

# Report on research collaborations and investments in Germany

Country report on Danish-German relations in NNF grants and NH investments

# Executive summary



The Novo Nordisk Foundation (NNF) has awarded a total of €10.7 mio. to five projects involving German and Danish applicants.



Between 2016 and 2020, the NNF grant recipients collaborated with 86 German companies. 40% are in the biotechnology sector and 41% of the companies have less than 50 employees.

**10/10**

The NNF Grant recipients collaborate with all ten universities in the top 10 for Germany



Ultimo 2020, Novo Holdings holds investments in 3 companies based in Germany - seed investment and two Principal investments. One company is public listed.

**37%**

NNF grant recipients have co-authored 1355 publications with researchers located in Germany. 33% of these are among the top 10% most cited in their field.



Since 2016, Novo Holdings has funded an average of 1 German company each year as part of its portfolio.

**57**



Since 2016, 57 young German researchers have been awarded a grant to attend the Copenhagen Bioscience Conferences.

# Introduction

The Novo Nordisk Foundation is an independent Danish foundation with corporate interests.

The Foundation has two objectives:

- to provide a stable basis for the commercial and research activities of the companies in the Novo Group (Novo Holdings A/S, Novo Nordisk A/S and Novozymes A/S); and
- to support scientific, humanitarian and social causes.

Since 2015, the Foundation has donated € 3.3 billion to science and society.

The Novo Nordisk Foundation is listed as the wealthiest charitable foundation among the 42 largest [charitable foundations Worldwide](#).

This report is presented in two parts;

- Activities that Novo Nordisk Foundation (NNF) grant recipients have with institutions or organisations in Germany.
- An overview of Novo Holdings' investments in Germany.

This report showcases NNF's contribution to the German academic community and industry.

Through figures and case studies, it demonstrates the different kinds of relationships and activities between NNF grant recipients and German academic and industry partners. Data in the presentation are based on activities between 2016 and 2020 (inclusive).

## Our vision

The Novo Nordisk Foundation's *vision* is to contribute significantly to research and development that improves the lives of people and the sustainability of society.

## Our mission

- › To enable Novo Nordisk A/S and Novozymes A/S to create world-class business results and contribute to growth
- › To develop knowledge-based environments in which innovative and talented people can carry out research of the highest quality and translate discoveries into new treatments and solutions
- › To inspire and enable children and young people to learn

# The history of the Novo Nordisk Foundation



The Novo Nordisk Foundation dates back to 1922, when Nobel laureate August Krogh returned home from the United States and Canada with permission to produce insulin in the Nordic countries. This marked the beginning of the development of world-class diabetes medicine in Denmark and the establishment of several foundations that, many years later, merged into today's Novo Nordisk Foundation.

1952 – the **Novo Foundation** was established as the owner of the Novo Terapeutisk Laboratorium

**1989** – the **Novo Nordisk Foundation** was established as part of the merger between the two firms Novo Terapeutisk Laboratorium and Nordisk insulinlaboratorium in to Novo Nordisk A/S

In 2020 the **Novo Nordisk Foundation** awarded 756 grants with a total amount of €745 million.

For more information please see the [2020 Annual Grant Report](#)

1922 – the **Nordisk Insulin Foundation** was established as the owner of the Nordisk Insulinlaboratorium. The founders agreed that the profit from the sale of diabetes medicine should be used for scientific and humanitarian purposes.

# An independent Danish foundation with corporate interests

## novo nordisk fonden

### Grants

Grants awarded in 2020:  
€ 745 million  
(DKK 5.54 billion)

- Biomedical and health science research and applications
- Patient-centred and research based care
- Life science research and industrial applications promoting sustainability
- Natural and technical science research and interdisciplinarity
- Innovation
- Education & outreach
- Social, Humanitarian and Development aid

Dividends

100% SHARES

## novo holdings

Investors in life science

Dividends

28.1% SHARES\*  
76.1% VOTES



25.5% SHARES\*  
72.0% VOTES



### Investments

Investment result in 2020:  
€ 3.9 billion  
(DKK 29.0 billion)

