

Technology transfer for academic research
A company of the LifeScience Foundation



ANNUAL REPORT

2017

Life Sciences into Business

Innovation. For the benefit of all.

Ascenion is an independent technology transfer company that supports more than 30 partners in Germany and Europe: research institutes, university hospitals and associated organizations.

Our focus is life sciences. We work closely with our partners to identify research results with great commercial potential, securing patent protection and developing them further. Our team's particular strengths are project development and start-up support. Together we have already launched numerous diagnostics and therapies that benefit millions of people.

In 2017 alone, a turnover of more than **EUR 1.85 billion** worldwide was achieved with products and services based on research results from Ascenion's partner institutes.

Around **325 people** were employed by companies in which Ascenion held equity in 2017.

At home in industry and academia

At the end of 2017 Ascenion had more than 30 employees. We are interdisciplinary, international and industry-experienced.

We are:

- technology managers and project developers
- lawyers and negotiation experts
- start-up coaches and equity managers



2017: Specialist expertise for successful transfer



2017 was an exciting, cross-border year for Ascenion. We gained our first Austrian partner institute – the Medical University Innsbruck. And from the beginning of 2017, together with knowledge and technology transfer organizations from the UK, Norway and Sweden, we have also been supporting the evaluation and utilization of research results as part of the European Horizon 2020 programme.

Here in Germany, many start-up projects accompanied by us over the years have reached significant milestones, not least the Hannover Medical School start-up, Cardior Pharmaceuticals, which closed a financing round of EUR 15 million. We have contributed around one man-year's worth of development work to the realization of this start-up project, which was jointly financed by the German Federal Ministry of Education and Research as part of the Spinnovator Programme.

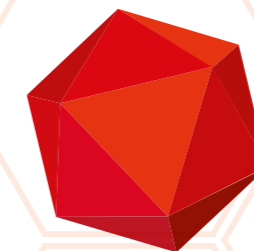
Further start-up successes in 2017 include:

- 2 financings
- 2 new start-up participations
- 2 new clinical trials commenced

A clear trend is emerging across all regions, partners and projects: Ascenion is increasingly sought after and appreciated for its specialist expertise, for example in the marketing of international joint inventions, in the realization of complex deals, or for its support of start-ups. Knowledge and technology transfer becomes more productive when institutes are able to complement their own expertise with competencies such as these. This is confirmed by the 2017 results in our consultancy segment.

We will continue with our goal of realizing cooperation models that enable the sustainable transfer of research results for the benefit of society. Our thanks go to all our partners in research, industry and venture capital who support us in this work. We look forward to our continued cooperation!

Dr Christian Stein
CEO, Ascenion



Ascenion's Partners

Science

Ascenion supported technology transfer at 36 publicly funded research institutes and university hospitals in 2017. 30 of these are long-term partners including 10 endowing institutes of the LifeScience Foundation for the Promotion of Science and Research. A further 6 are institutes that Ascenion has worked with on specific projects.

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

- 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

- IFW, Leibniz Institute for Solid State and Materials Research Dresden
- IPF, Leibniz Institute for Polymer Research Dresden
- IPK, Leibniz Institute of Plant Genetics and Crop Plant Research
- LIKAT, Leibniz Institute for Catalysis
- LIN, Leibniz Institute for Neurobiology
- ZMT, Leibniz Centre for Tropical Marine Research

Universities, university hospitals and others

- Charité - Universitätsmedizin Berlin*
- MHH, Hannover Medical School*
- MUI, Medical University of Innsbruck
- BTO, Bergen Teknologioverføring (Norway)
- EKFS, Else Kröner-Fresenius Foundation
- iba, Institute for Bioprocessing and Analytical Measurement Techniques
- IMB, Institute of Molecular Biology
- 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

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.

In 2017, Ascenion managed around **490 active contracts** with industry partners.

