Technology transfer for academic research
A company of the LifeScience Foundation

ascenion

Annual Review 2018

Life Sciences into Business

2018 in Figures

PARTNERS IN SCIENCE

28 research institutes, universities and university hospitals
3 new partners in 2018
10 are endowing members of the LifeScience Foundation

LIFESCIENCE FOUNDATION

EUR 0.6 m from Ascenion's revenues distributed to the Foundation
EUR 0.9 m made available as grants for projects at endowing institutes

TRANSLATION

– numerous projects developed in line with market conditions
– EUR 17.3 m in funding acquired for translation

LICENCES & COOPERATIONS

58 revenue-generating agreements closed with industry partners
>140 further agreements relating to commercial exploitation supported
EUR 5.38 m in revenue for our partner institutes through agreements supported by us: including licences, options and sales of materials

PROTECTING IDEAS

119 invention disclosures assessed
45 patent applications managed

TRAINING

20 training courses held for scientists on topics in knowledge and technology transfer

START-UPS

13 start-up projects accompanied by us
2 exits/equity transactions
EUR 34 m in financing acquired by 2 portfolio companies (grants and private capital)

PRODUCT PROGRESS

3 clinical milestones:
– antibiotic against tuberculosis enters Phase I
– cardiac failure candidate enters Phase IIa
– atrial fibrillation candidate enters Phase II

2 extended approvals:
– Blincyto® for leukaemia also approved for children in Japan and the EU
– Veyvondi for von Willebrand syndrome also approved in the EU

BENEFITS TO SOCIETY

Ascenion is an independent knowledge and technology transfer company. Our focus is on the life sciences. We work closely with our partners in research and industry to launch new products, services and companies that benefit society.

Integrated Services for Knowledg e and Technology Transfer

Training courses & specialized services

Over the past years, we have supported our partner institutes in establishing efficient structures for knowledge and technology transfer (KTT) and strengthening their transfer culture. We offer intensive consultancy, basic seminars for scientists, and tailored training courses for KTT teams.

20 KTT training courses held in 2018

Protection of ideas

We keep a finger on the pulse of innovative research, discovering projects that promise exciting applications: diagnostics and therapies, platform technologies and attractive research materials. Where appropriate, we develop suitable patenting strategies.

45 patent applications managed in 2018
820 patent families and research materials managed in total

Translation

Together, we close the gap between early-stage research projects and market requirements. We plan in line with industry requirements, bring the right people together, and advance projects step by step. The result is an asset that convinces licensing partners and investors alike.

40 project developments supported intensively in 2018
Successful development of innovative translation structures such as MDCell - Helmholtz InnovationLab
EUR 17.3 m in funding acquired for translation

Licences & cooperations

Thanks to our global network, we are able to find the ideal partner for every project. A partner that shares our clients' goals and has the resources required to achieve them – from big pharma companies to regional specialists.

58 revenue-bringing agreements shaped and negotiated for our partners in 2018
EUR 5.38 m received by our partners from licence agreements supported by Ascenion, including licences, options and sales of materials
1,500 active contacts to industry and investors to market our partners' technologies

Start-up coaching

We have accompanied more than 100 start-up projects. Together, we can avoid the mistakes that others have made before, giving start-ups a more solid basis from the start. We steer company founders through the funding jungle, support project development and find the right contacts: specialists, industry representatives and investors.

13 start-up projects accompanied by us in 2018

Investment management

We usually acquire a minority shareholding when a start-up is founded, and manage this as profitably as possible. We distribute almost all revenues from the sale of our equity to the LifeScience Foundation.