- Principal investments
- Growth equity
- Venture investments
- Seed investments
- Financial investments

\*) Through Novo Holdings, the Foundation has A-shares in Novo Nordisk and Novozymes. A-shares have 10 times voting power per share

# Case stories

## A university collaboration

A collaboration between **Heinrich Heine University Düsseldorf** and **University of Copenhagen** is studying whether benefits of physical activity outweighs the risks. It is a study combining data on physical activity, air pollution, and cardiovascular disease. The research is possible only in Denmark, with the data possibilities available from registries, while the German collaborator is an expert in the field of air pollution and cardiovascular disease.

## A hospital collaboration

A collaboration between **University Hospital of Münster** and **Aarhus University Hospital** is identifying mutations in the gene SLC4A3 in Danish and German patients with short Q-T syndrome, a rare genetic type of abnormal heart rhythm. So far, 5 new mutations have been discovered, and research is ongoing to understand the physiological significance of the mutations by using both clinical data from the patients and experimentally using animal models in the laboratories.

Source: Novo Nordisk Foundation (2019) based on ResearchFish® reporting



# German academic and industry collaborations involving NNF grant recipients 2016-2020

# 5 projects funded by NNF include Danish and German researchers as co-applicants

The Novo Nordisk Foundation has in the last five years (2016-2020) funded **5** projects that have had **5** co-applicants from Germany. Co-applicants are members of the international group applying for an NNF grant. The total funding allocated to these projects is € **10.718.794**. All 5 projects were awarded in open competition.

- **University of Copenhagen and German - Federal Institute of Material Research** has received funding for an interdisciplinary project on nanosensor technology and cell biology – NNF Funding € 0.7 million
- **University of Copenhagen and RWTH Aachen University** has received funding for a project within Plant Science – NNF Funding € 8.06 million
- **University of Copenhagen** has received funding for a Data Science Collaborative Research Programme with **Bielefeld University** – Total NNF Funding € 2.00 million



Since 2016, **57** young German researchers have been awarded a grant to attend the Copenhagen Bioscience Conferences.

*“An opportunity that facilitate high level training for PhD students and postdocs”*

*NNF applicant, 2015*

# NNF Grant recipients' project collaborations with German partners

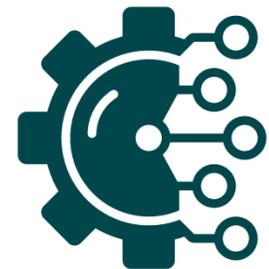
Between 2016 & 2020...



The Foundation's grant recipients have collaborated with many international project partners on projects, including **346** collaborations between Danish and German partners.



**249** of those partners are universities, university hospitals and non-profit research institutes.



**77** German companies co-authored at least one scientific article with grant recipients from the Novo Nordisk Foundation.

# 10 out of 10 top universities collaborate with NNF grantees

## Top ranked universities in Germany

1	Technical University of Munich
2	Ruprecht Karl University of Heidelberg
3	Ludwig Maximilian University of Munich
4	RWTH Aachen University
5	University of Hamburg
6	Friedrich-Alexander-University Erlangen-Nürnberg
7	Karlsruhe Institute of Technology
8	Free University of Berlin
9	Eberhard Karls University of Tübingen
10	Technical University of Dresden

Source: Novo Nordisk Foundation, CWTS Leiden Ranking 2019



# Publication collaborations between NNF grant recipients and German partners



Between 2016 and 2020, NNF grant recipients have co-authored **1355** publications with researchers located in Germany.



The highest number of German partners come from Helmholtz Zentrum München, German Research Center for Environmental Health (154 publications) followed by the Ludwig-Maximilian-University München (108 publications) and German Center for Diabetes Research (100 publications).

