business Park for Renewable Raw Materials) in the immediate vicinity of the scientific and technical facilities of the Straubing Competence Center for Renewable Raw Materials the documented potential to successfully build complex regional bio-economic value chains. Starting from our regional approach the BCG has developed with the “Green Chemistry Belt®” concept a bio-economic strategy for the European Danube region. Here, local Picking, regional conversion and central refinement along the Danube will lead to production of platform and speciality chemicals and dedicated products based on renewable raw materials in the light of a European Danube strategy.

# BIOCOM AG

## BIOCOM AG

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10785 Berlin  
Germany

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Website: [www.biocom.de](http://www.biocom.de)

Contact Person: Dr. Boris Mannhardt

Email: [info@biocom.de](mailto:info@biocom.de)

Number of Employees: 30

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**Specific Requests:** BIOCOM provides communication and dissemination services for EU-funded consortia

**Short Company Profile:** BIOCOM is a leading specialised information company, which has focussed on biotechnology ever since 1986. Nearly 30 years, an expert team of scientists, journalists and communication and IT specialists have been analysing the development of the biotechnology sector in Europe. Their findings have been aggregated and structured in proprietary in-house databases, and their results utilised in studies and publications. BIOCOM cooperates closely with approx. 25 national and, above all, European associations and organisations.

Some examples for BIOCOM's activities: BIOCOM organises national and international conferences covering various aspects of bioeconomy including industrial biotechnology, biopharmaceuticals, technology transfer and IPR. On behalf of the German Federal Ministry of Education and Research BIOCOM is also responsible for all aspects of the information platform [biotechnologie.de](http://biotechnologie.de), where biotechnology is represented as one of the most innovative fields in science and economics. [biotechnologie.de](http://biotechnologie.de) has become a leading source of information on modern biotechnology with more than 40,000 visits pcm. Among other relevant websites that have been developed and are maintained by BIOCOM are [eurobiotechnews.eu](http://eurobiotechnews.eu), [transkript.de](http://transkript.de), [pharma-sea.eu](http://pharma-sea.eu) or [biooekonomierat.de](http://biooekonomierat.de). The latter is the website of the Bioeconomy Council, an independent advisory board to the German Federal Government. The office and the operational activities of the Council are the responsibility of BIOCOM. The company is also an active publishing house with the magazines „European Biotechnology News“ and „Itranskript“ as well as books with relevance in practical work. Last but not least, BIOCOM has an active video production facility, creating short programmes focussed on biotechnology for streaming online.



**BioGenes GmbH**

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Number of Employees: 33

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**Short Company Profile:** BioGenes is a world-wide acting full-service supplier of protein analysis services, customised polyclonal and monoclonal antibodies as well as immunoassays with strong commitment to quality and service.

BioGenes supports customers with a whole range of analytical services starting from feasibility assessments to complete immunoassay development, validation, manufacturing, and implementation, especially for generic, multiproduct or process-specific Host Cell Protein (HCP) ELISAs for quality control.

In 2013 BioGenes launched their own generic ELISA kits (CHO<sub>3</sub>60-HCP ELISA) for detection of HCP.

BioGenes develops monoclonal antibodies against all kinds of antigens including modified proteins and peptides as well as anti-idiotypic antibodies.

BioGenes is certified to meet the international requirements and regularities of quality assurance and animal welfare.



### **BIOLOG Life Science Institute – Forschungslabor und Biochemica-Vertrieb GmbH**

Flughafendamm 9a  
28199 Bremen  
Germany

Phone: +49 (0)421 591355

Fax: +49 (0)421 5979713

Website: [www.biolog.de](http://www.biolog.de)

Contact Person: Dr. Hans-G. Genieser

Email: [service@biolog.de](mailto:service@biolog.de)

Number of Employees: 20

- 
- Specific Requests:**
- » Partners interested in outsourcing nucleoside/nucleotide production
  - » Partners for (EU) grant applications
  - » Cooperation partners for drug development, e.g. based on second messenger systems

**Short Company Profile:** BIOLOG is an innovative and scientifically orientated enterprise, specialized in tools for signal transduction research. Founded in 1989, the privately held university spin-off has its focus on nucleotide chemistry, second messenger research, and the development of corresponding agonists and antagonists. Fully equipped laboratories for organic syntheses and preparative chromatography support our experienced and committed team in the potential and pitfalls of nucleotide chemistry.

**PRODUCTS & SERVICES:** BIOLOG's product portfolio for the research reagent market comprises 600+ different rare and high purity nucleosides, nucleotides and nucleobases, including probably the largest collection of cAMP and cGMP analogues. Among these are numerous unique cAMP and cGMP agonists and antagonists, which differ in terms of potency, cell membrane permeability, receptor specificity, and metabolic stability. Additional products are nucleoside di- and triphosphates, cyclic dinucleotides, NAD<sup>+</sup> analogues, and compound libraries. With its long standing experience in nucleotide chemistry, BIOLOG can also offer custom syntheses and custom purifications as well as bulk production.

**RESEARCH & DEVELOPMENT:** BIOLOG is scientifically active, collaborates and publishes together with several academic groups on the evaluation of novel compounds within a broad variety of biological test systems, and has been participating in a number of different EU projects. In close collaboration with academic and industrial partners BIOLOG also develops improved second messenger analogues as lead compounds for drug development projects.



**Bio<sup>M</sup> Biotech Cluster Development GmbH**

Am Klopferspitz 19a  
82152 Martinsried/Munich  
Germany

Phone: +49 (0)89 899679-0

Fax: +49 (0)89 899679-79

Website: [www.bio-m.org](http://www.bio-m.org)

Contact Person: Prof. Dr. Horst Domdey

Email: [Hierl@bio-m.de](mailto:Hierl@bio-m.de)



Number of Employees: 12

**Specific Requests:** International companies, researchers and organizations looking for collaborations, business development opportunities, cooperation in development (research, clinical projects, ...) in Bavaria can be guided by our organization.

**Short Company Profile:** Bio<sup>M</sup> Biotech Cluster Development GmbH is a publicly funded not-for-profit organization supporting the biotechnology sector in Munich and Bavaria. The cluster management agency has built up an extensive national and international network, also helping companies from the region to establish new business contacts. It initiates and promotes the interaction between regional SMEs and external companies, investors and other players in the life science sector. As the first point of contact for international business partners, Bio<sup>M</sup> provides comprehensive information and an overview about the Bavarian life science sector.

For Bavarian biotech companies, Bio<sup>M</sup> offers a wide range of seminars and events and provides support in marketing, communications, and public promotion. The website [www.bio-m.org](http://www.bio-m.org) offers an extensive company-database, news updates and a job forum.

The Greater Munich Area counts over 20,000 persons employed by more than 270 companies in the life science sector (biotech, pharma, CROs, suppliers,...) making Munich one of the leading biotech regions in Europe. The region is characterized by a strong focus on the development of new therapeutics and diagnostics. The federal funding program “m<sup>4</sup>- Personalized Medicine” has sharpened Munich’s profile further. Within this program, more than 100 partners from industry and academy join forces in more than 40 collaboration projects. Furthermore, infra-structural projects like a biobank initiative and a service agency for clinical trials provide excellent framework conditions for medical research. An effective technology transfer concept is in place to identify innovations and to support start-ups.

[www.bio-m.org](http://www.bio-m.org)

[www.m4.de](http://www.m4.de)



### **Biomax Informatics AG**

Robert-Koch-Str. 2  
82152 Planegg  
Germany

Phone: +49 (0)89 8955740

Fax: +49 (0)89 895574 825

Website: [www.biomax.com](http://www.biomax.com)

Contact Person: Dr. Philipp Krubasik

Email: [philipp.krubasik@biomax.com](mailto:philipp.krubasik@biomax.com)

Number of Employees: 50

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- Specific Requests:**
- » Collaborations in the Clinical, Health and Medical Sector
  - » Collaborations with Pharmaceutical and Biotechnology Companies
  - » Cooperation Partner for Research
  - » Further Collaborations
  - » Business Opportunities

**Short Company Profile:** Biomax Informatics AG is a leader in the development of computational solutions for the life sciences. Biomax helps customers generate value from proprietary and public resources by extracting the knowledge indispensable for efficient data exploration and interpretation. They focus on integrating information to enable a knowledge-based approach to develop innovative life science products.

Biomax offers solutions for companies and research organizations in the following areas:

- » Health informatics
- » Synthetic biology
- » Clinical research
- » Drug discovery
- » Diagnostics
- » Biomarker discovery
- » Fine chemicals
- » Food and plant production

Biomax supports its customers with a platform that combines software products with knowledge resources that cover oncology, nutrigenomics, plant research, functional genomics, and more. The company provides computational solutions for better decision making and knowledge management in the life sciences:

- » BioXM™ Knowledge Management Environment
- » BioRS™ Integration and Retrieval System
- » Pedant-Pro™ Sequence Analysis Suite
- » Viscovery® data-mining technology



**Biomeva GmbH**

Czernyring 22  
69115 Heidelberg  
Germany

Phone: +49 (0)6221 90260

Fax: +49 (0)6221 902690

Website: www.biomeva.com

Contact Person: Dr. Thomas Pultar

Email: t.pultar@biomeva.com



Number of Employees: 47

**Specific Requests:** Contract manufacturing Organization

As a fee-for service CMO in the biopharmaceutical industry, it is our main focus to grow and expand our customer base. Apart from that, BIOMEVA is interested in collaborations and partnerships in the field of microbial cell line and process technology.

To be able to help our clients with additional services outside Contract Manufacturing, collaborations with Contract Research and Clinical Development organizations could be of interest.

**Short Company Profile:** BIOMEVA GmbH, a reliable and experienced contract manufacturing organization (CMO) in the biopharmaceutical industry, is dedicated to meeting the manufacturing needs for the production of microbially expressed protein products (APIs). Recently Biomeva established the plant expression system moss for API cGMP production at large scale.

Since 1993, BIOMEVA has been producing more than 400 batches of cGMP-compliant material for pharmaceutical and biotech companies at the 1000 L fermentation scale. BIOMEVA has served more than 30 customers worldwide. Partners benefit from BIOMEVA's track-proven operational expertise in the transfer, development, optimization, scale-up and validation of cGMP processes. BIOMEVA offers comprehensive services around cGMP manufacturing and processing of biopharmaceuticals using microorganisms (E. coli and yeasts) and moss including process development and process optimization (High cell density fermentation, down stream processing and chromatographic purification). In its fully cGMP-compliant facility, BIOMEVA can manufacture at Biosafety Level I (BSL-1) and Biosafety Level II (BSL-2).

BIOMEVA houses classified laboratories for microbial cell bank production, testing, characterization and storage, and state-of-the-art production facilities (Class A, B, C, D) for fermentation, chromatography, bulk filling, and quality control. Chromatography purification steps can be performed at ambient or cold room (2-8°C) temperatures. A Class A/B filling suite is maintained for bulk drug substance filling.

BIOMEVA has been inspected by the German authorities and the EMA. A general manufacturing licence as well as a GMP certificate has been granted.

BIOMEVA is privately owned and centrally located in Heidelberg, Germany.

**BIOMEVA'S SERVICES:**

- » cGMP production of biopharmaceuticals expressed in microbial systems and moss
- » Process development and optimization
- » Cell Bank Manufacture of microbial MCBs and WCBs
- » Cell Bank Characterisation / Testing
- » Cell Bank Storage (long-term) in the vapour phase of liquid nitrogen
- » Development and validation of analytical methods
- » Process validation



### BIOTECON Diagnostics GmbH

Hermannswerder 17  
14473 Potsdam  
Germany

Phone: +49 (0) 331 2300-200

Fax: +49 (0) 331 2300-299

Website: [www.bc-diagnostics.com](http://www.bc-diagnostics.com)

Contact Person: Kornelia Berghof-Jäger, Ph. D. – Chief Executive Officer  
Alois Schneiderbauer – Chief Business Officer

Email: [bcd@bc-diagnostics.com](mailto:bcd@bc-diagnostics.com)

Number of Employees: 70

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- Specific Requests:**
- » Distributors
  - » Cooperation Partners
  - » Business Development Partners

**Short Company Profile:** BIOTECON Diagnostics was founded in 1998 and is established as a well-known qualified global partner for the food and beverage industry as well as for producers of pharmaceuticals and cosmetics. BIOTECON Diagnostics focuses on development, production and marketing of rapid detection systems for pathogens, allergens, animal species, genetically modified plants and beverage spoilage organisms in food, feed and other matrices like environmental samples. The **foodproof**<sup>®</sup> and **microproof**<sup>®</sup> Detection and Quantification Kits, based on real-time PCR, are developed as easy-to-use systems to provide fast, safe and specific results for manufacturers and consumers.

Now AOAC and MicroVal validated, BIOTECON Diagnostics has offered automated sample preparation and test setup solutions since 2009. The **foodproof**<sup>®</sup> RoboPrep+ Series, a fully automated system for the analysis of pathogens, was the first system on the market especially designed for the needs of the food industry. The **foodproof**<sup>®</sup> Magnetic Preparation Kits offer a range of convenient and robust solutions for the automated extraction and purification of bacterial, plant and animal DNA.

BIOTECON Diagnostics additionally offers customized contract development. Due to close contacts with many different industries, the company is well aware of customers' current and future challenges. BIOTECON Diagnostics is thus able to provide flexible solutions to production and processing companies through new, tailored, and economical approaches.

For safer food – BIOTECON Diagnostics: simply builds up trust.



**BLOWORX – Biotechnologielabor – Thomas Grimm**

Max-Planck-Str. 3  
12489 Berlin  
Germany

Phone: +49 (0)30 63921041

Fax: +49 (0)30 63921042

Website: [www.bioworx.de](http://www.bioworx.de)

Contact Person: Thomas Grimm

Email: [tgrimm@bioworx.de](mailto:tgrimm@bioworx.de)

Number of Employees: 4

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**Short Company Profile:** BLOWORX manufactures based on biocatalytic development for customers sample batches and small production of fine chemicals up to the kilogram scale. Processes for the production of raw materials and intermediates for the manufacture of pharmaceutical products are developed and manufactured. Substances are produced on customer order at the desired scale. Biomass, enzymes and crude extracts from microbial and plant sources are screened, isolated and prepared for use in biotransformation.

BLOWORX provides services for customer-related issues with a focus on developing biocatalytic process. Screenings can be carried out in microwell plates, in mini bioreactors and shake flasks. Scale up can be done in stirred tank reactor and small fermenter. After process development and scale-up to the customer scale, the methods can be transferred into production. A final complete documentation for the use of processes and products in the chemical and pharmaceutical industries, can be carried out by BLOWORX.



**BlueSens gas sensor GmbH**

Snirgelskamp 25  
45699 Herten  
Germany

Phone: +49 (0)2366 4995 500

Fax: +49 (0)2366 4995 599

Website: [www.Bluesens.com](http://www.Bluesens.com)

Contact Person: Dr. Holger Müller

Email: [info@bluesens.de](mailto:info@bluesens.de)

Number of Employees: 20



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**Short Company Profile:** BlueSens has been a specialist for the gas analyses of bioprocesses since over a decade. The measurement of various gases (e.g. O<sub>2</sub>/CO<sub>2</sub>, Ethanol, H<sub>2</sub>, CH<sub>4</sub>) is in the fore – from the laboratory all the way to the industrial application. BlueSens will help you to understand, to monitor and to log your process in real-time. The BlueSens's software will calculate vital parameters automatically. BlueSens offers various measurement/QbD solutions for the pharmaceutical/Biotech/Biofuels industry. The analysers and sensors are easy to integrate in existing production lines, reliable and reasonably priced.

BlueSens understanding bioprocesses.



**Boehringer Ingelheim Biopharmaceuticals GmbH**

Binger Str. 173  
55216 Ingelheim am Rhein  
Germany

Phone: +49 (0)6132 77 0

Website: [www.bioxcellence.com](http://www.bioxcellence.com)

Email: [bioxcellence@boehringer-ingelheim.com](mailto:bioxcellence@boehringer-ingelheim.com)

Number of Employees: 2,700

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**Short Company Profile:** Boehringer Ingelheim Biopharmaceutical Contract Manufacturing is represented by its new brand Boehringer Ingelheim **BioXcellence™**. As a leading biopharmaceutical contract manufacturer with more than 35 years of experience it has brought more than 20 biopharmaceutical products to market. Boehringer Ingelheim **BioXcellence™** offers tailor-made contract development and manufacturing services to the biopharmaceutical industry, providing the entire production technology chain from DNA to fill and finish under one roof at its facilities in Biberach (Germany), Vienna (Austria), Fremont (USA) and Shanghai (China).

Boehringer Ingelheim **BioXcellence™** can secure product supply throughout the entire product lifecycle – transferring customer projects at any stage, delivering to almost any scale and thereby makes out-sourcing easy.



### German Pharmaceutical Industry Association (BPI e.V.)

Friedrichstr. 148  
10117 Berlin  
Germany

Phone: +49 (0)30 27909-0

Fax: +49 (0)30 27909-354

Website: [www.bpi.de](http://www.bpi.de)

Contact Person: Dr. Pablo Serrano

Email: [pserrano@bpi.de](mailto:pserrano@bpi.de)

Number of Employees: 30



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**Short Company Profile:** The German Pharmaceutical Industry Association (BPI – Bundesverband der Pharmazeutischen Industrie e.V.) consists of approximately 240 pharmaceutical companies. These include not only the classic pharmaceutical firms and service-providers, but also biotechnology companies and manufacturers of medical devices.

All of our members use our association as a platform for information and communication to develop collaborative responses to the diverse challenges they face.

Our team consists of highly qualified experts in all fields which are necessary to generate a sustainable benefit for pharmaceutical companies, e.g. market access, regulatory affairs, law, biotechnology and political affairs.



**CANDOR Bioscience GmbH**

Simoniusstrasse 39  
88239 Wangen  
Germany

Phone: +49 (0)7522 795270

Fax: +49 (0)7522 79527 29

Website: [www.candor-bioscience.com](http://www.candor-bioscience.com)

Contact Person: Dr. Tobias Polifke

Email: [info@candor-bioscience.com](mailto:info@candor-bioscience.com)

Number of Employees: 10

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- Specific Requests:**
- » Biomarker development
  - » Companion Diagnostics

**Short Company Profile:** CANDOR Bioscience GmbH is an internationally oriented, innovative and owner-managed enterprise.

CANDOR develops, produces and distributes a comprehensive selection of premium solutions for immunoassays.

CANDOR offers more than 50 different products including optimizers, blockers, stabilizers and buffer solutions for immunoassays. By using these solutions the reliability of results can be improved, the assay can be simplified and process times can be reduced.

CANDOR quality comprises highest product quality, highest quality standards and demanding quality control in production in addition to comprehensive product support and customer service.

The company is certified according to DIN EN ISO 9001:2008.



**cellasys GmbH – R&D**

Ohmstrasse 8  
80802 München  
Germany

Phone: +49 (0)89 2000110 74

Fax: +49 (0)89 2000110 76

Website: [www.cellasys.com](http://www.cellasys.com)

Contact Person: Dr. Joachim Wiest

Email: [wiest@cellasys.com](mailto:wiest@cellasys.com)

Number of Employees: < 10

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**Short Company Profile:** cellasys offers system solutions for online analysis of living cells. These include services as research and development, production and maintenance of cell based assays. Furthermore we are consultant for development of applications, data analysis and data interpretation. The cell based assays monitor different parameters directly at living cells. These parameters are extracellular acidification (pH), cellular respiration (pO<sub>2</sub>) and morphology (impedance) of the cells. The measurement is label-free, parallel, continuous and in real-time. With this cell based assays one can e.g. determine the efficiency of a drug outside of humans (or animals) prior to the start of the therapy. Another possible application is to continuously monitor the vitality of cells in a micro-fermenter.



**CellGenix GmbH**

Am Flughafen 16  
79108 Freiburg  
Germany

Phone: +49 (0)761 88889-0

Fax: +49 (0)761 88889-800

Website: [www.cellgenix.com](http://www.cellgenix.com)

Contact Person: Prof. Dr. med. Felicia Rosenthal

Email: [info@cellgenix.com](mailto:info@cellgenix.com)

Number of Employees: 50

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- Specific Requests:**
- » Further Collaborations
  - » Cooperation Partner for Research

**Short Company Profile:** CellGenix is a premium supplier of high-quality reagents and tools for cell therapy and regenerative medicine.

As a first company to obtain a GMP manufacturing authorization for cell processing in Europe, CellGenix has more than 20 years experience in cell therapies and recombinant biopharmaceuticals.

CellGenix develops and manufactures products according to GMP guidelines and under serum-free and animal-derived components free (ADCF) conditions. The high-quality GMP cell culture reagents are suitable, safe and reliable to be used as ancillary materials in clinical ex vivo cell culture. Drug Master Files (DMF) for many products have been filed with the FDA. The QM-System is ISO 9001:2008 certified and conforms with USP <1043> and <92>.

The products are used by leading experts and proven in clinical trials worldwide. CellGenix is continuously expanding its portfolio for ex vivo cell processing:

- » Serum-free media for the cultivation of dendritic cells, hematopoietic stem cells, T-cells, NK cells and mesenchymal stem cells
- » Preclinical grade and GMP grade cytokines for optimal growth support and/or differentiation of hematopoietic stem and progenitor cells, as well as dendritic cells, T-cells, NK cells, MSC, ESC and iPS cells
- » FEP Bioprocessing containers with unique properties for cell culture and cryopreservation



**CellSystems Biotechnologie Vertrieb GmbH**

Langer Ring 5  
53842 Troisdorf  
Germany

Phone: +49 (0)2241 25515-0

Fax: +49 (0)2241 25515-30

Website: [www.cellsystems.de](http://www.cellsystems.de)

Contact Person: Dr. Oliver Engelking

Email: [oliver.engelking@cellsystems.de](mailto:oliver.engelking@cellsystems.de)

Number of Employees: 15

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**Specific Requests:** Contact to prospective customers

**Short Company Profile:** Since its formation in 1992, CellSystems® has been a reliable partner for the life science community. CellSystems offers highly sophisticated research products, including EU validated 3D in vitro skin models for research and toxicology assays that were developed and are produced at our onsite laboratories. Additionally, CellSystems offers a wide range of contract services. In 2010, we opened our new clean room laboratories to meet the growing demands for various 3D tissue models and services. Today, our portfolio comprises a wide range of products for cell biology research and in vitro toxicology studies. CellSystems is certified ISO 9001:2008.



### ChemCon GmbH

Engesserstr. 4b  
79108, Freiburg im Breisgau  
Germany

Phone: +49 (0)761-5597-0

Fax: +49 (0)761-5597-449

Website: [www.chemcon.com](http://www.chemcon.com)

Contact Person: Reinhard Hirsch

Email: [reinhard.hirsch@chemcon.com](mailto:reinhard.hirsch@chemcon.com)

Number of Employees: 75



- Specific Requests:** ChemCon is looking for customers who need:
- » organic/inorganic chemical synthesis services, process development
  - » purification of natural compounds
  - » modification of biopolymers
  - » monomers & medical polymers
  - » scale up / transfer to GMP
  - » API manufacturing for clinical trials
  - » commercial GMP API supply in small to medium scale (injectable, ophthalmic grade, highly potents, controlled substances)

**Short Company Profile:** ChemCon GmbH, founded in 1997, is a world leader in chemistry contract research and custom manufacturing of small molecule APIs and fine chemicals in the areas of organic, inorganic and polymer chemistry for the global pharmaceutical, biotechnological and fine chemicals industries. As a service provider, we are specialized in synthetic route development and small to medium scale routine manufacturing (from mg up to hundreds of kg supply), operating under full cGMP. Our products are used worldwide for preclinical development, during clinical trials and as drug substances in commercial products. ChemCon's facilities in Germany include state-of-the-art research laboratories, clean room manufacturing suites and a broad range of chemical and microbiological analytical equipment for API release. Our facilities are inspected multiple times by the US FDA and by European authorities. We are an ISO 9001 certified company using the highest quality standards. ChemCon's more than 70 employees supply products and services to America, Europe, the Middle East, India, Japan and Australia.



### **c-LEcta GmbH**

Perlickstraße 5  
04103 Leipzig  
Germany

Phone: +49 (0)341 355214-0

Fax: +49 (0)341 355214-33

Website: [www.c-Lecta.com](http://www.c-Lecta.com)

Email: [contact@clecta.com](mailto:contact@clecta.com)

Number of Employees: 50

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**Short Company Profile:** c-LEcta is a leading industrial biotechnology company, using best-in-class biotechnologies to efficiently provide customized enzymes and microbial strains to industrial applications. Scientific excellence is combined with in depth commercial and regulatory know-how to bring innovative and competitive bioprocessed products into scale. Besides its in-house project and product pipeline, c-LEcta has a strong focus on strategic cooperation with industrial partners. Moreover, c-LEcta is an established enzyme supplier, manufacturing unique, quality-controlled enzyme products in large technical scale.



**CONARIS Research Institute AG**

Schauenburgerstr. 116  
24118 Kiel  
Germany

Phone: +49 (0)431 5606 821

Fax: +49 (0)431 5606 823

Website: [www.conaris.de](http://www.conaris.de)

Contact Person: Dr. Dirk Seegert

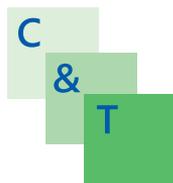
Email: [d.seegert@conaris.de](mailto:d.seegert@conaris.de)

Number of Employees: 4

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**Specific Requests:** » Looking for new projects (preferably academic sources) in the anti-inflammatory and anti-infective field

**Short Company Profile:** » Preclinical and early clinical development of anti-inflammatory drugs  
» Cell biology, molecular biology, in vitro and in vivo assays, assay development, protein production and purification  
» Commercial evaluation of academic projects



### **ConsulTech GmbH**

Morgensternstraße 24  
12207 Berlin  
Germany

Phone: +49 (0)30 7720 5920

Fax: +49 (0)30 7720 59229

Website: [www.consultech-ct.de](http://www.consultech-ct.de)

Contact Person: Dr. Daniel Schubart

Email: [schubart@consultech.de](mailto:schubart@consultech.de)

Number of Employees: 6

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**Specific Requests:** We would like to get into contact with companies or research consortia interested in acquiring German and/or European (HORIZON 2020) grants supporting their R&D projects.