Global concerns

Regional innovation leaders

Medium-sized companies Incubators

Pharmaceuticals Food **Start-ups**

Environmental technology IT Diagnostics

Big Data

Medical technology Banks **Agricultural technology**

Venture capitalists **CROs** **Investment funds**

Biotechnology Family Offices

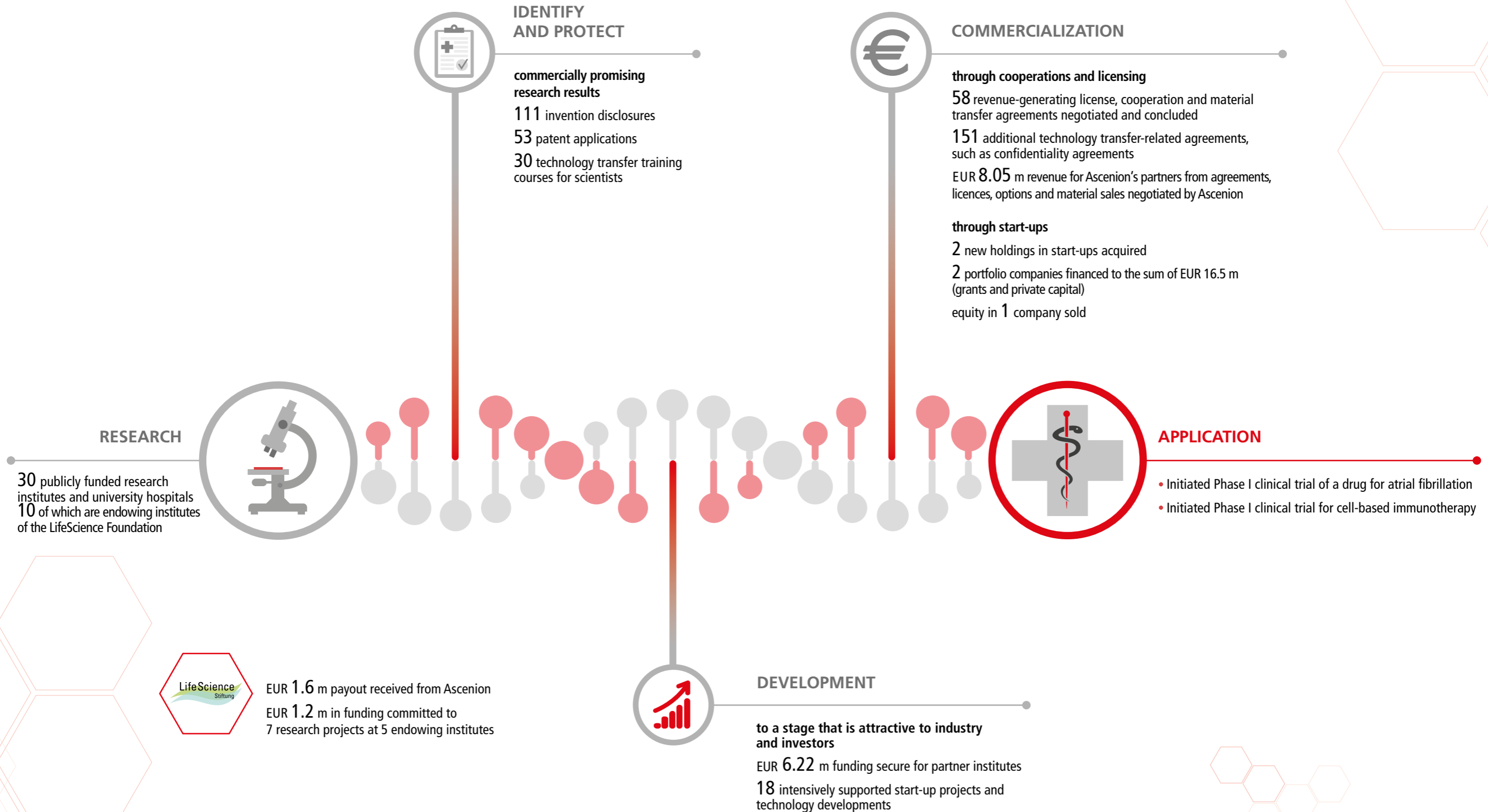
Knowledge and technology transfer

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 2017 Ascenion was active in over 17 initiatives and associations, such as:

- ASTP-Proton
- 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
- TechnologieAllianz
- Wirtschaftsagentur Wien

2017 in figures





'Just' back pain – or inflammatory autoimmune disease?