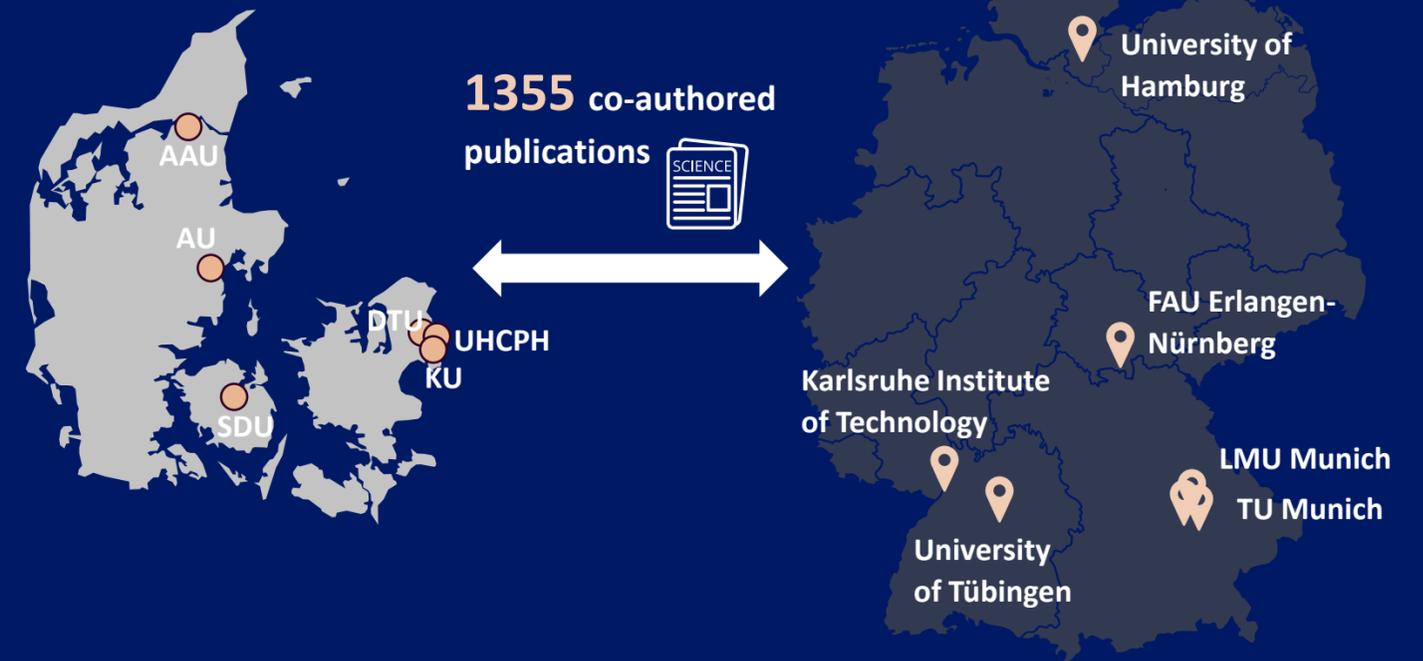


**67%** of the co-authored publications are within the three research areas *Immunology and Medicine* and *Biochemistry, Genetics & Molecular Biology*.



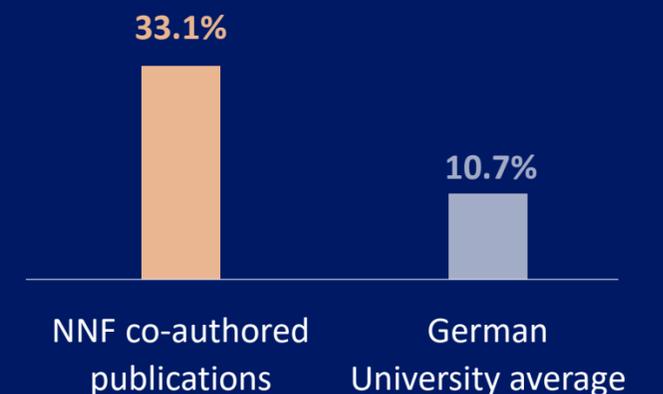
**33.1%** of the co-authored publications are within the top 10% most cited publication in their research field. The national average among the top German universities is 10.7%.

