The journey from a research breakthrough to an innovation that improves the lives for people can vary in any number of ways. We have collected a selection of such journeys from Karolinska Institutet in the fields of Diagnostics, Medtech, Biotech, Digital Health, Social Innovation and Pharma. We hope that every one of them gives you an inspirational snapshot of the process that takes ideas to innovation.
Karolinska Institutet has a proud history of groundbreaking discoveries that have improved the lives for people all over the world, with the pacemaker, the gamma knife and the Seldinger technique as inspirational examples. Now we have the opportunity to re-establish Sweden as a strong global actor in life sciences. Region Stockholm has a stated ambition of securing the region a place among the world’s five leading life sciences hubs by 2023. This is where we have a key role to play. As Sweden’s top medical university, Karolinska Institutet has a responsibility to contribute to the development of society as a whole, particularly in the health care sector. The journey to that goal involves, among other things, greater innovation and continued concerted knowledge development.

In this booklet, we present some of the ideas that have emerged from Karolinska Institutet over the past 20 years; ideas selected to reveal the breadth of our work. We hope they will inspire and encourage yet more innovation. At the same time as needing to be better at noticing and encouraging new ideas, we must also be better at developing them so that more of them become innovations that can be implemented in the healthcare system. We do not achieve substantive change until new breakthroughs reach everyday healthcare in the form of new products and methods and improved organisation and working practice. This is something for us to work on in the future. We need to know more about the extent to which our research and development leads to societal benefit and improvements daily life for patients and staff: the obstacles we need to remove and the success factors we should embrace. My ambition is on the national level, by working for more research related to how we best implement new products and findings to create world-class healthcare.

As we call for increased innovation and commercialisation, we must maintain transparency and academic freedom. This requires robust ethical and critical thinking.

"We do not achieve substantive change until new breakthroughs reach everyday healthcare."

Ole Petter Ottersen
President of Karolinska Institutet
20 years of innovation

The journey from a research breakthrough to an innovation that improves the lives for people can vary in any number of ways. We have collected a selection of such journeys from Karolinska Institutet in the fields of Diagnostics, Medtech, Biotech, Digital Health, Social Innovation and Pharma. We hope that every one of them gives you an inspirational snapshot of the process that takes ideas to innovation.

Here we present selection of stories from the past 20 years of innovation. There are of course many more excellent examples to highlight, and many more individuals who have been crucial in the process of transforming research results into societal benefit. We have attempted to provide an idea of the variety of what is done here at Karolinska Institutet. A variety that sustains our leading position in research and development that we see today. We hope to inspire an increase understanding about innovation.
Aprea Therapeutics AB is working on the development of a new p53-based treatment for cancer. Klas Wiman is one of the company’s founders, and he draws a clear distinction between the roles of researcher and entrepreneur.

A key element of the body’s defences against cancer—the protein p53—was discovered at the end of the 1970s. p53 was later dubbed “the guardian of the genome” because amongst other characteristics it can respond when damage to cells’ DNA occurs. The absence of functioning p53 greatly increases the risk of cancer. Mutations in the p53 gene are found in around half of all tumors and is the most common genetic change in cancer.

“The discovery of p53 mutations in cancer attracted a lot of attention at the end of the 1980s, and it was at that point that I started my research in the p53 field. After a few years we decided to look for a molecule that could get mutant p53 working again and kill cancer cells,” explains Klas Wiman, professor at Karolinska Institutet.

Many were sceptical

At the beginning of the 2000s, Wiman and his colleagues Galina Selivanova and Vladimir Bykov had identified a molecule with interesting characteristics. They realized early on that their molecule could perhaps be developed into a new drug and therefore approached KI Innovations for help.

Together with KI Innovations, the team established Aprea AB in 2003 with the aim of developing new cancer treatment. Karolinska Development was among the first to invest in the company, with others such as Industrifonden following suit later. Initial clinical trials started in 2009, and showed promising results.

Wiman and his colleagues chose to publish their results at a relatively early stage.

“I think it was good for Aprea to participate in this initiative and interact with leading p53 researchers in Europe,” he says. “It’s important to ensure that our research benefits cancer patients, and commercialization is the way to reach patients. At the same time, my roles as an objective researcher and entrepreneur must be kept apart,” he adds.

Even if you hope that everything’s going to work, you need to continue to be objective and critically review your results.”

Today, Aprea Therapeutics is conducting several clinical trials, including one in ovarian cancer and one in a certain type of leukemia. This is very exciting, Wiman says, who has been able to continue doing what enjoys the most: academic research.

“We’re now running a new project where we’re attempting to reactivate another type of p53 mutants in a different way. We’re back at a very early phase of drug development and haven’t even reached animal testing. But I love it, and it’s where I can contribute most. This strategy may also work on the same type of mutations in other important genes that prevent cancer.”
Leading the way for greater social innovation

The DöBra (“Die Well”) cards help people to reflect on and talk about their values and preferences for the end of life—a topic that can often be difficult to raise. This tool was developed through an interdisciplinary research programme at Karolinska Institutet and Umeå University, and has contributed to an ongoing process to develop support for social innovations at Karolinska Institutet.

DöBra is a national research programme run by Karolinska Institutet and Umeå University. The programme includes a number of research projects that aim to raise issues surrounding dying, death and grief to better prepare people for future encounters with the end-of-life.

The DöBra cards have attracted attention from the general public, professionals and different media. They are based on what is internationally known as “advanced care planning”, which, among other things, involves early consideration of your values and preferences prior to the end-of-life, preferably before illness develops.

