

Report on research collaborations and investments in Sweden

Impact

Report on NNF-funded research collaborations and investments in Sweden

Country report on Swedish relations in Novo Nordisk Foundation (NNF) grants and Novo Holdings investments

Executive summary



Between 2017 and 2021, the Novo Nordisk Foundation (NNF) financed 243 projects with Swedish applicants, totaling €109 million.

57%

With 57% of the Swedish grant recipients' publications being co-authored with researchers affiliated with an international organization, the NNF grants contribute to internationalization of Swedish research.



NNF has awarded a total of €23.4 million to 14 projects involving money to both Swedish and Danish applicants.



Between 2017 and 2021, the Swedish grant recipients collaborated with 27 Swedish companies. 18% are in the biotechnology sector, and 56% of the companies have less than 50 employees.

23%

Between 2017 and 2021, Swedish grant recipients have published 1449 journal articles. 23% of these are among the top 10% most cited in their field.



Between 2017 and 2021, Novo Holdings invested in 6 companies based in Sweden. The current 2022 portfolio includes two Seed investments and two Principal investments. One company is publicly listed.

5/10

Out of the 10 most frequent university partners for Swedish grant recipients, five are among the 50 highest ranked universities world-wide.



Between 2017 and 2021, Novo Holdings has funded an average of two Swedish companies each year as part of its portfolio.

Introduction

The Novo Nordisk Foundation (NNF) 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 2017, the Foundation has invested €3.9 billion in science and society.

The center of gravity for the Foundation is Denmark followed by the Nordic Countries.

This report includes a presentation of:

- The Novo Nordisk Foundation (NNF)
- Activities that the Foundation grant recipients have with institutions or organizations in Sweden
- An overview of the Foundation's commercial activities in Novo Holdings and its investments in Sweden

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

Through figures and case studies, it demonstrates the different kinds of relationships and activities between NNF grant recipients and Swedish academic and industry partners. Data in the presentation are based on activities between 2017 and 2021 (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 Foundation and the Nordisk Insulin Foundation were merged into **Novo Nordisk Foundation** as part of the merger between the two firms Novo Terapeutisk Laboratorium and Nordisk Insulinlaboratorium in Novo Nordisk A/S.

In 2020 the **Novo Nordisk Foundation** awarded 617 grants with a total amount of €1183 million.

For more information, please see the [Impact Report 2020](#)

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 2021:
€1183 million
(DKK 8.8 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*
76.7% VOTES



25.5% SHARES*
72.6% VOTES



Investments

Investment result in 2021:
€5.0 billion
(DKK 37.0 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

University collaboration

A collaboration between **Lund University** and **University of Copenhagen** has led to the discovery of how various natural compounds can trigger cell death (autophagy) in plant cells. More importantly, the project has uncovered how cell death is an important mechanism through which plant cells adapt to changes in their environment. The collaboration is now looking into how exactly the identified compounds affect plant cells' ability to adapt to environmental changes.

Hospital collaboration

A collaboration between **Karolinska University Hospital** and **Copenhagen University Hospital** is looking at the safety of using nasally administered ketamine and sufentanil for the treatment of pain in children. The collaboration has provided access to a registry containing clinical data corresponding to approximately 3,000 treatments. This allows for a systematic review of a large cohort of children spanning 10 years of treatment and will provide invaluable information for future treatments of pain in children.

Source: Novo Nordisk Foundation (2020), based on ResearchFish® reporting

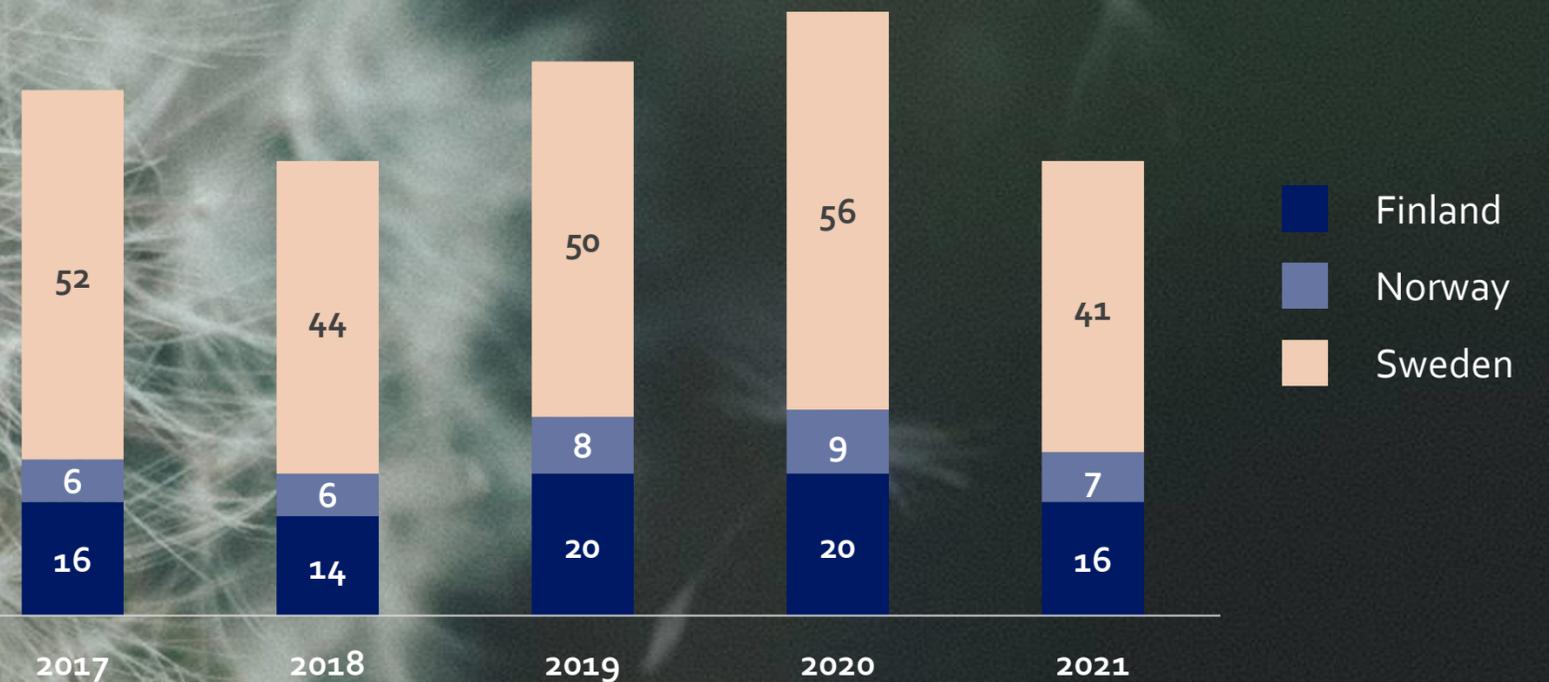


NNF-funded research in Sweden involving academic and industry collaborations between 2017 and 2021