2 shareholdings sold in 2018
EUR 0.41 m in revenues from share transactions distributed to the LifeScience Foundation
21 shareholdings in total managed in 2018

BioVaria: Platform for Life-Science-Deals and Start-ups

Where industry and investors meet

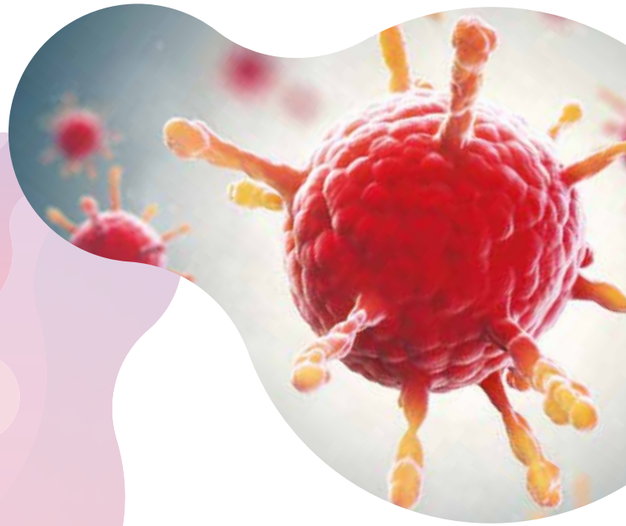
BioVaria is our event for all those seeking to present, discover and advance innovations from academic research in Europe. This is where decision makers from industry and the financial wold come together with scientists, company founders and technology transfer experts to initiate tomorrow's deals.

Additionally, BioVaria's Startup Pitch & Partner program offers a forum specifically for entrepreneurs, packed with valuable opportunities, e.g. an interactive panel with first-class venture capitalists, the BioVaria Startup Awards and individual mentoring sessions.

For more than 10 years we have been organizing BioVaria together with further leading technology transfer organizations in Europe.

BioVaria Highlights 2018

- **63** TECHNOLOGIES
- **17** TECHNOLOGY TRANSFER PARTNERS
- **>250** PARTICIPANTS
- **50** RESEARCH INSTITUTES & UNIVERSITIES
- **26** TECHNOLOGY PITCHES PLUS **63** POSTERS
- **10** START-UP PITCHES
- **2** WINNERS OF THE BIOVARIA STARTUP PITCH & PARTNER AWARDS: OPSYON AND LIFT BIOSCIENCES



Ascenion's Partners

Connecting science and industry

We accompanied over 28 academic institutes on a continuous basis in 2018 and supported many others for individual projects. Our network in industry and capital markets comprises numerous decision makers worldwide with whom we maintain close personal contact – often over a number of years.

HELMHOLTZ ASSOCIATION

- DZNE, German Center for Neurodegenerative Diseases
- **HZDR, Helmholtz-Zentrum Dresden-Rossendorf**
- **HZI, Helmholtz Centre for Infection Research**
- **Helmholtz Zentrum München, German Research Center for Environmental Health**
- **MDC, Max Delbrück Center for Molecular Medicine in the Helmholtz Association**

LEIBNIZ ASSOCIATION

- ATB, Leibniz Institute for Agricultural Engineering and Bioeconomy
- **DIfE, German Institute of Human Nutrition Potsdam-Rehbruecke**
- **DPZ, German Primate Center – Leibniz Institute for Primate Research**
- DRFZ, German Rheumatism Research Centre
- FLI, Fritz Lipmann Institute - Leibniz Institute on Aging
- **FZB, Research Center Borstel - Leibniz Lung Center**
- **HKI, Hans Knoell Institute - Leibniz Institute for Natural Product Research and Infection Biology**
- HPI, Heinrich Pette Institute - Leibniz Institute for Experimental Virology and Immunology
- LIN, Leibniz Institute for Neurobiology
- ZMT, Leibniz Centre for Tropical Marine Research

UNIVERSITIES, UNIVERSITY HOSPITALS AND FURTHER PARTNER INSTITUTES

- CAU, Kiel University
- **Charité - Universitätsmedizin Berlin**
- **MHH, Hannover Medical School**
- MUI, Medical University of Innsbruck
- EKFS, Else Kröner-Fresenius Foundation
- iba, Institute for Bioprocessing and Analytical Measurement Techniques
- IMB, Institute of Molecular Biology
- IMBA, Institute of Molecular Biotechnology
- LIFE & BRAIN
- MGC, Mouse Genetics Cologne Foundation
- TWINCORE, Centre for Experimental and Clinical Infection Research
- UMG, University Medical Center Göttingen
- ULL, University of La Laguna (Tenerife)

Endowing institutes of the LifeScience Foundation are highlighted.