Everyone has back pain at some point or other. Between 20 and 30% of Europeans have chronic back pain, and in 5% of these cases the cause is inflammatory rheumatic disease, or spondyloarthritis (SpA). The immune system attacks cartilage and bone tissue, which is not only extremely painful, but can also cause significant damage to the spine and joints in the long term. Diagnosing the disease as early as possible is the best way to prevent or at least delay this damage. At present, however, early diagnosis is rarely achieved. Until changes in the spine can be detected by radiological means, the only way to diagnose the conditions is through the overall analysis of several, in themselves unspecific, clinical findings. The most helpful type of examination here is magnetic resonance tomography (MRT), which

is too expensive for widespread use. Prof. Torsten Witte and his team in the Department of Clinical Immunology and Rheumatology at the Hannover Medical School have therefore been looking for a marker of SpA that can be detected simply and cheaply. With success. They have identified antibodies to CD74 as relevant and specific markers, and validated their findings in a clinical trial.

On the basis of this research, a licensing partner, AESKU.DIAGNOSTICS, has developed a CE-certified ELISA kit. In combination with existing tests, the kit enables SpA patients to be identified and treated at an early stage for the first time – without costly MRT examinations.

Identify and protect





Every innovation begins ...

... with scientists. Their brilliant ideas are the basis for applications that change all our lives. This is why we invest in personal contacts and give ourselves time to fully understand their projects. To this end, we work closely with our technology transfer colleagues at the respective institutes. Together we identify promising projects as soon as possible, assess their potential and develop a suitable patenting and commercialization strategy.




111 invention disclosures assessed for our partner institutes in 2017.

53 new patent applications managed in 2017.

We currently manage a portfolio of around 700 patent families and commercially attractive materials for our partners:

- 350 patent families**
-  Potential therapeutics
 -  Potential diagnostics
 -  Platform technologies
 -  Other



- 350 materials**
-  Antibodies
 -  Vectors
 -  Animal models

Healing heart tissue - preventing heart failure

Around 400,000 people in Germany suffer a heart attack each year. In a fifth of those affected, this leads to a complex process of restructuring in the heart. In an attempt to compensate for the damage, heart muscle cells grow and enlarge. The heart's volume increases, but the force with which it pumps decreases. This pathological process can eventually lead to heart failure.

In a seminal study, Prof. Thomas Thum and his team at the Hannover Medical School (MHH) have demonstrated that microRNAs – short, non-coding RNA strands – play a significant role in this process. *In-vivo* studies have shown that when certain microRNAs are inactivated using complementary oligonucleotides, the restructuring process can not only be stopped, but actually reversed. The heart

returns to its normal size and regains its usual pumping efficiency. This could represent a breakthrough for thousands of patients.

Ascenion recognized the potential of this research at an early stage, and worked intensively with Prof. Thum and his entrepreneurial team to launch the spin-off Cardior Pharmaceuticals from the MHH. Approximately one man-year of development work – co-financed by the German Federal Ministry of Education and Research as part of the Spinnovator Programme – formed a significant contribution to the foundation in 2016. Further external consultation led to the closure of a EUR 15 million financing round in May 2017, representing a key milestone in the research company's operational implementation.

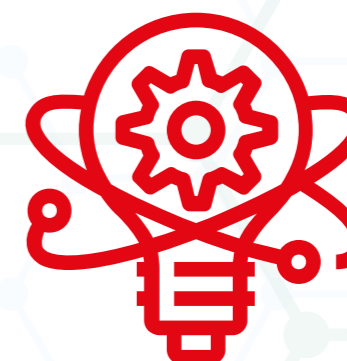
Development

The success of innovation ...

... grows with the developmental progress of academic projects. If a new therapeutic or diagnostic approach has not been properly validated, there is little chance of attracting an industry partner. We are familiar with industry evaluation and development mechanisms, and use our know-how to advance early academic projects step-by-step in a targeted way. The role that we take in this process varies from project to project. We are a sparring partner, project manager or co-architect of innovative development structures. In addition, we support the acquisition of the required financing and funding.



6.22 m EUR in funding for translational development was secured by our partners with our help in 2017.