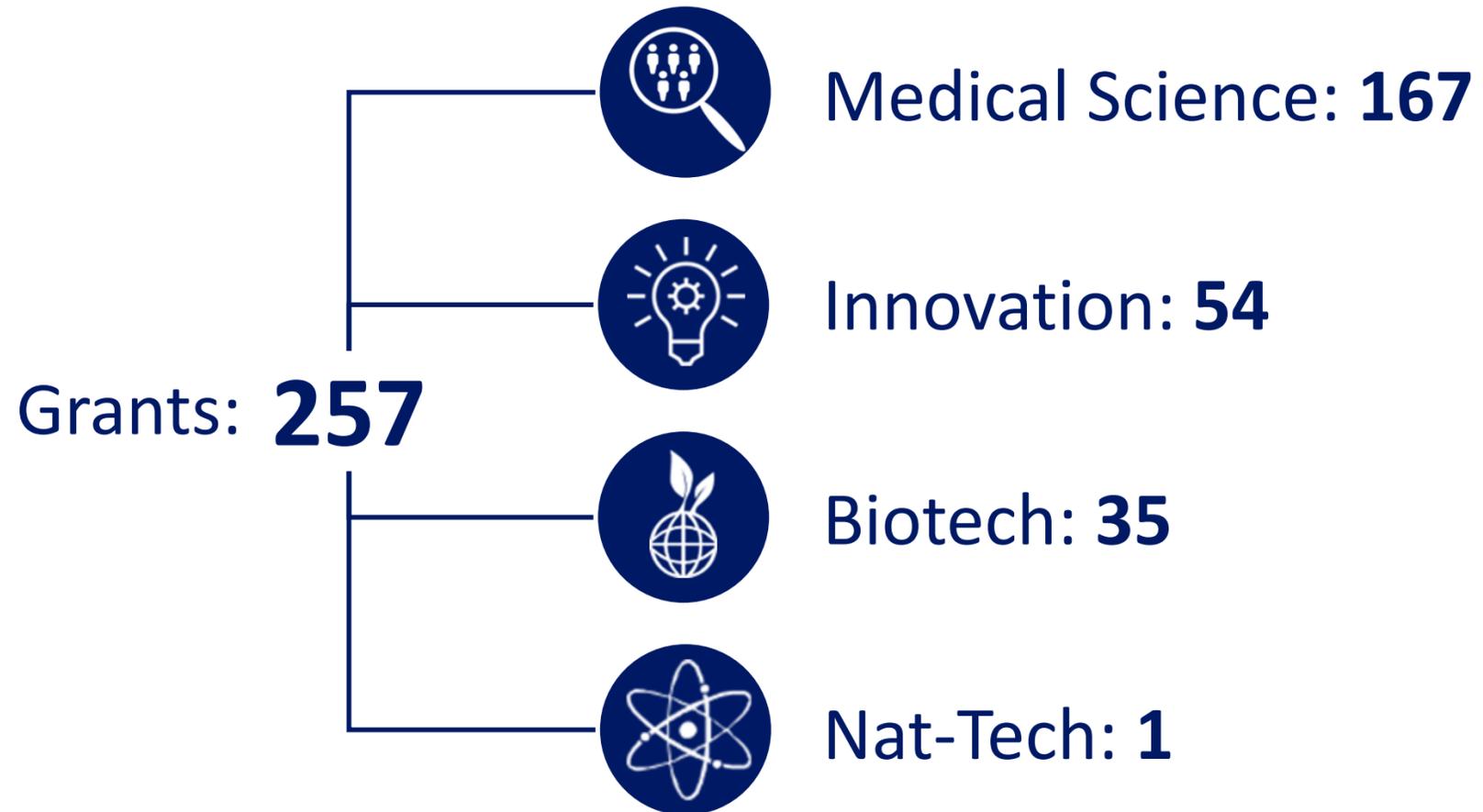
Centre of gravity

The centre of gravity for NNF is Denmark, followed by the Nordic countries of Finland, Sweden, and Norway. The Foundation awards grants to both Danish and Nordic researchers and to collaborations between researchers in the Nordic countries.

Between 2017 and 2021, the foundation has awarded **365** grants to recipients in Sweden, Norway and Finland, **10** of these being collaborative projects with Danish partners.



NNF grants awarded to Swedish applicants or co-applicants, distributed by grant-giving area



Between 2017 and 2021, NNF has financed 257 projects with Swedish researchers as applicants or co-applicants



243 grants were awarded to research and innovation projects with main applicants from Sweden.



The 243 projects with Swedish main applicants amount to a total of **€109** million in funding.



14 projects had a Danish main applicant but involved 12 different co-applicants* from Sweden.

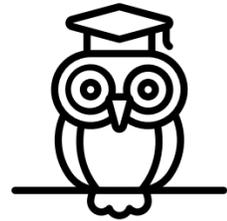


The 14 projects were awarded a total of **€23.4** million.



* Co-applicants are members of the international group applying for NNF grants.

Institutional affiliation of Swedish main applicants awarded a NNF grant



The **243** grants amounting to **€109** million are distributed between **17** different institutions in Sweden, comprising universities, university hospitals and a university incubator.

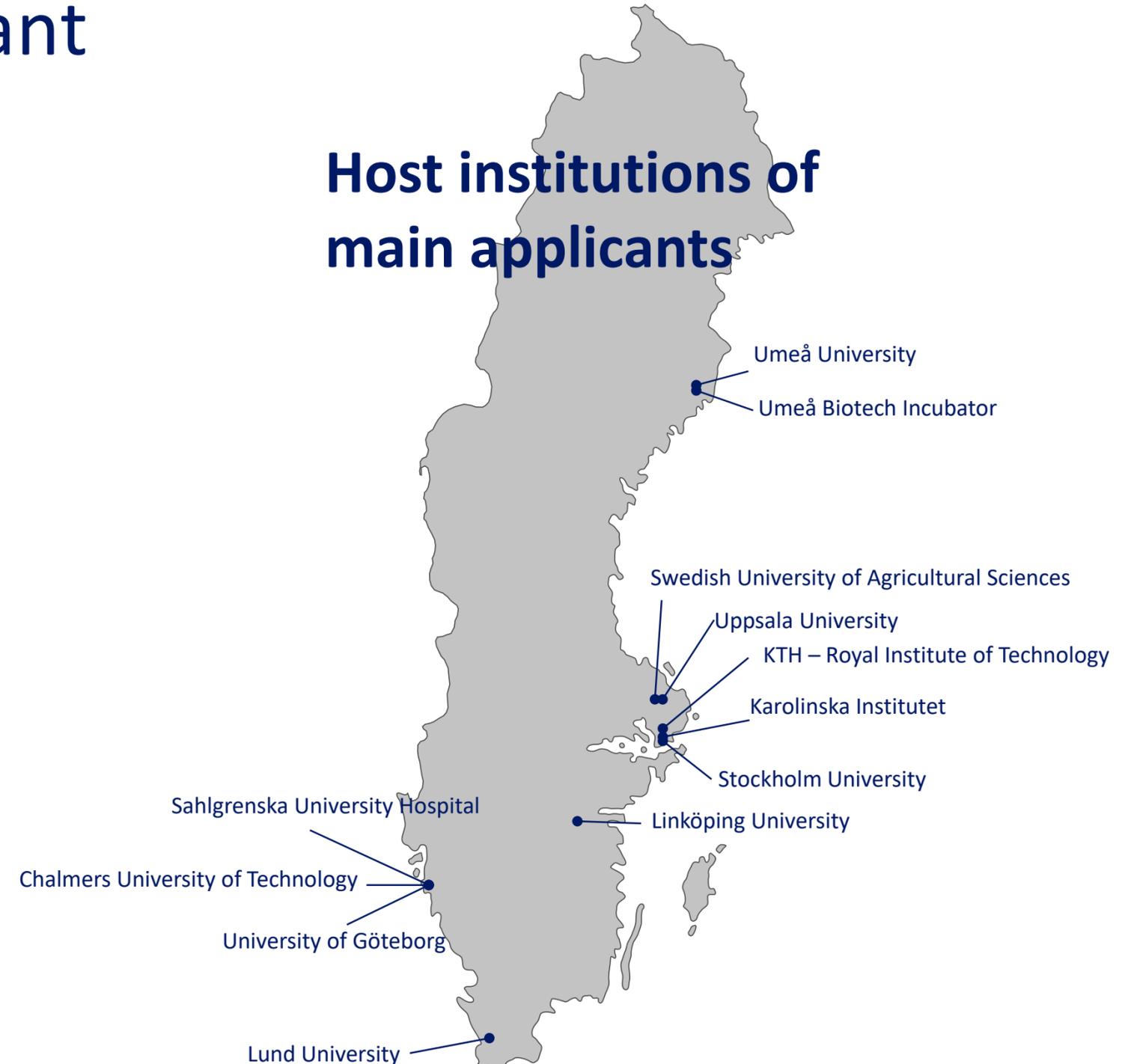


Karolinska Institute has received **€29** million in funding for a total of **84** projects.