**Short Company Profile:** ConsulTech is a consulting company that supports companies and research institutions active in the life-science field in securing public grants from the European Commission and the German government. We support the entire process of setting-up and executing proposals for R&D projects:

- » We identify grants that support your R&D project and which are issued from the German state, the German federal countries and from the European Union.
- » We conceive, compose and chaperone research projects from planning, writing, filing, up to their implementation, realization and commercial exploitation.
- » We find and assemble partners from industry and science to form research consortia.
- » We offer support in the preparation of interim, final and financial reports.



**CureVac GmbH**

Paul-Ehrlich-Straße 15  
72076 Tübingen  
Germany

Phone: +49 7071 9 2053-100

Fax: +49 7071 9 2053-101

Website: [www.curevac.com](http://www.curevac.com)

Contact Person: Verena Lauterbach, Manager Communications

Email: [verena.lauterbach@curevac.com](mailto:verena.lauterbach@curevac.com)

Number of Employees: 160

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**Specific Requests:** We are interested in collaborations with pharmaceutical & biotechnological companies and NGOs that wish to develop innovative mRNA-based cancer immunotherapies, prophylactic vaccines or therapeutic proteins

**Short Company Profile:** CureVac, a German clinical stage biopharmaceutical company founded in 2000, is pioneering the field of mRNA-based technology platforms for medical purposes, in which unmodified mRNA is specifically optimized and formulated. CureVac has been developing novel mRNA-based cancer immunotherapies and prophylactic vaccines against infectious diseases – both under the brand RNAActive®. Moreover, CureVac's technology RNArt® is designed as molecular therapy to trigger the body's own production of therapeutic proteins without stimulating the immune system.

CureVac has successfully established the first GMP (good manufacturing practice) facility worldwide for the manufacture of mRNA in 2006 and has pioneered mRNA-based drugs in various clinical studies.

# CyBio

An Analytik Jena Company

## CyBio AG

Goeschwitzer Str. 40  
07745 Jena  
Germany

Phone: +49 (0)3641 351-0

Fax: +49 (0)3641 351-409

Website: [www.cybio-ag.com](http://www.cybio-ag.com)

Email: [info@cybio-ag.com](mailto:info@cybio-ag.com)

Number of Employees: 93

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**Short Company Profile:** CyBio is a worldwide established manufacturer of high quality liquid handling technologies. In the pharmaceutical and life science industries, CyBio's products enjoy the highest reputation for precision, reliability and simplicity. The product portfolio ranges from dispenser up to automated simultaneous pipettors all way to robotic systems. Moreover, CyBio's Automation Team designs, produces and installs fully automated systems tailored to our clients' application, throughput and capacity requirements. Since 2009 CyBio is part of the Analytik Jena Life Science division. The Analytik Jena Group is a global represented and leading manufacturer of analytical and bioanalytical systems for industrial and scientific applications.

**DCZ** Executive Search GmbH

**DCZ Executive Search GmbH**

Gerresheimer Landstrasse 127  
40627 Duesseldorf  
Germany

Phone: +49 (0)211 99364 225

Website: [www.dcz.de](http://www.dcz.de)

Contact Person: Dr. Carmen Zirngibl

Email: [Zirngibl@dcz.de](mailto:Zirngibl@dcz.de)



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**Short Company Profile:** DCZ Executive Search GmbH is a globally operating Executive Search Company based in Düsseldorf, Germany.

Founded in the mid 1990ies by Dr. Carmen Zirngibl, DCZ presents almost 50 years of experience and expertise in Executive Search chiefly in life science and technology positioned branches. With a strong scientific background and a worldwide network DCZ Consultants concentrate on recruiting key professionals in

- » Biotechnology
- » Pharmaceutical
- » Medical Device
- » Chemical
- » IT-Technology dedicated markets.

In those highly specialized market sectors talking the “same language” is vital to deliver success. Our commitment and highly developed network of business experts worldwide allows to perceive and to place talents successfully wherever clients need them.

DCZ Executive Search – Your Recruiting Specialist in Life Sciences.

Your partner  
for contract research  
and experimental services  
since 1986

### DR. U. NOACK LABORATORIEN

#### DR.U.NOACK-LABORATORIEN

Käthe-Paulus-Str. 1  
31157 Sarstedt  
Germany

Phone: +49 (0)5066 70 670

Fax: +49 (0)5066 70 67 89

Website: [www.noack-lab.de](http://www.noack-lab.de)

Contact Person: Dr. Udo Noack

Email: [info@noack-lab.de](mailto:info@noack-lab.de)

Number of Employees: 75



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- Specific Requests:**
- » Cooperation Partner for Contract Research and Services
  - » Cooperation Partner for Analytical Method Development

**Short Company Profile:** DR.U.NOACK-LABORATORIEN, an independent and privately owned contract institute since 1986, offers services in aquatic (freshwater and seawater) and terrestrial ecotoxicology, environmental fate, metabolism studies, biodegradability, physico-chemical properties testing, method development and residue analysis. Our worldwide activities are performed in compliance with Good Laboratory Practice (GLP) and meet all authorities requirements.



### ELSCHNER CONSULTING

Weinbergstr. 42,  
79576 Weil am Rhein  
Germany

Phone: + 49 (0)7621 1631348

Website: [www.elschner-consulting.de](http://www.elschner-consulting.de)

Contact Person: Steffi Elschner

Email: [info@elschner-consulting.de](mailto:info@elschner-consulting.de)

Number of Employees: 2



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#### Specific Requests:

##### A) Clinical Trial Insurance:

Most countries require clinical trial insurance prior to approving a clinical study. We assist you in obtaining the insurance documents for timely submission to the local authorities / ethics committees; customized to your clinical trial, worldwide. What is more, for the entire duration of your study we are your point of contact regarding changes to the insurance coverage. New regulations in the trial country, modification of the study protocol, or extension of the trial period – we take care of the formalities with the underwriters. At the end of your study we obtain the closure documents for you.

B) Errors & Omissions for Service Providers in the Life Science Industry  
Service providers in the life science sector are faced with the increasing necessity to obtain coverage for pure financial losses. This is crucial especially for contract research organizations. Coverage requirements are often part of the agreements between the sponsor and the CRO. For example, if the CRO recruits unsuitable test persons, the clinical trial could fail. The sponsor would have to repeat the study, risking delays in launching his drug. For these losses he could potentially seek damages from the contract research institute. We are cooperating with renowned liability insurers to provide you with worldwide errors and omissions coverage.

#### Short Company Profile:

What do I need in a given country to obtain clinical trial insurance?  
What is covered by travel accident insurance, and what is not? What is the difference between a trial with or without mandatory insurance?

We have the answers for you!

On a routine basis we work together with renowned national and international insurers and we are authorized to collect on their behalf. Rest assured that we will put together the perfect package for your multinational trial. And we deliver with remarkable speed.

We draw on our expertise and vast experience in this special field to provide you with comprehensive advice.



**evimed GmbH**

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60314 Frankfurt  
Germany

Phone: +49 (0)69 348 795 23-0

Fax: +49 (0)69 348 795 23-9

Website: [www.evimed.com/de](http://www.evimed.com/de)

Contact Person: Maike Dieckmann

Email: [m.dieckmann@evimed.com](mailto:m.dieckmann@evimed.com)

Number of Employees: 10



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- Specific Requests:**
- » Collaborations
  - » Exchange of information and know-how with Business partners
  - » Cooperation partner for clinical studies
  - » Expanding customer base

**Short Company Profile:** evimed has focused on providing modern information systems and mobile technologies to guarantee a high-quality and innovative patient care, by improving the ways of data collection and data processing. Our innovative software solutions and services uniquely combine expertise in medicine and information technology.

Innovative software solutions enable to carry out clinical trials more efficiently with less costs and a greater success rate.

Our product portfolio includes independently but also synergistically applicable modules. The modules are extremely flexible and can be adapted to individual user's requirements. Among our customers are pharmaceutical companies, trial centers and CROs.



**Evonik Industries AG**

Rellinghauser Str. 1-11  
45128 Essen  
Germany

Phone: +49 (0)201 177 01

Website: [www.evonik.com](http://www.evonik.com)

Email: [bioeconomy@evonik.com](mailto:bioeconomy@evonik.com)

Number of Employees: 33.000

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**Short Company Profile:** Evonik, the creative industrial group from Germany, is one of the world leaders in specialty chemicals. Profitable growth and a sustained increase in the value of the company form the heart of Evonik's corporate strategy. Its activities focus on the key megatrends health, nutrition, resource efficiency and globalization. Evonik benefits specifically from its innovative prowess and integrated technology platforms.

Evonik is active in over 100 countries around the world. In fiscal 2014 more than 33,000 employees generated sales of around € 12.9 billion and an operating profit (adjusted EBITDA) of about € 1.9 billion.

Evonik innovates and serves the bioeconomy markets. Products are i. a. Biolys<sup>®</sup>, RESOMER<sup>®</sup>, ThreAMINO<sup>®</sup>, TrypAMINO<sup>®</sup>, and VESTAMID<sup>®</sup> Terra.



### ExcellGene SA

Route de l'île au bois 1A  
1870 Monthey  
Switzerland

Phone: +41 24 471 9660

Fax: +41 24 471 9661

Website: [www.excellgene.com](http://www.excellgene.com)

Contact Person: Dr. Florian Wurm

Email: [Florian.wurm@excellgene.com](mailto:Florian.wurm@excellgene.com)

Number of Employees: 25



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**Short Company Profile:** As an established service provider and CMO since 2001, XLG produces high value protein therapeutics and generates corresponding manufacturing processes for such proteins, using animal cells in bioreactors. This work covers the entire chain of work from a DNA sequence to the corresponding purified product. As host systems, Chinese Hamster Ovary cells, Human Embryo Kidney cells and insect cells are used that have been optimised for high growth rate and high productivity under suspension cultures in animal product free media, scalable to any industrial manufacturing scale. XLG has developed a number of highly innovative, even disruptive technologies that speed up production, reduce cost and increase output and quality of biological products made by animal cells in bioreactors. XLG can execute high-throughput based expression at small scale (capacity to run 2000 bioreactors in parallel) and can scale up production up to the 200 Liter scale under cGMP conditions or 2500 Liter scale under pilot (non-GMP) conditions.



### **FESTEL CAPITAL**

Mettlenstrasse 14  
6363 Furigen  
Switzerland

Phone: +41 41 780 1643

Fax: +41 41 780 1643

Website: [www.festel-capital.com](http://www.festel-capital.com)

Contact Person: Gunter Festel

Email: [gunter.festel@festel.com](mailto:gunter.festel@festel.com)

Number of Employees: 3

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**Short Company Profile:** FESTEL CAPITAL is an investment firm focusing on the commercialisation of technologies in the areas of energy, environment, health, materials and nutrition.

#### **FESTEL CAPITAL ...**

- » supports companies, research institutions and universities to develop / commercialise innovative products and technologies,
- » identifies high potential “not market-ready” projects and develops / commercialises them together with investors / industrial partners,
- » finances development work together with external investors,
- » supports start-ups and spin-offs from business planning over transactions up to business optimisation,
- » advises inventors as well as investors to successfully create and develop new businesses,
- » invests in selected start-up and spin-off companies mainly in the seed phase.



**FILTROX AG**

Moosmühlestrasse 6  
9001 St. Gallen  
Switzerland

Phone: +41 71 272 9111

Fax: +41 71 272 9100

Website: [www.filtrox.com](http://www.filtrox.com)

Contact Person: Ralph Daumke

Email: [r.daumke@filtrox.ch](mailto:r.daumke@filtrox.ch)

Number of Employees: 84

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- Specific Requests:**
- » Cooperation partners for cell harvest applications
  - » Business development partner in European and international markets specialized in biotechnology processes
  - » Cooperation partners for activated carbon applications
  - » New customers

**Short Company Profile:** As a global market leader in microfiltration, FILTROX offers complete solutions for filtration of high value liquids.

We are experts in development, manufacturing and supply of Swiss top quality products for a wide range of applications in pharmaceuticals, biotechnology, chemicals and cosmetics as well as in food and beverage. Since 1938 we develop and manufacture filter media and filtration equipment in-house. Based on this experience, we can offer our customers a complete range of products.

FILTROX's worldwide distribution network and comprehensive technical support will help you optimize your filtration process.

In the biotech environment we are the specialist for single-use cell harvest. Our product FILTRODISCTM BIO SD is available from lab to production size. Beside our standard filter sheets and modules we also can offer a wide range of activated carbon filter e.g. for decolonization.

Visit us on the web at [www.filtrox.com](http://www.filtrox.com) for more information.



**Fraunhofer ITEM – Business Unit: Biopharmaceutical  
IMP-Manufacturing**

Inhoffenstr. 7  
38124 Braunschweig  
Germany

Phone: +49 531-6181-6000

Fax: +49 531-6181-6099

Website: [www.item.fraunhofer.de](http://www.item.fraunhofer.de)

Contact Person: Dr. Kathrin Bohle  
Dr. Holger Ziehr

Email: [kathrin.bohle@item.fraunhofer.de](mailto:kathrin.bohle@item.fraunhofer.de)  
[holger.ziehr@item.fraunhofer.de](mailto:holger.ziehr@item.fraunhofer.de)

Number of Employees: 40

- Specific Requests:**
- » Seeking for cooperation partners for development of cell lines and manufacturing processes of pharmaceutical-grade viruses and ATMPs.
  - » Serving as provider for biopharmaceutical services from cell line development to GMP manufacture and release of IMPs based on proteins, nucleic acids, and viruses/bacteriophages for clinical trials.

**Short Company Profile:** Fraunhofer ITEM combines biological compound-specific expertise for both upstream and downstream process development. In addition, platform technologies are established for fast and cost-effective bioprocess development of antibodies and plasmids. The service portfolio includes technologies, starting from protein expression systems to cultivation and purification development up to technical scale (400 L). Bacteria, yeasts, fungi, insect and CHO cell lines are used as production organisms.

The pilot plant comprises different classes of clean rooms, enabling contract manufacturing of pilot batches of investigational biopharmaceutical drug substances (proteins, glycoproteins / recombinant-, monoclonal antibodies, nucleic acids / plasmids, virus / virus-like particles / bacteriophages) and sterile drug products in vials and ampoules.

**Services:**

- » Consulting
- » GMP audits
- » Development of mammalian and microbial production cell lines
- » GMP manufacture and storage of master and working cell banks
- » Development and scale-up of upstream and downstream sequences and processes
- » GMP manufacture of pilot batches of investigational biopharmaceutical drug substances
- » ICH Q2 analytical method development and validation
- » Release testing and release of investigational biopharmaceutical drug substances and products
- » ICH Q1A stability studies
- » Aseptic filling of final dosage forms (IMPs)
- » GCP labeling and QP release of final dosage forms for clinical trials



Project Group  
Resource-efficient Mechatronic  
Processing Machines

### Fraunhofer IWU – Project Group Resource-efficient Mechatronic Processing Machines (RMV)

Beim Glaspalast 5  
86153 Augsburg  
Germany

Phone: +49 (0)821 56883-54, -44

Fax: +49 (0)821 56883-50

Website: [www.iwu.fraunhofer.de/rmv](http://www.iwu.fraunhofer.de/rmv)

Contact Person: Dr. Martin Wagenknecht  
(Group Leader Industrial Biotechnology)  
Dipl.-Ing. Christian Seidel  
(Head of Department Components and Processes)

Email: [martin.wagenknecht@iwu.fraunhofer.de](mailto:martin.wagenknecht@iwu.fraunhofer.de)  
[christian.seidel@iwu.fraunhofer.de](mailto:christian.seidel@iwu.fraunhofer.de)

Number of Employees: 50

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**Specific Requests:** Seeking for customers that want to enhance their products and/or processes by combining classical manufacturing engineering with innovative biotechnological approaches. Serving as cooperation partner for research and development projects in the fields of:

- » Biological cleaning
- » Microbial/enzymatic recycling, degradation and modification
- » Biogas technology

Seeking for customers interested in:

- » Energy efficiency analyses and optimization of production processes
- » Life Cycle Assessment of products and processes
- » Modelling and simulation of chemical, physical or biological processes

**Short Company Profile:** Focus of the Project RMV in Augsburg is applied research in the field of production technology. The organizational integration in the Fraunhofer IWU and the close cooperation with the Institute for Machine Tools and Industrial Management (iwb) of the Technische Universität München (TUM) assures successful interdisciplinary research in the field of resource efficiency. Our scope of activities includes the key fields of mechanical, industrial and electrical engineering as well as mechatronics and biotechnology.

The aim of the Industrial Biotechnology Group is to replace pollutive and resource-consuming processes by using biotechnological approaches and to improve existing technologies that involve biological processes. Our priorities comprise the topics:

- » Recovery of valuable resources by microbial/enzymatic recycling
- » Biological cleaning of additively manufactured structures
- » Model Predictive Control for optimized biogas production

For biotechnological works, such as genetic engineering as well as strain and enzyme characterizations, the group has an own biology laboratory facility (biosafety level 1).



**Fzmb GmbH, Research Centre of Medical Technology and Biotechnology**

Geranienweg 7  
99947 Bad Langensalza  
Germany

Phone: +49 (0)3603 8330

Fax: +49 (0)3603 833 150

Website: www.fzmb.de

Contact Person: Dr. Peter Miethe

Email: pmiethe@fzmb.de

Number of Employees: 100

**Specific Requests:**

NETWORKS  
medways e.V.  
Medical Technology and Pharma Forum in Bavaria, Nürnberg  
Thuringian Food Network  
Christian Doppler Research Society  
Materials from Regenerative Sources Research Association  
BMT cooperation network (image editing, pattern recognition and technical vision systems)  
Thuringian Medical Technology Work Group

**Short Company Profile:**

CORE RESEARCH  
Biotechnology research and process development  
 >> Materials with biological affinity for innovative separation and analysis methods  
 >> Nano particle manufacturing and application  
 >> Processes for the manufacture, modification and application of nano cellulose.  
 In-vitro diagnostics development  
 >> Molecular biology and immunological evidence processes  
 >> Production of antibodies, native and recombinant proteins  
 >> Development of in-vitro diagnostics  
 Food safety and consumer protection  
 >> Fast spectral analysis (NIR)  
 >> Test kits for quick evidence of germs and toxins  
 >> Quality management / process optimisation  
 Veterinary medicine / medical technology  
 >> Chondrocyten regeneration and arthrosis diagnostics  
 >> Tumour therapy  
 >> Lung diseases  
 Equipment technology / bio instruments  
 >> Portal "point of care" diagnostic systems  
 >> Near-infrared spectroscopy (NIR)  
 >> Respiratory gas analysis with ion mobility spectroscopy  
 Cell biology  
 >> Cultivation and characterisation of Chondrocyte  
 >> In-vitro manufacture of (human, equine) antibodies  
 >> Dendritic cell therapy  
 SERVICES  
 >> Veterinary medicine services, including lab diagnostics  
 >> Micro biological and chemical food research, including water analysis  
 >> Hygiene management  
 >> Bio instruments and device development, especially in the field of optical spectroscopy  
 >> Biotech process development and process optimization  
 >> Development and manufacture of biotech products  
 >> (Nanocellulose, antibody, recombinant proteins)  
 >> Development and manufacture of in-vitro diagnostics Advanced training, seminars, courses



**GENTERprise GENOMICS**

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55128 Mainz  
Germany

Phone: +49 (0)6131 3923287

Fax: +49 (0)6131 3925397

Website: [www.genterprise.de](http://www.genterprise.de)

Contact Person: Dr. Sven-Ernö Bikar

Email: [bikar@genterprise.de](mailto:bikar@genterprise.de)

Number of Employees: 8

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**Short Company Profile:**

**MOUSE AND RAT GENOTYPING SERVICE:**

» Analysis of knock-outs, knock-ins and transgenic animals.

**NEXT GENERATION SEQUENCING WITH ILLUMINA NEXTSEQ 500, MISEQ AND HISEQ 2500:**

- » DNA Sequencing (large Genomes)
- » Gene Regulation Analysis
- » Sequencing-Based Transcriptome Analysis
- » SNP Discovery and Structural Variation Analysis
- » Cytogenetic Analysis, DNA-Protein Interaction Analysis (ChIP-Seq)
- » Exome enrichment
- » Sequencing-Based Methylation Analysis
- » Small RNA Discovery and Analysis
- » Metagenomics

**NGS LIBRARY CONSTRUCTION SERVICE:**

- » single- and paired-end libraries
- » special libraries like mate-pair libraries, exome enrichment, custom enrichment, cancer panel
- » DNaseq libraries
- » RNAseq libraries
- » ChIPseq libraries
- » In vitro transposition based Illumina libraries
- » 16S, 18S and ITS libraries for metagenomic analysis

**BIOINFORMATICS**

**DEVELOPMENT OF MICROSATELLITE MARKER INCLUDING PCR ASSAYS**

**CONTRACT RESEARCH**

**SANGER SEQUENCING**



**Geokompetenzzentrum Freiberg e.V.**

Burgstrasse 19  
09599 Freiberg  
Germany

Phone: +49 (0)3731 773715

Fax: +49 (0)3731 773716

Website: <http://gkz-ev.de>

Contact Person: Dr. Wolfgang Reimer

Email: [wolfgang.reimer@gkz-ev.de](mailto:wolfgang.reimer@gkz-ev.de)

Number of Employees: 4

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- Specific Requests:**
- » Further Collaborations
  - » Business Development Partner for the European Market
  - » Project partner in HORIZON 2020 work programme 2016-2017

**Short Company Profile:** GKZ is an independent, non profit triple helix network of industry, research, and administration operating in the fields of mineral raw materials along the whole value chain, including Applied Geobio-technology in Mining and Environmental. With its architecture GKZ is unique in FRG and comprises more than 160 national and international members. GKZ provides substantial services especially for SME on the local and international market such as assistance in market survey, market entry and in the exploitation of research know-how and innovation. GKZ is member of the European Association of Mining Industries, Metal Ores & Industrial Minerals (EUROMINES), the European Technology Platform on Sustainable Mineral Resources (ETP SMR) and in the European Innovation Partnership on Raw Materials. GKZ references lay in the conduction of national and international R&I and CSA projects as lead partner and partner. GKZ has successfully launched the promotion of geobiotechnology in use of environmental friendly mining and initiated the implementation of a DECHEMA TAK Geobiotechnologie. GKZ initiated and is managing the HORIZON 2020 project FAME – Flexible And Mobile Economic Processing Technologies, 2015-2018, which focuses on the application of microbiology on processing complex and low grade ore types <http://fame-project.eu> .



**GMBU e.V.**  
**Gesellschaft zur Förderung von Medizin-,  
Bio- und Umwelttechnologien e.V.**

Erich-Neuß-Weg 5  
06120 Halle (Saale)  
Germany

Phone: +49 (0)345 77796 41

Fax: +49 (0)345 77796 56

Website: [www.gmbu.de](http://www.gmbu.de)

Contact Person: Dr.-Ing. Klaus Krüger

Email: [halle@gmbu.de](mailto:halle@gmbu.de)

Number of Employees: 42

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**Specific Requests:** We are interested in cooperation partners for research in Environmental Biotechnology and Bioanalytic in the fields:

- » microbiology
- » valuable bioproducts of microalgae
- » immunoassays for biochemical diagnostics
- » bioactivated carrier materials for environment and agriculture
- » automated biological methods for monitoring of bioprocesses

**Short Company Profile:** The GMBU e.V. – founded in 1992 – is a registered (non-profit) association for industrial research and development established in three departments (50 employees) with main competences each in:

- » Environmental Biotechnology,
- » Photonic and Optosensoric,
- » Functional Layers.

We introduce young people to problems to be solved in chemical and biochemical engineering when leaving the university and meeting the allday situation in companies and enterprises.

The main department of the GMBU e.V. is in Halle (Saale) in Saxony-Anhalt.

The department of Environmental Biotechnology in Halle practices applied research and development in the areas of engineering, microbiology/biosensor technology and analytics.

Key aspects are the development of methods and devices to:

- » environmental and bioprocess analytics
- » biochemical diagnostics
- » separation and reaction processes using ultrasonics and microwave technology
- » bioprocess engineering and microbiology

The GMBU e.V. cooperate with the regional industry and science. The innovation activities of the GMBU e.V. are an important linkage between academic research and the small and middle sized enterprises.

greenovation

**greenovation Biotech GmbH**

Hans-Bunte-Str. 19  
79108 Freiburg  
Germany

Phone: +49 (0)761 470 99 0

Fax: +49 (0)761 470 99 -191

Website: www.greenovation.com

Contact Person: Dr. Andreas Hartmann

Email: ahartmann@greenovation.com



Number of Employees: 20

- Specific Requests:**
- I. Co-development- /Out-licensing-partner for greenovation’s lead candidates for enzyme-replacement-therapy (ERT) in orphan lysosomal storage diseases: moss Alpha-Galactosidase (Fabry Disease) and moss Glucocerebrosidase (Gaucher’s Disease)
  - II. Cooperation partners/Customers for (contract-) development and production of customized proteins using greenovation’s BryoTechnology™-platform in particular glyco-designed production strains (e.g. for enhanced ADCC, enhanced mannose-glycosylation, glyco-phosphorylation)

**Short Company Profile:** greenovation develops its own leads and offers development and production of customized protein biopharmaceuticals using its proprietary eukaryotic *Physcomitrella*-based BryoTechnology™-platform. Stable moss cell lines are developed for a sustainable, cGMP-compliant production of active pharmaceutical ingredient (API) candidates.

Key features of greenovation’s BryoTechnology™:

- » Rapid genome customization to express demanding proteins
- » Genetically stable (genomic integration)
- » Straightforward genetic glyco-engineering
- » Eukaryotic post-translational modifications
- » Highly homogeneous glycosylation pattern
- » Targeted elimination of plant-type glyco-forms (e.g. xylose, fucose)

Large scale production of the photoautotrophic moss cell lines is performed in certified, disposable bag-based reactors of the wave-type. A GMP facility at BIOMEVA, Heidelberg, ensures clinical supply. Products are fully physico-chemically and biologically characterized at Protagen Protein Services GmbH, Heilbronn.