Business and investors

Ascenion boasts a comprehensive worldwide network of industry representatives and capital investors in relevant sectors. Long-term personal contacts form the basis for the successful initiation of cooperation and licensing agreements.

Knowledge and technology transfer

As accredited coaches, consultants, trainers and experts, Ascenion's employees are contributing continuously to the development of the technology transfer landscape. They are involved – often in a voluntary capacity – in trainings, establishing professional standards and the promotion of technology transfer at all levels: regional, national and international.

In 2018 Ascenion was active in over 18 initiatives and associations, such as:

- ASTP, A World of Knowledge Transfer
- Alliance of Technology Transfer Professionals (ATTP)
- Association of University Technology Managers® (AUTM)
- BayStartUP
- BioDeutschland
- BioFIT
- DECHEMA
- Forum MedTech Pharma
- Horizon 2020-Projects: ESOTRAC + UTILE
- IDEA Summit
- Innoderm
- Knowledge Transfer Ireland
- Licensing Executives Society (LES)
- Life Science Inkubator
- Life Science Nord
- TransferAllianz
- TTS Global Initiative
- Vienna Business Agency

Ascenion's Team

Achieving more together

Ascenion's team comprises over 30 members of staff at seven locations, with headquarters in Munich. We are interdisciplinary, international and industry experienced. Many of us have a biological sciences background and experience in start-ups, mid-sized companies or global concerns. We work hand in hand with our partners in science and industry to achieve tangible benefits for society.

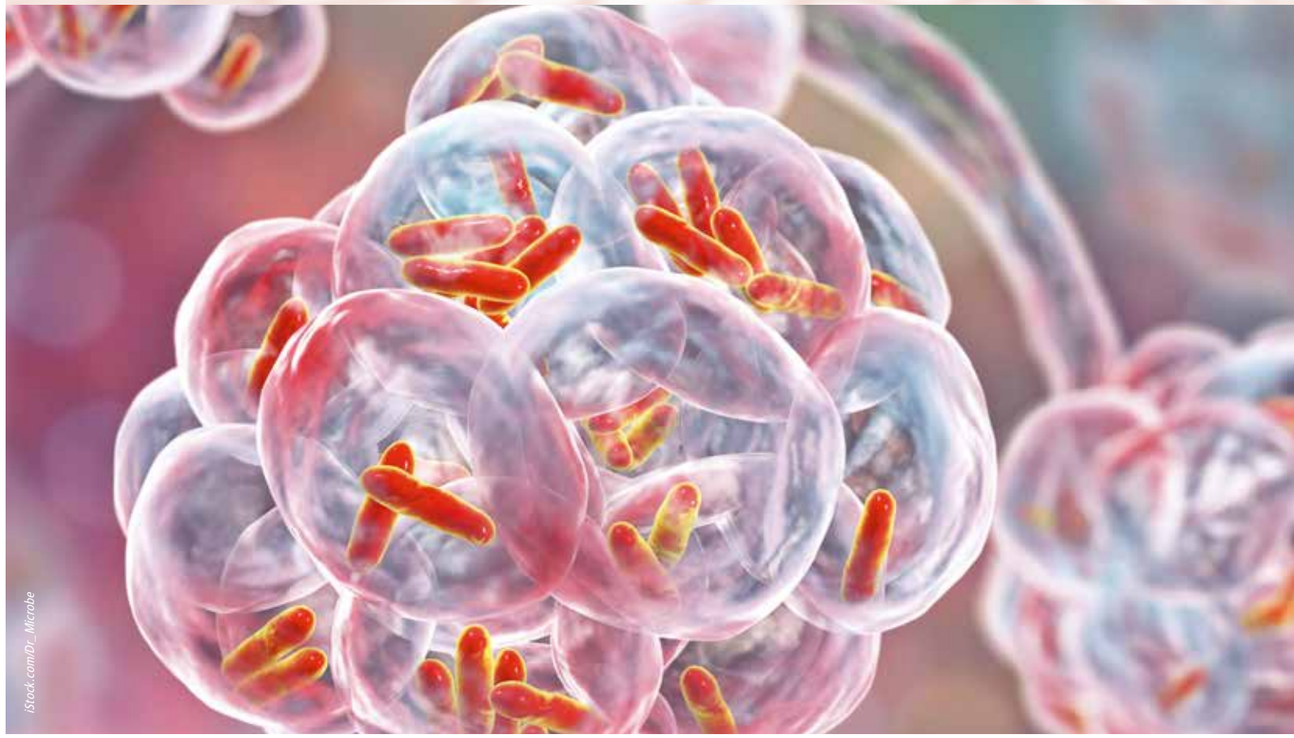
We are
» Technology managers and project developers
» Lawyers and expert negotiators
» Start-up coaches and equity managers