Lund University has received **€34** million with the aim to establish world class research infrastructure at the European Spallation Source – ESS. In total, Lund University has received **€47.4** million for 51 projects.

Host institutions of main applicants



Swedish NNF grant recipients collaborate with many international partners

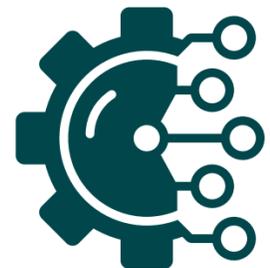
Between 2017 and 2021...



The Foundation's Swedish grant recipients have many collaborations with national and international project partners. In total, **935** research organizations and governmental institutions contribute to the collaborations.



Of these, **926** are international universities, university hospitals or hospitals as well as companies. In total, **74** different countries are represented.



45 of the international partners are US based companies that have co-authored at least one scientific article with the grant recipient from the Novo Nordisk Foundation.

Swedish NNF grant recipients collaborate with many international companies

Between 2017 and 2021...

132 companies located world-wide have collaborated with the Swedish NNF grant recipients, either on formalized research projects (22) or by co-authoring scientific publications (116).

47% of companies have less than 250 employees, and 50 (38%) have less than 50 employees.

54 companies are in the biotechnology sector.

21 are categorized as pharmaceutical companies.

57 are in the “other” category, being in either in the Medical Device sector, the Computer Science, Consultancy or Hospital & Health Care sector.

“A research team at Karolinska Institute has together with industry partner Boehringer Ingelheim found a compound that improves functional stroke outcome in mice. This is the first step in potentially developing a drug that could improve stroke outcomes in human patients.”
Reporting in Researchfish, 2019

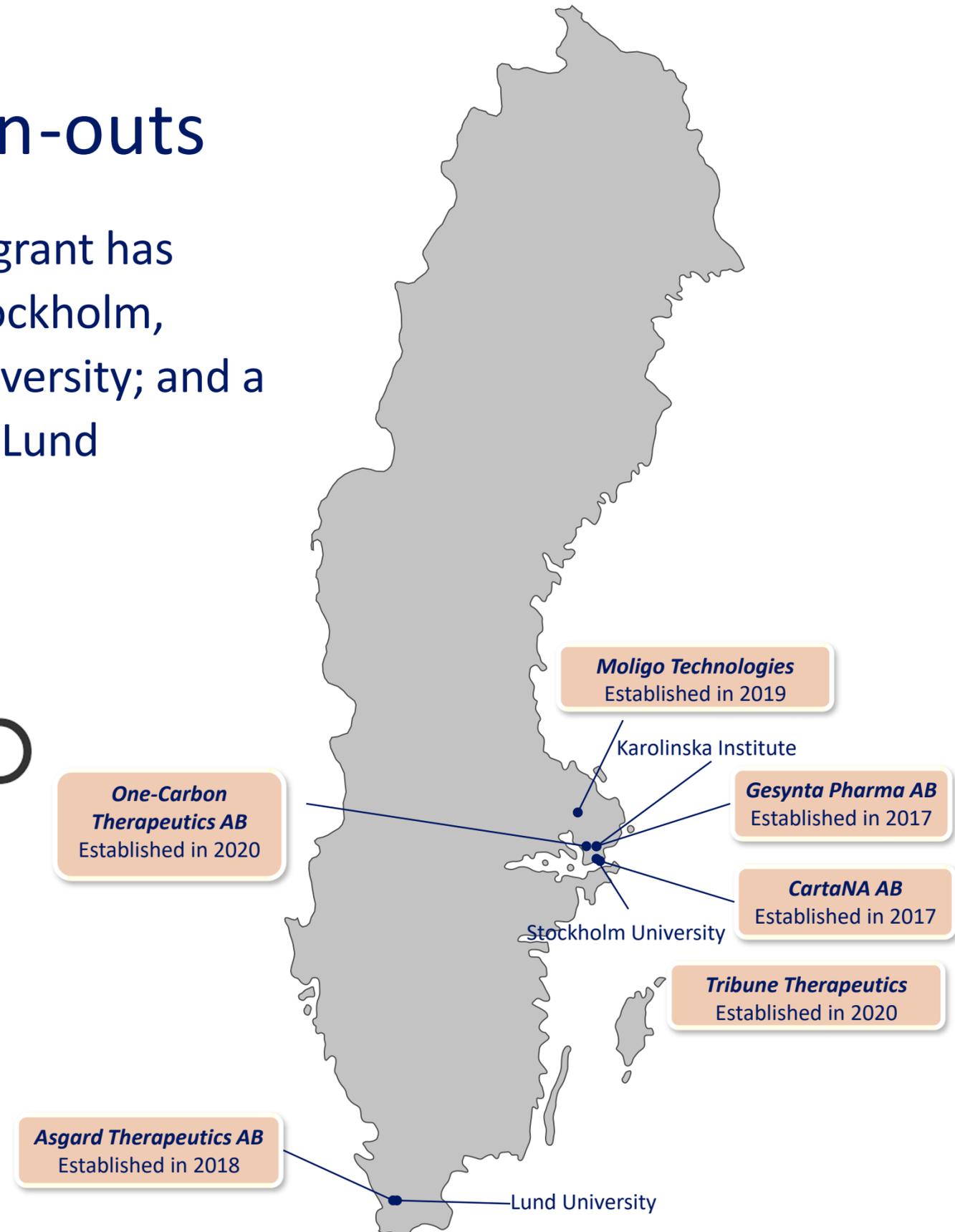
Location of NNF’s Swedish grantees’ collaborating partners



- Biotechnology
- Pharmaceuticals
- Other

NNF grants lead to university spin-outs

Between 2017 and 2021, NNF's Explorative Pre-seed grant has resulted in six spin-out companies: five situated in Stockholm, spun out from Karolinska Institute and Stockholm University; and a single company formed by researchers affiliated with Lund University.



Swedish NNF grant recipients collaborate internationally



Between 2017 and 2021, Swedish grant recipients have published **1449** publications in internationally recognized journals.

57% of the publications are co-authored with researchers affiliated with an organization outside Sweden. The national average among the top Swedish universities is 67%.

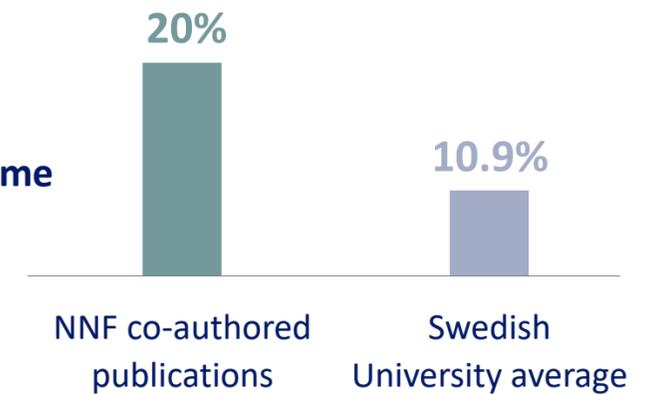
The most frequent international partner is Harvard University with 127 publications, followed by University of Oxford with 77 publications, and University of Cambridge with 73 publications.

20% of the co-authored publications are within the top 10% most cited publications in their research field. The national average among the top Swedish universities is 11%.