If you are able to discuss these issues in advance, you may be more prepared to deal with an acute situation when it’s really necessary,” says Carol Tishelman, professor in innovative healthcare, and DöBra programme director.

The Swedish cards are based on the “Go Wish” card game which was developed by the non-profit organization Coda Alliance in the US. DöBra researchers translated and adapted the cards to the Swedish context working in partnership with different patient and retiree organisations.

“We hope that we’ve developed a set of cards that do not systematically eliminate anyone living in Sweden, regardless of background. The topics are selected to trigger discussion rather than being precise questions about different situations or events that can occur,” says Sophia Savage, DöBra programme program manager.

A model for social innovation

During the project, researchers were contacted by members of the public and healthcare professionals who wanted to buy a copy of the cards to use outside of the research setting.

“It’s been a long process for us to gain clarity on what we as researchers may and may not do, for example in financial and legal contexts. At the university you’re encouraged to start businesses to commercialize research results, but that wasn’t our aim. We wanted to keep our focus on research, but at the same time we wanted the cards to be available to as many people as possible,” explains Tishelman.

An initiative is now underway between the research group and different stakeholders in Karolinska Institutet’s organization and KI Innovations to expand and improve social innovation support structures.

“We see considerable potential for social innovation at Karolinska Institutet in general, and specifically in disciplines not often actively engaged in innovation at present, and we hope that improved support can contribute to creating more research-based societal benefits,” says Savage.
The right contacts led the way

He is behind a unique test to distinguish benign prostate cancer from aggressive forms of the condition that require immediate treatment. Finding the right contacts at the right time was key to the success of the project.

Chunde Li came to Karolinska Institutet as a guest researcher in 1993 from China. Initially, the plan had been to return home after getting his doctorate, or move on to the US. His research goals were ambitious: “First find a biomarker that can distinguish between benign prostate cancer from the aggressive form that requires immediate treatment. Then find a method of treatment that can cure those patients whose cancer has spread throughout the body,” says Li, now a senior consultant at Karolinska University Hospital and associate professor at Karolinska Institutet.

Li has since set up Chundsell Medical, having identified a method that distinguishes between aggressive and low risk prostate cancers and can therefore be a complement to screening. Chunde Li has given himself 10 years to find a treatment for patients who currently cannot be treated.

One of the keys to success was meeting US professor Patric O Brown, responsible for a method that enables the rapid, simultaneous examination of activity among thousands of genes. “We launched a co-operation that generated some extremely promising results. And when we developed the method further, we could reach three specific genes that we analyze today. When we add in clinical parameters, we can determine whether a patient needs immediate treatment with 80 to 90 per cent certainty.”

To disseminate their results, Li applied to a mentor programme at IVA (Kungliga Ingenjorsakademien), where he met his mentor Sune Rosell, a former professor at Karolinska Institutet and research director at Astra in the early 1980s. “At the time I knew nothing about patents or running a business. But after I told him about my results, he immediately said: we’re going to start a business!”

Together they started the company to which they both gave their names: Chundsell Medical. Today, they supply the Prostatype test primarily to private clinics, but they also hope to supply local care authorities on completion of an ongoing verification process.

“I’m driven by seeing my patients on a daily basis. I want to be able to give them the best choice among current treatments or even new effective treatments in the future,” says Li.

“AFTER I TOLD HIM ABOUT MY RESULTS, HE IMMEDIATELY SAID: WE’RE GOING TO START A BUSINESS!”
The man who has saved the lives of a million babies

The Curosurf story is a tale of success. To date, the drug has saved the lives of around one million premature babies worldwide. And the story is far from over. Despite being 73, Tore Curstedt returns to the lab every day - the lab where he has developed a new variant of a drug that is set to help many more babies in the future.

The place: the neonatal department of Karolinska University Hospital on a grey afternoon in January. Curstedt’s eyes are gentle as he holds a premature baby. Taking great care not to disturb the tubes and sensors sticking out of the tiny body, he holds the little life closely to him as though letting the baby feel his steady breathing. In one of the photographer’s pictures, the baby raises its arm as if in triumph.

It’s nearly 40 years since the first doses of Curosurf left the lab. Today, between 300,000 and 500,000 premature babies are treated with the drug every year, and it has been given to an estimated four to five million babies since its introduction in 1992. At least one million of them would not have survived without it.

So yes, there’s plenty to be triumphant about.

The ambitious 20-year-old started his research when he was still training to be a doctor at the then Kemikum at Karolinska Institutet (KI). At the time, you could pass future Nobel medicine laureates Bengt Samuelsson and Sune Bergström in the corridors. Curstedt did his thesis on phospholipids.

No cure was available

Premature babies lack a particular substance at birth, called lung surfactant. Surfactant starts to develop in the fetus at a very late stage, and not before around 10 weeks prior to birth. Without it, babies are unable to breathe and alveoli in the lung collapse.

This has been known since the end of the 1950s. However, by the beginning of the 1980s, nobody had succeeded in developing a cure.

Only when the idea of extracting surfactant from animals was tried was progress made. One of the first researchers to test the idea was Bengt Robertson, also a doctor and researcher at Karolinska Institutet.

As Robertson worked on cleansing samples, he sought help from Curstedt. Surfactant is primarily made up of phospholipids. By combining their knowledge of testing and purification, they both arrived at a substance that produced excellent results.