2018 Success Stories

Resistant tuberculosis strains

Teams of Dr Florian Kloß from the Leibniz Institute for Natural Product Research and Infection Biology – Hans Knöll Institute (HKI) and of Prof. Dr Michael Hölscher from the Ludwig-Maximilians-Universität (LMU) in Munich have achieved something extraordinary: they have developed a new antibiotic against tuberculosis from basic research to clinical testing solely with public funding. Phase I trials of their drug BTZ043 began in June 2018. In contrast to existing antibiotics, BTZ043 can also kill multiresistant tuberculosis strains. This gives new hope for the treatment of tuberculosis, which is still one of the top 10 causes of death worldwide. The proportion of resistant strains is increasing alarmingly worldwide.

The project is being financed by, among others, the InfectControl 2020 consortium and the German Center for Infection Research (DZIF). Two specialist companies have come on board as partners for production and clinical development. Ascenion has supported the team from the beginning in all relevant IP-related matters, and helped to give the partnerships a sound and sustainable contractual basis.



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2018 Success Stories

‘Killer’ cells against cancer

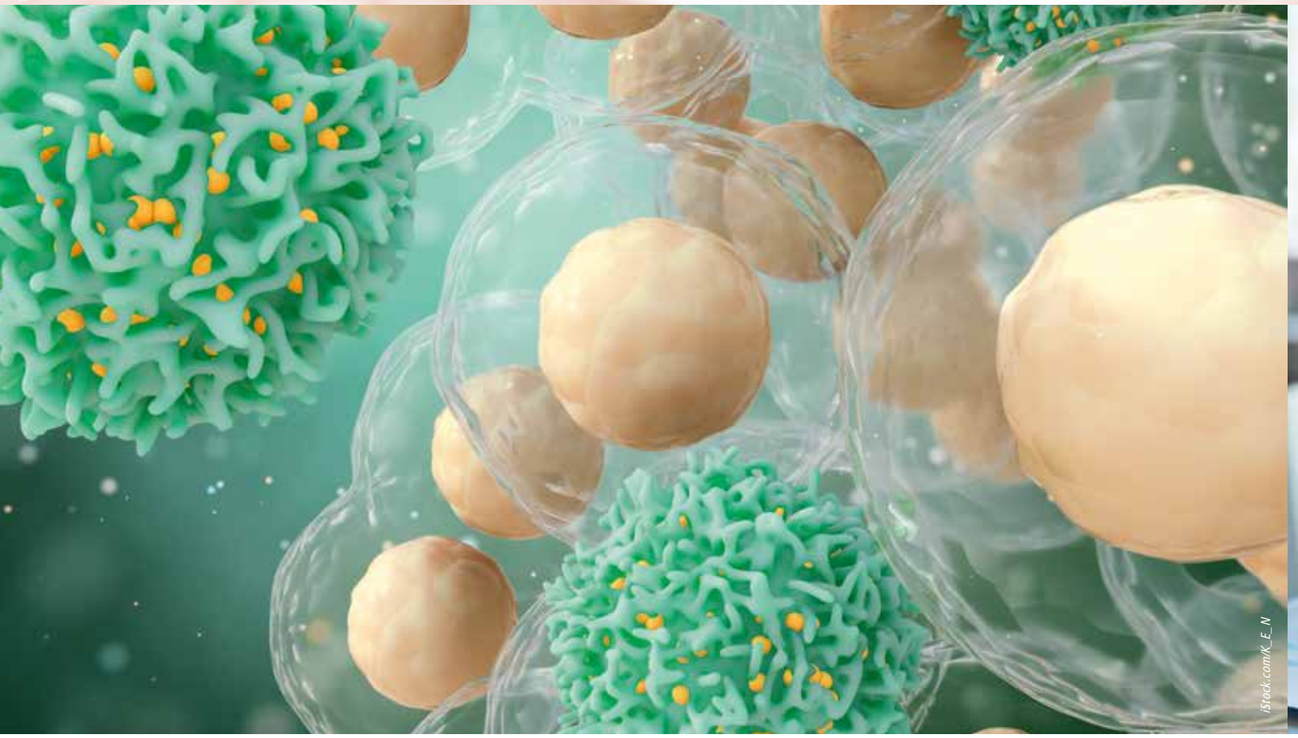
CAR T and CAR NK cell therapies are the current rays of hope for cancer treatment. The patient’s own T cells or NK cells – the immune system’s ‘killer’ cells – are furnished with cancer-specific receptors, allowing them to recognize and specifically destroy cancer cells. Scientists at the Max Delbrück Center for Molecular Medicine (MDC) in Berlin have developed a series of new receptors with highly specific binding properties for BCMA (B cell maturation antigen). This antigen is exclusively present on plasma cells, with increased amounts being expressed on malignant cells. Receptors for BCMA are therefore attractive components of cell therapies for multiple myeloma, a common bone marrow tumour resulting from the degeneration of plasma cells.