EU Projects

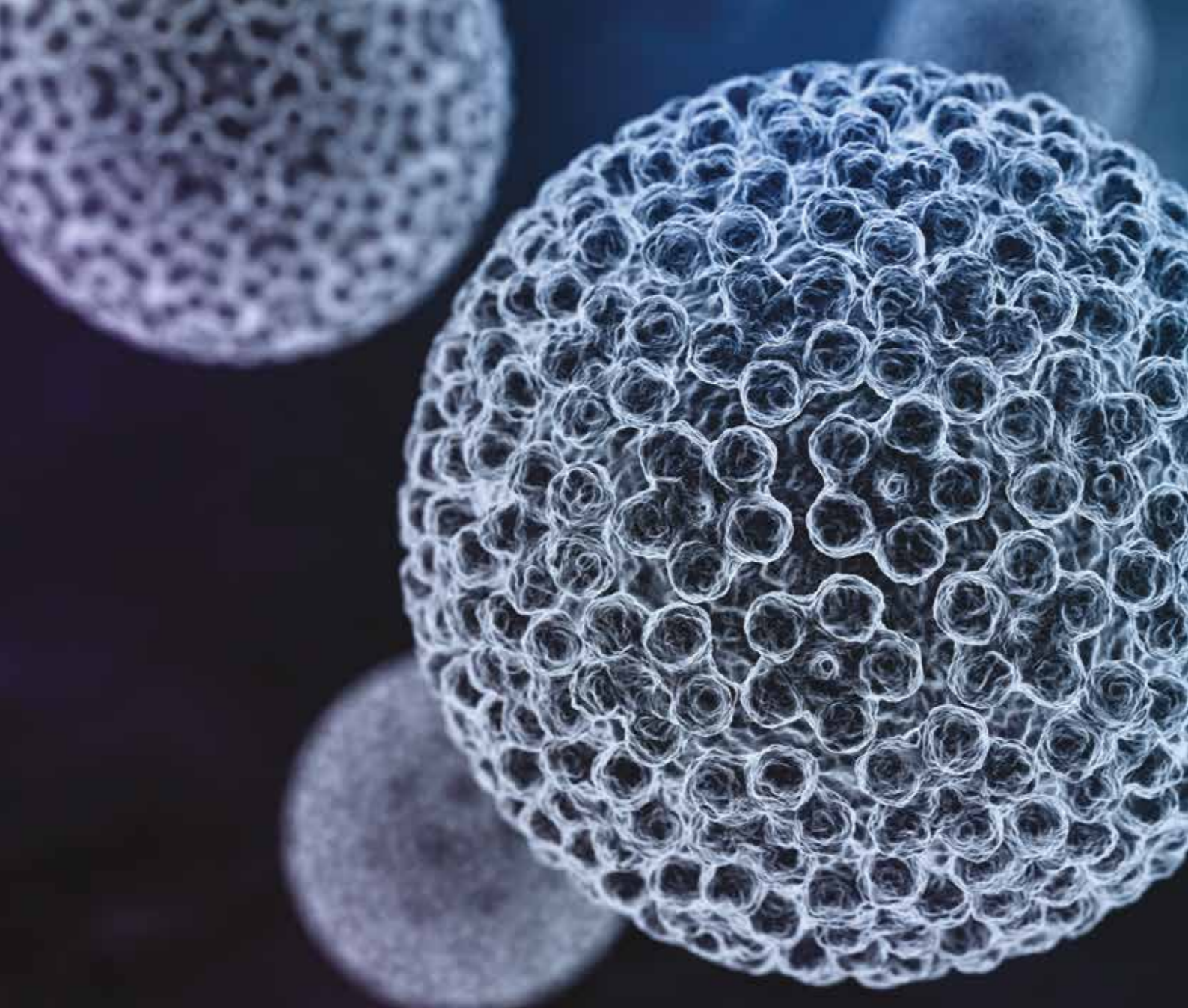
In 2017 Ascenion also supported the transfer of EU-financed research projects, for example as a consortium partner on projects in the European research and innovation programme, Horizon 2020. Two such cooperations started at the beginning of 2017:

UTILE

11 partners are working together on UTILE to support the commercialization of EU-financed research projects, for example through an online marketplace. Together with three other knowledge and technology transfer (KTT) organizations, Ascenion is evaluating the research projects' commercial potential. The other KTT partners working alongside Ascenion are Bergen Teknologioverføring (Norway), Karolinska Institutet (Sweden) and LifeArc (UK).

ESOTRAC

9 partners, led by the Helmholtz Zentrum München, are developing a hybrid endoscope for more rapid and easier diagnosis of oesophageal cancer. Ascenion is responsible for the work package concerning the distribution, utilization and communication of research results.



Commercialization I: cooperations and licensing

The right partner for innovation ...