"AT LEAST ONE MILLION BABIES WOULD NOT HAVE SURVIVED WITHOUT IT. SO YES, THERE’S PLENTY TO BE TRIUMPHANT ABOUT."
The missing ingredient

Hundreds of tests on animals were soon completed with the new substance and with the same successful results. As news of their success spread, the pair realized that they lacked the right contacts to take their work to the market. "We looked at each other and realized that we lacked the right contacts to take their work to the market," says Curstedt.

But at the same time we knew we had recorded some great results, and how careful we’d been with our documentation. So there was just one question left: would we make it in time?

The first baby

Years later, in 2016, Curstedt was nominated for a Lifetime Achievement Award from the European Patent Office (EPO). Fellow nominees include Nobel laureates and leading innovators from all over the world. Curstedt’s nomination was big news in Sweden, and the Curosurf story spread across the country. The following morning, messages of congratulation flooded Curstedt’s inbox. But there was one email that stood out. And it started with the sentence: “I was the first one!” The sender was one Patrick Svensson, born 1983. “And when we counted back to that date, it was right. Patrik was the very first baby to receive our surfactant.”

That time, in 1983, they managed to purify just enough material to give the increasingly blue-looking boy a dose. And the results were extraordinary. Within an hour or so the boy’s normal colour had started to return and he could breathe unaided.

“I was a dramatic moment. We didn’t manage to document it in any way at the time, but when I met Patrik later he told me what his parents had told him about that moment,” says Curstedt.

Clinical trials of the substance were launched in the 1980s. A dozen clinics throughout Europe participated. The study soon proved so successful that it was discontinued early to allow more patients to benefit from the prospective drug.

But when Curstedt and Robertson approached Pharmacia to take the drug to market, they were turned down. The drug’s potential was considered too insignificant for the drug giant – an estimated SEK 200 million a year. “We were pretty disappointed. Neither of us wanted to start our own business.”

Robertson was in contact with a doctor in Parma in Italy who heard about our difficulties. The doctor knew two brothers who ran a small drugs company named Chiesi. And they wasted no time conducting the last study prior to it being ready, but it’ll be 2023 before a new drug is registered.

“It’s easy to be optimistic when you see such good results in the lab, he says. “Optimism is great, but in my experience things take a lot longer than you think.”

Despite his 73 years, Curstedt is still working. “Optimism is great, but in my experience things take a lot longer than you think.”

The drug Curosurf got its proprietary name through a merger of Tore Curstedt’s and Bengt Robertson’s name, as well as the substance surfactant. Curosurf = Curstedt-Robertson-surfactant.

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Research-based methods reduce time spent in care

The introduction of ERAS Society surgical guidelines results in reduced time spent in hospital and improved patient outcomes. The methods, which are being promoted by the company EnCare, have improved care provision in some 23 countries. One of the people behind the initiative was once a young surgeon at Karolinska University Hospital, critical of the status quo.

As a young doctor at Karolinska University Hospital Olle Ljungqvist questioned the advice given to patients that they should not drink fluids before operations. He argued that it would be preferable for patients to drink a special carbohydrate-rich preparation to activate their metabolism. “This gives patients more energy to recover following an operation - an extremely stressful experience for the body,” says Ljungqvist, surgical professor at Karolinska Institutet and Örebro University.

Several previous studies have suggested that there is no scientific grounding to the advice not to eat or drink prior to having an operation. Ljungqvist met an English surgeon, Kenneth C. Fearon, who felt the same way. The two of them pledged to improve patient care by using scientific methods to improve surgery. “Our goal was to review existing research to identify and compile everything that was shown to be beneficial for patients,” says Ljungqvist. Together, they set up a research group with members from Tromsø, Copenhagen and Maastricht, and after around 18 months the first guidelines were ready.

“We included everything that related to the patient care journey, from preparations to the surgery itself, anesthesia and post-op care - this hadn’t been done before,” he explains.

Adopted internationally
The work led to the founding of the international ERAS Society, an independent research association. Together, they have developed around 15 guidelines for different forms of surgery that have been adopted all over the world. Follow-up has shown that when all aspects of the care journey are conducted in optimal ways, total care time can be reduced by several days.

Alongside the ERAS Society, the company EnCare was founded with the task of developing an IT tool that could be used to implement and follow-up methods at clinics all over the world. “We have now created a high quality register focused on the patient process. When you document everything you do in relation to a patient, you can also see why you reach certain results. Improving healthcare remains our driving force, and today we share that with everyone who disseminates or implements our guidelines.”

Care time reduced
The next step is to use all the data that has been collected for further research. In this phase, large patient groups can be studied extremely effectively, which can lead to the development of more and improved guidelines. “We have also conducted comprehensive testing of our own guidelines to see whether they are accurate and the result is shorter care times and fewer complications.”

“Improving healthcare remains our driving force, and today we share that with everyone.”
Family business BioLamina has a unique technology for growing stem cells. It is an area that is currently experiencing strong growth and now the company is scaling up production.

“Within five years, BioLamina will have annual sales of SEK 100 million and employ about 50 people,” says Kristian Tryggvason, CEO. The company’s customers are primarily drug companies and research groups that develop new therapies with the help of stem cells. Researchers have already produced, among other things, new dopamine cells, heart cells and photoreceptor cells with the company’s products.

“We sell our products in conjunction with a great deal of knowledge. We also try to be a bridge between our customers who are highly specialised in their respective fields. We see our task as being a catalyst that brings cell therapy to fruition,” says Kristian Tryggvason.