Ascenion has accompanied the scientists from the patent application stage onwards and helped negotiate an option agreement with the US company Fate Therapeutics. Fate has acquired an option to exclusively license the receptors for use with its own technology platforms, including the development of cell products for cancer therapies based on CAR T and CAR NK cells.

Successful acquisition

The agreements were signed in summer 2018. The world’s largest vaccine manufacturer, the Serum Institute of India Pvt. Ltd (SII), has acquired a majority stake in Vakzine Projekt Management GmbH (VPM) in an all-cash transaction. This secures the future of the company and its projects. VPM is a spin-off of the Helmholtz Centre for Infection Research (HZI). Its flagship programme, the tuberculosis vaccine VPM1002, has been jointly developed with SII over the past years, with Phase II clinical trials successfully completed. SII shares the vision of all those involved to make the vaccine available to people in every sector of society all over the world at fair price. SII also intends to continue other VMP activities with the existing team in Hanover for the foreseeable future.

As majority shareholder of VPM and the technology transfer partner of the Helmholtz Centre for Infection Research (HZI), Ascenion has supported the HZI start-up intensively for several years and coordinated the sales process. ‘We were extremely glad to have such an experienced negotiating partner at our side,’ says Silke Tannapfel, Administrative Director of the HZI. Together, it was possible to secure the best possible future for VPM and its projects, while feeding a fair share of the sale proceeds back into basic research.