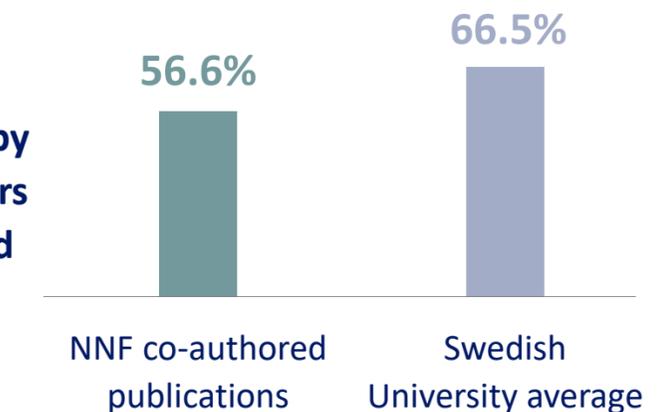
NNF grants contribute to research excellence

Share of publications among the top 10% most cited world-wide in the same research field and year



Swedish grant recipients publish frequently with international peers

Share of publications co-authored by Swedish researchers and researchers affiliated with an institution located outside Sweden

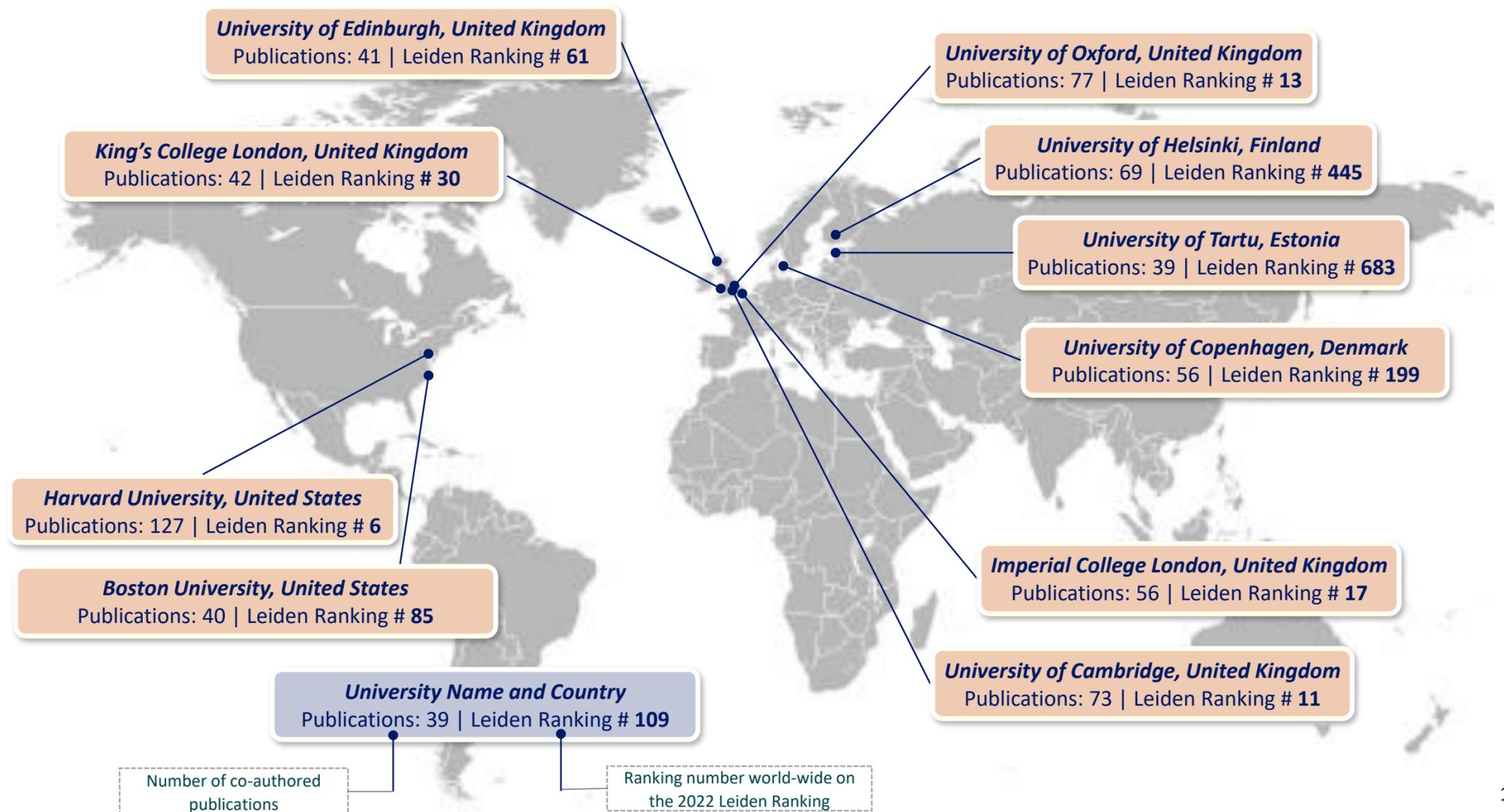


Swedish NNF grant recipients' collaboration with top universities in United States and Europe

Top 10 universities collaborating with NNF's Swedish grant recipients ranked by number of publication collaborations

- 1 Harvard University, United States
- 2 University of Oxford, United Kingdom
- 3 University of Cambridge, United Kingdom
- 4 University of Helsinki, Finland
- 5 Imperial College London, United Kingdom
- 6 University of Copenhagen, Denmark
- 7 King's College London, United Kingdom
- 8 University of Edinburgh, United Kingdom
- 9 Boston University, United States
- 10 University of Tartu, Estonia

Source: Novo Nordisk Foundation, CWTS Leiden Ranking 2021



Supporting young talented researchers

Since 2015, 104 young Swedish researchers have been selected in open competition to participate at the Copenhagen Bioscience Conference series.

“The Copenhagen Bioscience Conferences facilitate high level training for PhD students and postdocs”

NNF applicant, 2018

Swedish Grant recipients' project collaborations with Swedish partners

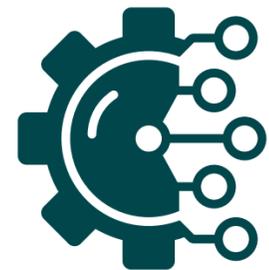
Between 2017 & 2021...



The Foundation's Swedish grant recipients have collaborated with many Swedish national project partners. In total, **78** other research organizations and governmental institutions are involved in the projects.