A clinical trial phase I/II for greenovation’s lead candidate, moss Alpha-Galactosidase in Fabry Disease, will start in autumn 2014.



### **HB Technologies AG**

Paul-Ehrlich-Strasse 5  
72076 Tübingen  
Germany

Phone: +49 (0)7071 97611

Fax: +49 (0)7071 976190

Website: [www.h-net.com](http://www.h-net.com)

Contact Person: Joachim Zühlke

Email: [Joachim.zuehlke@h-net.com](mailto:Joachim.zuehlke@h-net.com)

Number of Employees: 30

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- Specific Requests:**
- » Development projects for new laboratory instruments
  - » Development projects for bioinformatikc tasks
  - » Collaboration in next generation sequencing projects

**Short Company Profile:** HB Technologies AG is one of the largest developing software companies in the field of Life Science software, placed in the southern part of Germany. HB Technologies has also huge expertise in project consultancy and the development of technical software solutions.

Founded in 1992, the company has a wealth of experience with over 450 projects. We are experts in software for production processes in both industrial and research laboratories. Additionally, HB Technologies is technology partner of BOSCH Lab Systems and develops the BOSCH Workflow Manager Software.

Our subsidiary INTAVIS Bioanalytical Instruments AG increases our experience in custom-built soft-ware for lab instruments and devices and we are also offer petptides for sale.

Furthermore, HB offers individual bioinformatics services for small to big data sets. Our bioinformatics experts are specialized in projects with a focus on RNA-seq, proteome and microbiome analysis. Based on your research questions we develop both one-step-solutions as well as individual multi-step-pipelines.

With the existing in-house innovation department HB Technologies AG uses its great expertise in the engineering of laboratory and medical devices. Through Synergy effects which are generated between software and hardware issues HB is in demand as a partner for integrated solutions.

# Heraeus

## Heraeus Materials Technology GmbH & Co. KG

Heraeusstr. 12 – 14  
63450 Hanau  
Germany

Phone: +49 6181.35-0

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Website: [www.heraeus-materials-technology.com](http://www.heraeus-materials-technology.com)

Contact Person: Nicole Rühmann

Email: [hmt@heraeus.com](mailto:hmt@heraeus.com)

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**Short Company Profile:** Heraeus, the technology group headquartered in Hanau, Germany, is a leading international family-owned company founded in 1851. Heraeus creates high-value solutions for its customers, strengthening their competitiveness in the long term. Target markets include: Chemicals and metals, energy and environment, communications and electronics, health, mobility, and industrial applications.

In the industrial sector of precious and special metals, Heraeus Performance Products is a leading player. Based on a broad portfolio of technologies and deep added value, Heraeus is a skilled partner for processing these metals and other innovative materials.

Heraeus is a leading global manufacturer and refiner of platinum labware and precious metals.

Heraeus Platinum Labware is ideally suited for lab-scale analytical and laboratory systems. Laboratory equipment calls for materials with very special properties, whether it involves analytical investigations or chemical analysis. Heraeus Platinum Labware is mechanically and chemically stable, resistant to acids and corrosion, and withstands high temperatures.

Heraeus supplies a full line of crucibles, dishes, electrodes, and semi-finished products (wire, sheet, tube). Moreover, it offers XRF crucibles and casting dishes for all major automatic fusion machines as well as high-purity pre-fused flux.

Working directly with the manufacturer, customers recover the highest value from their used platinum labware and apply this value directly to their order.

As a recognized leader in platinum labware, Heraeus offers world-class customer service and technical support.



### **House of Innovation**

Het Kerkepad 2  
6983 HM Doesburg  
The Netherlands

Phone: +31 6 25094496

Website: [www.house-of-innovation.nl](http://www.house-of-innovation.nl)

Contact Person: Frank Smeets

Email: [smeets@house-of-innovation.nl](mailto:smeets@house-of-innovation.nl)

Number of Employees: 1

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**Specific Requests:** Innovative and business development partner for developing new home-based bio technology and (bio-)chemistry units to reduce and/or upgrade household waste streams.

**Short Company Profile:** Innovative business development company with links to industries and academia working on new materials and processes, microfluidics, process intensification, micro system technology, embedded systems, sensor technology, photonics and 3D manufacturing.

Cooperation is main collaboration model. Sharing risks and revenues.



**IMG Innovations-Management GmbH**

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67663 Kaiserslautern  
Germany

Phone: +49 (0)631 316680

Fax: +49 (0)631 3166899

Website: [www.img-rlp.de](http://www.img-rlp.de)

Contact Person: Dr. Klaus Kobek

Email: [kobek@img-rlp.de](mailto:kobek@img-rlp.de)

Number of Employees: 20

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**Specific Requests:** Collaboration partner for the further development of inventions. Licensees for research results and patents from universities in Rhineland-Palatinate.

**Short Company Profile:** The IMG is a subsidiary of the Investitions- and Structure Bank Rhineland-Palatinate and is active in different fields of technology transfer, i.e. cluster-management, fair organization, Enterprise Europe Network and patent exploitation.

We are the patent marketing agency in Rhineland-Palatinate and are collaborating with the regional universities and research institutions. We evaluate their inventions, take care for securing Intellectual Property Rights and are offering licenses in these novel technologies.



**INFORS HT**

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Website: [www.infors-ht.com](http://www.infors-ht.com)

Email: [info@infors-ht.com](mailto:info@infors-ht.com)

Number of Employees: 130

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**Short Company Profile:** INFORS HT is your specialist for bioreactors, incubation shakers and bioprocess control software. You benefit from sophisticated systems, in which your cell lines or microorganisms develop their full potential in a reproducible way, thus contributing to your success.

For your applications, we offer the right solutions:

- » Fermentation of microorganisms (bacteria, fungi and yeasts)
- » Cell culture (mammalian cells, insect cells, plant cells and algae)
- » Biofuel (biodiesel and bioethanol)
- » Parallel bioprocesses
- » Custom-made bioreactors and incubation shakers
- » Bioprocess control software
- » Qualification of bioreactors and incubation shakers

Closeness to the customer, high quality, innovation and flexibility are our greatest strengths.



**Insilico Biotechnology AG**

Meitnerstr. 8  
70563 Stuttgart  
Germany

Phone: +49 (0)711 460 594-0

Fax: +49 (0)711 460 594-10

Website: [www.insilico-biotechnology.com](http://www.insilico-biotechnology.com)

Contact Person: Klaus Mauch

Email: [klaus.mauch@insilico-biotechnology.com](mailto:klaus.mauch@insilico-biotechnology.com)

Number of Employees: 20



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- Specific Requests:**
- » Business Development Partner for the US Market
  - » Cooperation Partner for Industrial Biotechnology
  - » Cooperation Partner for Preclinical Development

**Short Company Profile:** Insilico Biotechnology is a market-leading company providing solutions and software for the simulation of living cells. An interdisciplinary team of experts offers customised solutions for the efficient manufacturing of biotechnological products and for the testing of pharmaceuticals by using high-performance computing and Insilico's proprietary software platform. For world-leading companies from the chemical and pharmaceutical industries, Insilico's technology lowers time, risk and costs of development processes. Founded in 2001, Insilico is a privately held company based in Stuttgart, Germany.



### **InVivo BioTech Services GmbH**

Neuendorfstrasse 24 a  
16761 Hennigsdorf bei Berlin  
Germany

Phone: +49 (0)3302 883 769

Fax: +49 (0)3302 883 771

Website: [www.invivo.de](http://www.invivo.de)

Contact Person: Caterina Farnleitner

Email: [c.farnleitner@invivo.de](mailto:c.farnleitner@invivo.de)

Number of Employees: 35

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**Short Company Profile:** InVivo is a contract manufacturing organization (CMO) dedicated to the development and production of monoclonal antibodies and expression of recombinant proteins for research, diagnostic and pre-clinical use. InVivo is an ISO 9001 certified company with over 16 years' experience. As a trusted provider of cost-effective outsourcing solutions, InVivo has worked with a large number of satisfied clients. Companies of all sizes, including small university spin-offs, major research institutes, and biopharmaceutical companies, have taken advantage of InVivo's expertise as an independent contract manufacturer.

More than 2500 different hybridomas have been cultivated in InVivo's proprietary serum-free media ISF1. Production under serum-free conditions enables high productivity without the drawbacks of serum-containing processes, e.g. contamination with bovine IgGs. High cell density fermentation using different cell retention systems yields up to 500 mg antibody per liter per day. After a one step purification using recombinant protein-A/G our monoclonal antibodies are of highest purity.

Furthermore InVivo offers the complete range of modern recombinant protein expression techniques. Starting from synthetic cDNAs your protein can be expressed in bacteria, insect or mammalian cell lines. To meet your needs for mammalian derived proteins on short order we offer transient transfection using HEK cells. This fast and productive alternative is often favored over stable cell line development.



**Iris Biotech GmbH**

Waldershofer Str. 49-51  
95615 Marktredwitz  
Germany

Phone: +49 (0)9231 9619 73

Fax: +49 (0)9231 9619 99

Website: www.iris-biotech.de

Contact Person: Dr. Thomas Bruckdorfer

Email: thomas.bruckdorfer@iris-biotech.de

Number of Employees: 20



**Specific Requests:** To any spin-off companies or university groups, who have made inventions in the field of our activities, we offer the service to bring their products and technologies to market through our worldwide sales and marketing network.

**Short Company Profile:** Iris Biotech supplies reagents for Drug Discovery, Drug Delivery, and Diagnostics. We have specific know-how and production capabilities to supply over 6500 products from labs scale to multi ton lots.

**1. STARTING MATERIALS FOR PEPTIDE SYNTHESIS, PEPTIDOMIMETIC AND MEDICINAL CHEMISTRY**

Protected amino acids, coupling reagents, linkers and resins for solid phase chemistry, natural & unusual amino acids, and building blocks.

**2. TECHNOLOGIES FOR DRUG DELIVERY**

With over 1000 different polymer carriers we provide the widest portfolio for drug delivery technologies used in Polymer Therapeutics for small API molecules, as well as for large biopharmaceuticals.

**PEGylating** reagents from short monodisperse to long polydisperse poly(ethylene glycol) derivatives.

**Poly(amino acids)**, homopolymers of Arginine, Glutamic acid, Ornithine, and Sarcosine, are biodegradable drug carrier systems providing the advantages of polymer therapeutics also to small drug molecules.

**PASylation** is a modern technology, in order to improve the pharmacokinetic properties of biopharmaceuticals produced by recombinant techniques.

**PEG based Dendrimers** for multiple and parallel applications in diagnostics and combination therapy.

**3. REAGENTS FOR LIFE SCIENCES AND DIAGNOSTICS**

Substrates for reporter enzymes and drug interaction studies, metabolites, glucuronides and inhibitors, inducers, antibody conjugates and cross-linkers, natural products, with biological and pharmacological activity, carbohydrates, dyes and fluorescent labels as Tools in Immunology, Biochemistry and Molecular Biology.

**4. CONTRACT MANUFACTURING**

We are carrying out many Contract Manufacturing projects in these areas; our strong points are unusual derivatives with one or several chiral centers.



**IVAM Microtechnology Network**

Joseph-von-Fraunhofer-Strasse 13  
44227 Dortmund  
Germany

Phone: +49 (0)231 9742 168

Fax: +49 (0)231 9742 150

Website: [www.ivam.eu](http://www.ivam.eu)

Contact Person: Dr. Thomas R. Dietrich

Email: [td@ivam.de](mailto:td@ivam.de)

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**Short Company Profile:** IVAM is an international association of companies and institutes in the fields of microtechnology, nanotechnology, advanced materials and optics and photonics. At present about 300 companies, institutes and partners from all over the world are part of the IVAM Microtechnology Network. As the communicative bridge between suppliers and users, IVAM brings innovations to market and creates competitive advantages via technology marketing. Furthermore, IVAM offers lobbying services for small and medium-sized enterprises, project management, economic research, various publications and world-wide networking on trade fairs and events.



### **iX-factory GmbH**

Konrad-Adenauer-Allee 11  
44263 Dortmund  
Germany

Phone: +49 (0)231 47730 580

Fax: +49 (0)231 47730 590

Website: [www.iX-factory.com](http://www.iX-factory.com)

Contact Person: Dominique Bouwes

Email: [info@iX-factory.de](mailto:info@iX-factory.de)

Number of Employees: 13



- Specific Requests:**
- » Further Collaborations
  - » Cooperation Partner for Research

**Short Company Profile:** Die iX-factory ist ein innovativer technischer Dienstleister in der Mikrosystemtechnik- und Nanotechnologie mit maßgeschneiderten Lösungen für Ihre Bedürfnisse. Wir sind ein kompetentes Team und beraten Sie gerne persönlich zu Ihrem individuellen Projekt mithilfe unserer langjährigen Erfahrung. Und erstreckt, wenn es kompliziert wird, sind wir flexibel und zuverlässig uns der Durchführung des Projekts anzunehmen.

Unsere Leistungen für Sie:

- » Exklusive Projektarbeit und Fertigung exakt nach Ihren Anforderungen – mit interdisziplinären Technologien im eigenen Reinraum.
- » Individuelle Chips aus Glas und Silizium präzise nach Ihren Bedürfnissen – flexibel in der Menge, in der Sie sie brauchen.
- » Persönliche Fachberatung und optimale Umsetzung – durch fachkundiges Expertenwissen und langjährige Erfahrung.
- » Sichere Prozesse nach ISO 9001 zertifiziert und transparente Abläufe – Ihre Wünsche werden stets optimal umgesetzt.

In der Zukunft werden wir weiterhin ein Benchmark sein, um der hohen Nachfrage der Miniaturisierung von Mikrosystem- und Nanotechnologie weltweit gerecht zu werden.



### Jobvector – the Science Career Centre

Kölner Landstraße 40  
40591 Düsseldorf  
Germany

Phone: +49 (0)211 301384-01

Fax: +49 (0)211 301384-69

Website: [www.jobvector.de](http://www.jobvector.de)

Contact Person: Sylvia Schieß

Email: [Sylvia.schless@jobvector.com](mailto:Sylvia.schless@jobvector.com)

Number of Employees: 30

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#### Specific Requests: **SPECIFIC PARTNER NETWORK:**

Over the course of the last 15 years, jobvector has established a target group specific network of partnerships with more than 70 associations, trade fairs and specialised journals.

**Media Partners (print & online):** nature, analytik.de, DeviceMed, European Biotechnology News, Laborpraxis, medtechzwo, Technology Review, transkript, Process and many more

#### **Associations and Technology-Cluster:**

Bio Deutschland, Dechema, DGM, Spectaris, VDI and many more

**Trade Fairs and Career Events:** AICHEMA, analytica, Biotechnica, Hannover Messe Industrie, PerMediCon, ScieCon and many more

#### Short Company Profile: **Your specialised online job board for scientists, health professionals & engineers:**

jobvector – the Science career center is Germany's best specialised online job board for scientists, health professionals & engineers! Benefit from our target group focus and recruit highly qualified graduates, technical assistants and experienced industry professionals. Take advantage of our well-established partner network. By posting your jobs on jobvector, they will simultaneously be published in our network of established partner sites.

#### **Career guide "Karrieretrends für Naturwissenschaftler, Mediziner & Ingenieure"**

Present your company and strengthen your employer brand with our target group specific career guide for scientists, health professionals & engineers.

#### **jobvector career days:**

Recruit highly qualified and motivated graduates, young professionals and experienced industry professionals with a background in science, medicine and engineering on our jobvector career days. Our recruiting event takes place at various attractive locations nationwide.

Our experienced team will address your enquiries and requests individually.



**L&R Kältetechnik GmbH & Co.KG**

Hachener Str. 90a  
59846 Sundern  
Germany

Phone: +49 (0)2935 966 14-0

Fax: +49 (0)2935 966 14-50

Website: [www.lr-kaelte.de](http://www.lr-kaelte.de)

Contact Person: Burkhard Rößmann

Email: [info@lr-kaelte.de](mailto:info@lr-kaelte.de)

Number of Employees: 78

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**Short Company Profile:** Innovative refrigeration systems are our challenge, efficient solutions are our everyday business.

We are a traditional company with outstanding expertise in refrigeration systems. We have placed particular emphasis over the past 20 years on the environmentally and energy-aware use of powerful, high-performance refrigeration systems. Our range covers refrigeration and temperature control systems in a variety of designs with differing outputs. The temperature range extends from -120°C to +350°C.

We supply clients in the following disciplines:

- » Plastics and rubber industry
- » Surfaces and electroplating
- » Food processing industry
- » Chemical and pharmaceuticals industry
- » Medical systems
- » Metal processing

The two factors we value highly are a consistently high level of quality for our products and a satisfied customer who remains loyal to the company.

In partnership with our customers, we elaborate energy-efficient overall concepts, which achieve hitherto incomparable efficiency in their long-term effect.

An important area in which we must demonstrate our competence every single day, is service: Commissioning, inspections and optimization of existing systems are carried out by a specially trained team with technical skills and a deep awareness of their responsibilities.

**Lederer & Keller, Patentanwälte Partnerschafts mbH,  
European Patent Attorneys- European Trademark Attorneys**

Unsöldstr. 2  
80538 Munich  
Germany

Phone: +49 (0)89 21 23 99 0

Fax: +49 (0)89 21 23 99 22

Website: [www.lederer-keller.de](http://www.lederer-keller.de)

Contact Person: Dr Günter Keller

Email: [info@lederer-keller.de](mailto:info@lederer-keller.de)

Number of Employees: 13

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**Short Company Profile:** The law firm Lederer & Keller is specialized on intellectual property. We have huge experience in patent prosecution, freedom to operate opinions, opposition proceedings, nullity actions and patent infringement.

All partners have a PhD in biology, biochemistry or chemistry and are qualified as German and European patent and trademark attorneys.



**LEVITRONIX GmbH**

Technoparkstrasse 1  
8005 Zürich  
Switzerland

Phone: +41 44 445 1913

Fax: +41 44 445 1913

Website: [www.levitronix.com](http://www.levitronix.com)

Contact Person: Wolfgang Dornfeld

Email: [dornfeld@levitronix.com](mailto:dornfeld@levitronix.com)

Number of Employees: 90



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**Specific Requests:** We are looking for OEM and Biotech-/ Pharmaceutical Endcustomer Business Development Partners for Biotech Processing related to Pumps, Mixers and Ultrasonic Flow Sensors

**Short Company Profile:** LEVITRONIX is the worldwide leader in magnetically levitated Bearing-less Motor technology, previously specialized in supplying medical blood pumps to the medical community and now focusing on ultra-pure fluid handling devices for Biotech-, Pharmaceutical and other Industrial applications.

Our patented technology permits the motor and magnetic bearing to be combined into a single unit with products that achieve maximum reliability, long life, and the ability to pump precious fluids in the harshest of environments.

LEVITRONIX offers the ideal solution for those applications that demand contaminant-free pumping, mixing or fluid control for extended periods in a highly reliable fashion.

Beside established Multi-Use Pumps systems there is a newly released Single-Use pump series available to the market branded as PuraLev SU (Single-Use) Pump Series.

LEVITRONIX is headquartered in Zurich, Switzerland.

*Life Science Consult*  
MANAGEMENT  
CONSULTING

**Life Science Consult**

Innovation and Start-Up Center for Biotechnology  
Am Klopferspitz 19  
82152 Martinsried  
Germany

Phone: +49 (0)89 120 104-26

Fax: +49 (0)89 921 852-13

Website: [www.LifeScienceConsult.com](http://www.LifeScienceConsult.com)

Contact Person: Dieter Lingelbach

Email: [Lingelbach@LifeScienceConsult.com](mailto:Lingelbach@LifeScienceConsult.com)

Number of Employees: 5



- Specific Requests:**
- » Growing in Europe's Life Sciences Industry
  - » Identifying the right specialists and executives for growth in Central Europe
  - » Business Development Clinical Diagnostics
  - » Business Development Research Business
  - » Identifying the right cooperation partner in Central Europe
  - » Growing in the Japan Life Sciences Industry with our Tokyo office

**Short Company Profile:** Life Science Consult is offering systematic searches in the Life Sciences Industries worldwide, be it for product or business development partners, or for specialists and executives to become personally involved in your expansion. After likely partners or advisors have been identified, we approach and interview them to ensure that they are right for your needs before being presented to you. Our Clients are offered only serious options, no generic strategy talk but business-specific support from the more than 7.000 personal contacts in our database.

Networks are the key to success in most businesses, and nowhere are they more important than in the highly specialized Life Science industry. Over the past 15 years, Life Science Consult has built a network of more than 7.000 professionals through personal connections and targeted search activities, giving us access to the people that your business needs for growth.

This unique and powerful database – the Life Science Talent Network™ – allows us to rapidly assemble the appropriate network to advance your business at every stage in its development.

# Lonza

## Lonza Cologne GmbH

Nattermannallee 1  
50829 Köln  
Germany

Phone: +49 (0)221 99199 0

Fax: +49 (0)221 99199 111

Website: [www.lonza.com](http://www.lonza.com)

Contact Person: Dr. Karl Clasen, Dr. Claus-Dietmar Pein

Email: [info.cologne@lonza.com](mailto:info.cologne@lonza.com)

Number of Employees: 103

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### Short Company Profile: About Lonza Cologne GmbH

Lonza Cologne GmbH offers products for various everyday uses, such as disinfectants and detergents in hospitals or pool and spa areas, in pesticides against snails (metaldehyde), in sports and energy drinks (vitamin B<sub>3</sub>, L-Carnitine) or in body lotions as emulsifying agents.

At the BioCampus Cologne, Lonza's Bioscience Solutions staff develops and commercializes nonviral gene transfer products for primary cells and hard-to-transfect cell lines. Primary cells more accurately reflect the condition and behavior of cells within an organism when compared to commonly used laboratory cell lines. Therefore, they are important model systems for both basic and clinical research. With Lonza's Nucleofector™ Technology, the functionality of different genes can be analyzed in biologically relevant cell types. These results help identify possible new pharmaceuticals and therapies, for example to fight cancer or cardiovascular diseases.

In addition, Cologne is the German distribution center for further Lonza businesses. Thus, customers are served in different areas, such as endotoxin detection, water treatment, personal care, health and hygiene, industrial conservation, material preservation, wood treatment, nutrition and agriculture.



**Lumiprobe GmbH**

Feodor-Lynenstr. 23  
30625 Hannover  
Germany

Phone: +49 (0)511 165 968 11

Fax: +49 (0)511 165 968 15

Website: [www.lumiprobe.com](http://www.lumiprobe.com)

Contact Person: Dmitry Sankevich, CEO

Email: [dmitry.sankevich@lumiprobe.com](mailto:dmitry.sankevich@lumiprobe.com)



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**Short Company Profile:** Lumiprobe GmbH is a privately held innovative company with main expertise in fluorescent chemicals, and organic synthesis. The company is aimed at providing most advanced chemicals for molecular biology research and diagnostics.

Since 2009, Lumiprobe manufactures and markets a number of fluorophores, which have been used and cited by a number of research groups around the world. The company is developing new fluorophores which are designed to overcome the limitations of existing fluorescent structures.

Another research activity involves the development of new multiplex solutions based on mass spectrometry, with strong predisposition to diagnostic use.



**MACHEREY-NAGEL GmbH Co. KG**

Neumann-Neander Str. 6-8  
52355 Düren  
Germany

Phone: +49 (0)2421 969 0

Fax: +49 (0)2421 969 199

Website: [www.mn-net.com/Bioanalysis](http://www.mn-net.com/Bioanalysis)

Contact Person: Dr. Ulrich Schübel

Email: [bdm-bio@mn-net.com](mailto:bdm-bio@mn-net.com)

Number of Employees: 515

- Specific Requests:**
- » Potential customer for DNA, RNA, and protein purification
  - » Distribution partners
  - » Cooperation partners for OEM business
  - » Application / Lab focus related partnerships / Co-Marketing
  - » Cooperation partners for research and product development
  - » Others ...

**Short Company Profile:** Profound technology know-how and long-time experience have enabled MN to pioneer innovative solutions for DNA, RNA, and protein extraction. Since 1993 MN develops and manufactures a comprehensive range of ready-to-use kits and consumables for nucleic acid and protein purification. The company provides innovative bio-separation technologies and high-value products for a large variety of users world-wide: life science, academic, industrial, clinical, CROs, and governmental research, genomics, nucleic acid based molecular diagnostics, clinical samples, applied testing (including veterinary testing, food safety, GMO detection / quantification, animal species differentiation, as well as forensics), gene expression profiling, gene therapy, and proteomics. MACHEREY-NAGEL has become an important brand of high-quality products in sample preparation being certified under the EN ISO 9001 norm and for medical devices under EN ISO 13485 norm. The products cover a broad range of applications and are highly esteemed in leading laboratories worldwide.

Within the last 20 years, MN has created a large portfolio of purification technologies and formats to meet your everyday needs.

- » Silica-based anion exchanger (NucleoBond®)
- » Silica-based membrane technology (NucleoSpin®)
- » Beads based on silica or latex (NucleoTrap®)
- » Magnetic beads (NucleoMag®)
- » Ultrafiltration (NucleoFast®)
- » Gel filtration (NucleoSEQ®)
- » Affinity chromatography (Protino®).

MACHEREY-NAGEL offers high quality solutions for your specific application needs.



### **MCI Management Center Innsbruck**

Maximilianstraße 2  
6020 Innsbruck  
Austria

Phone: +43 512 2070-3800

Fax: +43 512 2070-3899

Website: [www.mci.edu](http://www.mci.edu)

Contact Person: Prof. Dr. Christoph Griesbeck

Email: [christoph.griesbeck@mci.edu](mailto:christoph.griesbeck@mci.edu)

Number of Employees: 240



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- Specific Requests:**
- » We are looking for cooperation partners in our research fields.
  - » We offer study programs and post-graduate educational programs in the fields of technology & life sciences and management.