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2018 Success Stories

Signal reversal: from ‘stop’ to ‘go’

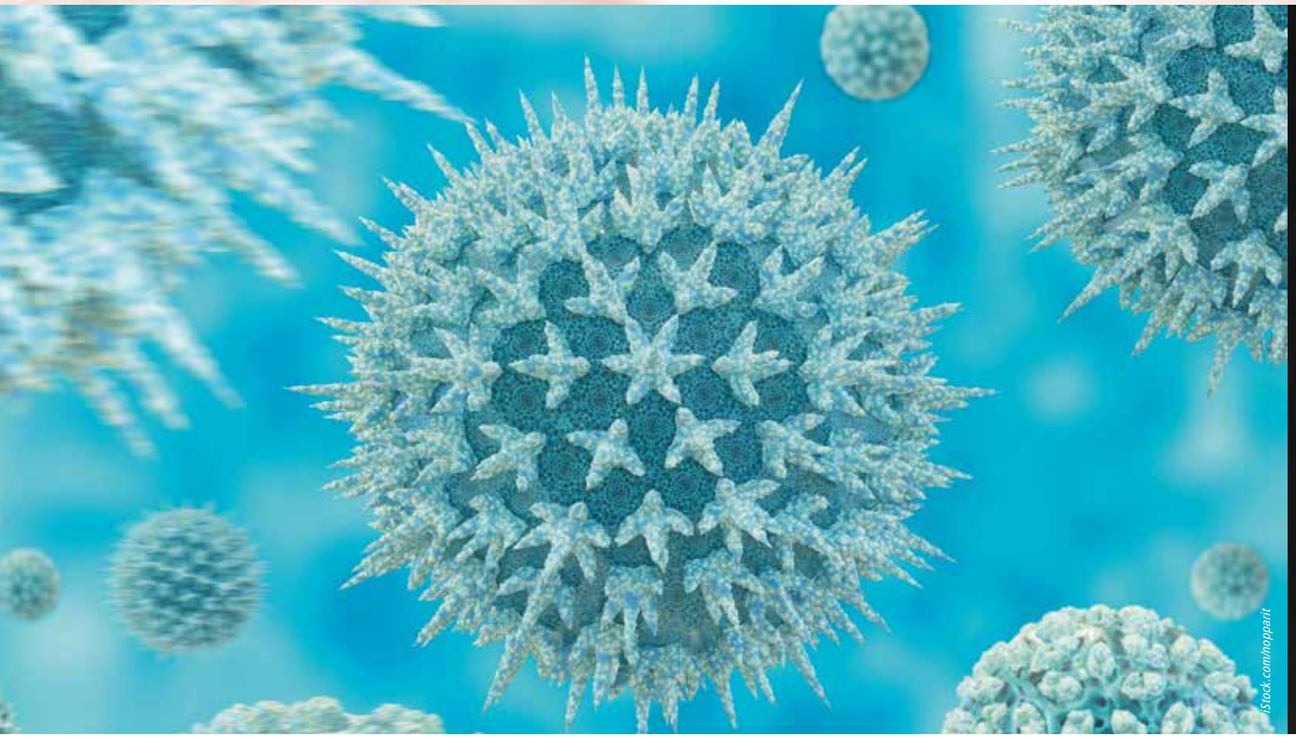
T cells are highly potent immune effector cells. Many immunotherapies therefore rely on harnessing them for the destruction of cancer cells. However, tumours often create a hostile microenvironment in order to fight off T cells. They emit checkpoint proteins (such as PD-L1), that diminish or block T-cell activity. Prof. Elfriede Nößner and her team from the Helmholtz Zentrum München have developed a fusion protein, PD-1/4-1BB, that can reverse this ‘stop’ command into a ‘go’ signal. Used as a co-stimulator, it could increase the effectiveness of diverse T-cell therapies.