42 Swedish universities, university hospitals and non-profit research institutes.

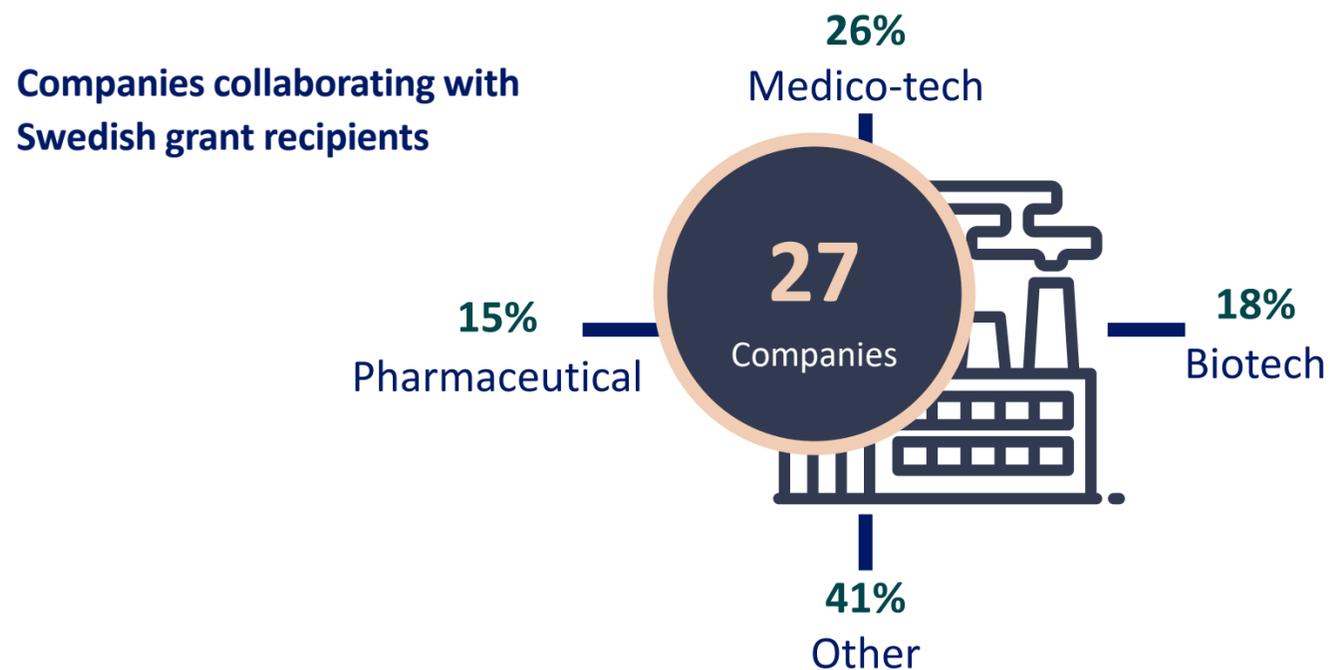


19 Swedish companies which co-authored at least one scientific article with the grant recipient from the Novo Nordisk Foundation.

Swedish researchers receiving NNF grants collaborate with Swedish companies

27 companies located in Sweden collaborate with the Swedish NNF grant recipients, either on formalized research projects or by co-authoring scientific publications. 19 companies contribute to publication collaborations, and 10 have formalized collaboration projects.

59% of the companies have less than 250 employees, and 15 (56%) have less than 50 employees.



Location of NNF grantees' collaborating partners in Sweden



“A group funded by the Novo Nordisk Foundation at Karolinska Institute has, in collaboration with industry partner Orexo, filed patent applications for two compounds within a new class of anti-inflammatory drug (mPGES-1-inhibitors).”
Reporting in Researchfish, 2019

NNF grants contribute to research excellence for Swedish grant recipients and their Swedish peers



Between 2017 and 2021, Swedish grant recipients have co-authored **1296** publications in internationally recognized journals with Swedish peers.

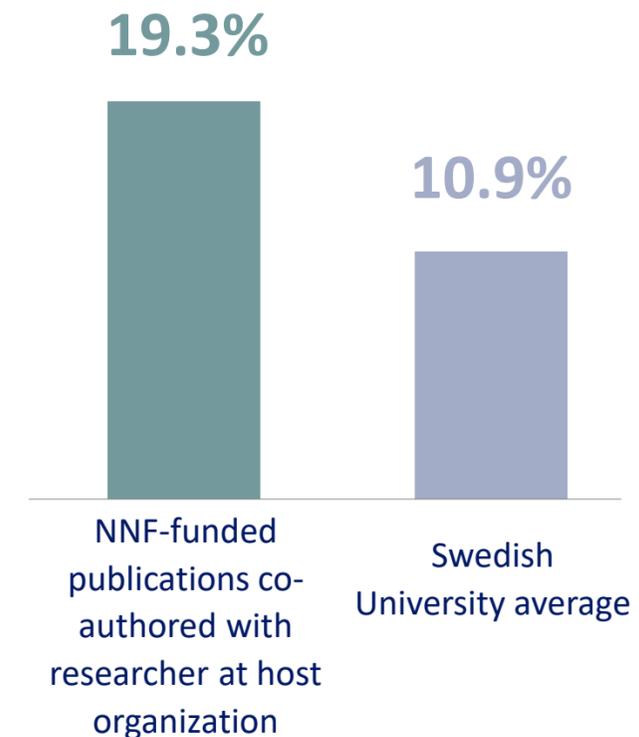


44% of the publications are co-authored with researchers affiliated with the grant recipients' host organization.



19% of the co-authored publications are among the top 10% most cited publications in their research field. The national average among the top Swedish universities is 11%.

Share of publications among the top 10% most cited world-wide in the same research field and year

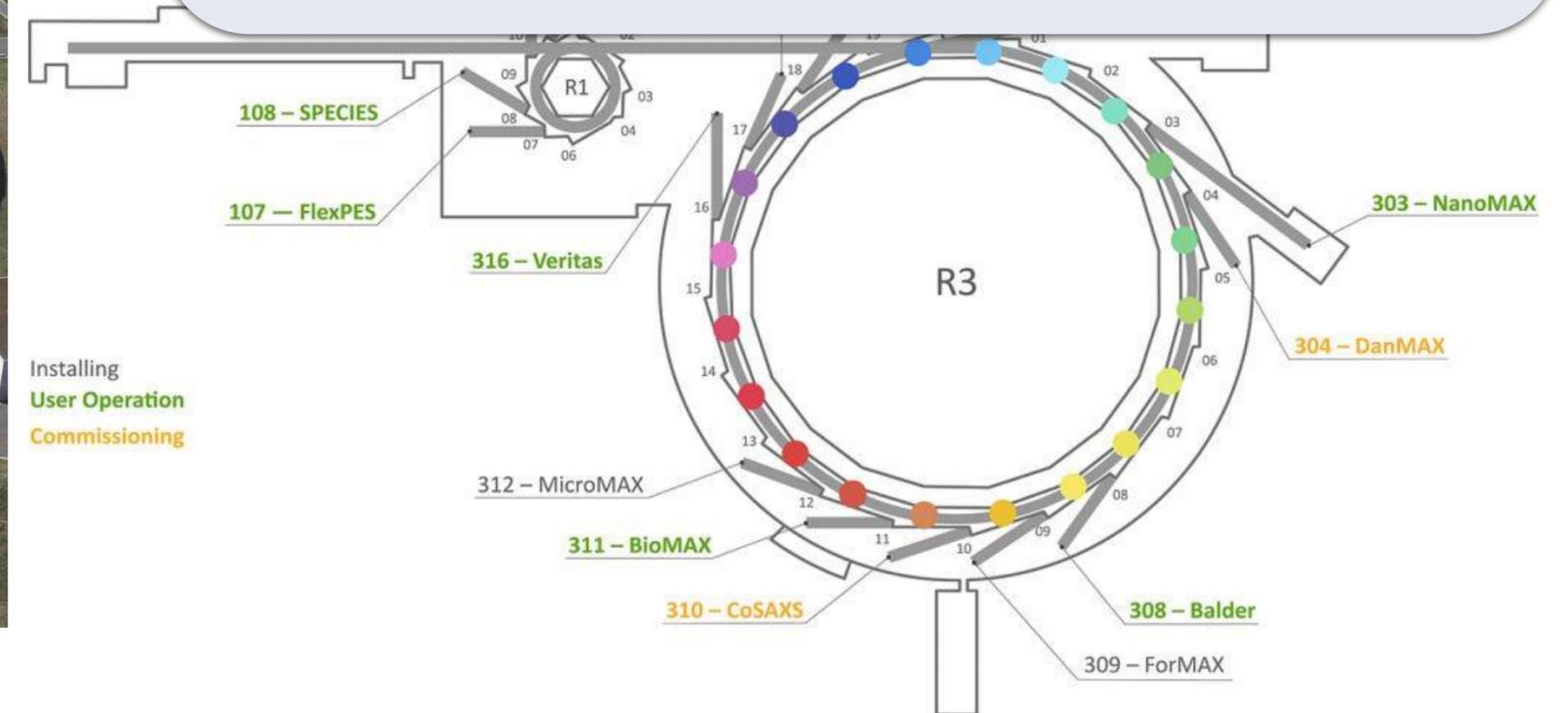


Case: Support for research infrastructure



The Max IV – MicroMax beamline

- DKK 255 million (€33.5 million) have been awarded to the Max IV synchrotron facility in Lund, Sweden, to build a MicroMax beamline.
- The MicroMax beamline provides new tools to study the most challenging scientific questions in structural biology, related to membrane proteins and molecular complexes.
- The beamline is expected to be up and running in 2022.