... is one who shares our research partners' goals and possesses the resources and experience required to achieve them. We use our network to find the best partner for every project and objective. This could be a pharmaceutical group or a regional specialist. In each case, we negotiate agreements, facilitate the progress of the project, increase the chances of application and compensate inventors and institutes fairly in line with market terms. Above all, Ascenion is there to help when things get complicated, e.g. when international inventor consortia are involved, or creative deal structures are required.

Revenues from cooperation, licensing and material transfer agreements go directly to our partner institutes and the inventors involved. Ascenion receives a commission.

58 revenue-generating agreements were negotiated on behalf of our partners in 2017, many of which we initiated, together with a further **151** contracts, e.g. confidentiality agreements.

8.05 m EUR earned by our partner institutes in 2017 from cooperation, licensing and material transfer agreements negotiated by us.

Boost for viral gene transfer

The vision of introducing genes into human cells to heal life-threatening diseases is more than 50 years old. Today, the first gene therapies are approved. Transduction – the successful transfer of genes into the target cells via viral shuttle-systems – remains, however, a critical bottle-neck. Frequently only a small proportion of the desired cells are reached, particularly in the case of immune or stem cells, which do not divide and are therefore particularly difficult to transfect. But it is exactly this type of cell that is of the greatest therapeutic importance.

LentiBOOST™, an adjuvant jointly developed by the Helmholtz Zentrum München and SIRION Biotech, addresses exactly this

problem. It can increase the efficiency with which lentiviral vectors introduce gene material into human cells from the approx. 30% currently achieved to up to 90% – even in resting cells. A US licensing partner is currently investigating the adjuvant in a gene therapy study.

With the approval of the study by the regulatory authority FDA, an initial milestone payment to SIRION Biotech became due, from which the Helmholtz Zentrum München also profits. Ascenion has been working with the SIRION–Helmholtz team for some time already, and has structured appropriate cooperation and licensing agreements between the partners and the licensees.





iStock.com/BraunS

Live images in the operating theatre

The art of a successful breast cancer operation lies in being able to remove as much cancerous tissue as possible and avoid the formation of metastases. Unfortunately, this is not achieved in approximately 40% of cases, increasing the risk of relapse for patients and possibly necessitating a second operation.

In order to make primary operations more successful, scientists at the Helmholtz Zentrum München have developed an innovative imaging technology. During the operation, the surgeon is provided with live images of the previously fluorescence-labelled tumour tissue, so that it can be exactly localized and precisely removed. The technology has been advanced to first clinical trials by SurgVision,

a start-up from the Helmholtz Zentrum. Ascenion supported the founding of the company in 2013, and negotiated the licence for the required technology. In 2017, the start-up was acquired by Bracco Imaging, a specialist in the field of diagnostic imaging. Bracco will continue the development of this technology and undertake further clinical validation, in order to market the technology as a medical product. Bracco is active in over 100 countries worldwide, and therefore an ideal partner for making the technology available to surgeons and patients. Ascenion's revenues from the sale of its equity in SurgVision have been distributed to the LifeScience Foundation for the Promotion of Science and Research.

Commercialization II: start-ups and equity

To develop innovations ...

... you need scientists with entrepreneurial spirit. We can support you with the experience gained from more than 100 start-up projects we have accompanied so far. We often work closely with partners in the run up to launching a start-up, helping with project development, financial and business planning, even with putting together the team. We also offer access to our network, bringing entrepreneurs in touch with the right contacts: investors, industry representatives, hospitals and regulatory experts, e.g. at the Biotech NetWorkshop or at BioVaria's 'Startup Pitch & Partner' programme.

When a start-up is launched, Ascenion usually acquires a minority holding in the company and often takes a seat on the Board. We use our experience to support our portfolio companies on their growth trajectory and to manage our shares as profitably as possible up to exit, or, in the case of floatation or takeovers by listed companies, beyond. We distribute most of our revenues from the sale of equity and shares to the LifeScience Foundation.



- 2 new equity holdings.
- 0.48 m EUR in revenue through sale of shares and equity, mostly distributed to the LifeScience Foundation.
- 23 active equity holdings.
- 16.5 m EUR in financing acquired by 2 portfolio companies (grants and private capital).
- 2 Phase I trials started by 2 portfolio companies.
- 30 entrepreneurs and scientists looking to start a business, speakers from 7 European countries, 10 leading venture capitalists in the life-science sector, 9 presentations on key issues and trends in (pre-)clinical development at the 11th Biotech NetWorkshop.