A bold decision
BioLamina’s products build on many years’ research by Professor Karl Tryggvason, Kristian’s father. The fact that his father approved the commercialization of his own research results as BioLamina was bold,” his son says.

“Our business model means that the more we sell our products, the greater the academic rivalry is for our ongoing research.” But this is something that Karl Tryggvason seems happy with. “My ultimate goal has always been to develop new therapies, and BioLamina makes that possible on a much larger scale,” says Karl Tryggvason.

Following in his father’s footsteps
BioLamina’s solution for growing stem cells is based on so-called laminins, which are a form of tailored proteins. Covering surfaces that are used to grow cells with laminins, creates a natural environment where cells thrive. This also creates a safe environment that avoids the risk of contamination. The research took an important step forward at Karolinska Institutet after Karl Tryggvason was hired there in the mid-90s. Today, he is a professor at Duke-NUS Graduate Medical School in Singapore, where he leads his own research group.

“Amongst other things, we’ve succeeded in growing skin cells to treat burn victims, all based on BioLamina’s products. But it wouldn’t have been possible without Kristian,” Karl explains.

Kristian was unsure about following in his father’s footsteps. But when he saw the potential of being an entrepreneur instead of a researcher, his mind was made up. So he took the opportunity of building a company on the foundations of his father’s research.

“You could certainly say that I’ve realized my father’s dream of developing new therapies, but now it’s my dream as well. It’s hugely exciting to see all these groups around the world that are making real progress with the help of our products,” says Kristian Tryggvason.
 Spot on

SciBase improves the reliability of malignant melanoma diagnoses. The technique is used by skin doctors to support decision-making as an alternative to biopsies in cases of suspected skin cancer.

"Diagnoses are always made by a responsible doctor, but our technique can considerably improve safety and reliability," says Stig Ollmar, currently attached to the Department of Clinical Science, Intervention and Technology at Karolinska Institutet. SciBase instruments use microscopic gold-plated plastic bristles that are placed against areas of suspected skin alteration to measure the skin’s electrical characteristics. After about 10 seconds, a reading is given on the likelihood of a melanoma on a scale of one to 10.

Technological development of the method has continued since the 1980s. It all started when Ollmar was asked whether he could develop a way of measuring how different dental restorative materials affect mucous in the mouth. "Measuring impedance seemed the most promising approach."

A prototype was soon ready. After further research, the technique could be used to measure alterations in the skin. "When we saw how we could measure a difference between irritated and healthy skin - that was a real "wow" moment. After that we decided to go after the hardest target we could think of: malignant melanoma," he explains.

Approved in the US

SciBase was established in 1998 with the help of, among others, the Knowledge Foundation. Subsequent innovations have improved the method further and the technology was validated in a number of clinical studies. In 2015, the company was listed and in 2017, the technology was approved in the US. To date, SciBase is better known outside Sweden, but Ollmar hopes that the technique will soon be also accepted by local healthcare authorities in Sweden.

"You should never give up because someone else says what you want to do is impossible. You can always go further, but rarely in ways that you envisaged when you started," says Ollmar.

“YOU SHOULD NEVER GIVE UP BECAUSE SOMEONE ELSE SAYS WHAT YOU WANT TO DO IS IMPOSSIBLE.”
Putting a brake on Alzheimer’s

BioArctic is getting closer to producing a drug that substantially limits the development of Alzheimer’s.

BioArctic’s drug candidate is based on a discovery made at Karolinska Institutet back in 1998. This was when Lars Lannfelt received a letter from a local doctor in Umeå, northern Sweden, asking for help. At the time, Lannfelt was an authority on Alzheimer’s due to research he had carried out with, among others, Bengt Winblad, senior professor at Karolinska Institutet.

“I went there and met a family that had been hard hit by Alzheimer’s due to an inherited mutation, which we later named the Arctic Mutation, and that led us to the idea of a new therapy,” says Lannfelt, currently senior professor at Uppsala University.

Alzheimer’s is associated with the death of nerve cells in the brain, with sufferers affected by gradually deteriorating memory, finding it difficult to interpret their surroundings, to think and control movement. A damaging protein, amyloid-beta, builds up in the brain in the form of small lumps, known as plaque. Lannfelt’s idea was to prevent this build-up before it started.

“My idea was to attack the soluble forms of amyloid-beta, which we call protofibrils, that we saw in the Arctic Mutation. It’s the protofibrils that subsequently grow, expand and form plaque.”

Difficult to develop an antibody

Work started on the development of an antibody that could attack protofibrils, meanwhile Lannfelt took up a professorship at Uppsala University. Research continued there until 2005 at which point the researchers identified a candidate with the appropriate properties.

“It was difficult to develop an antibody because the amyloid-beta protein is highly sensitive to manage. We first had to develop entirely new technologies to do this,” says Lannfelt.

Lannfelt and Dr. Pär Gellerfors founded BioArctic when development was still at an early stage. Among the first investors was KI Innovations.

“You have to commit to what you believe in. I also applied early for a patent, which involved a lot of work and took about seven years to get approval. This is where you need to focus on commercial success because a patent is a business tool.”

Early treatments a key

The preliminary results of BioArctic’s Phase 2 trial, conducted with co-operation partner Eisai, came out last summer. The condition had been significantly slowed in around 80 per cent of participants to such an extent that they could no longer be diagnosed as having Alzheimer’s.

“It was extremely encouraging. I’ve always believed in this but having said that, there are so many unknown factors in the body. It turned out better than I could have ever imagined,” he says.