**Short Company Profile:** Management Center Innsbruck (MCI) is an integral part of the unique “Open University Innsbruck” concept in Austria and has attained a leading position in international higher education as a result of its on-going quality and customer orientation. MCI strives to mentor motivated people, who want to build their future through goal-oriented continuing education, in their personal and professional development. MCI offers graduate, non-graduate and post-graduate educational programs. MCI’s programs focus on all levels of the personality and include areas of state-of-the art knowledge from science and practice relevant to business and society.

Besides the programs in Business and Management MCI strongly focuses on the field of Technology and Life Sciences offering study programs in Biotechnology, Environmental & Energy Engineering, Bioresource & Food Engineering, Business Engineering and Mechatronics. Our very well developed collaborations to industry partners ensure up-to-date teaching at a top level and strong connections between university, students and companies.

MCI’s research focuses are in the fields of Algal Biotechnology, Agro & Food Technology, Process Technology, Renewable Energy, Fluids & Mechanics, Electronics and Operational Excellence.



**Medigene AG**

Lochhamer Str. 11  
82152 Planegg/Martinsried  
Germany

Phone: +49 (0)89 200033-0

Fax: +49 (0)89 200033-2920

Website: [www.medigene.com](http://www.medigene.com)

Contact Person: Dr. Kerstin Pino Tossi

Email: [business.development@medigene.com](mailto:business.development@medigene.com)

Number of Employees: 65

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- Specific Requests:**
- » Cooperation Partner for Clinical Development
  - » Cooperation Partner for Research

**Short Company Profile:** Medigene is a publicly listed (Frankfurt: MDG1, prime standard) biotechnology company headquartered in Martinsried near Munich, Germany. Medigene concentrates on the development of personalized T cell immunotherapies with a focus on haematological malignancies. Medigene is the first German biotech company to have revenues from a marketed product, which is distributed by commercial partner companies. Medigene has advanced drug candidates which are licensed to partners and additional candidates in clinical development. The company is developing highly innovative treatment platforms concentrating on cancer and autoimmune diseases.



### MicroDiscovery GmbH

Marienburger Str. 1  
10407 Berlin  
Germany

Phone: +49 (0)30 443 50 90-0

Fax: +49 (0)30 443 50 90-10

Website: [www.microdiscovery.de](http://www.microdiscovery.de)

Contact Person: Dr. Arif Malik

Email: [arif.malik@microdiscovery.de](mailto:arif.malik@microdiscovery.de)

Number of Employees: 15

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**Specific Requests:** Searching for a practical, rapid analysis system? Our latest innovative product mo:Test and mo:Test MULTI is a professional smartphone based analysis system for your lateral flow tests. With mo:Test we offer a fast and cost-efficient solution, making it easy to get reliable analysis results immediately. Our mobile system can be adapted to any lateral flow cartridges and layouts.

**Key Benefits:**

- » Simple and rapid analysis
- » Reliable and stable results
- » Proper documentation of results
- » Data transfer by WLAN, Bluetooth, web or email
- » Self sustained operation: no power supply needed
- » Self sustained operation: on-system storage
- » Suitable for field or emergency situation
- » Support of intra-team communication

**Short Company Profile:** MicroDiscovery is a leading provider of high-quality software solutions for research in molecular biology, personalized medicine and innovative diagnostics.

The company has a high level of expertise in developing custom software. This includes implementation of regulatory standards in the sector of bio-medical applications and in vitro diagnostics.

For the emerging field of mobile health, MicroDiscovery developed mo:Test, an innovative smartphone-based analysis system for lateral flow assays.

This easy-to-use device is not only mobile, but also provides a quantitatively reliable documentation of test results.

Other services such as the biostatistical data analysis, planning and management of complex bioinformatics research projects are also offered by MicroDiscovery. Our software products CheckReport, Gene Spotter and Aluco have satisfied professionals in the field due to its well-designed user friendly interfaces and forward-looking automation.



**Minerva Biolabs GmbH**

Köpenicker Straße 325  
12555 Berlin  
Germany

Phone: +49 (0)30 20004370

Fax: +49 (0)30 20004379

Website: [www.minerva-biolabs.com](http://www.minerva-biolabs.com)

Contact Person: Dr. Dirk Vollenbroich

Email: [d.vollenbroich@minerva-biolabs.com](mailto:d.vollenbroich@minerva-biolabs.com)

Number of Employees: 16

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- Specific Requests:**
- » Global Business Development Partner
  - » OEM Contract Manufacturing Partner

**Short Company Profile:** Minerva Biolabs GmbH is a leading biotechnology company dedicated to the prevention, detection and elimination of microbial contaminations in the field of cell culture technology and biopharmaceutical industry. Our core competence lies in the manufacturing of products for the control of mycoplasma, bacteria and viruses. In addition we employ our specialized kits and reagents as PCR based kits for the detection of microbial contaminations in water.

Minerva also provides contract manufacturing services for any kind of molecular diagnostics reagents especially freeze-dried temperature-stable reagents.



**M+W Process Industries GmbH**

A Company of the M+W Group  
 Lotterbergstr. 30  
 70499 Stuttgart  
 Germany

Phone: +49 (0)711 8804 1800

Fax: +49 (0)711 8804 1888

Website: [www.pi.mwgroup.net](http://www.pi.mwgroup.net)

Contact Person: Ilga Palfner

Email: [Info.pi@mwgroup.net](mailto:Info.pi@mwgroup.net)

Number of Employees: 650

- Specific Requests:**
- Engineering and construction of GMP facilities
  - » Consulting (EU-GMP, FDA, benchmarking, FDA audits)
  - » Design (concept, basic, detail)
  - » Procurement
  - » Construction management / Project management
  - » Realization / Construction (turnkey/EPC, EPCMV)
  - » Process systems (i.e. customized temperature controlled mixing vessels)
  - » Qualification & validation
  - » Technical facility management

**Short Company Profile:** **M+W Process Industry GmbH – The Engineering and Construction Company for LifeScience Project Deliveries -**  
 M+W Process Industries GmbH, a subsidiary of the M+W Group, is a global engineering and construction company headquartered in Stuttgart, Germany.  
 M+W Process Industries GmbH offers complete process and facilities solutions. The strong track record of experiences includes profound references amongst the pharmaceutical, biotechnology and chemical manufacturers as well as in the medical devices, consumer care, cosmetics and the food & beverages industries.  
 Clients are both large and medium-sized enterprises as well as start-up companies.

**Competencies – Integrated Solutions for the Process Industry**  
 M+W Process Industries specializes in process engineering, logistics, process systems, cleanroom technology, HVAC and building services (M+E) as well as civil and architecture (CSA), providing optimum, single source solutions by integrated project teams.  
 Whether you require the turnkey construction of a new production facility, cleanroom, laboratory or building, or the extension or reconstruction of existing facilities – M+W Process Industries will find the best and most economical solutions to meet your deadlines.  
 Experienced project managers guarantee optimal solutions and commercial success. Projects are based on current GMP guidelines. Following analysis of the requirements, these are subsequently implemented in a pragmatic manner with the aid of risk analyses. An entire technical facility management will provide services during the complete life cycle period.

## MOLOGEN AG

### MOLOGEN AG

Fabeckstraße 30  
14195 Berlin  
Germany

Phone: +49 (0)30 84178838

Fax: + 49 (0)30 84178850

Website: www.mologen.com

Contact Person: Claudia Nickolaus  
Head of Investor Relations & Corporate Communications

Email: investor@mologen.com

Number of Employees: ~ 60

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- Specific Requests:**
- » Cooperation Partner for Clinical Development with cancer immunotherapy MGN1703:
    - Collaborative trials in the indications colorectal and lung cancer
    - Combination trials with other immuno-oncology drugs
  - » Cooperation Partner for Clinical Development:
    - Collaborative trials in diseases other than cancer
  - » Partner for distribution/marketing in EU and US
  - » Cooperation partner for Research

**Short Company Profile:** MOLOGEN AG is a biotechnology company specialized in the research and clinical development of cancer immunotherapies and DNA vaccines against infectious diseases.

The cancer immunotherapies MGN1703 is the company's lead product and best-in-class TLR9 agonist for the treatment of solid tumors. Thus, it could be used in various cancer indications. It is currently under development for first-line maintenance treatment of colorectal cancer (pivotal randomized trial started) and lung cancer (randomized controlled trial started).

Second clinical-stage product is MGN1601, a therapeutic vaccination for the treatment of renal cancer. A phase I/II clinical study has already been completed successfully.

With unique, patented technologies and innovative products, MOLOGEN is pioneering immunotherapies.

MOLOGEN AG is a publicly listed company, founded in 1998 and headquartered in Berlin. The shares (ISIN DE0006637200) are listed in the Prime Standard of the German Stock Exchange.



**nadicom GmbH**

Hertzstr. 16  
76187 Karlsruhe  
Germany

Phone: +49 (0)721 6084-4481

Fax: +49 (0)721 6084-4618

Website: [www.nadicom.com](http://www.nadicom.com)

Contact Person: Dr. Bernhard Nüßlein

Email: [info@nadicom.com](mailto:info@nadicom.com)



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**Short Company Profile:** nadicom Gesellschaft für angewandte Mikrobiologie mbH is a leading international operating GMP-certified biotech company specializing in the identification of bacteria and fungi in pure cultures, environmental samples and complex mixed cultures. For the identification of micro-organisms, the most modern molecularbiological methods are applied in our laboratories.

Qualitative identification of bacteria and fungi from pure cultures is carried out via sequencing of specific marker genes. To exactly identify micro-organisms, the sequences of the specific marker genes are compared with the gene sequences of nadicom's extensive database containing more than 45,000 validated sequences. Within a few days, the client receives a complete analysis report containing the phylogenetic classification of the isolate.

In addition, nadicom uses various methods for the creation of DNA-fingerprints from bacterial and fungal strains.

Contracted research represents another focus of the range of services offered. Here, nadicom currently works with partners in environmental microbiology. In this sector, the main focus is on the stimulation of plant-microbe interactions.

In bioinformatics, nadicom offers the GMP-compliant software package "tree by nadicom" allowing the fast and reliable phylogenetic classification of cultivated and non-cultivated microorganisms. The database "fybase by nadicom" gives a broad overview about the prevalent micro-organisms present in the pharmaceutical laboratory including detailed description, classification, risk evaluation and literature.

Our services are completed with educational seminars for laboratory personnel and consulting in the field of microbiology and environmental monitoring.



### **nanoTools Antikoerpertechnik GmbH & Co. KG**

Tscheulinstr. 21  
79331 Teningen  
Germany

Phone: +49 (0)7641 455 670

Fax: +49 (0)7641 455 671

Website: [www.nanotools.de](http://www.nanotools.de)

Contact Person: Dr. Petra Schuessler

Email: [info@nanotools.de](mailto:info@nanotools.de)

Number of Employees: 24

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**Short Company Profile:** nanoTools GmbH & Co. KG is a privately owned German company providing custom monoclonal antibody development services for the international pharmaceutical and biotech industry. Founded in 1994, we have longstanding technical experience and an advanced technological platform of our own. We are well-qualified to solve the most ambitious technical challenges for our customers and to provide large numbers of functionally well-characterized, high affinity antibody hits.

Our technological platform includes our proprietary High Responder Mouse Strains, a sophisticated vaccine and immunization strategy as well as a comprehensive range of high throughput screening formats. Among these are Luminex, EnSpire Alpha, RTCA, Flow Cytometry, Western Blot and diverse cellular assay formats. Full characterization of fusion products including functional screening and determination of  $K_D$  values is performed prior to subcloning of cell lines. This drastically reduces the customer's inhouse effort for selection of suitable drug candidates or research tools.

Besides custom antibody development, we are also offering an in-house manufactured portfolio of monoclonal antibodies for the worldwide research market. We are particularly specialized on Autophagy, Alzheimer and Signal Transduction tools, such as phosphorylation-specific monoclonal antibodies that show high specificity and selectivity for the respective phosphoepitope.



### **N-Zyme BioTec GmbH**

Haasstr. 9  
64293 Darmstadt  
Germany

Phone: +49 (0)6151 3912760

Fax: +49 (0)6151 3912779

Website: [www.n-zyme.de](http://www.n-zyme.de) (in preparation)

Contact Person: Dr. Stefan Marx

Email: [marx@n-zyme.de](mailto:marx@n-zyme.de)

Number of Employees: 16



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**Specific Requests:** N-Zyme BioTec is looking for commercial partners for the industrial use of natural bioactives for food/feed, cosmetic or technical applications (stabilization, preservation, health/wellness, beauty, anti-aging,..). R&D collaborations in new technological (e.g. phytoextraction, bioassays) or applications fields (e.g. preventive nutrition) with industry and research institutes are welcome.

**Short Company Profile:** N-Zyme BioTec is a science and technology driven company founded in 1999 as a spin-off from two Universities in Darmstadt and passed a restructuring process in 2012. Under the claim “unlocking the potential of nature” N-Zyme BioTec has specialized in research, development, production and marketing of bioactives from natural produce in application fields of food, cosmetic, pharma and chemical industries. Based on our continuously broadening AMBOSS (bio)technology platform different active molecules from olive side streams are generated, modified and functionalized to yield extracts, fractions and isolates according to the application specific requirements. As AMBOSS bioactives are safe and innocuous they can not only give added value to health & wellness products but can also be used to replace the functionality of hazardous chemicals by biological agents from sustainable sources. Besides the AMBOSS unit, N-Zyme BioTec is providing biotechnical service activities to different life science industries ranging from consulting, analytical support to toll manufacturing of bioactives and bioreagents.



### **ORGANO BALANCE GmbH**

Gustav-Meyer-Allee 25  
13355 Berlin  
Germany

Phone: +49 (0)30 46307-200

Fax: +49 (0)30 46307-210

Website: [www.organobalance.com](http://www.organobalance.com)

Contact Person: Dr. Klaus Pellengahr

Email: [pellengahr@organobalance.com](mailto:pellengahr@organobalance.com)

Number of Employees: 30

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**Specific Requests:** ORGANO BALANCE offers a broad range of services and capabilities in microbiology and molecular biology. These include for example:

#### SCREENING

- » broad range of OASSYS bioassays
- » adhesion, cellular interaction, inhibition
- » application-relevant strain selections

#### ANALYTICS

- » metabolites: Sterols, fatty acids
- » molecular and physiological strain characterisation
- » probiotic properties

#### PROCESSES

- » scale up of fermentations
- » down-stream processes
- » pilot productions

**Short Company Profile:** ORGANO BALANCE uses its unique microbial culture collection and natural diversity for the development of highly effective, gentle and patentable products.

We explore the vast potential of microorganisms for the development of highly innovative and natural compounds and products for the fields of food, feed, personal care, agriculture, the chemical and the pharmaceutical industry.

Likewise, we use our extensive experience in the field of metabolic engineering for the commercial production of platform and fine chemicals.



**Pall Life Sciences**

Philipp-Reis-Straße 6  
63303 Dreieich  
Germany

Phone: +49 (0)6103 307-0

Fax: +49 (0)6103 307-295

Website: [www.pall.com](http://www.pall.com)

Contact Person: Dr. Dirk Sievers

Email: [dirk\\_sievers@europe.pall.com](mailto:dirk_sievers@europe.pall.com)



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**Short Company Profile:** Pall Life Sciences provides cutting-edge products and services to meet the demanding needs of customers discovering, developing and producing biologics and classic pharmaceuticals. The company's membranes and membrane devices optimize detection and sample preparation in the drug research, clinical diagnostics, genomics, and proteomics markets. Pall is a leading provider of automated systems and single-use solutions to pharmaceutical and biotechnology companies – from upstream, through downstream, to formulation and filling – and maintains certified ISO9001 manufacturing facilities worldwide. The company's Scientific and Laboratory Services (SLS), Technical Services and Validation Laboratories have been a cornerstone of customer support for more than 30 years providing compatibility studies, extractable/leachable studies, particulate validation and more.



### **PeproTech GmbH**

Oberaltenallee 8  
22081 Hamburg  
Germany

Phone: +49 (0)40 734357770

Fax: +49 (0)40 734357779

Website: [www.peprotech.com](http://www.peprotech.com)

Contact Person: Dr. Bärbel Icheln

Email: [bicheln@peprotech.de](mailto:bicheln@peprotech.de)

Number of Employees: 8

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**Short Company Profile:** Supporting life science research since 1988, PeproTech is the trusted source for the developing and manufacturing of high quality cytokine products for the life-science and cell therapy markets. Over the past 25 years the company has grown into a global enterprise with state-of-the-art manufacturing facilities in the US, and offices around the world.

With over 2,000 products PeproTech has developed and refined innovative protocols to ensure quality, reliability and consistency.

Our mission is to provide the highest quality products and premium support that address the needs and demands of today's scientists and researchers.

We pride ourselves on being a trusted partner within the scientific community.

- » Research Use Only (RUO) proteins and antibodies
- » GMP-Compliant products for Cell, Gene and Tissue Therapy
- » Animal Free Cytokine Range
- » ELISA kits
- » Media Kits / Supplements



### Pharmacelsus GmbH

Science Park 2  
66129 Saarbrücken  
Germany

Phone: +49 (0)681 396 7510

Fax: +49 (0)681 396 7511

Website: [www.pharmacelsus.de](http://www.pharmacelsus.de)

Contact Person: Dr. Stephanie Urschel

Email: [urschel@pharmacelsus.de](mailto:urschel@pharmacelsus.de)

Number of Employees: 37

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- Specific Requests:**
- » Fee-for-service preclinical studies
  - » Bioanalytical support for phase I clinical studies
  - » Cooperation partners for research projects

**Short Company Profile:** Since the year 2000, the GLP-certified CRO Pharmacelsus GmbH provides the pharmaceutical and biotech industry with high quality and innovative research services. Inspired by successful participation in research projects, we make innovative solutions for our client's challenging projects available.

The Pharmacelsus service portfolio contains *in vitro* and *in vivo* methods for the evaluation of potency and safety of potential new drugs with a focus on *in vitro* ADME & *in vivo* pharmacokinetics as well as bioanalytical services (GLP, GCLP and non-GLP).

Pharmacelsus plans and conducts state-of-the-art *in vivo* studies with pre-clinically relevant species. The bioanalytical department quantifies both in-house and external samples using leading edge technologies (LC/MS-(MS)) to provide high quality data. Additional services include *in vitro* compound profiling, exploratory *in vitro* toxicology testings and target-based bioassays in the fields of diabetes, obesity and steroid endocrinology.

All services are conducted in a GLP environment. For phase I clinical trials Pharmacelsus offers bioanalysis under consideration of regulatory GCLP rules.

Our goal is to enable our clients to reach their clinical development without delays. Adapting standard assays to accommodate for the uniqueness of our client's projects is our standard practice. Study designs are always tailored to the particular needs of our clients.

Pharmacelsus is committed to participating in domestic and European research projects to expand its service portfolio.



**Phytowelt GreenTechnologies GmbH**

Kölsumer Weg 33  
41334 Nettetal  
Germany

Phone: +49 (0)2162 77859

Fax: +49 (0)2162 89215

Website: [www.phytowelt.com](http://www.phytowelt.com)

Contact Person: Dr. Peter Welters, CEO

Email: [contact@phytowelt.com](mailto:contact@phytowelt.com)

Number of Employees: 25



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**Specific Requests:** Further collaboration in identification of enzymes and production strain optimization for fermentation processes

**Short Company Profile:** Phytowelt GreenTechnologies GmbH is a company with international operations, providing products and services in industrial biotechnology for the economic utilization of plant enzymes (phytomining). We create individual, custom-tailored solutions for different markets, e.g. perfume and fragrance manufacturer, fine and bulk chemicals, adhesives, feed, food, personal care and pharma industry. Over the last 17 years, we have gained extensive knowledge about enzyme identification and biosynthetic pathway construction. Our unique selling point is the functional expression of very efficient plant enzymes in high productive microorganisms. Using our biotechnology tools, we create and optimize biosynthetic pathways, production strains, enzyme activity and enzyme assays. A scientific network out of more than 50 national and international academic and industrial partners helps us to stay innovative and always provide the best solution to the customer. Our highly qualified and committed employees guarantee with their expertise a not only customized but also sustainable solution following our vision to provide products by phytoinspiration for a future worth living.



**PreSens Precision Sensing GmbH**

Josef-Engert-Str. 11  
93053 Regensburg  
Germany

Phone: +49 (0)941 9 4272-1 00

Fax: +49 (0)941 9 4272-1 11

Website: [www.presens.de](http://www.presens.de)

Contact Person: Dr. Gernot T. John (Director Marketing & Innovation)

Email: [g.john@presens.de](mailto:g.john@presens.de)

Number of Employees: 90

**Specific Requests:** PreSens is constantly looking for development and cooperation partners as already done in the past. Some examples for successfully closed projects:

- » EU-Project “Invitroheart” – (Partners e. g. Linköping University, Sweden, Cellartis, Göteborg/ Sweden, Pharmacelsus GmbH, Saarbrücken/Germany, University of Saarland, Germany, etc)
- » EU-Project “Nanobe” – (Partner e. g. VTT Espoo, Finland; CNRS Paris, Frankreich, EPFL Lausanne, Switzerland etc.)
- » BMBF-Project “Bioacid” – (Partner e. g. AWI Bremerhaven, Max-Planck-Institut, Bremen etc.)
- » BFS-Project “Smart Gels” – (Partner: LMU München)

**Short Company Profile:** Based on research activities started in the 1980’s PreSens was founded in 1997 as a spin off from the University of Regensburg, Germany. The company combines these long-time experiences of different researchers in the fields of electronic engineering and sensor development. Right from the beginning micro sensor systems were sold to researchers in the life science area. During the last more than 18 years PreSens became one of the leading companies in the field of chemical optical sensors. Together with its partners it offers full service in Europe, USA and Asia.

PreSens offers a broad range of sensor systems for end users in Bioprocess Control, Biological & Environmental Research, Food & Beverage industry as well as other industrial applications. We offer e. g.

- » Dissolved oxygen (DO) and CO<sub>2</sub> measurement in gases and liquids
- » Non-invasive online pH, CO<sub>2</sub> and oxygen measurement
- » Oxygen and pH sensors for single-use bioreactors
- » Microsensors for pH and oxygen
- » Process control in shake flasks
- » Low-maintenance DO measurement for fermentation and bioreactor systems
- » Online oxygen and pH measurement in disposables like multiwell plates and plastic bags
- » Imaging Solutions for 2D-sensing of oxygen-, pH- and CO<sub>2</sub>- distribution

Furthermore, PreSens is developer and manufacturer of optoelectronic OEM sensor components for companies in the field of medical equipment and process control. Please do not hesitate to contact us for any request concerning your customized solution.



**Rentschler Biotechnologie GmbH**

Erwin-Rentschler-Str. 21  
88471 Laupheim  
Germany

Phone: +49 (0)7392 701 0

Fax: +49 (0)7392 701 300

Website: [www.rentschler.de](http://www.rentschler.de)

Contact Person: Dr. Marion Schrader

Email: [marion.schrader@rentschler.de](mailto:marion.schrader@rentschler.de)

Number of Employees: 600

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**Short Company Profile:** Rentschler is a Contract Development and Manufacturing Organization (CDMO) for bio-pharmaceuticals with over 40 years' experience. We make a crucial contribution to the global availability of biopharmaceuticals. Rentschler is a solid, owner-managed, medium-sized company which can act independently on a long-term basis.

For our clients, we lead projects to success thus enhancing their competitiveness in the markets and provide products according to their needs and timelines.

Our full-service customized solutions range from biopharmaceutical development over manufacturing to fill & finish and regulatory support. Focused on mammalian cell lines our experience covers the all stages of development and manufacturing of recombinant proteins such as cytokines, enzymes, monoclonal antibodies and fusion proteins in compliance with international GMP standards (EMA/FDA).

In our GMP certified facilities we produce material for clinical phases and commercial supply in stainless steel as well as in single-use bioreactors. With our state-of-the-art production platforms we meet all clients' requirements and the highest manufacturing standards.

We provide excellent regulatory support for clinical studies as well as for market approval.

Comprehensive and tailored project management by one designated contact person allows us proactive and responsive communication with our clients.

The Rentschler brand stands for expert guidance and solutions, long-term experience, innovation, reliability, and quickest possible time to market.



### **Richter-Helm BioTec GmbH & Co. KG**

Suhrenkamp 59  
22335 Hamburg  
Germany

Phone: +49 (0)40 55290-430

Fax: +49 (0)40 55290-888

Website: [www.richter-helm.eu](http://www.richter-helm.eu)

Contact Person: Dr. Kai Pohlmeier

Email: [k.pohlmeier@richter-helm-biotec.eu](mailto:k.pohlmeier@richter-helm-biotec.eu)

Number of Employees: 155 (incl. Richter-Helm BioLogics)

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- Specific Requests:**
- » Development and GMP-compliant contract manufacturing of microbial derived biopharmaceuticals
  - » In- and out-licensing of biopharmaceuticals

**Short Company Profile:** Richter-Helm is a dynamic and expanding German biotech company specialized in the development and GMP-compliant manufacturing of products derived from microbial expression systems (bacteria and yeasts). Richter-Helm has more than 25 years of experience in the development and production of recombinant proteins, plasmid DNA and vaccines and provides its customers tailored solution for all stages from clinical trials up to commercial supply.

Richter-Helm offers services with highest pharmaceutical quality standards, which was confirmed by leading regulatory authorities (e.g. EMA, FDA, ANVISA, MFDS).

Our services:

- » Strain development
- » Establishment of cell banks
- » Process development
- » Development and validation of analytical methods (incl. biological assays)
- » Technology transfer
- » GMP manufacturing for clinical phase I to III and commercial
- » Process validation
- » Stability studies

In addition Richter-Helm is the platform of Gedeon Richter and Helm AG for worldwide licensing options as well as partnerships for co-development and marketing of biopharmaceutical products.