Breakdown in bacterial communication

Pseudomonas aeruginosa is a much-feared hospital germ. It can cause dangerous infections, is extremely resilient, and has acquired multiple resistance as a result of its extensive presence in the hospital environment, so that available antibiotics are frequently ineffective against it. Researchers at the Helmholtz Institute for Pharmaceutical Research Saarland, a subsidiary institute of the Helmholtz Centre for Infection Research (HZI), are therefore developing a drug that fights this bacterium in an unusual way. By blocking the quorum sensing system, the drug interferes with bacterial communication. The bacteria are not destroyed, but rather prevented from forming protective biofilms

and producing virulence factors, thus losing their ability to cause disease. In contrast to classical antibiotics, there is no danger of resistance developing, because the new drug does not interfere with any vital bacterial processes.

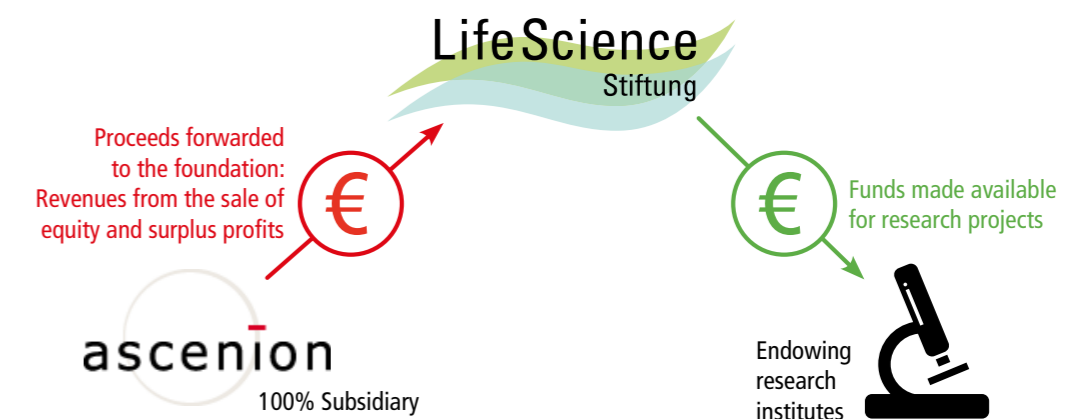
In 2017, the project received a grant of around EUR 390,000 from the LifeScience Foundation. This enabled the financing of key services required in the run-up to preclinical development and was a prerequisite for raising further urgently needed funding.

LifeScience Foundation

The foundation for innovation ...

... is the LifeScience Foundation for the Promotion of Science and Research. It is Ascenion's sole shareholder. As a non-profit organization, it promotes research projects for the benefit of society at its endowing institutes. The necessary funds mostly come from Ascenion's revenues.

Since 2001, Ascenion has distributed a total of EUR 12.1 million to the foundation. This foundation model is unique in Germany. Via Ascenion, it offers all life-science-oriented research institutes specific and professional technology transfer support, including support for spin-offs. In addition, institutes that choose to endow the foundation can maximize their revenues from technology transfer and play a part in the development of the foundation and its subsidiary Ascenion.



- 11** endowing institutes in total in 2017: institutes of the Helmholtz association, the Leibniz association, Hannover Medical School and the Charité.
- 1.2** m EUR in funding provided by the Foundation in 2017 for research at endowing institutes.
- 7** projects at 5 research institutes were supported in this way.

BioVaria

The European platform for innovation ...

... is BioVaria. Where innovative minds from science, technology transfer and business come together to present, discover and develop promising academic research projects.

BioVaria marked its 10th birthday by becoming a two-day event, with an extended programme especially for start-ups.