One of the keys to the treatment is that treatment starts early, something that is possible thanks to today’s advances in diagnostics. Today, BioArctic is a fully fledged research business that works closely with several universities.

“The Swedish universities are especially important for us. You need to surround yourself with good people, and accept that you can’t do everything yourself if you want to succeed.”

The next step is a Phase 3 trial to confirm the results before becoming an approved drug.
From cells to therapy via your own personal biobank account

Biobank Cellaviva offers parents-to-be the chance to store stem cells from umbilical cord blood and tissue at birth. Experiences from stem cell management have now led to the development of one of Sweden’s first cell therapy drug treatments.

But everything started with a pregnancy.

“When my wife Emma was pregnant, I read about stem cells found in umbilical cord blood. The idea of storing my child’s stem cells for future use fascinated me,” says Mathias Svahn, now NextCell Pharma CEO.

The option of storing stem cells from umbilical cord blood and tissue has long existed overseas, but Svahn did not feel comfortable about sending cells abroad. The alternative was to recover and store them himself. At the time, Svahn worked as a PhD student at Karolinska Institutet, and with colleagues’ help he succeeded in doing just this.

Today, he has saved stem cells from all three of his children. The experience led to Svahn founding Sweden’s first private family storage facility for stem cells, Cellaviva, in 2015. The bank now also has clients in Norway and Denmark. But this was never the ultimate goal of the project.

“As a researcher, there’s no great interest in simply collection and storage, I’ve always been thinking about what’s next. KI Innovations encouraged the team to set up a company, which they did, with founders including Hans-Peter Ekre, Karolinska Institutet professor Edward Smith and Lena Degling Wikingsson, currently CEO at Dilafor. The company received financial backing from Vinnova and drug company Diamyd Medical.

First study in Sweden

The next step was to apply learnings from running the biobank to developing a new cell therapy with the help of stem cells from umbilical cord tissue. Development work is currently being conducted in partnership with Diamyd Medical, and is focusing on type 1 diabetes.

“We’re conducting the first study in Sweden to have been granted approval to evaluate mesenchymal stem cells. The reason that this has gone so quickly is our partnership with the Karolinska Trial Alliance (KTA). With their support, we’ve been able to get the study underway in record time.”

The study on cell therapy drug treatment ProTrans is being carried out under the direction of stem cell researcher and diabetes specialist Per-Ola Carlsson, Uppsala University.

“Our hope is that ProTrans will be used to slow the onset of type-1 diabetes by inhibiting the immune system. This effect can also be used in kidney transplants to prevent rejection,” says Svahn.

There are also plans to open a bank for stem cells from adults. Here too, Svahn is set to be the very first account holder.

“We want to offer the option of recovering stem cells from fat tissue. Initially, we’re focusing on people planning to have liposuction. We’d be offering something that could be of value at a later date. So yes, I’m going to have liposuction done, with the aim of saving my own stem cells for the future.”
Working close to industry stimulates research

Top research is based on teamwork, with success derived from continually querying results. Pär Nordlund likens the work of a research director to the job of forming a talented corporate team.

“Heading a research group is like being an entrepreneur. You put together your team in a similar way to when you start a business, and you need to be extremely responsive to the people you surround yourself with,” says Nordlund, professor of oncology-pathology at the institution.

Under the leadership of Professor Nordlund, the team is responsible for a raft of research breakthroughs in medical biochemistry and biophysics. Many of them have become the basis for new companies that improve processes within drug development.

“We’ve achieved excellent research purely in academic terms. And I’ve always liked working closely with industry. This is how we’ve come to understand the challenges facing drug development today, and succeeded in providing a number of solutions,” explains Nordlund.

Spin-offs include Sprint Bioscience that was established in 2009. The background to this was a breakthrough known as fragment-based drug development, where knowledge about the molecular structure of individual proteins is used to build-up a drug molecule piece by piece.

A mechanism for drug discovery

“We now have a mechanism for drug discovery in place, with which we can introduce any sort of biological concept with the relevant characteristics. We offer both a platform and the right competencies to develop new drugs, which differentiates us considerably from other companies to come out of Karolinska Institutet”, says Jessica Martinsson, one of the five founders of Sprint Bioscience.

Setting up the company was made easier with advice from KI Innovations, and in its early stages, the company grew at KI Science Park. Today, Sprint Bioscience is stock market-listed and its some 30 employees work next-door to Karolinska University Hospital in Huddinge.

Combination of competences

Sprint’s strong performance shows how important it is to have the right combination of competencies, explains Martinsson.

“The most important thing is to get the right people in place from the outset. It’s so easy for things to go wrong early on. Then you need to continue to question your results. You mustn’t fall in love with your project and blind yourself to the task of trying to understand what’s happening and how something works,” says Nordlund.

Pelago Bioscience is the latest company based on Nordlund’s research. The business helps drug companies improve control of new drug candidate testing.

“We’ve created a general method for indicating when a drug binds to target proteins, which has not previously been available. Today, our method is used by most drug development companies,” says Nordlund.

The team has played a decisive role here too, he stresses.

“If you think you have a useful idea, it’s not before you start a company and meet your customers that you know what it’s worth,” says Nordlund.

“In parallel with the spin-offs, work continues on academic research.

“Starting a business makes the research just that bit more real, and of practical use. If you think you have a useful idea, it’s not before you start a company and meet your customers that you know what it’s worth,” says Nordlund.
Patient focus

Approximately five million cancer patients have received optimised radiotherapy with the help of RaySearch Laboratories. Today, the company is a global player, offering a management system that optimises the running of entire cancer clinics. And it all started with a Master’s thesis at Karolinska Institutet.