Source: Novo Nordisk Foundation (2020)

Between 2017 and 2021, NNF has funded **14** projects involving Danish researchers collaborating with Swedish peers



The Novo Nordisk Foundation has awarded a total of **€23.4** million to **14** projects with Swedish co-applicants.

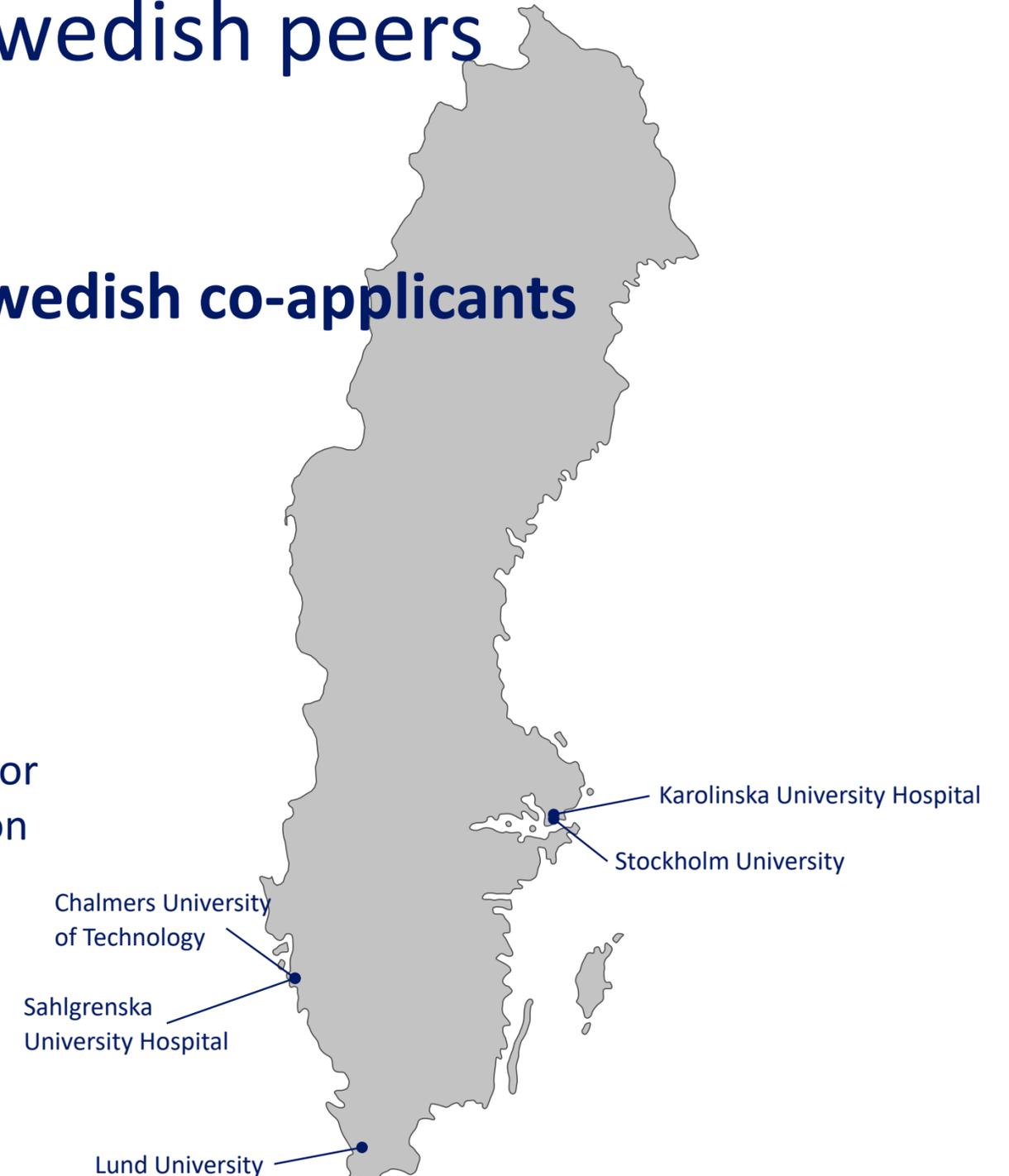


5 institutions, universities and university hospitals have been awarded a grant between 2017 and 2021.



Sahlgrenska University Hospital is co-applicant for an Investigator Initiated Clinical Trial grant. The **€1.3** million grant has a duration of five years.

Swedish co-applicants



Danish grant recipients' collaborations with Swedish co-applicants include a large number of other Swedish organizations

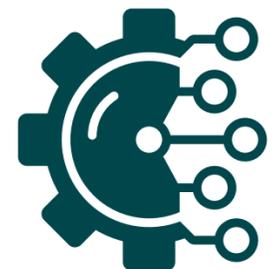
Between 2017 & 2021...



The Danish grant recipients and their Swedish co-applicants together have **71** collaborations with both international and Swedish partners, including **47** collaborations with Swedish and international universities and university hospitals.



3 of the collaborating universities are Lund University, Chalmers University of Technology and Uppsala University.



6 companies originating in Denmark, United Kingdom and United States have co-authored at least one scientific article with grant recipients from the Novo Nordisk Foundation.

The Danish grant recipients and their Swedish co-applicants have published **62** journal articles, of which **24%** are among the top 10% most cited world-wide within their research field and year.

NNF grant recipients' collaboration with Swedish researchers

Besides its direct funding of Swedish grant recipients and Danish grant recipients applying with Swedish co-applicants, the Foundation also supports Danish grant recipients who collaborate with Swedish researchers



Between 2017 and 2021, the awarded grants to Danish applicants have resulted in **109** collaborations with Swedish partners.



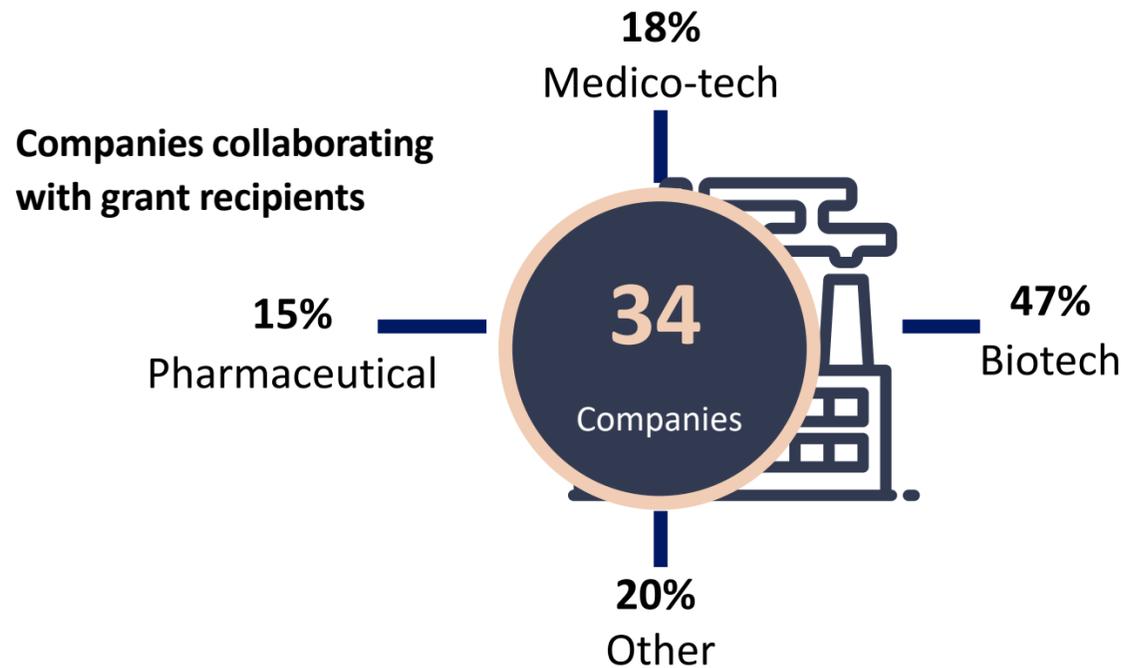
NNF grant recipients' collaboration with the most prominent universities in Sweden