At the end of 2018 Ascenion’s technology managers mediated the negotiation of a licensing agreement with Medigene. This gives the company exclusive rights to use PD-1/4-1BB as a co-stimulator in combination with T cell receptor therapies and dendritic cell-based vaccines. The concept is currently in preclinical testing.

Insatiable hunger

Never full – some people live with a feeling of extreme hunger from birth. The result is obesity, often from early childhood, caused in certain patients by defects in a central molecular signal pathway responsible for maintaining energy balance and triggering a feeling of satiety. Scientists have known for a long time that the melanocortin 4 receptor (MC4R), which is also expressed in the brain, plays a key role in this pathway. Previous attempts to activate this receptor in a targeted way to produce a feeling of fullness have failed however, above all due to critical side effects. This could now be a thing of the past. Scientists at the Charité, Berlin have obtained impressive results with a new peptide that activates MC4R. Young patients with genetic obesity lost a considerable amount of weight without significant adverse effects. The explanation: the peptide preferentially and selectively activates one of the MC4R downstream signal cascades that, up until now, had hardly been investigated. These findings offer new therapeutic and diagnostic opportunities, e.g. in identifying patients who could benefit from drug therapy.

Through the excellent cooperation between the research team led by Dr Peter Kühnen, Charité technology transfer and Ascenion, it was possible to patent these findings prior to publication. The IP potential was recognized during publication screening, allowing the findings to be developed into a patentable invention and IP protection to be secured before publication. This created a solid foundation for translation into medical application.



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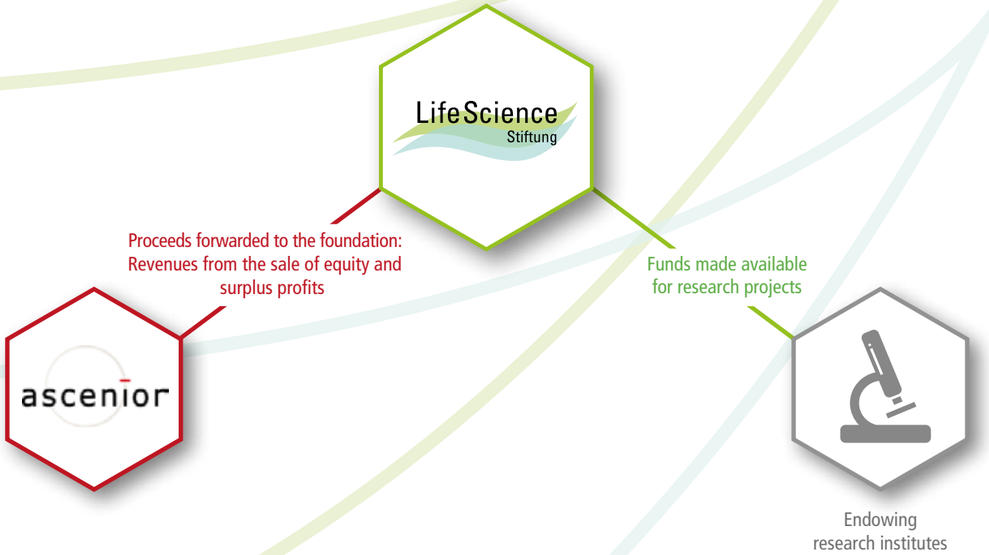
LifeScience Foundation

Advancement of science

The idea of integrating knowledge and technology transfer at academic institutions into a foundation model is unique in Germany. As a 100% subsidiary of the LifeScience Foundation for the Promotion of Science and Research, Ascenion distributes surpluses from its business operations and proceeds from equity transactions to the Foundation, which in turn makes them available to its endowing institutes in the form of research grants.

The AIRR study of pulmonary disease in premature infants being conducted at the Helmholtz Zentrum München is one example of a project to have received a Foundation grant in 2018.