# Selected links between Germany and Denmark



## NNF grants contribute to research excellence

Share of co-authored publications among the top 10% most cited worldwide in the same research field and year



# Examples of collaborations between NNF grant recipients and German partners



## A database publication

*Danish and German researchers have collaborated and continue collaboration on building and maintaining the STRING database. STRING is a powerful database that aims to collect and integrate protein information, by consolidating known and predicted protein–protein association data for a large number of organisms.*

*Reporting in Researchfish, 2019*

## A Nature publication

*Danish and German researchers have collaborated on a paper published in Nature. They discovered how the most common antidiabetic medicine Metformin changes the gut microbiota, and how this can explain both some of the drug's therapeutic but also adverse effects.*

*Reporting in Researchfish, 2019*

## A Nature Genetics publication

*A collaboration involving amongst others Danish and German researchers have resulted in the first ever genetic risk sites for ADHD based on genome-wide research on a cohort of more than 50,000 people.*

*Reporting in Researchfish, 2019*

Source: Novo Nordisk Foundation (2019) based on ResearchFish® reporting

# Researchers receiving grants from the Novo Nordisk Foundation collaborate with German companies

**86** companies located in Germany collaborate with the NNF grant recipients either on formalised research projects (9) or by co-authoring scientific publications (77)

**52%** of companies have less than 250 employees, and 35 have less than 50 employees.

**34** companies are in the biotechnology sector.

**11** are categorised as pharmaceutical companies.

**20** are either in the Medical Device sector, Computer Science, Consultancy or Hospital & Health Care sector.

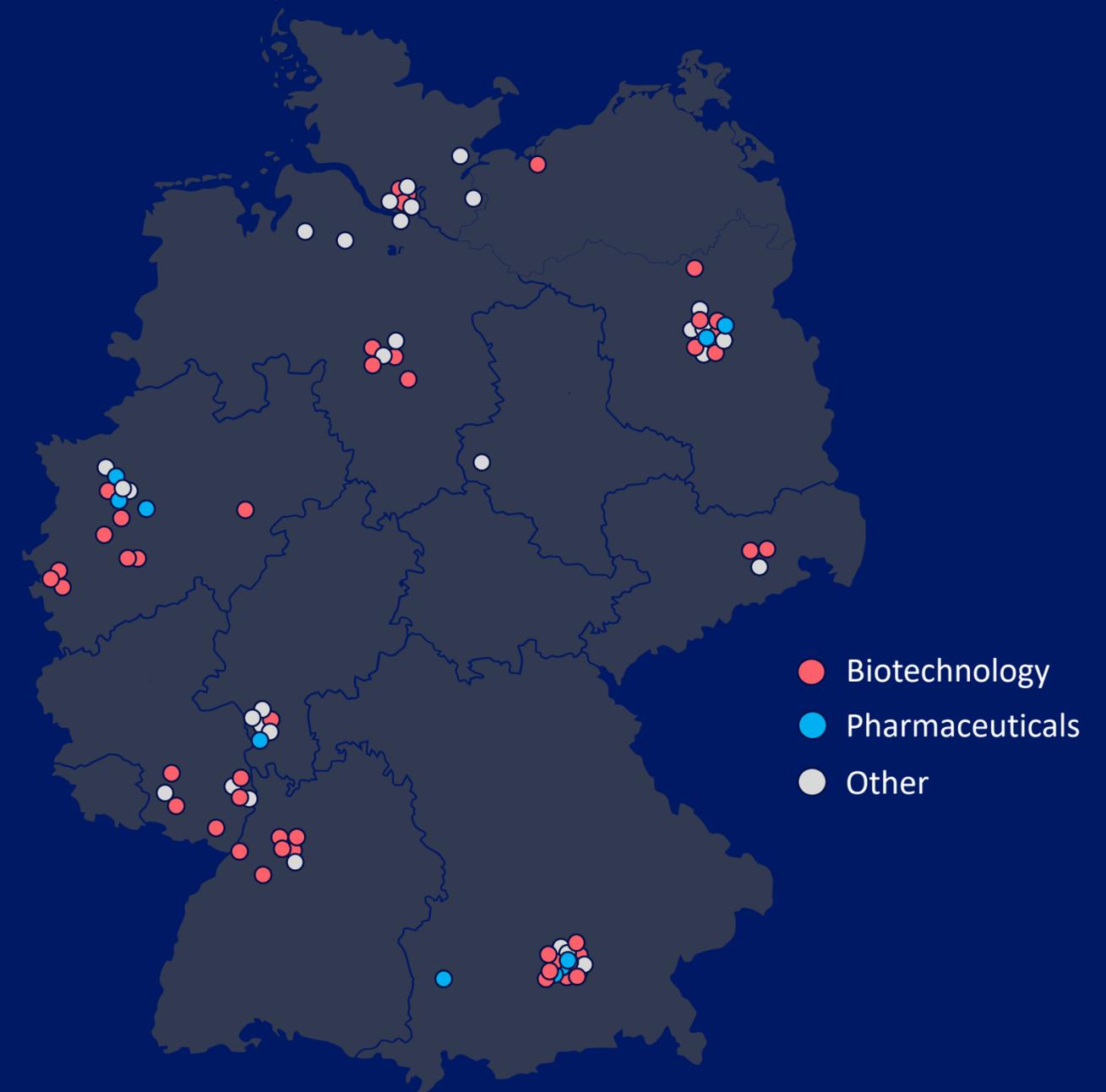
## University-Industry collaborative research projects:

*“A group at the Aarhus University Hospital has, in collaboration with industry partner Siemens Healthcare, has implemented new reconstruction algorithms for PET-images, which allows for direct quantification of glucose uptake in malignant and non-malignant tissue. The new algorithms have been used as part of routine clinical work-up of referred patients.”*

*“A group at the University of Copenhagen has, in collaboration with Nanion Technologies GmbH, identifies a potential new therapeutic target in pancreatic ductal adenocarcinoma, one of the most lethal cancers.”*

Reporting in Researchfish, 2019

# Location of NNF grantees' collaborating partners in Germany





# Novo Holdings A/S in Germany

## Our mission

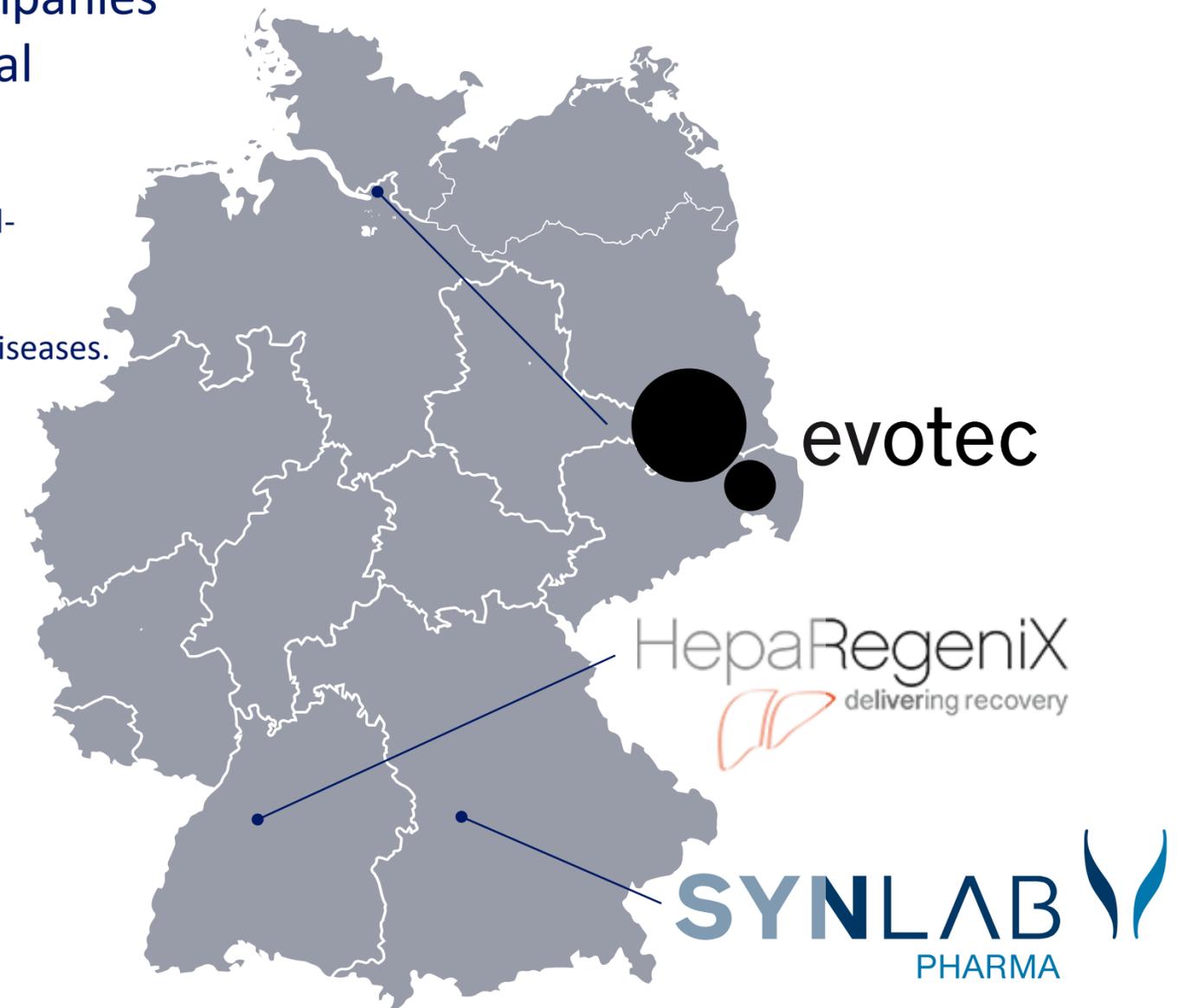
Novo Holdings is to be a supportive owner of the Novo Group companies and to make a growing and positive impact on health, science and society by generating attractive long-term returns on the assets of the Novo Nordisk Foundation.