Work on his thesis brought KTH student Johan Löf to professor Anders Brahme at the department of medical radiation physics at Karolinska Institutet. The aim of Löf’s thesis was to improve the accuracy of radiotherapy to avoid damaging healthy tissue surrounding cancer tumors. The results were so good that the prestigious Inverse Problems published the research paper.

“The next step was to scale-up the method and model real patients, which I did in my Master’s work at Karolinska Institutet,” says Löf, CEO and founder of RaySearch Laboratories.

Up-scaling is still in full flow almost 20 years later. Today, RaySearch Laboratories is a research-driven company where around 160 of its almost 300 employees work on research and development. Around a third of these are PhD students.

“Early on I felt that we could have a major breakthrough with our results by starting a company than by simply continuing with the research and publishing results within academia,” says Löf.

Management of entire clinics

In addition to the RayStation planning system, the company recently launched the RayCare information system for operational management of entire cancer clinics. This was released in 2018 and is now operational in some of the world’s leading cancer clinics. Among the unique aspects of the system is that it can optimise combinations of radiotherapy, chemotherapy and surgery.

“The entire architecture is a teaching system and is set to revolutionise treatment by suggesting optimal treatment strategies. The world’s leading clinics want to work with us and believe in our vision of big data and machine learning. That shows that we’re on the right track,” says Löf.

Optimising care systems for entire hospitals

The next step is to take learnings from RayCare and apply them to an entire hospital. Existing healthcare information systems manage everything from daily clinical activity to operational planning. But Löf envisions how these could be improved, not least by paying greater attention to patients’ everyday lives.

“We want to make a contribution for those seeking healthcare but experience a lack of co-ordination and communication. This is where we can optimise care systems’ efforts so that they work in tune with the rest of patients’ lives,” says Löf.

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Tracking the risk for dyslexia in children

The eye movement of a child reading may indicate an increased risk of dyslexia or reading difficulties. This discovery led to the formation of the company Lexplore that today has operations in Sweden, the UK and the US. Now, the researchers behind the breakthrough are adapting the technology to identify early Alzheimer’s and Parkinson’s.

To date, some 40,000 children have been screened with Lexplore’s eye-tracking technology. Of those, around 10 per cent have been identified as pupils who need to have support from specialists in reading difficulties. The screening can be carried out considerably earlier than conventional dyslexia checks.

“Getting early support is crucial in cases of reading and writing difficulties because it makes it easier for younger students to develop their reading abilities than when they’re older,” says Mattias Nilsson Benfatto, associate professor at Karolinska Institutet, who founded Lexplore with Gustaf Öqvist Seimyr.

An archived study
The idea behind Lexplore was born when Öqvist Seimyr met professor att Karolinska Institutet, Nilsson Benfatto, associate professor at Karolinska Institutet, who founded Lexplore with Gustaf Öqvist Seimyr.

The pupils’ eye movement was monitored reading and writing difficulties at the beginning of the 80s: the Kronoberg Project, which monitored reading and writing ability among some 200 children from school age to adulthood. The pupils’ eye movement was recorded while they read with the help of cameras integrated into a large, bulky pair of glasses.

“The team were pioneers in the field and made use of what was the most advanced technology available at the time. The project was run by, among others, Dr Per Uddén who also invented the Permobil electric wheelchair,” says Öqvist Seimyr, senior researcher at Karolinska Institutet.

One of the researchers behind the Kronoberg Project revealed that all the recordings still existed, stored on analogue tapes in an archive. This set Öqvist Seimyr’s imagination running: he contacted his colleague Mattias Nilsson Benfatto. Both were computational linguists who had previously studied eye movement.

“We were able to pick up the trail after 20 years and review the same data but with new methods based on machine learning and AI. And we saw a difference in eye movement between those who became strong readers and those who did not. It was fascinating and suggested that it was possible to use to identify dyslexia in children at an early stage,” says Nilsson Benfatto.

Already at that point, with only preliminary results conducted, contact was made with KI Innovation.

“They were extremely encouraging and got us in touch with researchers who subsequently became the company’s first CEO. We hadn’t expected such a positive response because our field differs from the clinical research typically conducted by Karolinska Institutet,” says Öqvist Seimyr.

Larger study
Their primary focus, however, was not to start a business. Rather, they were set on finding ways of identifying whether the preliminary results could be replicated in a considerably larger study.

Vinnova provided backing that meant the study could be scaled up to 3,000 pupils in 2015-2016 and conducted in a classroom setting. And the initial results held.

Subsequently, analysis methods and technologies have developed further and today the products are used in Sweden, the UK and the US. Something that also means that the number of screened children was increased dramatically.

“Every screening is conducted by school staff and responsible administrators get an insight into future student needs. As results from the screenings are available so quickly, this can free-up time that can instead be used to support students experiencing difficulties, says Nilsson Benfatto.

“Our screening shows which pupils are at heightened risk of dyslexia and reading difficulties. Specialised teaching staff are then available to offer continued support.”

Early diagnostics of Alzheimer’s
In May 2016, the company received fresh backing from Vinnova to see, in collaboration with Karolinska Institutet, whether the methods could also be used to identify early Alzheimer’s and Parkinson’s.