EUR 0.9 m in grants provided by the Foundation for 2 projects in 2018
11 endowing research institutes in the Foundation as of 2018



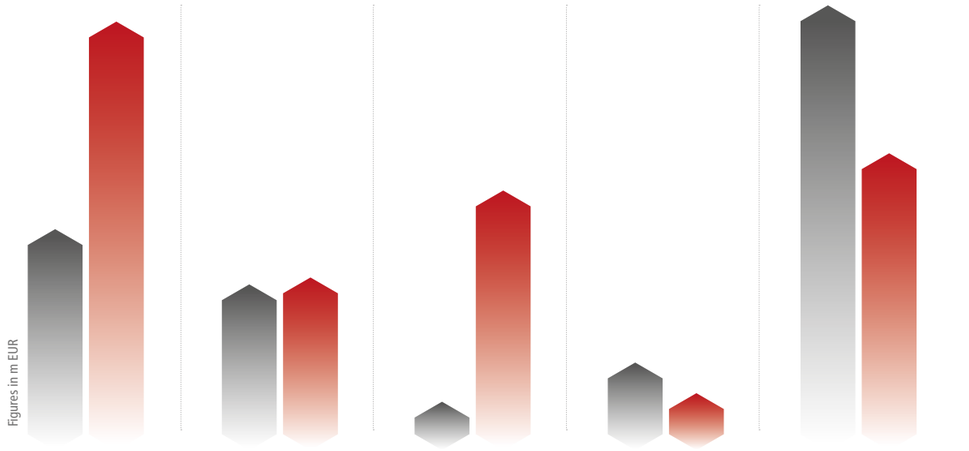
Pulmonary disease in premature infants

Premature babies weighing less than 1.5 kg at birth are particularly at risk of developing chronic pulmonary disease that persists for the rest of their lives. Little is known about the causal mechanisms, prompting Dr Anne Hilgendorff and her team from the Helmholtz Zentrum München and the Medical Center of the University of Munich to launch a study. Disease processes are being analysed on several levels: signal pathways, biomarkers, lung function and imaging. The results should suggest approaches to improve the early identification and treatment of affected premature babies.

The LifeScience Foundation has provided a grant of around EUR 285,000 toward the costs of staff, materials, etc.

Financial Results & Outlook

2017 / **2018**



Total turnover (incl. sales of equity)	Operating expenses (incl. all costs)	Proceeds from equity transactions (Sales of shares and equity)	Payouts* (to the LifeScience Foundation)	Income from commercialization (from agreements, passed on to Ascenion's partners)
4.010 **7.763**	3.204 **3.242**	0.480 **4.714**	1.600 **0.600**	8.050 **5.384**

*The payouts include surpluses from Ascenion's business operations and proceeds from equity transactions. Proceeds from equity transactions accrued in the second half of the year are not paid out until the following year, i.e. the payouts in 2019 will reflect the high proceeds from sale of equity in 2018.

A particularly exciting project for us in 2018 was the sale of Vakzine Projekt Management GmbH (VPM) to the Serum Institute of India Pvt. Ltd (SII). As majority shareholder, we led the negotiations in close consultation with our partners. The deal not only secures the futures of the VPM team and its projects, but also the future of the first new tuberculosis vaccine to emerge in the last 100 years. A glance at the annual figures also reveals that this and other equity transactions in 2018 have significantly contributed to the proceeds from knowledge and technology transfer.

We are convinced that this will become an established trend. Start-ups will continue to gain importance as vehicles of translation and as a source of revenue from technology transfer. The quality of start-up coaching and equity management will determine the extent to which the originating institutes share in the success of their spin-offs. For us, it means that we must continue to develop our resources and instruments in the start-up area. After the appointment of two new colleagues to posts in start-up and technology management in the first half on 2019, we are already well on our way.

Our heartfelt thanks go to all our partners, without whose help our successes to date would not have been possible – whether in start-ups, or in other areas of knowledge and technology transfer. We look forward to continuing these close cooperations!

Dr Christian A. Stein
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