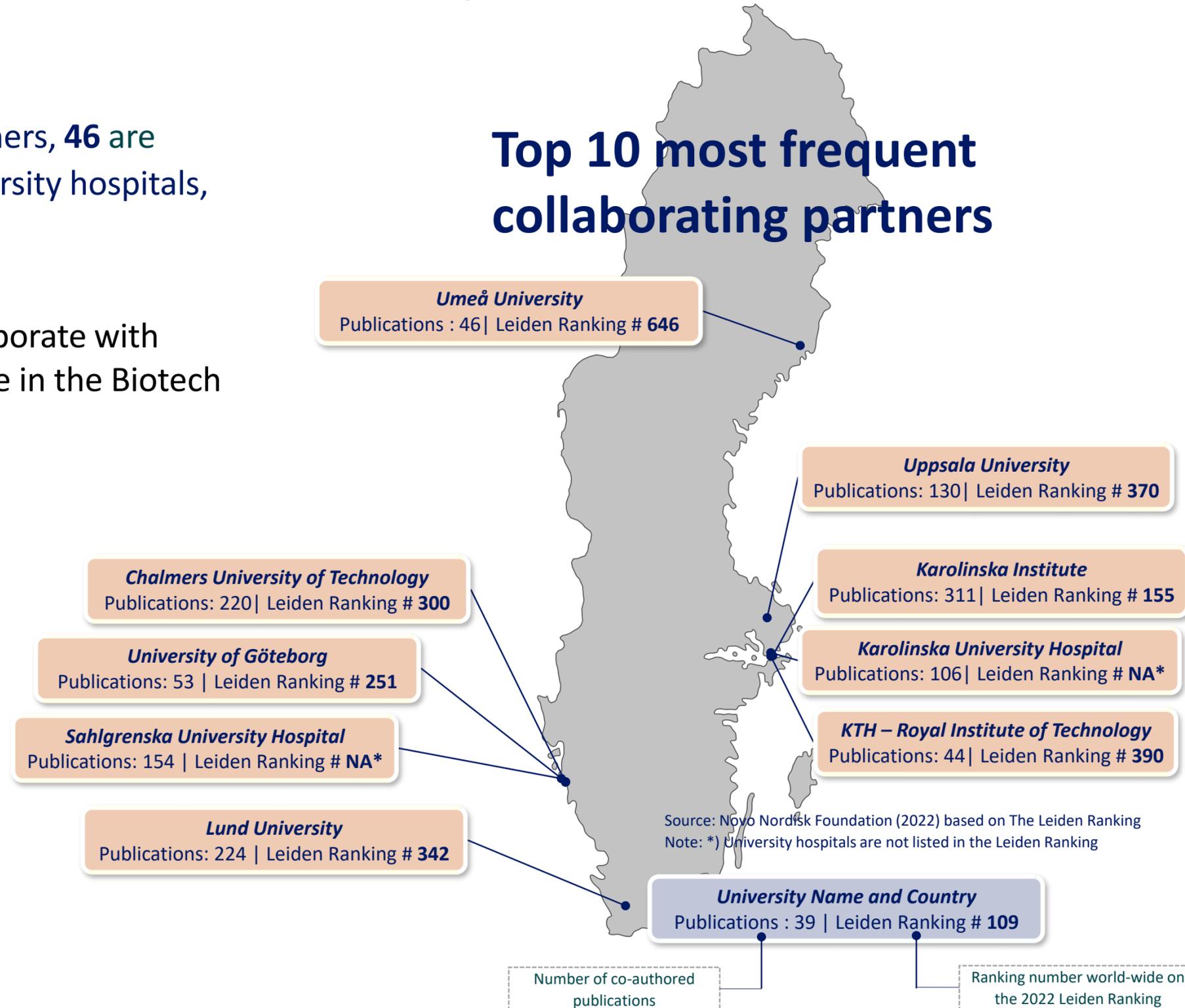
Out of the **109** collaborations with Swedish partners, **46** are collaborations with Swedish universities and university hospitals, and **34** are with companies located in Sweden.



The grant recipients and their Swedish peers collaborate with **34** companies located in Sweden, of which 47% are in the Biotech sector and 50% have less than 50 employees.



Top 10 most frequent collaborating partners



NNF grants contribute to scientific excellence for grant recipients and their Swedish peers



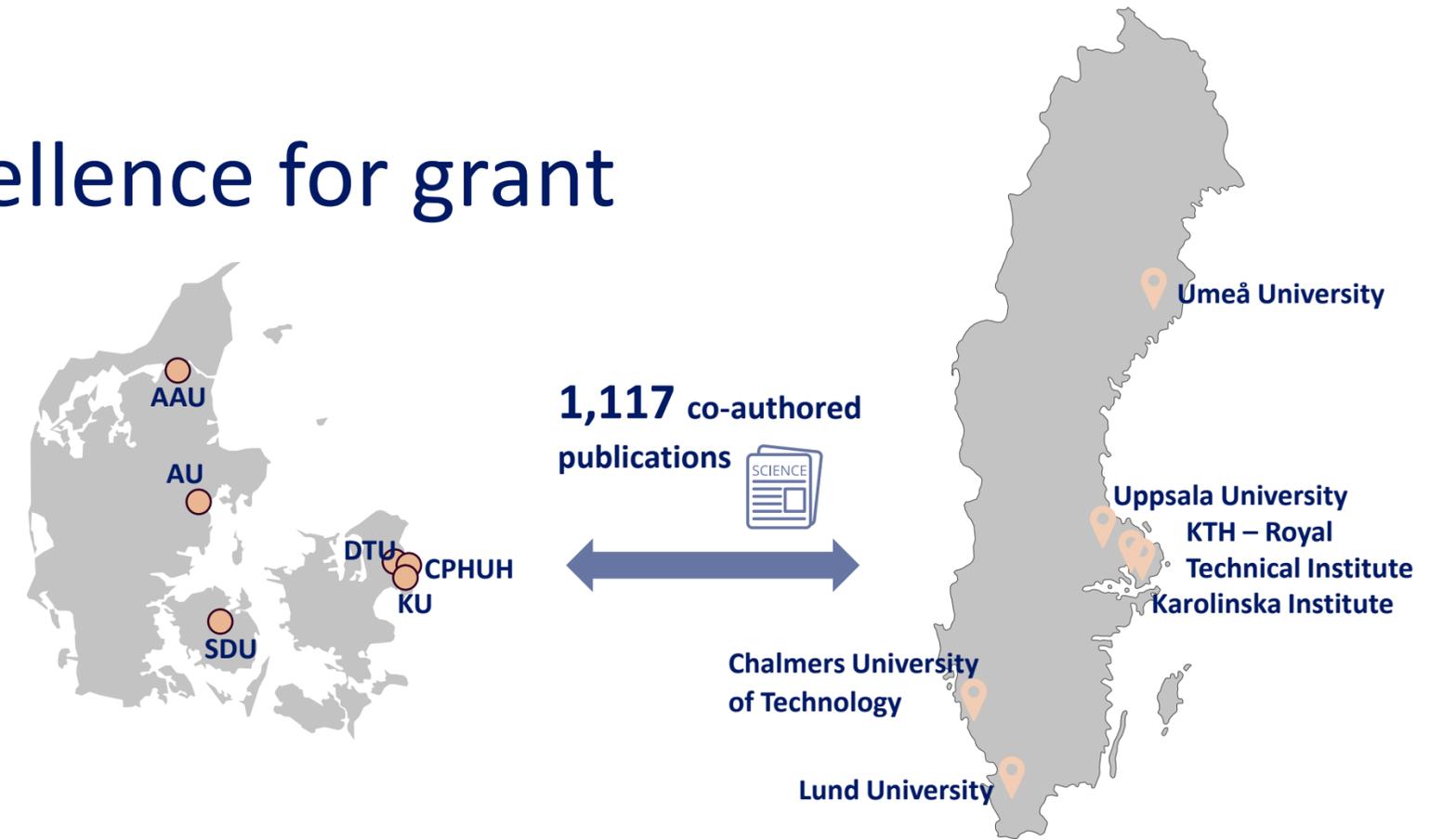
Between 2017 and 2021, NNF grant recipients have co-authored **1,117** publications with researchers based in Sweden.