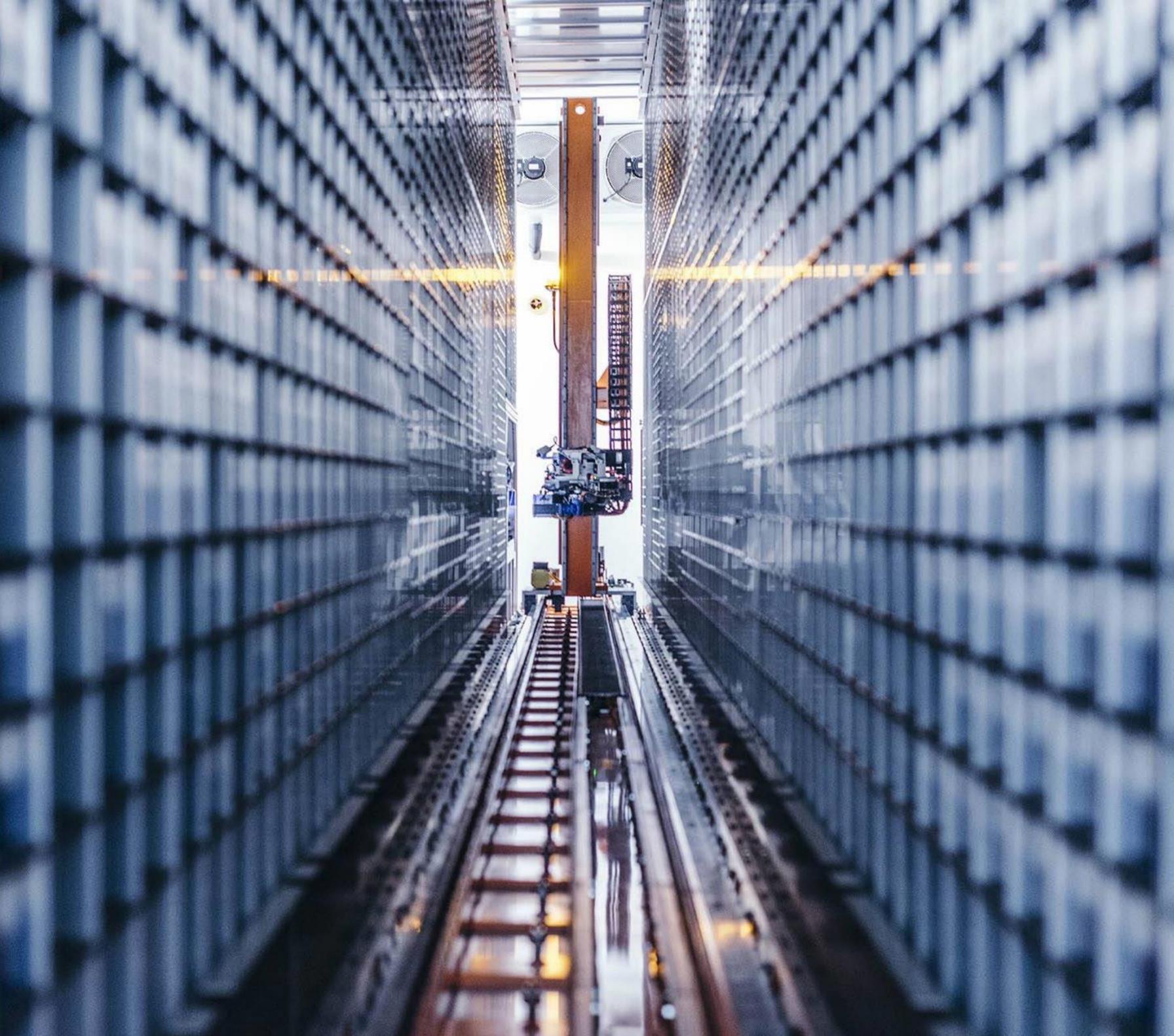
# Novo Holdings A/S Investments in Germany

Novo Holdings A/S has in the period 2016-2020 invested in 3 companies based in Germany. One is a seed investment and two are Principal investments, of which one is public listed.

- **Evotec**, is a drug discovery company. By combining cutting edge research technologies with well-established drug-discovery tools the company progresses product ideas from target to clinic.
- **HepaRegenix GmbH**, is developing a novel therapy for the treatment of acute and chronic liver diseases.
- **SynLab Pharma**, is the largest laboratory service provider in Europe offering a full range of medical laboratory services for both clinical practice and hospital sector.

## Companies in the current portfolio





# Appendix and additional slides

# Methods and sources

## Methods:

- Collaborations were defined as either a project collaboration or a publication collaboration funded by NNF with at least one collaborator/institute with origin in Germany
- University ranking was based on the time period 2016-2019, across all sciences, with institutions with at least 100 publications, and based on the PP(top10%)
- Publications were defined as publications with at least one German and one Danish author
- German industry collaborators were defined as collaborations with companies registered in the Germany
- German research partners were defined as successful NNF grant applications with at least one German co-applicant
- The number of German attendees at the Copenhagen Bioscience Conference series were defined as applicants and attendees registered to a German research institute
- Novo Holdings A/S investments in Germany were defined as investments in companies with their headquarter located in the Germany

## Sources:

- Researchfish (NNF grant data)
  - Research publication collaborations
  - Company project collaborations
  - Publications
- Data Warehouse, NORMA and OMADA (NNF grant application data)
  - Co-applicants
  - Copenhagen Bioscience PhD programme applicants
- The Leiden Ranking 2019
  - University rankings
  - Publication impact data
- Clinicaltrials.org
  - Clinical trials data
- Novo Holdings A/S
  - Investment data