### RUHR-IP Patentanwälte (Patent Attorneys)

Brucker Holt 58  
45133 Essen  
P.O. Box 230144  
45069 Essen

Germany

Phone: +49 (0)201 17 00 35 90

Fax: +49 (0)201 17 00 35 98

Website: [www.RUHR-IP.com](http://www.RUHR-IP.com)

Contact Person: Patent Attorneys  
Dr. Anna Katharina Heide, Dipl.-Biol.  
Biotechnology & Biochemistry  
Dr. Tanja Bendele, LL.M, Dipl.-Chem.  
Chemistry & Pharmaceuticals



Email: [heide@ruhr-ip.com](mailto:heide@ruhr-ip.com)  
[bendele@ruhr-ip.com](mailto:bendele@ruhr-ip.com)

Number of Employees: 5-10

- Specific Requests:**
- » Contact to prospective customers
  - » International network

**Short Company Profile:** RUHR-IP Patent Attorneys, having own entrepreneurial and business experience in the field of industrial property rights, counsel and represent domestic and international clients worldwide on all aspects of the intellectual property right law. Including patents, trademarks and designs, licenses and infringement cases. Our main activities involve prosecution of application (EU, US, JP, CN, TW, GCC), Opposition and Nullity Procedures with a focus on Europe as well as strategic counsel and preparation of expert opinions to support Freedom to Operate (FTO-Opinions) in all technological fields; Organization and representing in national and international infringement procedures.

DR. ANNA HEIDE – Consultancy in tailored IP-strategy, individual solutions and project management for companies applying biotechnology. Former worked at Jülich Research Center, KIT-Karlsruhe, Henkel KGaA and Bayer AG. Biotechnology, Biochemistry, Molecular Biology, enzymes, proteins, antibodies, vaccines, interdisciplinary disciplines e.g. Hygienics; Medical Field, Diagnostic, Cosmetics, anti-(bio)fouling; since 2009 international Patent Prosecution, FTO, Oppositions, Trade Marks, licensing, strategic IP-consulting for SME.

DR. TANJA BENDELE – Founder of RUHR-IP Patent Attorneys. Former patent manager of generic drug company, Ratiopharm from 2000. Practice in patent law firm and former owner of firm for the planning of experiments for opposition procedures in the field of pharmaceuticals. Chemistry, Pharmaceuticals, SPCs, Generic drugs, Dental and Medical Field, cosmetic, food, Due Diligence, Freedom to Operate (FTO), International Patent Prosecution, Oppositions, Appeals, Infringement, international project management, Nullity Procedures, Trade Marks. Creative Solutions for Prevention of Infringement.

**ScheBo • Biotech**

**ScheBo® • Biotech AG**

Netanyastr. 3  
35394 Giessen  
Germany

Phone: +49 (0)641 49960

Fax: +49 (0)641 499677

Website: [www.schebo.com](http://www.schebo.com)

Contact Person: Dr. Ursula Scheefers-Borchel

Email: [u.borchel@schebo.com](mailto:u.borchel@schebo.com)

Number of Employees: 47

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### Specific Requests:

- » Further collaborations
- » Business development partner for foreign markets
- » Looking for new diagnostic products for further development and distribution
- » Worldwide distributors

### Short Company Profile:

ScheBo® • Biotech AG is an innovative biotech company that is active in the fields of development, production and marketing of diagnostics.

Continuous innovation, strong customer focus and creative problem solving have made ScheBo® • Biotech AG a worldwide leading manufacturer of unique products.

R&D and production led to the successful launch and global sales of the following products:

ScheBo® • Pancreatic Elastase 1 Stool test the noninvasive gold standard for the diagnosis/exclusion of exocrine pancreatic insufficiency. The test is available as a quantitative ELISA test and as a qualitative rapid test.

M2-PK is an innovative biomarker, which has been identified as a key metabolic enzyme in colorectal cancers and adenomas. The dimeric isoform of M2-PK is specific for a change in the glucose metabolism, which occurs in colorectal adenomas and cancers. M2-PK is a screening marker to discover even the early stages of colorectal cancer. It can detect non-bleeding, as well as bleeding, colorectal adenomas and cancers. ScheBo® • 2in1 Quick™ measures parallel M2-PK and hemoglobin in a lateral flow assay. ScheBo® • M2-PK EDTA Plasma test is worldwide the first test which detects a metabolic state, specific for 13 cancer entities.



### **sifin diagnostics gmbh**

Berliner Allee 317-321  
13088 Berlin  
Germany

Phone: +49 (0)30 927030-0

Fax: +49 (0)30 927030-30

Website: [www.sifin.de](http://www.sifin.de)

Email: [info@sifin.de](mailto:info@sifin.de)

Number of Employees: 72

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**Short Company Profile:** sifin diagnostics gmbh, founded in 1991, is a long-established *in vitro* diagnostics company in Germany. It's a partner you can rely on for carrying out research and development work as well as for the production of *in vitro* medical devices under the conditions of a certified quality management system.

#### **OUR CORE COMPETENCES**

Immunology: blood grouping serological products, bacteriological test reagents, monoclonal antibodies for different technologies, contract manufacturing for cell lines of partners

Bacteriology: culture media, bacteriological test reagents.



**Struktur- und Wirtschaftsförderungsgesellschaft  
des Landkreises Teltow-Fläming mbH  
Abteilung Biotechnologiepark Luckenwalde**

Im Biotechnologiepark, CCB  
14943 Luckenwalde  
Germany

Phone: +49 (0)3371 681-614

Fax: +49 (0)3371 681-612

Website: [bio-luck@swfg.de](mailto:bio-luck@swfg.de)

Contact Person: Johannes Ferdinand

Email: [j.ferdinand@swfg.de](mailto:j.ferdinand@swfg.de)

Number of Employees: 8



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- Specific Requests:**
- » Further Collaborations with a special Technology-Park
  - » Settlement of a branch
  - » Establishment of a sales office for a low cost as an excellent European / German market access

**Short Company Profile:** The Biotechnology Park Luckenwalde is one of the key-components of the Berlin-Brandenburg Life Science Cluster. Located just 50 km south of Berlin, the Park is one of the most modern facilities of its kind in Germany. Already 30 national and international companies with 500 employees are located in the park which is a perfect location to setup a new business.

The excellent Campus for Biotech, Pharma and Medtech companies provides a branch-specific Technology Center, equipped labs, central technical GMP-services, congress centre with library and restaurant, a private educational centre of biotechnology and chemistry, Industrial property ready for building with a low price, apartments and single houses.

First Biotechnology Park in Germany to meet the GMP and ISO requirements. Cooperation networks with universities, research institutes and hospitals.



**Subitec GmbH**

Julius-Hölder-Str. 36  
70597 Stuttgart  
Germany

Phone: +49 (0)711 365 4029 0

Fax: +49 (0)711 365 4029 10

Website: [www.subitec.com](http://www.subitec.com)

Contact Person: Dr. Peter Ripplinger

Email: [info@subitec.com](mailto:info@subitec.com)

Number of Employees: 14



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**Specific Requests:** We are looking for partners in the food, feed and chemical industry as well as for partners who are interested in the energetic use of algae biomass and the application of industrial CO<sub>2</sub>-sources for cultivating microalgae. In this regard we already cooperate with nameable German power authorities but are also interested to forge links to further energy providers.

**Short Company Profile:** Subitec GmbH was founded in 2000 as a spin-off of the Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB in Stuttgart. In 2001 Subitec acquired two patent families from Fraunhofer-Gesellschaft e.V., Munich, which protect the know-how regarding the construction and design of the Flat-Panel-Airlift (FPA) photobioreactor.

Based on this FPA photobioreactor, Subitec is able to mass-cultivate microalgae by using industrial CO<sub>2</sub> sources and solar energy, and thus produce numerous valuable substances. System integration and bio-refinery concepts allow the cultivation of algae biomass for the production of feed, bulk chemicals and energy. Subitec offers cultivation systems from lab up to production scale on the basis of the patented 6, 28 and 180 Liter FPA reactors.

Currently several pilot plants on the basis of the 180 L reactor are in operation using flue gas from combined heat and power units. Since 2013 two additional plants (indoor and outdoor) are under construction, the expected start of operation will be in spring 2014.



**Taros Chemicals GmbH & Co. KG**

Emil Figge Str 76a  
44227 Dortmund  
Germany

Phone: +49 (0)231 9742 7211

Fax: +49 (0)231 9742 7219

Website: [www.tarosdiscovery.com](http://www.tarosdiscovery.com)

Contact Person: Dr. Christian Janßen

Email: [sales@taros.de](mailto:sales@taros.de)

Number of Employees: 49

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**Specific Requests:** Taros is always keen to engage scientists around the globe to discuss opportunities for joint research projects. As exemplified by the many established scientific collaborations under European (eg. H2020) and national (eg. BMBF) grant schemes, we are routinely raising funds to execute innovative research at the interface between chemistry and biology.

**Short Company Profile:** Taros, an independent and privately owned contract research company based in Dortmund, Germany, has been serving the needs of pharmaceutical, chemical and biotech companies since 1999. More than 8.000 synthesis, research and process chemistry projects have successfully been delivered to the ever growing global customer base. Taros operates state-of-the-art lab facilities, employing a team of scientists (65% of whom hold post-graduate degrees in Chemistry) who are committed to supporting the diverse needs of its customers in efficient drug discovery, medicinal chemistry and classical synthetic chemistry. Taros' scientists combine more than 140 years of industrial organic chemistry experience with over 60 years of active drug discovery experience from big pharmas and biotechs. Our chemists bear expertise across a broad range of therapeutic areas (oncology, respiratory, CNS, cardiovascular, inflammation, pain, metabolism and infectious) and in all small molecule target classes. Being committed to supporting our global customer base in efficient drug discovery, medicinal and synthetic chemistry initiatives, we have developed TarosGate®. TarosGate® is a unique software suite putting cost, time and chemistry information at a Project Leader's finger tips – 24h/7 from anywhere in the world. TarosGate® software is a major cornerstone for the efficient chemistry process management of the European Lead Factory ([www.europeanleadfactory.eu](http://www.europeanleadfactory.eu)) drug development platform.

**TECO**medical Group

*always your partner*

**TECOmedical AG**

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4450 Sissach  
Switzerland

Phone: +41 61 985 81 00

Fax: +41 61 985 81 99

Website: [www.tecomedical.com](http://www.tecomedical.com)

Contact Person: Marieluise Wippermann

Email: [wippermann@tecomedical.com](mailto:wippermann@tecomedical.com)

Number of Employees: 16

**Specific Requests: Custom Assay Development & Services**

Custom ELISA Assay development and Services are offered to organizations like Biotech companies, CROs, Pharma and Research institutions, requiring specialty assays and studies based on customer specifications.

Host Cell Protein testing for recombinant protein pharmaceuticals – Immunogenicity assays to test for Anti Drug Antibodies (ADA) – High sensitive ELISAs – Food safety assays – Veterinary assays– Environmental assays

Assay Services include measurement of study samples, validation of new and existing assays, test adaption, pilot to medium size manufacturing of ELISA kits and assay components.

**Short Company Profile:**

Founded in 1984, the Swiss-based TECOmedical Group and the subsidiaries in Germany, France, Austria and Benelux provide assays and services for (pre)clinical studies, biosafety and toxicology studies, medical research and in vitro diagnostics. We offer an extensive portfolio of specialty assays, assay systems and services to Pharma and Biotech companies, CROs, medical and research centers.

**Specialty assays for (pre-)clinical studies, medical research, diagnostics and therapy control.**

bone/calcium/cartilage metabolism – diabetes/obesity/metabolic syndrome – liver disease & apoptosis – drug-induced liver & kidney injury/complement system – cardiovascular disease – oxidative stress – growth metabolism.

**Specialty assays and test systems for biosafety of medical devices, transplants, implants, pharmaceuticals and blood products**

Haemocompatibility related to activation of the complement (C) system – Anaphylatoxins – Complement C activation related to pseudoallergy (CARPA) – Complement activation in animals (in vitro & in vivo) – Cytotoxicity

**Specialty assays for toxicology**

Detection of drug induced liver injury (DILI) – Detection of drug induced kidney injury (DIKI)– Vitellogenin assay for endocrine disruption potential of chemical substances according to OECD for laboratory and environmental use. This is the first Vitellogenin fish assay allowing non-destructive, non-invasive sampling from epidermal mucosa.



**tgcBIOMICS GmbH**

Franz-Kirsten-Str. 1  
Gebäude 2  
55411 Bingen  
Germany

Phone: +49 (0)6721 98419-0

Fax: +49 (0)6721 98419-18

Website: [www.tgcbiomics.de](http://www.tgcbiomics.de)

Contact Person: Dipl.-Biol. Karolina Nadjafi

Email: [K.Nadjafi@tgcBIOMICS.de](mailto:K.Nadjafi@tgcBIOMICS.de)

Number of Employees: 10



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- Specific Requests:**
- » Contact to prospective customers
  - » Partner for common projects
  - » Further Collaborations

**Short Company Profile:** tgcBIOMICS GmbH (founded in 1999) is a company offering a broad range of services in the field of biotechnology. These include DNA isolation from different kind of sources and organisms, PCR amplification of target sequences as well as cloning into a broad range of plasmid vectors. Construction of synthetic genes could also be done in collaboration with third parties. When it comes to expression of heterologous proteins (e.g. bacterial pathogenicity factors, recombinant antibodies, enzymes, etc.), we generally use *E. coli* or eukaryotic cell lines as hosts. Small scale fermentation and the optimization of expression parameters to yield a maximum amount of biologically active polypeptides we do as well as the cultivation of bacteria up to 30 litres in a very short time using latest fermentation technology.

We are further specialized on the purification of recombinant or wild type proteins from different kind of sources using a broad spectrum of chromatographic methods.

Our eukaryotic cell lab generates customized hybridoma cell lines and produces monoclonal antibodies in 10-200 mg batches, that could be further purified by protein G/A and affinity chromatography.

A speciality of the company is the development and distribution of research components for enteropathogenic bacteria with some focus on *Clostridium difficile*. Our customers often order our *C. difficile* specialized diagnostic ELISA kits.

The complete product list is available on our internet presentation.



### TOPLAB GmbH

Fraunhoferstr. 18a  
82152 Martinsried  
Germany

Phone: +49 (0)89 244 1454 1281

Fax: +49 (0)89 244 1454 1286

Website: [www.toplab.de](http://www.toplab.de)

Contact Person: Dr. Konstadinos Salassidis

Email: [salassidis@toplab.de](mailto:salassidis@toplab.de)

Number of Employees: 11



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**Specific Requests:** Contact to prospective customers

**Short Company Profile:** TOPLAB GmbH is an internationally acting leading service provider with an outstanding expertise in the field of protein analytics.

Over the past 20 years TOPLAB has successfully completed hundreds of projects and established its reputation as a reliable contract research partner for pharmaceutical companies, the biotechnology industry and academic institutions.

TOPLAB offers an array of protein analytical services utilizing a combination of protein separation techniques, sequencing methodologies and advanced mass spectrometry instrumentation to accommodate the analytical needs of its clients for research and development of therapeutic proteins, vaccines and antibodies.

Our services include the identification and quantification of proteins in complex biological matrices by mass spectrometry, protein sequencing, host cell protein analysis and antibody characterization. We provide to our clients cost-effective, high quality services during all stages of the drug development and manufacturing process including research and discovery, preclinical and clinical development, production quality control and batch release testing.



**TRACE**  
*Analytics*

**TRACE Analytics GmbH**

Richard-Wagner-Straße 1  
38106 Braunschweig  
Germany

Phone: +49 (0)531 209008-0

Fax: +49 (0)531 209008-39

Website: [www.trace.de](http://www.trace.de)

Contact Person: Dr. Wolfgang Künnecke

Email: [info@trace.de](mailto:info@trace.de)

Number of Employees: 6

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**Specific Requests:** We are looking for business partners for our network Analytical bioprocess solutions ABS – *Your network of PAT sensor specialists*. ABS will act as a competence cluster for bioprocess analysis

**Short Company Profile:** TRACE Analytics GmbH is a leading provider of online analysis systems for biotech applications in research, development and production.

Based on our own research and development work, robust and easy to maintain devices and process connections are realized for monitoring and control of complex fermentation processes in industrial pharmaceutical productions under continuous measurement conditions.

Our technologies are successfully applied in cell cultivations and microbial fermentations at all levels of the process chain – from research and development to large scale production.

The online analyzing systems are fulfilling the special demands of biotechnological processes enabling a fast realization of PAT and QbD strategies.

The sampling systems are reliable interfaces to the process – independent from reactor geometry and process volume. Cell-free and cell-containing samples can be withdrawn automatically.

Our international customer base is ranging from global players in the pharmaceutical industry, renowned biotech-companies to numerous universities and high-tech research organisations.



**Trenzyme GmbH**

Byk-Gulden-Str. 2  
78467 Konstanz  
Germany

Phone: +49 (0)7531 122900

Fax: +49 (0)7531 1229011

Website: [www.trenzyme.com](http://www.trenzyme.com)

Contact Person: Dr. Reinhold Horlacher

Email: [Reinhold.horlacher@trenzyme.com](mailto:Reinhold.horlacher@trenzyme.com)

Number of Employees: 13



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- Specific Requests:**
- » Looking for Pharma & Biotech companies interested in outsourcing their cell line development or recombinant protein production to save valuable research time and budget
  - » Further collaboration
  - » Partner for common research projects

**Short Company Profile:** Trenzyme acts as life science service provider of customized cell line development and recombinant protein production for its clients from big pharma to biotech, since its establishment in 2000.

For 15 years, Trenzymes scientific experts have been continuously developing new and comprehensive solutions to provide reliable support for the individual and demanding projects of its customers with a deep understanding of the importance and complexity of their task.

Trenzyme's core competences:

- » CELL LINE DEVELOPMENT
- » PROTEIN EXPRESSION & PURIFICATION
- » *E.coli*, mammalian cell lines, insect cells, yeast
- » GENE SYNTHESIS & CUSTOM CLONING

As research partner for fundamental life science research, translational biomedical research and early stage pharmaceutical development, Trenzyme has steadily increased its customer base and works for a range of national and international clients, being big pharmaceutical companies as well as small biotechs and academia.

With more than 15 years of experience Trenzyme has a clear mission: Accelerating your innovation and save valuable research time and budget!



**TROCKLE Consulting**

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Switzerland

Phone: +41 43 818 0334

Fax: +41 43 818 0358

Website: [www.trockle-unternehmensberatung.com](http://www.trockle-unternehmensberatung.com)

Contact Person: Dr. Susanne Simon

Email: [simon@trockle-unternehmensberatung.com](mailto:simon@trockle-unternehmensberatung.com)

Number of Employees: 12



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**Specific Requests:** Dr. Susanne Simon is a TROCKLE Consulting senior partner heading the Zurich office in Switzerland. She is responsible for recruitment/ executive search in the biotechnology, diagnostics and pharmaceutical industry sectors. Dr. Simon has 14 years of industry experience in biotechnology and health care. Her track record includes managerial and senior positions in the fields of medical, marketing and sales on both, domestic and international levels. Prior to joining TROCKLE Consulting she was based as a director in the US at the headquarters of a global pharmaceutical and diagnostic research company.

**Short Company Profile:** Since 1991 TROCKLE Unternehmensberatung is one of the most renowned Executive Search and Recruiting company in HealthCare and Life Sciences industry (biotechnology, pharmaceutical, diagnostic, medical technology, medical engineering and hospital). Each of our consultants is coming from a different academic background (PhD, MD, Business Administration, Engineering, Economics) and has spent 10 – 15 years in various (international) leading positions in HealthCare and Life Sciences industry. We are experts in Human Resources and your competent advisor on operative and strategic HR questions. Specializing in the Life Science/Healthcare sectors, we regularly fill positions in all functions (Research and Development , Regulatory Affairs, Sales, Marketing, Human Resources, Legal, Finance) and all hierarchy levels (from sales specialist to CEO) for renowned international companies. Our profound professional background helps us to understand the business and position-specific challenges and opportunities in these respective markets. Within Health Care and Life Sciences we successfully placed candidates throughout the entire organization.



**UGA Biopharma GmbH**

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16761 Hennigsdorf  
Germany

Phone: +49 (0)3302 2024904

Fax: +49 (0)3302 2024901

Website: [www.ugabiopharma.com](http://www.ugabiopharma.com)

Contact Person: Dr. Ali Nasser Eddine

Email: [nassereddine@ugabiopharma.com](mailto:nassereddine@ugabiopharma.com)

Number of Employees: 9

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**Specific Requests:** We are looking to expand our activities on the European market. We would like to reach European biotech or pharmaceutical companies looking to outsource R&D for Biosimilars development, including cell line development as well as integrated USP and DSP solutions.

We are also interested in partners for Clinical development of biopharmaceuticals since our goal is to offer a complete package for Biosimilars development before out licensing, up to Phase I.

Investors willing to invest in the field of Biosimilars development are as well welcome.

**Short Company Profile:** UGA Biopharma, a private Contract Research Organization (CRO) based in Hennigsdorf, Germany, focuses on research, development and commercialization of biopharmaceutical products under contract with pharmaceutical and biotechnology companies.



### Vita 34 AG

Perlickstr. 5  
04103 Leipzig  
Germany

Phone: +49 (0)341 48792 40

Fax: +49 (0)341 48792 39

Website: [www.vita34.de](http://www.vita34.de)

Contact Person: Dr. André Gerth (CEO)

Email: [info@vita34.de](mailto:info@vita34.de)

Number of Employees: 101



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- Specific Requests:**
- » Research facilities
  - » Ministries for Health
  - » Ministries of the Environment
  - » Industrial Partners
  - » Medical Facilities
  - » Business Development Partner for the European and International Market

**Short Company Profile:** Vita 34 was founded as the first private umbilical cord blood bank in Europe, and now has more than 17 years of experience in this field. The core business of Vita 34 is the collection, processing and long-term storage of stem cells from umbilical cord blood and tissue as well as the production of stem cell transplants with the highest level of quality and safety. These stem cell units are for private provision and available for medical use in therapies for auto-immune diseases, metabolic disorders or brain damage. With some 125.000 stem cell units Vita 34 is the clear market leader in the German-speaking countries and the second largest bank in Europe. Vita 34 has the permission for the production and dispensation of autologous and allogenic preparations for therapeutic use. Through subsidiaries and cooperation partners Vita 34 is now besides Germany active in 20 countries in Europe (Spain, Italy, Austria, Balkan and Baltic states) as well as worldwide (Chile, Mexico, Vietnam). Vita 34 is also involved in stem cell research and works together with renowned universities and research institutes and, thus, is actively shaping the applied research regarding the use of umbilical cord blood. Research and development activities are further pursued in the Biotechnology business segment where Vita 34 develops biological processes for producing cell and tissue cultures, as well as their use in the optimization and multiplication of cells and plants.



### **VOGELBUSCH Biocommodities GmbH**

Blechturm-gasse 11  
1051 Vienna  
Austria

Phone: +43 1 54661

Fax: +43 1 5452979

Website: [www.vogelbusch-biocommodities.com](http://www.vogelbusch-biocommodities.com)

Contact Person: Katharina Harlander

Email: [hak@vogelbusch.com](mailto:hak@vogelbusch.com)

Number of Employees: 35

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- Specific Requests:**
- » Cooperation partner for technology supply
  - » Cooperation partner for industrial biotechnology projects

**Short Company Profile:** VOGELBUSCH Biocommodities GmbH is part of the VOGELBUSCH group, a privately held engineering firm based in Austria. Specializing in white biotechnology, the company designs and constructs bioprocess plants with proprietary technology for the production of biocommodities such as alcohol, yeast, vinegar, organic acids, and starch sugars.

Founded in 1921, VOGELBUSCH has developed into a premier global supplier with well tried technology and hands-on expertise with a wide range of starch and sugar containing substrates.

VOGELBUSCH Biocommodities provides the whole range of engineering services including process design, supply of key equipment and technical start-up assistance or turnkey supply of complete process units, and licenses proprietary technology. Headquartered in Vienna, Austria and with subsidiaries in the USA and Hong Kong, VOGELBUSCH Biocommodities offers bioprocess engineering services to food, beverage and chemical industries worldwide.



### VTU Technology GmbH

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8074 Grambach  
Austria

Phone: +43 (0)316 4009 4000

Fax: +43 (0)316 4009 4010

Website: [www.vtu-technology.com](http://www.vtu-technology.com)

Contact Person: Dr. Thomas Purkarthofer

Email: [thomas.purkarthofer@vtu.com](mailto:thomas.purkarthofer@vtu.com)

Number of Employees: 12

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**Short Company Profile:** VTU Technology is a leading contract research and development company located in Austria, providing services for the fast track generation of high performance *Pichia pastoris* protein production strains and economically viable protein production processes for biopharmaceuticals and enzymes. The development activities include production strain generation, development of upstream and downstream processes as well as establishment of analytical procedures and production of protein samples.

Exclusive proprietary technologies and profound experience of the VTU team lead to competitive production processes for a wide range of recombinant proteins including serum proteins, cytokines, Fc & HSA fusion proteins, Fabs & Ab derived fragments, scaffold proteins, vaccines and enzymes.

An exclusive library of synthetic PAOX1 promoter variants – VTU’s highly approved 1st generation promoter variants – forms the core of VTU’s cutting-edge in-house *Pichia pastoris* toolbox enabling high-level protein production and secretion of more than 20 g/L for a variety of proteins by individual fine-tuning of expression. Notably, this library was complemented with groundbreaking and unique methanol-free 2nd generation PAOX1 promoter variants, facilitating strong expression even with just glycerol or glucose as the sole carbon source.

The versatility and effectiveness of VTU’s *Pichia* system is further underlined by a set of proprietary expression enhancing helper factors, several platform strains with different genetic backgrounds, elaborated cloning and transformation protocols, a high-throughput micro-scale screening and cultivation regime and effective fermentation protocols for maximization of product yield and overall process performance.



**Witeg Labortechnik GmbH**

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97877 Wertheim  
Germany

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Website: [www.witeg.de](http://www.witeg.de)

Contact Person: Mario Swiegot

Email: [mswiegot@witeg.de](mailto:mswiegot@witeg.de)

Number of Employees: 70

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**Short Company Profile:** With an experience of more than 50 years, Witeg Labortechnik GmbH is one of the leading manufacturers and dealers of laboratory glassware, liquid handling, Wisd-instruments and equipment.

Witeg – Home of innovations: Our products are manufactured under the latest technical standards and according to all international regulations such as ISO, DIN and CE.