The majority of the Swedish partners come from Karolinska Institute (311 publications) followed by Lund University (224 publications) and Chalmers University of Technology (220 publications).

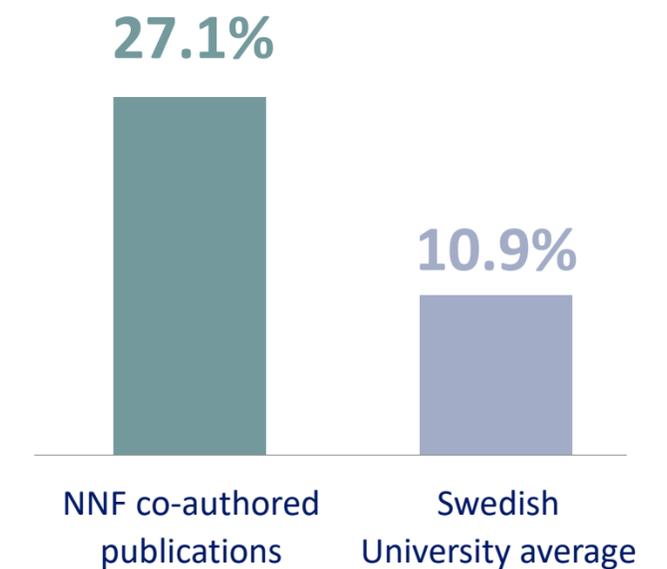


27% of the co-authored publications are within the top 10% most cited publication in their research field. The national average among the top Swedish universities is 11%.



NNF grants contribute to research excellence

Share of publications among the top 10% most cited world-wide in the same research field and year





Novo Holdings A/S in Sweden

Our mission

Novo Holdings' mission 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.

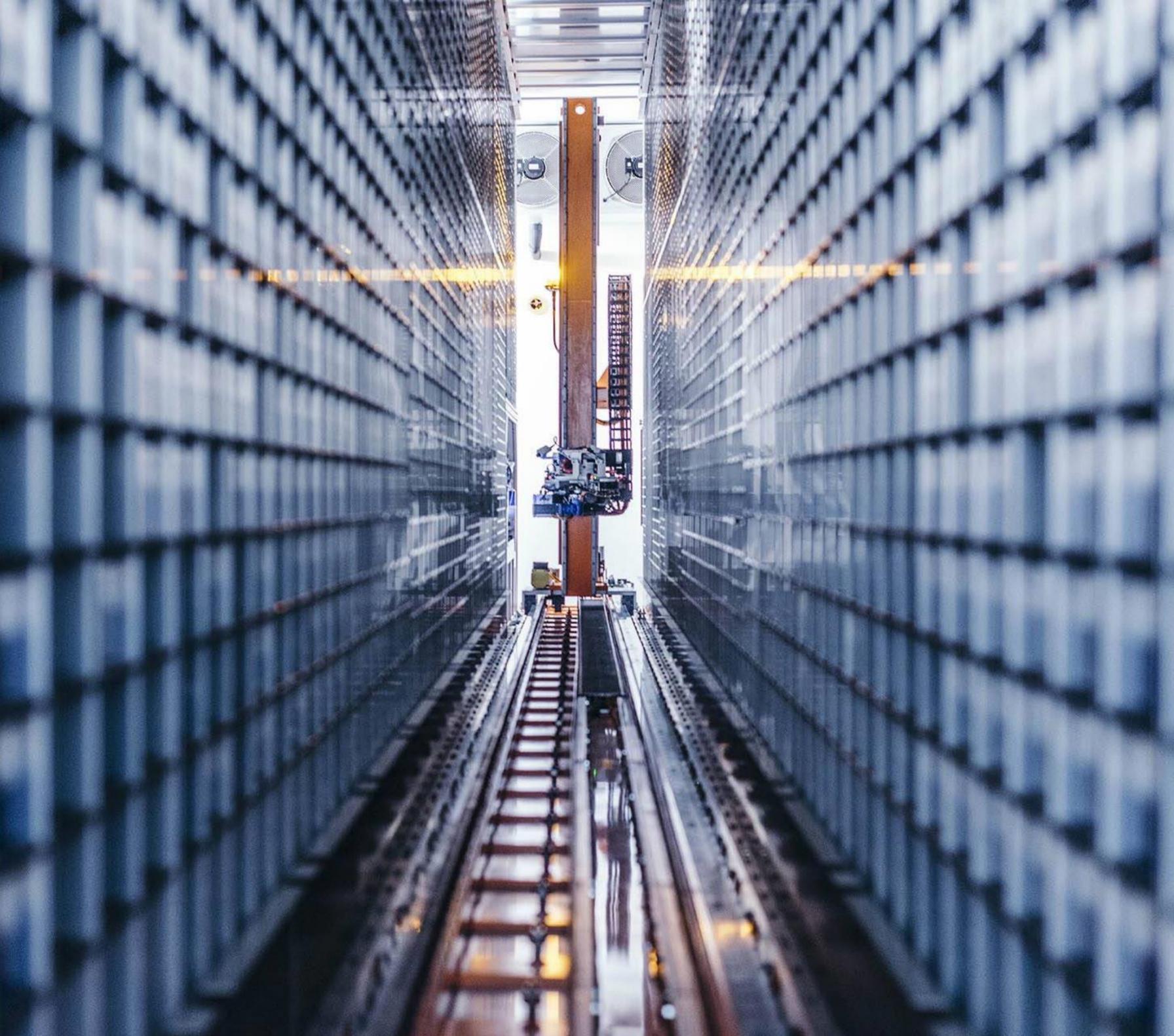
Novo Holdings A/S investments in Sweden

Novo Holdings A/S has in the period 2017-2021 invested in 6 companies based in Sweden. The current portfolio includes 2 Seed investments and 2 Principal investments, of which one is publicly listed.

Since 2017, Novo Holdings has invested in an average of two Swedish companies each year as part of its portfolio.

Companies in the current portfolio





Appendix and additional slides

Methods and sources

Methods:

- National collaborations were defined as either a project collaboration or a publication collaboration funded by NNF with at least one collaborator/institute with origin in Sweden.
- International collaborations were defined as either a project collaboration or a publication collaboration funded by NNF with at least one collaborator/institute with origin outside Sweden.
- University rankings were based on the time period 2016-2019, across all sciences, with institutions with at least 100 publications and based on the PP(top10%).
- Co-publications were defined as publications with at least one Swedish and one Danish author.
- Swedish industry collaborators were defined as collaborations with companies registered in the Sweden.
- International industry collaborators were defined as collaborations with companies registered outside Sweden.
- Swedish grant recipients were defined as successful NNF grant applicants.
- The number of Swedish attendees at the Copenhagen Bioscience Conference series were defined as applicants and attendees registered to a Swedish research institute.
- Novo Holdings A/S investments in Sweden were defined as investments in companies with their headquarter located in the Sweden.

Sources:

- Researchfish (NNF grant data)
 - Research publication collaborations
 - Company project collaborations
 - Publications
- NNF-Data Platform, NORMA and OMADA (NNF grant application data)
 - Applicants of Swedish origin
 - Co-applicants
 - Copenhagen Bioscience PhD programme applicants
- The Leiden Ranking 2021
 - University rankings
 - Publication impact data
- Novo Holdings A/S
 - Investment data