“Research into the relationship between eye movement and these conditions has been conducted for a number of years, but we’re the first to have developed measuring techniques for this. And thanks to our time with Lexplore, we see commercialisation as a way of also disseminating this research into wider society,” says Öqvist Seimyr.
From clinical tool to increased learning in schools

Children who exercise their working memory also find it easier to concentrate. This was one of the key insights that Torkel Klingberg gained from developing a clinical training programme for children with ADHD.

The next step is a research-based tool to increase knowledge of mathematics among the world’s children.

Klingberg was recently in Seattle, USA, the guest of the Bill & Melinda Gates Foundation. The organisation supports healthcare and education projects worldwide and wants to gather knowledge about children’s learning within the field of cognitive neuroscience – a comparatively new area of which Klingberg is a founding figure.

“Us researchers are a little different, but I’m a “doer” who wants to make a difference with my work. So it’s extra-fun to work with children who themselves are going to have an impact on the future,” says Klingberg, professor in cognitive neuroscience at Karolinska Institutet.

Training working memory

It all started after his postdoc at Stanford, when he was doing research into children’s working memory. His findings suggested that working memory, which had previously been thought of as essentially static, could be trained to improve. At the same time, other research was published that showed that youngsters with concentration issues also struggle to retain working memory.

He made the connection between the two together with his PhD student Helena Westerberg to develop a training programme for children with ADHD.

“We joined forces with two programmers, Jonas Beckeman and David Sjölander, who had previously worked with toys and educational games. Together, we could demonstrate that working memory could be improved through training and a subsequent study also showed that training reduced children’s problems with concentration,” says Klingberg.

Following contact with KI Innovations, they received support to start the company Cogmed in 2001. By the time Cogmed was bought by US-based Pearson in 2010, the company’s training programme had been implemented in some 30 countries.

“We thought we would weave together the working memory training with the maths training, and do it on a scientific basis,” he says.

In collaboration with others, several studies were published that showed excellent results. Together with the Sonia and Mattias Westman family, Cognition Matters was established, a not-for-profit foundation that was tasked with developing new cognitive training tools, as the Ipad application Vektor.

“Today, we teach maths entirely non-verbally with the help of the free Vektor app that can be used from pre-school. We now have around 30,000 weekly users.

“We decided to be a foundation because, among other things, we wanted make our reach as wide as possible,” he says.

“In part, this offered financial opportunities, and partly we wanted to test a new approach. We also reach schools in an entirely different way with a free app because it reduces the barriers to use enormously.”

Alongside development work, research continues. The use of Vektor creates a knowledge resource that may lead to more effective methods. In several countries, including India, Mexico, Uruguay and Argentina, we’re participating in selected development initiatives to help the most disadvantaged children.

“Soon we’re starting a major study together with 80 schools in the Argentinean countryside. There is vast global potential among these millions of children that lack regular education. If we can give them that, it could mean so much for global development.”

QUICK FACTS

Popular science on the bookshelf

Torkel Klingberg has written several popular science books to spread knowledge about learning more broadly. The latest is “Hjärna, gener och jätter anamma: hur barn lar”.

He says that “popular scientific books can open doors to new areas, which is an incredible feeling for everyone involved.”

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When medicine meets technology

Professor Hans von Holst is in his element where different disciplines intersect – where medicine meets technology. This is where his ideas have helped create, amongst other breakthroughs, MIPS, a technology that improves the protective properties of everyday helmets. Since 2011, the company has delivered around nine million helmets worldwide.

The MIPS success story grew from frustration over the large number of head injuries that neurosurgeon Hans von Holst had to deal with. He contacted KTH researcher Peter Halldin, and together they developed the technology behind MIPS (Multi-Directional Impact Protection System). A MIPS helmet improves protection for children by reducing side impact and mimicking the brain’s own protection mechanism. “When we launched [MIPS] we faced criticism from established helmet manufacturers that saw us as a threat. But with the help of our ingenious CEO, we developed our solution so that it could be added to entirely standard helmets. Then things really took off,” says von Holst, senior professor at Karolinska Institutet and neurosurgeon at Karolinska University Hospital.

Today, the stock market-listed MIPS works with 78 helmet brands that have launched some 450 models equipped with the technology.

“Some people asked why we took out a patent and set up a company to develop our solution – why don’t you just release everything for free instead? But if we’d done that, nothing would’ve happened at all. If you really want to do preventative work with, for example, head injuries, you need a business plan to get anywhere,” he says.

HealthCap provided the company with support early on and got Karolinska Development involved with development work early on.

Multidisciplinary

His ability to think on a multidisciplinary level has resulted in von Holst having several “bridging” positions. At the same time as he was a neurosurgeon and a consultant at Karolinska University Hospital, he was professor of neuromics at KTH. He also headed work at the World Health Organization Collaborating Center for Neurotrauma at Karolinska Institutet between 1992 and 2006.

It was also a frustration that prompted the idea of forming BioServo Technologies. von Holst would meet patients who had weak hands, a condition that made their daily lives a struggle. Together with Jan Wikander, professor of mechatronics at KTH, von Holst developed a robot-glove that gave people strength in their hands.

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“This is a great example of “soft values” from healthcare meeting technological development and the result being unbelievably positive. Patients enjoy considerably greater freedom, which in turn boosts their self-confidence, when they don’t need to wait for homecare staff to do something as simple as make a cup of coffee,” he says.

Industry interest soon picked up, and BioServo Technologies currently has a product for the healthcare system, and one for industry where a robot-hand is used for increased lifting strength and injury recovery.