**X-act Cologne Clinical Research GmbH**

Hansaring 97  
50670 Köln  
Germany

Phone: +49 (0)221 559220

Fax: +49 (0)221 5592233

Website: [www.x-act-cologne.com](http://www.x-act-cologne.com)

Contact Person: Ilka Strehlau

Email: [ilka.strehlau@x-act-cologne.com](mailto:ilka.strehlau@x-act-cologne.com)



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**Specific Requests:** Collaborations with sponsors and clinical CROs  
Further cooperations and challenges

**Short Company Profile:** PASSION. EFFICIENCY. QUALITY.  
An apparently simple, but highly effective strategy.

Facts and figures:

- 1994! X-act has been established as independent, privately held contract research organisation located in Cologne, Germany.
- 235+ Successful conduct of more than 235 clinical, non-interventional and medical device studies around the world.
- 25+ X-act's broad range of experiences. All types and phases. Local and global projects.
- 100 man-years of experience are contributed into each project by our seasoned as well as tech-savvy employees. Sponsors and business partners esteem our expertise as well as the collaboration with our active team.

With its specialisation in clinical data management and biostatistics X-act's consultancy and services are more in demand than ever before.

**EXPERTISE. SOLUTIONS. SUCCESS.**

Based on this guiding principle X-act provides realistic quotations to its clients granting budgetary planning certainty from the beginning. Moreover, X-act is delivering on schedule – valid data for reliable results.



### **XL-protein GmbH**

Lise-Meitner-Str. 30  
85354 Freising  
Germany

Phone: +49 (0)8161 53730 91

Fax: +49 (0)8161 53730 99

Website: [www.xl-protein.com](http://www.xl-protein.com)

Contact Person: Prof. Dr. Arne Skerra

Email: [skerra@xl-protein.com](mailto:skerra@xl-protein.com)

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**Specific Requests:** XL-protein seeks collaborations with pharmaceutical, biogeneric, and biotech companies, offering partnerships at various levels, from feasibility studies to out-licensing of its proprietary PASylation® technology for defined protein classes or disease areas. Contact for more information about partnering opportunities: [bd@xl-protein.com](mailto:bd@xl-protein.com)

**Short Company Profile:** XL-protein is a biopharmaceutical company utilizing its proprietary PASylation® technology to develop superior biopharmaceuticals with enhanced activity and extended plasma half-life. PASylation of therapeutic proteins or peptides allows less frequent and lower dosing combined with better tolerability, also opening perspectives for second generation products of approved biologics. PASylation – the genetic fusion (or chemical coupling) with conformationally disordered polypeptide sequences composed of the amino acids Pro, Ala, and/or Ser – provides a convenient way to attach a solvated random chain with large hydrodynamic volume to a pharmaceutically active compound. Thus, its typically rapid clearance via kidney filtration can be retarded by one to two orders of magnitude – depending on the PAS length – while the PAS moiety itself is biochemically inert and biologically degradable.



### ZytoVision

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27572 Bremerhaven  
Germany

Phone: +49 (0)471 4832-300

Fax: +49 (0)471 4832-509

Website: [www.zytovision.com](http://www.zytovision.com)

Contact Person: Maja Kukovic

Email: [Kukovic@zytovision.com](mailto:Kukovic@zytovision.com)

Number of Employees: 45

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**Specific Requests:** Pharmaceutical partners for co-development of drugs and *in-situ* hybridization (ISH)-based companion diagnostics (ZytoVision).

**Short Company Profile:** ZytoVision GmbH develops and produces *in situ* Hybridization (ISH) based products and associated reagents for medical purposes. The professional use of our products provides a valuable molecular tool supporting diagnoses and treatment decisions particularly in cancer diagnostics.

Initially focused on development of ISH-based *In vitro* Diagnostic (CE-IVD) products, ZytoVision soon became the label of choice in Europe. As the first manufacturer introducing dual color CISH probes (e.g. HER2/CEN17 probe for breast cancer diagnostic) as well as several uniquely designed probes (e.g. ALK/EML4 TriCheck™ for lung cancer diagnostic) ZytoVision became one of the market leaders for molecular diagnostics in Europe.

The company expanded offering clinical trial services comprising development of validated ISH assays, molecular profiling of patients, and development of companion diagnostics.

Thus, ZytoVision is strongly focused on the development of companion diagnostics which allow identification of clinically relevant patient groups and consequently the application of targeted and individual cancer therapies.

## Double patenting– abuse of law or legitimate interest of the patent owner?!

### Regulations under EPC and case law

By Dr. Anna Heide – RUHR-IP Patentanwälte, [www.RUHR-IP.com](http://www.RUHR-IP.com)

Basically, everyone is aware of the fact that one can obtain a single patent to protect its own technology, product or use and interested parties have to negotiate the only one patent to get the license for said technology, product or use. In infringement cases the infringing party can be brought to justice only once. That sounds logical but is there a legal basis for these general principles?

The European Patent Office (EPO) grants European Patents on the basis of legal requirements (Articles 52-58 EPC) of novelty, inventive step and industrial applicability. For evaluation of these criteria, EPO considers all documents which have been made available to the public before the date of filing or before the date of priority of the European patent application. Further, during search *“the examiner should [...] directing his attention [...] to any documents that may be of importance for other reasons, such as [...] European patent applications having the same filing or priority date as the application in respect of which the search is carried out, from the same applicant and relating to the same invention and therefore relevant to the issue of double patenting.”* (Guidelines for Examination in the EPO, 2014, B-IV, 2.3).

According to said guidelines (2014, G-IV, 5.4) it is an accepted principle in most patent systems, for example Ireland and United Kingdom, that only one patent can be granted to the same applicant for a single invention (T1423/07, 2.2.2). Despite a missing legal basis for an objectionable double patenting in the European patent convention (EPC), the EPO discussed this topic in the decisions G-1/05 and G-1/06, wherein the Enlarged Board of Appeal observed: *“The principle of prohibition of double patenting exists on the basis that an Applicant has no legitimate interest in proceedings leading to the grant of a second patent for the same subject-matter if he already possesses one granted patent therefor.”*

The subject-matter for which protection is sought is defined by the claims (Article 84 EPC), which terms determine the extent of the protection granted by a European patent (Article 69 EPC). Decision T1780/12 *“concluded, by reference to decision G-2/88, that the category or type of claim and its technical features constitute its subject matter and determine the protection conferred.”* Thus, it is a necessary requirement to evaluate whether or not the subject matter of the claims as defined by their categories in combination with their technical features are the same in order to evaluate the question of double patenting (see for example also T1391/07, T877/06, T1708/06, T469/03). Consequently, the product and its use were deemed as not “the same subject-matter” in the sense of G-1/05 and G-1/06. The same applies for the use of a product and a method of fabricating it (T1765/13).

This is in some contrast to life science patents where patents can be obtained for a first or further medical uses of known biotechnical/pharmaceutical products. Up to the revision of the EPC in 2007, a claim was allowable with the so called “Swiss-type” formulation as *“use of a substance X for the manufacture of a medicament for a specified therapeutic application”* (G 5/83) but since the revision of the EPC 2000 and the decision G-2/08 the claims have to be formulated as *“Substance X for use as a medicament”* (Article 54 (4) EPC) or *“Substance X for use in the treatment of cancer (specific use)”* (Article 54 (5) EPC).

However, decisions T879/12 and T1780/12 discussed if a claim directed to a second medical use under Article 54 (5) EPC is considered to be directed to the same subject-matter as a Swiss-type claim directed to the

same medical use because both these claims concern the same invention claimed in a different format and would result in double patenting. The EPO Board of Appeal argued that Swiss-type claims are interpreted as purpose-limited process claims while claims formatted pursuant to Article 54(5) EPC are defined as purpose-limited product claims. Both sets of claims defined the same compound and the same therapeutic use but in different categories (process vs. product). Because the Swiss-type claims comprised in addition the feature of “manufacturing” a medicament, the subject-matters of Swiss-type claims and newer claims (Article 54(5) EPC) are considered to be different. The feature “manufacturing” in Swiss-type purpose limited process claims lead to a different scope of protection and therefore would not result in double patenting.

Has the owner of patents granted with both “Swiss type” and “newer” claims two identical or overlapping patents? The question was addressed in cases T1780/12 and T1391/07. Since the scopes of protection only partially overlapped, there was no objective reason to deny the legitimate interest of an applicant in obtaining a protection different from that of the parent patent already granted (see G1/05).

In accordance with established EPO case law it is not abusive to obtain a protection for a preferred embodiment and to continue with two applications having the same description but which do not claim the same subject-matter (T2461/10). In such a case it is allowable to continue with further divisional applications (G-2/10) with different subject-matters of the claims. In case of identical subject-matter of the claims, only one patent will be granted (see above, T877/06, T372/88) because of lack of legitimate interest (Article 125 EPC). Should two applications of the same effective date be received from two different applicants, each must be allowed to proceed as though the other did not exist.

Although double patenting is no ground for opposition, the question of double patenting is considered by the opposition division if the patent owner files amended claims during opposition (T0936/04). But *“where at the time of the decision by the opposition division no patent had yet been granted on the divisional application, then for this reason alone the opposition division was correct to disregard the objections of double patenting [...] At that stage it would be only a matter for the Examining Division, in the proceedings on the divisional application before it, to avoid double patenting by allowing again claims already granted in the parent patent”* (e.g. T2402/10 – no double patenting)

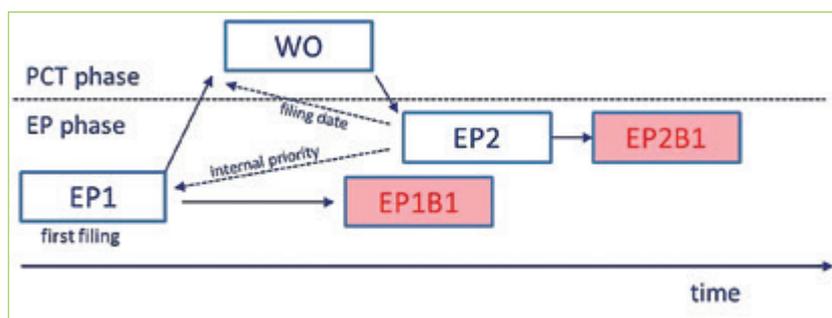


Fig.1: Scheme representing the situation discussed in the decision T1423/07.

Another interesting decision (T1423/07) concerns an application EP2 which claims the priority of a first application EP1, both with a substantially identical content including claims. The examining division refused the applications on the basis of the Guidelines (2014, G-IV, 5.4). However, T1423/07 confirmed the applicants’ position: the applicant does have a legitimate interest in extending the term of protection by a second identical patent (EP2) for the same invention as EP1 in view of the fact that the filing date and not the priority date is the

relevant date for calculating the 20-year term of the patent. Further, change of ownership in such a way that EP2 is transferred to company B, a subsidiary company of company A which still owns right of EP1, eliminates the objection of double patenting. After change of ownership, each application must be allowed to proceed as if the other did not exist.

Consequently, although the general principle “only one single patent for one invention” exists the EPO does not contain any explicit provision which would prohibit double patenting. Only the case law gives a certain directive “*on the basis that an applicant has no legitimate interest in proceedings leading to the grant of a second patent for the same subject-matter*”. But the differentiation of abuse of law and legitimate interest still remains a case-by-case approach on the basis of the decisions G1/05 and G1/06. The resulting effect therefrom, in particular the legal situation wherein potentially two entitled parties have to be considered (T1423/07) in license negotiations or in infringement cases is up to the national jurisdiction.

## Die „Qualified Person“ – Ein „Must-have“ für klinische Entwicklung und Arzneimittelherstellung

*Cathrin Pauly, ASPIRAS GbR und Dr. Kerstin Thaele, Dr. Thaele GmbH*

Allgemein bekannt ist der Begriff „Sachkundige Person“ oder „Qualified Person“ im Zusammenhang mit der Arzneimittelentwicklung und -herstellung. Doch wer genau verbirgt sich dahinter? Welche Aufgaben sind nach neuesten Gesetzen mit dieser Funktion verbunden? Braucht jedes Pharmaunternehmen einen solchen Sachverständigen?

Dieser Artikel soll einen kurzen Überblick über die wichtigsten Fakten zur Sachkundigen Person liefern und ihre zentrale Funktion in Qualitätssicherung und Qualitätsmanagement verdeutlichen.

### Einführung

Im europäischen Pharmarecht wurde die Funktion der Sachkundigen Person bereits mit der Richtlinie 75/319/EWG von 1975 definiert, die der Angleichung der Rechts- und Verwaltungsvorschriften über Arzneispezialitäten diente, um den freien Verkehr der Arzneimittel innerhalb des Europäischen Wirtschaftsraumes zu verwirklichen.

Deutschland ging anfangs einen Sonderweg, der ohne Sachkundige Person auskam und andere Beauftragte wie den Herstellungsleiter und Kontrollleiter zur Sicherung der Arzneimittelqualität vorsah und gleich die nationalen Vorschriften erst mit der 12. und 14. Novelle des Arzneimittelgesetzes im Jahr 2005 an. Damit wurde dem zunehmenden grenzüberschreitenden Arzneimittelverkehr Rechnung getragen, im Zuge dessen andere Staaten Zertifizierungen von Sachkundigen Personen verlangten. Zudem vermeidet die einheitliche Regelung innerhalb des europäischen Wirtschaftsraumes eine doppelte Kontrolle bei der Arzneimittelprüfung, da sich die einzelnen Staaten auf die qualifizierte Durchführung verlassen können und gleichgestellte Verantwortliche als Ansprechpartner haben.

### Aufgaben der Sachkundigen Person

Der Katalog der Aufgaben und Pflichten, die die sachkundige Person bewältigen muss, ist umfangreich und erfordert umfassende Kenntnisse der rechtlichen Vorschriften und des GMP-Systems sowie jahrelange Erfahrung auf dem Gebiet der Arzneimittelherstellung. Nach der 14. Novelle des deutschen Arzneimittelgesetzes ist es nicht mehr unbedingt erforderlich, dass diese sachkundige Person beim pharmazeutischen Unternehmer festangestellt ist. Es besteht eine deutliche Abgrenzung zur Leitung der Herstellung und Leitung der Qualitätskontrolle.

Vor allem kleinere Firmen können und wollen mit ihren zunächst wenigen Produkten keinen eigenen Verantwortlichen beschäftigen, sondern aus Kosten- und Kompetenzgründen auf externe Dienstleister zurückgreifen. Doch auch Lohnhersteller, die nicht selbst die Verantwortung für die Gesamtfreigabe übernehmen wollen oder Unternehmen aus Nicht EU-Ländern, die Arzneimittel in die EU einführen und unabhängig bleiben wollen, sind mit einer extern eingekauften Leistung gut beraten.

Die Sachkundige Person hat bei der Qualitätssicherung eine zentrale Funktion im Unternehmen inne. Ihre Kernaufgabe ist die Freigabe und Zertifizierung von Arzneimittelchargen. Der § 19 des Deutschen Arzneimittelgesetzes (AMG) legt ihre Verantwortungsbereiche wie folgt fest: Die Sachkundige Person nach § 14 ist dafür verantwortlich, dass jede Charge des Arzneimittels entsprechend den Vorschriften über den Verkehr mit Arzneimitteln hergestellt und geprüft wurde. Sie hat die Einhaltung dieser Vorschriften für jede Arzneimittelcharge in einem fortlaufenden Register oder einem vergleichbaren Dokument vor deren Inverkehrbringen zu bescheinigen.

Dies setzt die Kenntnis des jeweiligen Produktes und der für dessen Herstellung und Prüfung eingesetzten Verfahren voraus. Da die mehrstufige Herstellung mit entsprechenden Qualitätskontrollprüfungen einer Arzneimittelcharge an unterschiedlichen Orten stattfinden und von unterschiedlichen Herstellern ausgeführt werden kann, muss die Sachkundige Person sich zum Teil auf die Sachkunde und Entscheidungen anderer Personen verlassen, deren Qualifikation sie zuvor zu überprüfen hat oder die durch andere Sachkundige Personen schriftlich bestätigt wurde. Letztlich ist aber sie persönlich für die Freigabe der Arzneimittelcharge verantwortlich.

Sie bestätigt mit der Freigabe, dass die Wirkstoffe GMP-gerecht hergestellt wurden und ihre Qualität einwandfrei ist, die Lieferanten und Lohnhersteller qualifiziert sind, eine Validierung der Herstellungs- und Testverfahren stattgefunden hat und alle diesbezüglichen Änderungen genehmigt wurden, alle nötigen Dokumentationen genehmigt und alle Audits durchgeführt wurden, um das Qualitätssicherungssystem zu gewährleisten. Alle Abweichungen im Prozess und von der Festlegung der Spezifikation müssen dokumentiert und gründlich untersucht werden, und eine Risikoanalyse ist durchzuführen.

Bei Import von Fertigprodukten aus Drittstaaten sollten Proben von jeder Charge in der EG/EWR getestet werden, bevor die Fertigproduktcharge durch die sachkundige Person zertifiziert wird. Bei Import von Fertigprodukten aus Drittstaaten, mit denen die EG ein Abkommen über die gegenseitige Anerkennung (MRA) abgeschlossen hat, kann die Sachkundige Person auf eine vollständige Testung verzichten, sofern sie die Bestätigung des Herstellers als ausreichend ansieht, der Transport unter den erforderlichen Bedingungen durchgeführt wurde und Erhalt und Lagerung in der EG/dem EWR ordnungsgemäß erfolgt sind.

Eine weitere Forderung an die Sachkundige Person ist, ihre Kenntnisse im Hinblick auf technischen und wissenschaftlichen Fortschritt und Änderungen im Qualitätsmanagement auf dem neuesten Stand zu halten.

Gerade in Unternehmen aus dem Biotechnologie-Bereich sollte eine Qualified Person, die Verkehrsfreigaben durchführen kann, frühzeitig in die Entwicklung eingebunden werden. Dies ist insbesondere notwendig, da diese Unternehmen häufig mit Serviceanbietern für Wirkstoff-Produktion, Prüfmedikationsherstellung und Durchführung der klinischen Studien zusammenarbeiten und nicht über eine eigene Herstellungserlaubnis verfügen.

### **Aufgaben bei der Freigabe klinischer Prüfmuster**

Die Sachkundige Person sollte mit den Abläufen klinischer Prüfungen vertraut sein. Bei der Freigabe klinischer Prüfpräparate hat sie entsprechende Aufgaben wie bei der Freigabe zugelassener Arzneimittel. Allerdings bekommt die Qualitätskontrolle eine noch größere Bedeutung, da unter Umständen die Herstellungsverfahren nicht standardisiert oder noch nicht umfassend validiert sind. Zusätzlich ist der Herstellungsauftrag, die Anweisung zur Randomisierung und der Randomisierungscode zu überprüfen, ebenso die fertig

verpackten Prüfpräparate. Die zur Prüfung bestimmten Präparate müssen den Anforderungen der Genehmigung zur klinischen Prüfung entsprechen und die erforderlichen Herstellungsschritte wie Verblindung, prüfplanspezifische Verpackung und Kennzeichnung korrekt erfolgt sein.

Muster jeder Charge eines klinischen Prüfpräparates, einschließlich des verblindeten Prüfpräparates, und alle Unterlagen müssen mindestens fünf Jahre nach Abschluss oder formellem Abbruch der letzten klinischen Prüfung aufbewahrt werden. Rückstellmuster jedes einzelnen Verpackungsvorgangs müssen im Verlauf einer klinischen Prüfung aufbewahrt werden, bis der Studienabschlussbericht vorliegt.

Liegen die Produktqualität betreffende Beanstandungen vor, wird die Sachkundige Person einbezogen, um mögliche Auswirkungen auf die klinische Prüfung, die Produktentwicklung und die Probanden abzuschätzen.

### **Erforderliche Qualifikationen der Sachkundigen Person**

In § 15 des AMG wird zur Erreichung der Sachkenntnis und Qualifikation der Sachkundigen Person die Approbation als Apotheker oder ein Hochschulabschluss in Pharmazie, Chemie, Biologie, Human- oder Veterinärmedizin mit einer mindestens zweijährigen praktischen Tätigkeit in der Arzneimittelprüfung vorausgesetzt. Zusätzlich muss bei nichtapprobierten Apothekern ein Nachweis über theoretischen und praktischen Unterricht in genau bezeichneten Fächern vorgelegt werden.

#### **Spezielle Anforderungen bestehen, wenn es sich um folgende Arzneimittel handelt:**

Für die Herstellung und Prüfung von Blutzubereitungen, Sera, Impfstoffen, Allergenen, Testsera und Testantigenen muss eine mindestens dreijährige Tätigkeit auf dem Gebiet der medizinischen Serologie oder medizinischen Mikrobiologie nachgewiesen werden (§15 AMG). Für die Herstellung und Prüfung von Gentransfer-Arzneimitteln, Arzneimitteln zur In vivo-Diagnostik mittels Markergenen, Gewebezubereitungen, radioaktiven Arzneimitteln und Wirkstoffen muss eine mindestens zweijährige Tätigkeit auf einem medizinisch relevanten Gebiet der Gentechnik, insbesondere der Mikrobiologie, der Zellbiologie, der Virologie oder der Molekularbiologie, für Gewebezubereitungen eine mindestens zweijährige Tätigkeit auf dem Gebiet der Herstellung und Prüfung solcher Arzneimittel, für radioaktive Arzneimittel eine mindestens dreijährige Tätigkeit auf dem Gebiet der Nuklearmedizin oder der radiopharmazeutischen Chemie nachgewiesen werden.

Der Leiter der Herstellung, Leiter der Qualitätskontrolle und der Stufenplanbeauftragte können bei ausreichender fachlicher Qualifikation und praktischer Erfahrung mit der Sachkundigen Person identisch sein.

### **Fazit**

Die im Arzneimittelgesetz definierte Sachkundige Person ist der ‚Spiritus rector‘ für den pharmazeutischen Bereich in Unternehmen. Sie trägt letztendlich die Verantwortung für die angemessene Qualität von Prüfpräparaten oder Handelsprodukten. Die Sachkundige Person wird durch Qualitätssicherungs-Funktionen im Unternehmen unterstützt und arbeitet eng mit anderen pharmazeutischen Fachleuten wie Herstellungs- und Kontrollleitung zusammen. In ihren Entscheidungen ist sie nicht weisungsgebunden und nur ihrem pharmazeutischen Gewissen und den gesetzlichen Regelungen verpflichtet. Gerade in kleineren und jungen Unternehmen bietet es sich an, diese unabhängige Expertise von erfahrenen Dienstleistern einbringen zu lassen, die über die nötige Qualifikation verfügen. So bleibt die schlanke Organisation erhalten und trotzdem ist die Qualität gesichert!

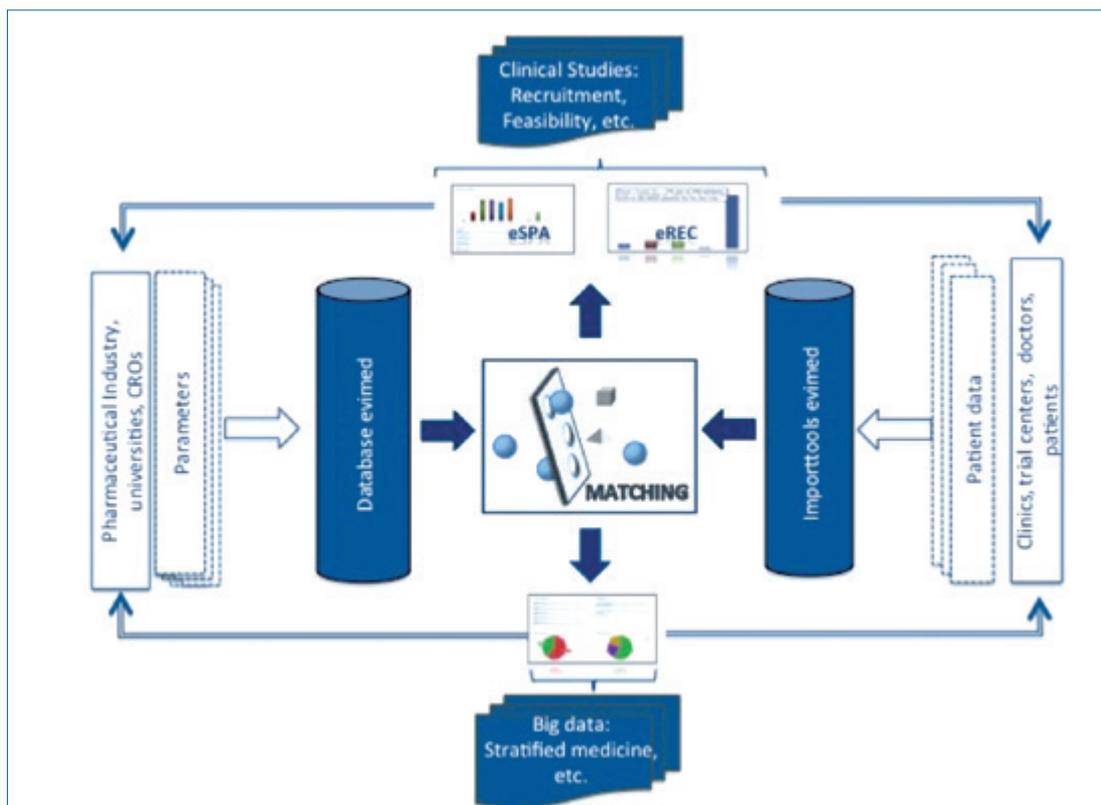
## Data Matching as a Success Factor for the Effective and Efficient Conduction of Studies

*Maike Dieckmann, evimed GmbH, Frankfurt/Main*

The application of IT in healthcare is gaining more importance in the field of clinical studies. With the help of efficient software solutions, time and expenses can be saved and valid results achieved.

Analysis of patient potential (feasibility) is decisive for the successful progression of a study. Currently, in trial centres the patient's potential to participate in a study is assessed through manually reviewing patient data and subsequent extrapolation. This often leads to misjudgements. 60 %<sup>1,2</sup>, of studies are still terminated or concluded late due to unavailable patients.