Life-science technologies

- 53 innovative projects from 50 European research institutes and universities
- Neurology, oncology, infection, gene therapy and diagnostics
- Representatives from 25 biotech and pharma companies from all over the world

Life-science trends

- Keynote on digital health
- Bart de Witte, Director Digital Health DACH at IBM and Prof. Dr med. Dr phil. Torsten Haferlach, MLL Münchner Leukämielabor GmbH

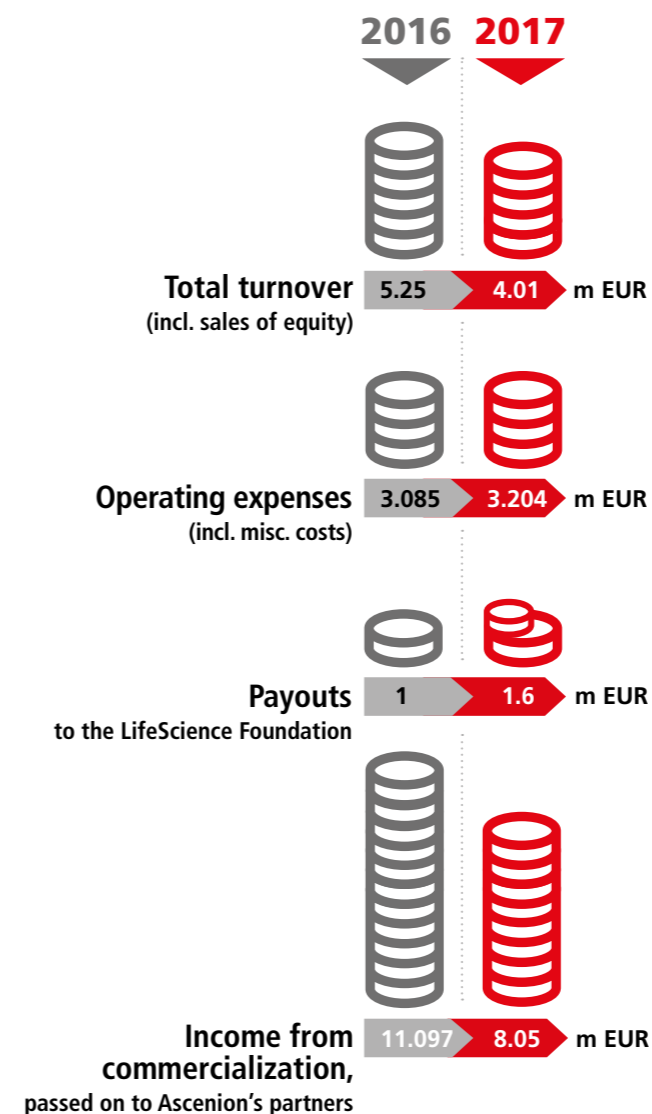
Life-science start-ups

- 10 selected start-ups from 3 European countries
- Representatives from 32 leading venture capital funds
- BioVaria Start-up Awards for Captain T Cell, a start-up from the Helmholtz Association's Max Delbrück Center for Molecular Medicine (MDC), and Provirex, a spin-off project at the Heinrich Pette Institute for Experimental Virology and Immunology (HPI)

Financial results in 2016 and 2017

Ascenion's revenues are made up of consultancy fees, performance-related bonuses and proceeds from equity transactions. Ascenion distributes most of any surplus to the LifeScience Foundation.

The overall decline in licensing revenues for Ascenion's partners in 2017 compared to 2016 is due to the fact that key licenses expired during 2017. This fall in turnover could be partly compensated by successful company exits and income generated by new business including EU-projects and additional consulting services, so that a surplus could once again be distributed to the LifeScience Foundation in 2017.



Ascenion's structure

The LifeScience Foundation is Ascenion's sole shareholder.

The endowing institutes are represented by seven board members or managing directors on the Foundation Board, but have no connection to the Foundation under corporate law. They elect the Chairmen who oversee Ascenion's business activities. Important business decisions are made by Ascenion's CEO and the Foundation's Chairmen, Dr Ronald Mertz and Nicolaus Steenken.

Ascenion is economically independent. An Advisory Board advises the company on strategic and technical issues. The Board Members are: Dr Manfred Baier (prev. Roche), Dr Timm-H. Jessen (Topas Therapeutics GmbH) and Dr Joachim Rothe (Life Sciences Partners).

Imprint:

This report is published annually by Ascenion:

Ascenion GmbH, Herzogstrasse 64, 80803 München, GERMANY

Represented by: Dr Christian A. Stein (CEO)

Register Court: Amtsgericht München HRB 118236

VAT Identification Number: DE 812299325



Berlin

Brunswick

Hamburg

Hanover

Munich

Neuherberg

Ascenion GmbH
Herzogstrasse 64
80803 München
GERMANY

T + 49 (0) 89 318814-0
F + 49 (0) 89 318814-20

info@ascenion.de
www.ascenion.de