In addition to the documentation and evaluation of data in clinical studies, computer-aided solutions can also be employed for analysing potential and recruiting patients. These are advantageous additions to current methods.



Computer-aided solutions in clinical studies (source: evimed GmbH)

- 1 MK, Snowdon C, Francis D, et al. Recruitment to randomised trials: strategies for trial enrollment and participation study. The STEPS study. Health Technol Assess 2007; 11: iii, ix–105.
- 2 Dilts DM, Sandler AB. Invisible barriers to clinical trials: the impact of structural, infrastructural, and procedural barriers to opening oncology clinical trials. J Clin Oncol 2006; 24: 4545–52.

Using electronic analysis of potential, all patient data can be examined for a match with the parameters of the study, with the help of specifically developed matching software. Retrospective data, as well as different parameters or studies can be compared over any periods – in compliance with data protection regulations. The result can be displayed in a dashboard in various layouts, so that a valid conclusion can be reached regarding the available patient potential in the respective test centre. With this method the risk of loss or significant deviation from the expected quantity of recruited patients is reduced to a minimum.

Through the integration of recruiting software in the respective hospital information system, tumour documentation system or doctor information system – in compliance with data protection regulations – the process of recruiting patients can be significantly improved. Depending on the desired workflow in the trial centre, patient data is compared with the criteria determined in the study's database. Should the data-matching software identify a match, a notification relevant to the process will be provided, so that the patient can be approached regarding possible participation in the study.

The processes described completely fulfil the high requirements with regard to data protection.

It has already been possible to establish that increases in efficiency and reductions in expenses could be achieved through the use of computer-aided solutions in clinical studies, with regard to the analysis of patient potential, as well as patient recruitment. Thus, through the application of recruiting software in oncological studies, pharmaceutical companies confirm a significant benefit in view of efficient patient recruitment, adherence to time frames, as well as transparency.

## Clinical Trial Insurance – Requirements and special issues regarding the protection of trial participants

### A look at Germany and beyond

*Steffi Elschner, proprietor ELSCHNER CONSULTING, info@elschner-consulting.de*

With few exceptions the ethics committee requires proof of clinical trial insurance before authorizing a clinical study. In Germany statutory regulations regarding liability and insurance of clinical trials are stipulated in the German Medicines Act (AMG) and the Medical Devices Act (MPG). Apart from insurance requirements they define the exceptions from mandatory insurance. In other European countries and worldwide these requirements might be completely different. Almost every country has its own legal provisions regarding liability as well as the amount and extent of coverage. Therefore most countries' ethics committees require proof of local insurance coverage according to the respective country's statutory regulations.

Prior to being included in a clinical trial, participants/patients must be provided with comprehensive patient information about the study and the potential side effects. If they suffer from adverse health effects caused by taking part in the clinical trial, they are entitled to damages from the insurance coverage that was obtained for them.

How does that work in Germany? In case of health damage the participant/patient is only liable for proof of a causal link. All potential health injuries communicated to the participant via patient information or study protocol are covered by compulsory insurance according to AMG/MPG. Clinical trial insurance does not provide for damages for pain and suffering. It offers compensation for health injuries incurred as a result of pharmaceuticals or substances used during the clinical trial or measures in connection with the study. Benefits include for example payment of treatment costs, annuities, higher expenses and maintenance. In Germany AMG and MPG require coverage of EUR 500'000 per participant/patient, whereas the total insurance amount of the clinical trial may be between EUR 5 million and EUR 50 million depending on the number of participants/patients and the trial risk. Exceptions from insurance obligation are also regulated by AMG/MPG, see AMG §40 (1)b and §20 (1) MPG. Adequate coverage may also be obtained for trials not subject to compulsory insurance, i.e. studies of food supplements or cosmetics. Insurance amounts in these cases are lower in line with reduced premiums.

Clinical trial insurance covers participants/patients for as long as they take part in the clinical study, from signing the informed consent until the end of the follow-up. In Germany an insured person's fetus conceived at the time of the clinical trial is also considered an insured person. The policyholder (sponsor) has an obligation to disclose any increase of risk to the insurer. If for example there is a change of protocol which impacts the safety of the participants/patients during the clinical trial, a favorable opinion of the insurer must be obtained to maintain continued coverage.

As mentioned above, in most countries the terms and requirements of clinical trial insurance are subject to national regulation. As a result, specific rules apply regarding the insured amount and the documentation required to obtain coverage. Local insurance guidelines may also govern exceptions from coverage. In order to avoid delays and ensure a smooth approval process by local authorities and ethics committees, the specific requirements of the trial country should be taken into consideration.

It should also be noted that while a German clinical trial insurance subject to AMG or MPG offers comprehensive coverage to the study participants, it does not necessarily provide adequate coverage to all parties of the trial. For example clinical trial insurance does not protect against potentially material financial losses incurred by the sponsor due to an error committed by the clinical research organization (CRO) while carrying out the study. In this case an errors and omissions insurance (E&O) would protect the CRO. In Germany the demand for this coverage is still rather infrequent, among Anglo-American sponsors, however, it is increasingly common.

ELSCHNER CONSULTING has many years' experience in this highly specialized field and offers competent advice about local insurance requirements and obtaining insurance documents in accordance with legal regulations of the study country. Whether Germany, Switzerland, EU countries, Latin America, Russia, the US, additional radiation liability insurance or travel accident insurance are concerned: our clients benefit from our contacts to multinational specialty insurers, if necessary with domicile in the respective country. Protocol changes, increase of trial participants, amendment of insurance terms due to slow recruitment, or in the event of a claim; our experienced team provides extensive support for our clients from the initial consultation all the way up to the end of the trial.

## Public Relations – Do Good and Let Others Judge

### Start-ups should view public relations as a strategic element

*By Dr. Holger Bengs and Anne Hachmann, BCNP Consultants, Frankfurt am Main*

Filing patents, finding a location, renting space, equipping a laboratory, advertising available positions, concluding employment agreements, setting up infrastructure, structuring accounting, ensuring financing, selecting suppliers, setting up a bank account, programming a website – the founding of a company is a complicated business. Founders usually neglect communication. Due to the multitude of important steps, founders often neglect the point of communication. If you know all the possibilities public relations offer, you learn to use them right from the start.

Public relations (PR), the managing of relations with the public, is rarely given a prominent place in a manual for start-ups. While writing a business plan and reflecting on the organisation you want to establish, you will always find good advice for internal communication and for marketing, but rarely for public relations or for handling the press. The experience gained in working with start-ups has shown that PR is not well understood. PR, marketing, advertising: These three areas are tossed into one pot with sales promotion on top. Public relations is an important strategic component for future growth and must be considered in a differentiated way. PR has an impact, both indirectly and over the long term.

### When others say: “You are good.”

Public relations can increase the value of a company because its good reputation and brand are strengthened and communication channels open up. You can see this very quickly when you are dealing with complex products and services or financing. Clients and investors do not just want to be informed through “marketingese”, but also neutrally. This makes public relations an issue for every start-up in the chemical industry or biotechnology. The most important point is: relations between the company and the public must be managed. If you want to increase sales to certain target groups over the short term, you should rely on good sales arguments and aggressive messages in brochures, reports on use or booths at trade fairs. For whom that is not enough places hopes in purchased media channels: advertisements in newspapers, banners on-line, radio or TV commercials. But, if you'd like to make others speak well of your company, its employees and products, the PR management has to get in contact with all the parties that have or could have an interest in the company: suppliers, customers, shareholders, residents, politicians, association representatives and cluster managers.

### Brand formation and employer branding

Public relations needs to be implemented the right way. If you spend money for being published, you have to be transparent. PR can create a positive environment for the company in an objective manner. It builds up the company's brand so the managing director becomes a sought expert in the company's technology field. After everything that must be considered, growth-oriented start-ups should also give thought to their image: Not every well-educated specialist has small companies on their radar as attractive employers. There are also shortages of personnel in small, rapidly-growing companies. Public relations can help with the development of an employer brand.

### Press releases as a basis

In an age of social media and blogs, the press release is still a good medium for communication. It is responsible for factual information and offers the opportunity to come into contact with journalists. News is always a door opener. It arouses interest, or it doesn't. Raving about yourself is taboo. News for technology companies includes not only the latest information, but also in particular progress and benefits for a segment of the public, a sector or society. If some press texts for a specialist publication are accepted directly without additional work, that is ideal. Problems arise when an editor incorrectly reproduces the content. Poor texts are often the cause of this. The sender is the reason for the problem if technical terms dominate the text. People who acknowledge editorial independence and can put the information in context are also welcome. Anyone who in interviews only praises himself and his own company and forgets about trends in the industry and competition is not suited for the media. If you take all this into account, it is possible to assume a good position and to be recognised on the marketplace of public opinion over the course of time. In the best case scenario, you develop relationships that will be valuable in a crisis, when undesirable news, devastating consequences, drama and conflict occur.

### With courage and creativity into the future

If you want your start-up to grow, it is necessary to have more than sales-promoting marketing instruments. Directors of companies with an eye on the future also plan public relations strategically. This takes the form of speaking opportunities or articles on subjects in the sector and issues for start-ups. Such directors compile objective press documents and constantly publish press releases that are worthy of the name. Thanks to a well-run news history presenting the pool of innovation of the company, investors and customers may get interested in the start-up. Beginning early on, pays off. And because public relations is so important, it is a matter for the top management.

### Tips for communication

1. Remain objective, transparent and journalistic in your PR.
2. Ask your industry or sector organisation about available media channels for you.
3. Think your press work through to the end and link different communication channels.
4. Be patient: Media work is based on trust.
5. Pay attention to your target groups: A lot helps a lot, and one size fits all do not work.
6. Respect the methods and work of editors.
7. Please write in German for the German market.

With the kind authorization of CHEManager, first published in German, CHEManager 7-8 /2015, p. 15

## Enabling of Biotechnology Start-ups by Founding Angels

*Gunter Festel, FESTEL CAPITAL, Fuerigen/Switzerland*

The technology transfer gap between academic research and the commercialisation of scientific knowledge can be addressed through start-ups, which translate this knowledge into industrial applications. But, especially in the area of biotechnology, there are not enough start-ups in Europe which hampers the effective and efficient commercialisation of new scientific knowledge. Founding Angels (FAs) help to boost the start-up scene in that they provide a mechanism to support founding teams both financially and operationally.

They hold business idea discussions long before the engagement of business angels (BAs) and venture capitalists (VCs) and found, together with scientists, biotechnology start-up companies to successfully commercialise the results from academic research. They complement the scientific team members, coming mainly from universities and research institutions, with business expertise. As part of the founding team they are operationally very much engaged bringing in their expertise from other successful start-up projects. Due to their very early and much more operational engagement they have more the role of a founder and entrepreneur and less that of an investor, thus complementing the later engagements of BAs and VCs as shown in Figure 1.

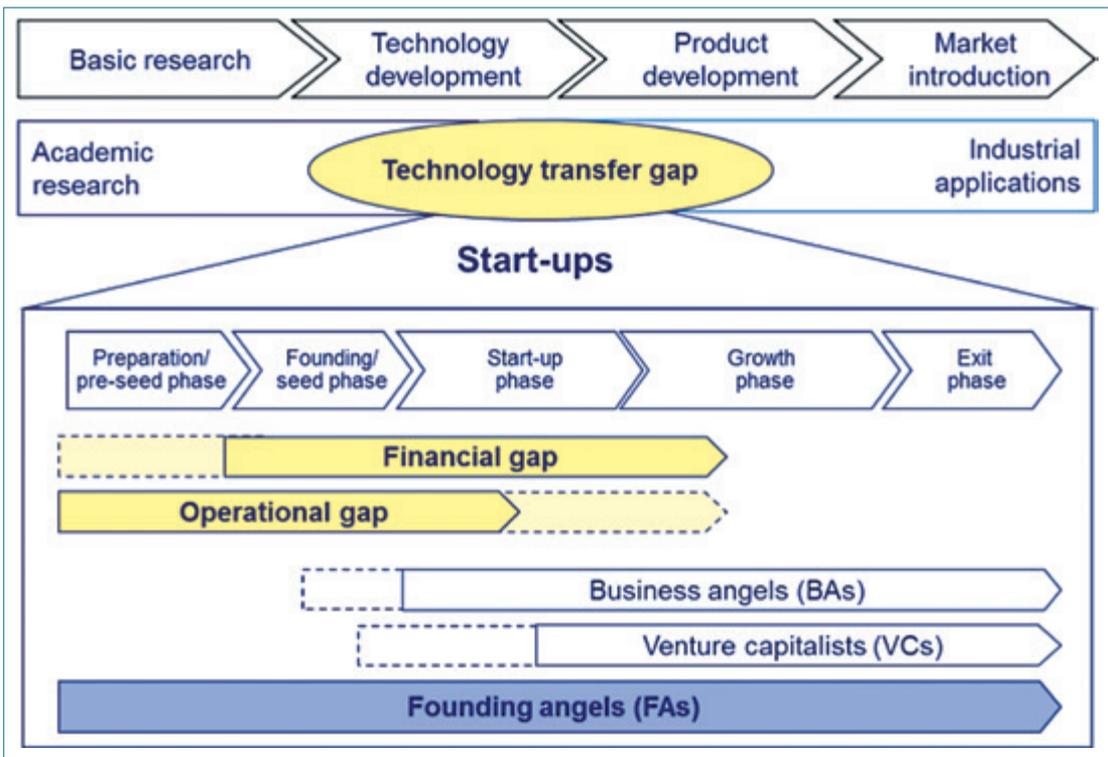


Figure 1: Gaps between academic research and industrial application as well as the role of FAs to close these gaps

The FAs’ investment strategy is based on three central aspects. One aspect contains the identification of interesting markets with high potential where established companies are too slow or “conservative”. Another aspect includes the understanding of the value chains and identification of bottleneck technologies with focused

investments to develop these technologies. Also important is the building up of a strong IP position and the co-operation with established companies to use their marketing and production resources. The uniqueness of the FAs' investment strategy offers clear advantages. As their engagement is at an early stage in the new start-up company, there is little competition with other investors and a large opportunity to ensure attractive investment possibilities with a high value creation potential.

The value added of FAs is based on 1) their time investment to support the scientific found-ers in the daily business, 2) their vast knowledge, skills and experience, 3) the access to their networks and 4) the pre-seed funding. Due to their experience and knowledge of a specific industry, FAs influence the development of start-ups as a driving force behind the founding of new start-up companies. They keep an eye out for new scientific breakthroughs which have the potential of being commercialised. Unrecognised commercial potential can be identified, and otherwise undiscovered technologies or ideas make it to the market. FAs have a "pull" function in the venture business and can significantly help to close the technology transfer gap through their support of start-up activities at a very early stage. Based on FA engagements, significant amounts of additional investors' money can be raised and the profitability of invested money is high with annual returns of more than 100% in successful engagements.

A good example is the Swiss biotechnology company Butalco. The company develops new production processes for second generation biofuels and biochemicals based on lignocellulose. The core technology based on genetically optimised yeast enables increased yields in bioethanol production by using C<sub>5</sub> sugars in the fermentation process. The FA supported the scientist, a professor at the University of Frankfurt who developed tools to modify yeast, in founding the company and finding additional investors. The research was conducted at the University of Frankfurt based on research contracts securing all the resulting IP property rights for Butalco. Also, additional IP rights to broaden Butalco's technology base were acquired. Butalco was recently sold to the French company Lesaffre which enabled all shareholders a profitable exit and the worldwide launch of the Butalco technology.

## NOVEL PRODUCTS FROM MICROALGAE

### – from extreme habitats to a new source of high value substances

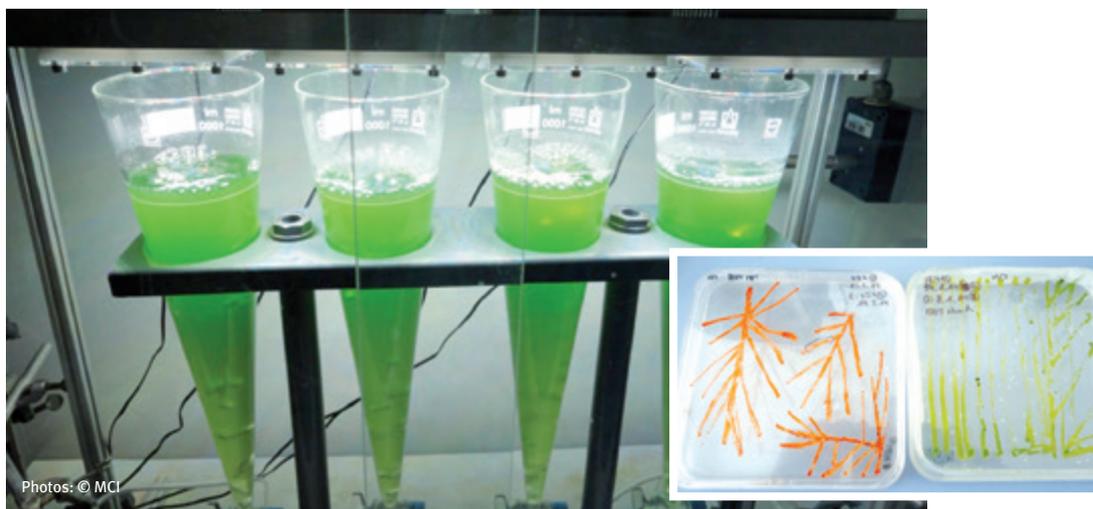
*Dr. Alexander Trockenbacher, Prof. Dr. Christoph Griesbeck – MCI University Innsbruck, Austria*

Phototrophic microorganisms (microalgae) combine the advantages of single cell, up-scalable cultivation with the enormous metabolic diversity due to the need for adaptations to extreme environments. The aim is to harvest this source of potential new bioactive substances by developing innovative cultivation methods, screening of unique biobanks and defining metabolic pathways.

One bottleneck to exploit the potential of microalgae was up to now the very slow growth rates as well as undefined growth conditions for the induction of stress induced metabolites. In a new project financed by the Austrian Research Promotion Agency (FFG) research groups from MCI University in Innsbruck and the University of Applied Sciences Upper Austria in Wels try to overcome these limitations by developing new photobioreactors and co-cultivation methods mimicking the essential conditions of the natural habitat for the production of bioactive metabolites. As a third partner, the Austrian Drug Screening Institute in Innsbruck contributes its expertise in automated high-throughput disease models to this project in order to screen for new drugs.

#### Screening of unique alpine algal collection

One basis in the search for new substances is a unique culture collection of mainly terrestrial microalgae (ASIB505 curated by Prof. Georg Gärtner at the Institute of Botany, University of Innsbruck) that includes several hundred strains from high alpine environments. Algae from these environment are often exposed to extreme physical (UV-light, temperature extremes, water scarcity), chemical (toxins from competitors) and biological pressure where they compete in soil, on rocks or even on glacier ice with bacteria and fungi for scarce resources. Exactly these conditions prompted us to search for bioactive substances that include UV-protective, antibacterial, antifungal, antiviral as well as cytotoxic, cell-growth inhibiting and anti-inflammatory substances. After the establishment of ideal growth conditions for biomass expansion we expose the algae to a panel of stress conditions that should promote secondary metabolite expression. Following cell lysis and compound extraction we perform several bioassays to screen for active compounds.



### Challenges – Low growth rates

Many of these highly adapted algae can satisfy their energy demands by switching from light to organic compounds. This mixotrophic energy metabolism can be exploited to boost biomass increase. Interestingly, even for terrestrial, mostly adherently growing algal strains growth is often possible in liquid suspension culture. Nevertheless the ideal chemical and physical growth parameters have to be determined systematically for each strain. In some cases algal growth seems to be dependent on the co-presence of fungi or bacteria. Therefore, we aim to develop new co-cultivation technologies where the cellular separation of algae and fungi or algae and bacteria, respectively, is accomplished by membranes that still allow for the transfer of mutually needed metabolites.

### Future perspectives

The ultimate goal of the project – the identification and production of new high-value bioactive substances from algae implicates also the elucidation of the metabolic pathway that leads to these compounds. Knowledge of the metabolic pathway should first of all facilitate the definition of optimal growth and metabolite induction parameters. To accomplish this metabolic engineering task a thorough understanding of the underlying metabolic pathway is necessary. Therefore we also try to define the metabolome, proteome and transcriptome of the algal strain under defined conditions. Finally, in order to establish feasible and cost-efficient production processes, it is necessary to establish the relevant methods in upscaling, downstream processing and analytics as soon as an algal strain and substance becomes promising.



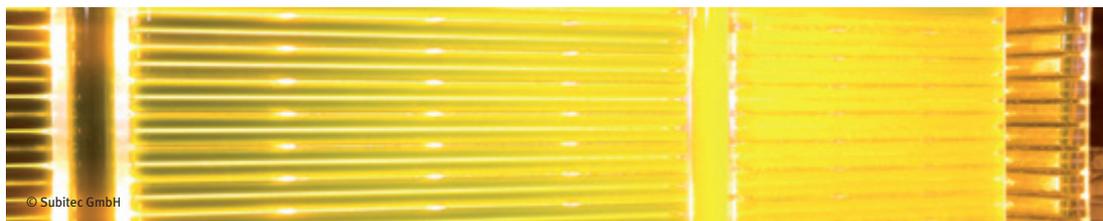
Dr. Alexander Trockenbacher is Senior Lecturer at the MCI Department of Biotechnology. After completing his PhD. in the field of Human Genetics he worked several years as Postdoc in basic and applied sciences before joining MCI faculty in 2011.



Prof. Dr. Christoph Griesbeck is Head of the Department and Study Programs of Biotechnology at MCI University in Innsbruck and member of the DECHEMA council for algal biotechnology.

## Biofuel of the future: Fuels from Algae

*Dr. Peter Ripplinger, Subitec GmbH, Stuttgart, Germany*



Algae are microscopic multitaskers. The valuable ingredients of the microalgae can be used as food supplements and feed. They also provide high-priced recyclable materials for the cosmetic and pharmaceutical industries. In addition, the energy produced by algae biomass can be used for example as biofuel. In the biorefinery concept different ingredients of the microalgae biomass are recycled in a cascaded use – a sustainable contribution to environmental protection.

Algae are fascinating life forms. As plant-like organisms they typically live in water and carry out photosynthesis but do not belong to conventional plants. Algae are distinguished between well visible, multicellular macroalgae, such as seaweed, and microalgae less than one millimeter of size with one to several cells.

Microalgae show all important characteristics for the commercial use of plants: Using standard nutrients for plant cultivation (mainly N, P, Fe), energy from sunlight and CO<sub>2</sub> as a carbon source they form organic carbon compounds, including many valuable substances. Microalgae are very interesting organisms for a variety of uses. Today high valuable substances such as fatty acids, proteins, vitamins, carotenoids and dyes are already derived from microalgae. Further, the produced algal biomass can for example be used to produce energy for the production of biofuels.

Compared to the conventional crop cultivation, biomass production from microalgae has some significant environmental and economic benefits. The surface area productivity is much higher compared to conventional farming. The “food or fuel” problem does not exist for the cultivation of algae biomass. Cultivation does not require fertile soil and can be done in areas where no conventional farming would be possible. The closed cultivation system uses nutrients such as phosphorus more efficiently – fewer expensive nutrients must be applied. Along with this, excess nutrients, such as phosphates and nitrates, are not released into the environment. The water consumption is – compared to classical agriculture – significantly lower, thanks to the closed cultivation system.

The biotech company Subitec from Stuttgart/Germany makes use of these advantages; Subitec cultivates microalgae in specially designed and patented flat-panel airlift (FPA) photobioreactors. Photobioreactors are clear containers ensuring the light supply for photosynthesis. The intermixing of the system with CO<sub>2</sub> and nutrients is optimized in the FPA-reactor. This enables high productivities and concentrations of algal biomass – requirements for a possible environmental friendly and cost-effective production and thus economic useful. A positive side effect: CO<sub>2</sub> from production plants or from energy production can be used for the growth of microalgae.

A most recent example is the cultivation plant in Zeitz/ Germany, an algae cultivation system on a pilot scale: With 24 reactors of 180 liters and a total volume of 4.30 m<sup>3</sup> microalgae is cultivated on an outdoor area of 160 m<sup>2</sup>. The fermentation gas of the bioethanol production is used as the source of CO<sub>2</sub>. About 1.8 tons of CO<sub>2</sub> are bound per ton produced algal biomass. On the grounds of the bioethanol plant of CropEnergies AG, a subsidiary of Südzucker AG, a new research project with the title “biorefinery based on carbohydrate-rich algal biomass, use of starch and protein” was setup by the cooperation partners Südzucker AG, Fraunhofer IGB (Institute for Interfacial Engineering and Biotechnology) and Subitec. Herein examined is the production of starch-rich algal biomass.

The main component starch shall be explored for ethanol production. In addition, the value of the accruing algal protein will be determined. The resulting protein fraction can be used as animal feed. Here, especially fish aquacultures are of interest, as there is a higher added value to be expected and the food of aquatic origin is well processed by fish. The residue from the ethanol fermentation is fermented into biogas – a source of bioenergy that results from the anaerobic fermentation of biomass. Due to its net energy yield, the so produced biogas is a sustainable alternative to reduce carbon dioxide emissions. Both protein utilization and the use of algal biomass for biogas production, the closure of material cycles for CO<sub>2</sub> and inorganic nutrients, provide additional economic contributions to fuel production from starch-rich algal biomass.



Algae cultivation system with 180 Liter FPAs in Zeitz/ Germany (© Subitec GmbH)

There is a great market potential for the use of microalgae due to the various application possibilities of microalgae biomass as well as the above-mentioned advantages over the conventional crop cultivation. To use this potential more efficiently, a cascade utilization of the various ingredients would significantly increase the profitability.

Microalgae have adapted in the course of evolution to a variety of conditions over the entire earth. Correspondingly diverse are the ingredients and properties of microalgae. It is estimated that there are between 250,000 and up to one million different strains of algae. Scientifically described are only about 35,000 microalgae. Currently industrial used are just 10 to 20 species. Although today some utilization possibilities are already economical, it emphasizes that this is just the beginning of using these multi-talents.

## Fermentative $\alpha$ -ionone production

Author: Dr. Guido Jach, Phytowelt Greentechnologies, Nettetal

Ionones are major fragrance compounds in plants and highly valuable for fragrance industry. In nature they are derived from carotenoids and therefore belong to the largest class of plant secondary metabolites, the terpenes. The group of ionones comprises the single compounds  $\alpha$ ,  $\beta$ - and  $\gamma$ -ionone with  $\alpha$ - and  $\gamma$ -ionone occurring as (R)- and (S)-enantiomers – all of them varying in scent. (S)- $\alpha$ -ionone has a woody, cedar wood like, raspberry and  $\beta$ -ionone like scent whereas the corresponding (R)-enantiomer is characterized by its violet-like, fruity, raspberry-like, flowery aroma and has a strong intensity. The woody scent of (S)- $\alpha$ -ionone is often perceived as unpleasant and has a too strong note of  $\beta$ -ionone. For that reason the fragrance industry is interested in a complete separation of the (R)- and (S)-enantiomers in order to receive only the violet scent without any other interfering odor note. In fact, in natural sources ionones are always found as mixtures of different composition, with  $\beta$ -ionone always being the major component, by far. Thus providing individual pure ionone compounds is intricate and cost intensive, especially regarding the (R)- $\alpha$ -ionone which only occurs in low amounts in natural sources.

Chemical synthesis of (R)- $\alpha$ -ionone indeed is feasible but the chemical process generates only a product with 97% enantiomeric purity, still bearing substantial amounts of the (S)-enantiomer. Moreover, a product yield of only 61% lowers the economic efficiency. In order to increase profitability and also to achieve a sustainable and environmentally compatible ionone production Phytowelt invented microbial fermentative production systems.

Former recombinant systems imitated the natural biosynthesis pathway known from plants. In plants ionone synthesis requires a multi-stage synthesis of the linear carotenoid lycopene followed by activity of different lycopene cyclases catalyzing conversions into mono- or bicyclic carotenoids, with  $\beta$ -carotenoid being the main product. The actual ionone generation takes place via enzymatic cleavage of these preformed carotenoids. The involved enzymes are known as carotenases or carotenoid-cleavage-dioxygenases (CCD). In previously described recombinant bacterial strains a carotenoid pathway was implemented as well as CCD1 enzymes. Preferential CCD1 enzymes were integrated in bacterial strains with lycopene,  $\beta$ -carotene or zeaxanthin provision (Vogel *et al.* 2008, Baldermann *et al.* 2012).

The exclusive generation of  $\alpha$ -ionone can be achieved only via enzymatic cleavage of  $\epsilon$ -carotene (or its monocyclic precursor  $\delta$ -carotene). However, only very few plants contain detectable tiny amounts of  $\epsilon$ -carotene though always in mixture with  $\alpha$ - and  $\beta$ -carotene. In consequence, recombinant microorganisms producing only  $\delta$ - or  $\epsilon$ -carotene are the ideal basis for  $\alpha$ -ionone production. However,  $\delta$ -carotene is not a reasonable choice as precursor, because, in contrast to  $\epsilon$ -carotene, only one molecule ionone can be released from this monocyclic substrate. Starting material for carotenoid biosynthesis are the isoprene derivatives isopentenyl-diphosphate (IPP) and its isomer dimethyl-allyl-diphosphate (DMAPP), which – depending on the host organism – are generated by the methylerythritol phosphate (MEP) and/or mevalonate (MVA) pathway. Linkage of several IPP and DMAPP molecules results in the intermediate geranylgeranyl diphosphate (GGPP). Condensation of two units GGPP induces the first tetraterpene compound named phytoene. Repeated desaturation and isomerisation steps transfer the colorless phytoene to lycopene with its characteristic red color, which is a central intermediate for generation of the carotenoids  $\alpha$ -,  $\beta$ -,  $\gamma$ -,  $\delta$ -,  $\epsilon$ -carotene by different cyclization reactions.

By engineering an optimized carotenoid pathway including a modified plant derived lycopene  $\epsilon$ -cyclase Phytowelt effectively synthesized highly pure  $\epsilon$ -carotene in *E. coli* and further converted it to enantiomeric pure (R)- $\alpha$ -ionone by a chosen carotenoid cleaving dioxygenase.

Since high product yields are most important for cost-effective fermentative systems, it is crucial to further enhance terpene production in *E. coli*. By implementation of the mevalonate (MVA) pathway Phytowelt is able to increase carotenoid production. Furthermore, Phytowelt could successfully replace individual bacterial MVA enzymes by their plant derived counterparts which showed equal to higher activity in kinetic studies. Additionally Phytowelt constructed a plasmid with an optimized operon for the carotenoid biosynthesis genes. Optimization of DNA sequences, gene arrangement and regulatory motives induces a 3-4 fold increase of lycopene yield. Additionally, Phytowelt constructed mutated plant  $\epsilon$ -cyclase enzymes. Bacterial strains co-expressing of the optimized pathway and EC genes results in high yields of  $\epsilon$ -carotene of at least 98% purity. Additionally, the controlled coexpressing of chosen dioxygenases splitting the 9, 10- and 9', 10'- double bond oxidatively results in the release of enantiopure (R)- $\alpha$ -ionone. The controlled and balanced expression of the involved enzymes is highly important for the developed process to gain optimum flux over the pathway as well as to avoid detrimental cleavage of precursors like lycopene.

The developed system has been evaluated successfully in different *E. coli* strains including strain *E. coli* TOP10, which is preferred. Phytowelt's data prove that plant derived enzymes are of high value to successfully set up synthetic metabolic pathways and functional and high yielding bacterial production systems for high value compounds with enantiomeric purity. Therefore their use in microbial fermentative systems for production of high value terpenoid compounds is notably and should bear much higher consideration.

To the best of Phytowelt's knowledge there is currently no other recombinant system allowing for the high yield production of enantiopure (R)- $\alpha$ -ionone.

## Phototrophic microorganisms for applications in biotechnology

*Mathias Rupf, GMBU e.V., Halle/Saale, Germany*

One aim of our research is the use of phototrophic microorganisms for applications in biotechnology. This comprises detection of cyanobacteria in environmental samples, strain maintenance as well as cultivation of micro-algae and cyanobacteria from laboratory to pilot-plant scale as core competencies. Other expertises include e.g. the development of process-control strategies in order to gain valuable compounds.

An approach was the development of a sandwich hybridization assay for detection of cyanobacterial 16S rRNA. This technology allows a rapid and cost-efficient detection of e.g. harmful cyanobacteria in bathing and drinking water samples enabled by oligonucleotide probes with a high specificity for several cyanobacteria genera. In cooperation with the ECH GmbH the GMBU e. V. develops a simple and mobile device for semi-quantitative discrimination of cyanobacteria using *in vivo* chlorophyll-fluorescence followed by a heuristic analysis of detected fluorescence signals for monitoring these microorganisms in water samples.

A further development within a R&D project is the production of cyanotoxins (e.g. microcystins) in photobio-reactor systems via modified cultivation strategies. Due to a specific variation of process parameters (e.g. temperature, light quantity) production of toxins shall be stimulated and maximized as well as spectrum of toxins shall be changed to gain rare structure variants of microcystins. In cooperation with the JenaBios GmbH biomass containing these toxins is used to produce highly purified standard chemicals for analytical purposes.

Another approach in close collaboration with the Dr. Junghanns GmbH, a specialist in the field of herbs and spices cultivation, is the production of biomass with high content of indole acetic acid (IAA). This biological plant additive is mainly being applied in organic farming. Due to a cultivation process suitable for the special requirements of phytohormone formation based on selected cyanobacteria the GMBU e.V. is able to produce organic extracts with a content of IAA up to 200 mg m<sup>-1</sup>.

Further planned projects and activities in the field of phototrophic microorganisms comprise the production of valuable compounds for food, cosmetic and pharmaceutical industry, e.g. pharmacologically active carbohydrates or within an intended collaboration with the PPM e.V. valuable cosmetic compounds like emulsifiers or foaming agents.

A main pillar of our research work in cooperation with qualified partners from the sectors of plant construction (Ventury GmbH), metalworking (PROMED Computertechnik GmbH) and optoelectronics (OUT e.V.) involves innovative cultivation systems for phototrophic organisms, e.g. microalgae, cyanobacteria, plant cells, duckweed, moss and lichen. The developed device allows a multiple, parallel experiment handling in small volumes for screening tests, optimization of cultivation parameters, media development and growth studies. The device is equipped with 16 separately used cultivation vessels (500 ml) that can individually be tempered (15 – 35°C) and aerated with an air/CO<sub>2</sub> gas mixture (up to 150 ml min<sup>-1</sup> and 0 – 5 % CO<sub>2</sub> by volume). Special attention was paid to the illumination system with high power LEDs. The experimental spots for each of the 16 cultivation vessel are equipped with 9 different LED types enabling an illumination throughout the entire visible range of wavelengths (photon flux densities from 500 – 1000 μmol m<sup>-2</sup> s<sup>-1</sup>) and in addition also UV-A radiation.

Moreover the GMBU e. V. is involved in several network projects such as “AquaAlgae”. Its aim is the adaptation of innovative analytical approaches for water monitoring against the background of toxic cyanobacterial blooms. Due to network activities, the GMBU e.V. expanded its partnerships with a variety of institutions from industry and research.

## Breakthrough in Transient Gene Expression

*InVivo BioTech Services GmbH, Hennigsdorf, Germany*

During the last years, InVivo BioTech Services has realized a novel technology for efficient transient transfection and expression in HEK and CHO cells. In the process of transient gene expression, introduction of the gene of interest into the host cell can be performed by various physical, chemical or biological methods<sup>[1]</sup>. Because of the greater scalability compared to physical methods and no safety concerns or restrictions that are associated with the use of viral systems, a transfection using chemical methods is the method of choice<sup>[2]</sup>. However, up to now up-scaling is limited by various scientific and economic bottlenecks regarding plasmid preparation and vector design, transfection reagents, host cell lines and cultivation media. To overcome these bottlenecks, InVivo BioTech Services developed in cooperation with emp Biotech, Berlin, and Xell AG, Bielefeld, a transfection reagent and a new culture medium that can be used for transfection and production. The in-house establishment of a TGE optimized HEK cell line and a method for large-scale plasmid preparation completed the production platform for HTS approaches and large-scale transfection for the production of gram quantities IgG within days.

Starting from a basal medium we were able to generate a novel recipe, which supports high-titer transient gene expression. Improvements were achieved by stepwise screening and optimization of media ingredients due to higher transfection efficiency and productivity. Batch growth for an exemplary HEK host cell line in the latest CD-ACF basic growth medium formulation reached a maximum viable cell density of nearly  $2 \times 10^7$  cells/mL in batch mode. The new media formulation exhibited transient transfection efficiencies of HEK and CHO cells greater than 95%.

High costs of commercially available lipofectamines or polycationic transfection reagents present a substantial economic disadvantage. While these reagents produce seemingly high transient transfection rates, there is still a strong desire for transfection reagents providing both secure and easy handling and higher recombinant protein production. InVivo BioTech Services initiated a joint venture with emp Biotech and developed a novel polycationic reagent, named INVect. INVect is a transfection reagent which demonstrates 5-fold lower cell toxicity than PEI and delivers extremely high transfection efficiencies of up to 95% measured by flow cytometry. The use

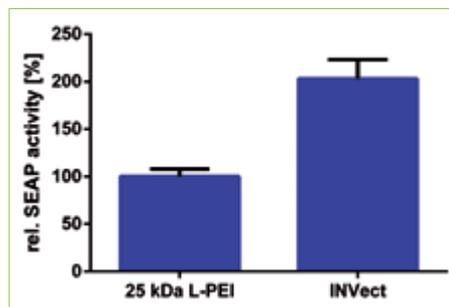


Fig. 1: Using INVect HEK293 cells were transfected with a SEAP harboring plasmid. Relative SEAP expression was determined 6 days post transfection in cell culture supernatant by a photometric pNPP turn-over assay.

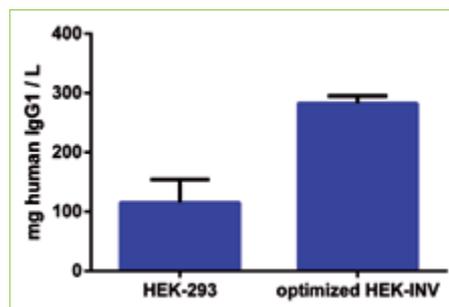


Fig. 2: Parental and optimized HEK cells by directed evolution were transfected with plasmids coding heavy and light chain of a human IgG<sub>1</sub>. Antibody concentration was determined by protein A affinity chromatography.

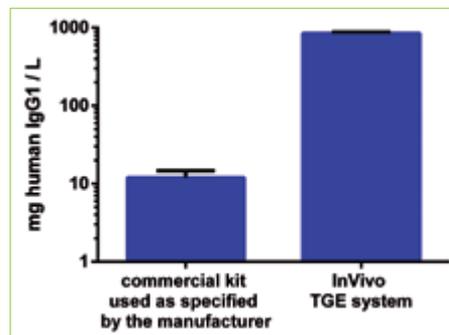


Fig. 3: Combinatorial effect of holistic process optimization in comparison to a commercial transient gene expression kit used as specified by the manufacturer. Cells were transfected with plasmids coding heavy and light chain of a human IgG<sub>1</sub>. Antibody concentration was determined by protein A affinity chromatography. Please note logarithmic scale.

of INVect for transfection under TGE conditions leads to exceptionally high levels of protein expression and outperforms 25kDa linear PEI by 2-fold (Fig. 1).

To generate an optimized host cell line for production of recombinant proteins directed evolution using flow cytometry is the method of choice. By this method it is possible to address several cellular properties like metabolism, stress-resistance, cell growth and viability and even productivity in TGE processes<sup>[3]</sup>. By utilizing random bulk-sorting an optimized cell line HEK-INV was generated. The IgG productivity was increased three-fold in comparison to parental HEK-293 cell line. (Fig. 2).

Since TGE needs large amounts of plasmid DNA (about 5-10 mg plasmid DNA per L transfection volume), up-scaling is often limited due to maximum yields (10 mg) of commercial plasmid preparations kits. Several *E.coli* strains and media were screened for high productivity, high quality and flexibility for DNA preparation in comparison to commercial kits. Additionally a purification process was implemented using a reusable anion exchanger. Up-scaling this process results in approx. 250 mg purified plasmid DNA.

By combining these set screws, it was possible to generate a high yielding “pseudo” perfusion TGE production process enabling space time yields exceeding 200 mg IgG per liter and day. Because of the low toxicity of INVect, transfection and cultivation at extreme-high densities (up to  $8 \times 10^7$  cells/ml) was possible.

Furthermore we worked on a simplified procedure of the production process using concentrated feed supplement. DoEs in which VCD, amount of DNA, feed volume and transfection enhancer were screened showed results with up to 250% increase in productivity. Finally, a holistic DoE-based optimization of all relevant parameters resulted in about 80 fold increase in human IgG1 production in comparison to a commercial available TGE system (Fig. 3, please note logarithmic scale).

In conclusion, InVivo’s TGE system includes an optimized and advanced cell line as well as vector system, a novel transfection reagent and a special designed media. This allows high throughput production of recombinant proteins for early development and lead identification as well as gram-scale production for pre-clinical trials. In addition, our proprietary vector system enables switching to stable cell line generation for the production of larger amounts. The above described developments do not only lead to a significant increase in productivity, but also all resulting services are completely royalty free.



**Fig. 4: State of the art equipment and a stringent quality management system allows InVivo high quality transient recombinant protein production in HTS approaches and gram-scale. (© InVivo BioTech Services GmbH)**

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## Real-Time Biomass Monitoring in Shake Flask Culture –

### Application of the SFR vario in Prokaryotic and Eukaryotic Cultures

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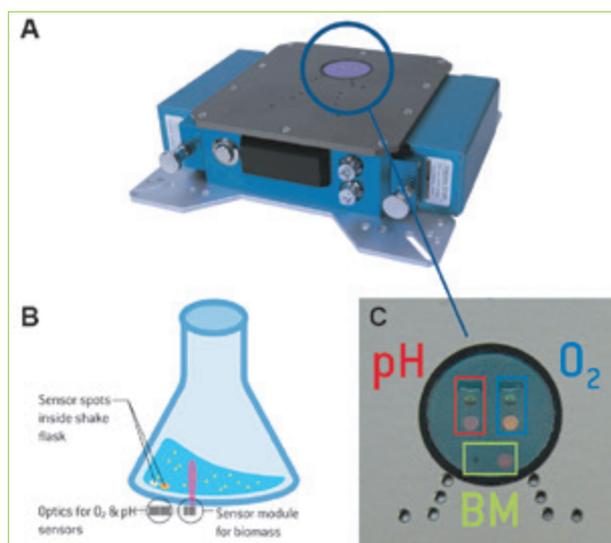
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A novel system for online biomass measurements inside shake flasks has been developed based on near 360° scattered light detection. The optosensory components for biomass monitoring were combined with established PreSens SFR Shake Flask Reader technology, for read-out of optical sensors inside the shake flasks. This new analytical unit can now be employed to monitor biomass, pO<sub>2</sub> and pH simultaneously and contactless through the flask bottom. First application of the prototype SFR vario on *Escherichia coli* K12 and *Kluyveromyces marxianus* culture resulted in highly reproducible online biomass data, with relative errors matching those of standard offline OD measurements.

In early stages of bioprocess development shake flasks are often applied, because results can be achieved with as less effort as possible running many experiments in parallel. At this small scale, however, it is difficult to monitor or control important cultivation parameters. Cell growth determination in shake flasks, for example, requires offline sampling. This is a major draw-back as it increases the risk of contamination and the work load. Furthermore, these measurements can only be performed at distinct points in time, leaving huge gaps where information could be decisive for deeper process understanding. Now a new analytical unit – the SFR vario – has been developed for online monitoring of cell growth in shake flask culture. The biomass measurement is based on detection of light scattered by particles inside the liquid. By non-linear calibration models a correlation to optical density (OD) and cell dry weight (CDW) can be established. The optoelectronic components used for cell growth determination are implemented in the established SFR Shake Flask Reader system to create a monitoring platform which allows simultaneous pO<sub>2</sub>, pH and biomass measurements in the shake flask cultures. Initial evaluation tests with *E. coli* K12 as prokaryotic and *K. marxianus* as eukaryotic models were performed providing highly reproducible results.

### Materials & Methods



An additional sensor module for determination of scattered light with a scatter angle of about 360° was incorporated in the optics for pO<sub>2</sub> and pH measurement of the SFR Shake Flask Reader (PreSens). The ray of light emitted by an LED is transmitted through the flask bottom and scattered by particles (cells) inside the culture medium; this scattered light is detected by a photodiode. During shaking a liquid sickle forms inside the shake flask, so a piezoelectric acceleration sensor was inte-

Fig. 1: SFR vario prototype (A); schematic illustration of the measurement principle (B); SFR vario optics for biomass (BM), O<sub>2</sub> and pH measurements (C).

grated to optimize the measuring cycle and time between measurements can be adjusted. The performance of this new analytical system was demonstrated with two microorganisms – *E. coli* K12 and *K. marxianus*. *E. coli* was cultivated in minimal medium containing glucose and lactose at 37 °C to follow diauxic growth. *K. marxianus* was cultivated in YM-medium with glucose monohydrate at 30 °C. Both microorganisms were cultured in 500 mL baffled shake flasks with integrated pO<sub>2</sub> and pH sensors (SFS, PreSens) at 100 mL working volume and 150 rpm. All cultivations were carried out four times under the same conditions. Three of the cultivations were used to generate a calibration model of scattered light intensity as a function of OD<sub>600</sub>. Therefore, offline samples were taken every 60 min under sterile conditions and OD<sub>600</sub> was determined. The remaining cultivation was used for validation. Measurements of biomass, pH and pO<sub>2</sub> were taken with a sampling interval of 15 s.

**Online Biomass Monitoring with the SFR vario**

Before the SFR vario can be used for online biomass monitoring a valid correlation between scattered light and biomass concentration explicitly for the monitored cell type in the respective cultivation conditions had to be deduced. Therefore, offline OD<sub>600</sub> measurements of the samples were correlated with the respective online measured values. For *E. coli* K12 and *K. marxianus* this correlation can be best described by a simplified Bleasdale-Nelder function:

$y = (a + b \cdot x)^{-1/c}$

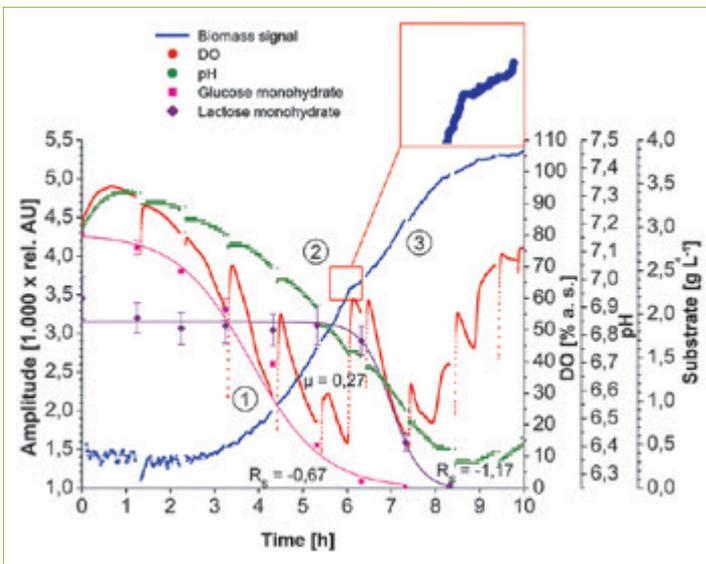


Fig. 2: Diauxic growth of *E. coli* K 12 in minimal medium with glucose and lactose: online biomass (median 45), dissolved oxygen (DO), and pH measurements recorded with the SFR vario prototype. Additionally offline measured OD<sub>600</sub> and substrate concentration are depicted. Insert: Ceased growth during metabolic shift from glucose to lactose consumption, visible in a plateau in biomass measurements.

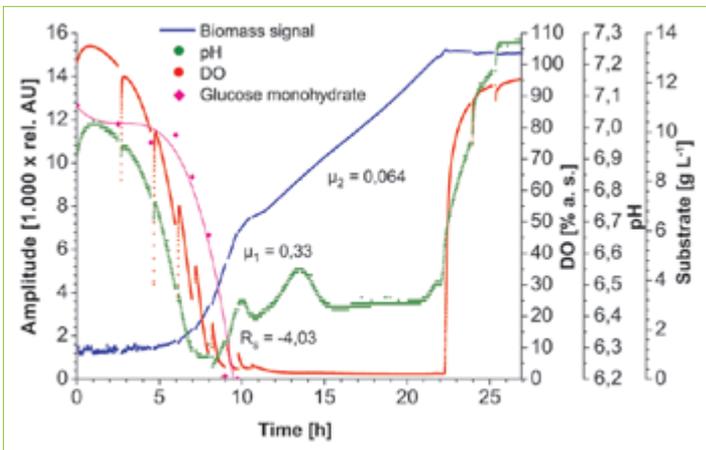


Fig. 3: Growth phases of *K. marxianus* culture in YM-medium inside shake flasks: Online biomass (median 45), dissolved oxygen (DO), and pH measurements recorded with the SFR vario prototype. Additionally offline measured OD<sub>600</sub> and substrate concentration are depicted. Slower growth during second phase is clearly visible in biomass measurements.

where  $y$  is the  $OD_{600}$  value,  $x$  stands for the measured light intensity, and  $a - c$  are the respective median filtered parameter values determined for the specific cell type. Figures 2 and 3 show biomass measurements with the prototype SFR vario in *E. coli* K12 and *K. marxianus* culture. Additionally, the online measured oxygen and pH, as well as offline determined  $OD_{600}$  and substrate concentrations values are depicted. The sampling rate for biomass measurements was set to 15 seconds, so a large amount of data was obtained giving a very good real-time overview of the biomass development. At the beginning of the cultivation some measurement noise was observed in cultures of both microorganisms. This is caused by low starting cell densities and boundary layer reflection of the detection light beam. With growing cell density and the culture broth becoming sufficiently turbid the biomass measurements stabled and values started increasing. A median filter was applied to smooth the graphs. The interruptions in oxygen and pH measurements were caused by stopping the shaking movement to take samples for offline measurements.

In Figure 2 the diauxic growth of *E. coli* can be clearly determined from the measurement values provided by the prototype device. After glucose in the medium is consumed a metabolic shift from glucose to lactose consumption takes place, which can be observed in a small plateau in the biomass measurements. Moreover, the exact match of stopped growth with rapidly increasing oxygen levels as well as a plateau in pH measurements could be recorded.

The different growth phases of *K. marxianus* can also be analyzed with online biomass data. In the first phase glucose is metabolized under aerobic conditions. When glucose in the medium becomes limiting, the cell metabolism switches to metabolize the products of the previous glucose consumption under high oxygen demand. This phase shows a lower growth rate than in the previous phase, which is clearly visible in the biomass measurements. Due to oxygen limitation growth is linear in this phase. So with the prototype SFR vario we were able to follow biomass development inside shake flasks of eukaryotic and prokaryotic microorganisms and gained measurement results that have never been recorded like this before in shake flasks. With the data provided by the SFR vario all relevant information about culture conditions can be monitored without the need for offline analysis.

## Conclusion

We successfully demonstrated the functionality and potential of this new sensor system by online monitoring of different cell types. Biomass measurements with the SFR vario prototype can be conducted in both prokaryotic and eukaryotic cell suspensions. High accuracy can be obtained with an error of less than 12 % compared to alternative offline techniques, as the calibration models for *E. coli* K12 and *K. marxianus* showed. Investigations with further cell lines and culture conditions are already on their way, and it becomes evident that online measurements of  $pO_2$ , pH and biomass with the SFR vario can be applied in a versatile application range. Individual calibration models deduced for different cell types and culture conditions are delivering precise predictions of the biomass concentration. By using this sensor system for contactless measurements through the flask bottom, it is possible to get information about cell growth in shaken cultures in real time.

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