Today, the listed company works with, amongst others, General Motors and NASA, Airbus, Eiffage Infrastructures, JM and General Electric. BioServo Technologies’ development is supported by, among others, Sting (Stockholm Innovation & Growth).

Plenty of new ideas

Today, von Holst travels regularly to China to contribute to an innovation initiative backed by the government. One of the main aims of the programme is to create an innovation environment in the city of Nanjing. But what he’s really passionate about is promoting the development of rural areas in Sweden.

“Although I’m invited to China, it’s not there that I want my ideas to be developed. I’d prefer to see them come to fruition in a way that gives more people in sparsely populated areas the opportunity to stay where they are instead of moving to find work,” he says.

“There are plenty of new ideas around, and in most cases they rely on a combination of the disciplines of medicine and technology. “Those who criticise interdisciplinary approaches have forgotten that the entire surgical process is based on technical innovations. Today’s neurological intensive care would not exist without engineers. Furthermore, in the future it’ll be more and more important because healthcare is set to become increasingly hi-tech.”
Interdisciplinary teams are the key to success

Staffan Holmin has developed a microcatheter that delivers drugs and cells directly to the body’s organs via blood vessels. The next step is to take samples from organs that are hard or too risky to reach with other methods. The key to success is an interdisciplinary team with a variety of core skill sets.

The inspiration for creating an interdisciplinary team of highly talented individuals comes from Apple founder Steve Jobs, explains Holmin, professor at the Department of Clinical Neuroscience at Karolinska Institutet.

“"CRUCIALLY, KI INNOVATIONS PROVIDED COMMERCIALIZATION SUPPORT.""

"If you’re going to succeed in creating something new, you need to work together with talented people who offer a variety of skill sets. As a doctor, I could never have built this myself, my role was to identify and describe the need, as well as discuss design together with engineers and technicians,” says Holmin.

Thinking outside of the box

The need Holmin identified was to deliver drugs with greater precision than has previously been the case, preferably directly into the tissue of any of the body’s organs. The inspiration came from a Swedish discovery made in the 1950s: the Seldinger technique. It is the technique to ensure penetration of blood vessels to bring in a thin catheter in the vascular system. But why not use this approach to access arteries or veins when a microcatheter has reached the right organ in the body?

“Making a hole through the vessel wall, inside and out, has been something you always wanted to avoid. But we said that it could be easy and safe. It’s actually quite a simple principle, but it has never been tested before,” says Holmin.

Intensive technical development followed a series of successful animal tests. Other key figures alongside Holmin were Johan Lundberg, back then a doctoral student in the research group and Stefan Jonsson, professor of Material Science at KTH.

Commercialisation support

Crucially, KI Innovations provided commercialisation support with, for example, contracts and the patent application. The rights for the Extroducer technology were sold to Smartwise Sweden AB in 2015, which in turn signed a research and commercialisation agreement with AstraZeneca last year.

"medicall technology set for growth

Historically, Sweden has pioneered several medical technology innovations that have had considerable impact at a global level. Together with KTH professor Mats Danielsson and Region Stockholm research director Jan Andersson, Holmin has developed the MedTechLabs initiative, an interdisciplinary centre for medical technology research at BioClinicum at Karolinska University Hospital. At the centre, Karolinska Institutet, KTH and Region Stockholm collaborate on the creation of new research services in medical technology.

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Saving lives with a smartphone

In Sweden, there are currently some 21,000 volunteers ready to respond to help cardiac arrest victims. A smartphone alert system guides them directly to victims – often faster than ambulances. The service, the result of research carried out at the Centrum för Hjärtstoppsforskning, is now ready for export markets.

In the event of a cardiac arrest, an alert is triggered on the smartphones of volunteer lifesavers located within a radius of around 1,500 metres from the victim. Those who are able to do so, confirm the alarm and make their way as quickly as possible to the victim.

“There’s a fantastic willingness from society to contribute. I wouldn’t have expected this to be this big before we launched the service,” explains Jacob Hollenberg, associate professor and director of the Centre for Resuscitation Science at Karolinska Institutet.

Today, the system has been scientifically proven with excellent results. The research group has succeeded very well in publishing its results. In 2015, two articles were published in NEJM, and in 2017 one in JAMA.

“Text message-lifesavers [SMS-livräddare] make a vital contribution to the survival chances of cardiac arrest victims. This is a great example of applying modern technology, citizen engagement and research to save lives,” says Hollenberg.

Karolinska Institutet and KI Innovations encouraged the researchers behind the initiative to commercialise the idea early on to spread its benefits in society.

“Many researchers dream of being involved with implementing scientific discoveries that make a difference to people’s everyday lives. KI Innovations makes a genuine difference by helping us towards this goal,” says David Fredman, who today is operations manager for the service and previously worked on the research team.

**Now live in four regions**

The SMSlivräddare service is run and developed by the company Heartrunner Sweden, and is now live in four regions in Sweden: Stockholm, Västra Götaland, Sörmland and Västmanland, and the service could be introduced across the country.

“Every region that works with SOS Alarm [emergency medical dispatch service] on ambulance prioritisation and dispatch can opt in to activate the service in their region,” says Fredman.

Furthermore, the service has also been exported to Denmark, where it has been introduced in two of the country’s regions.

“We want to access the rest of Europe, but need to co-operate with local organisations to get any headway. Our task is not only to install the IT system, but to recruit volunteers and prepare emergency medical services for the fact that they will receive help on the ground.”

At first, there was concern that volunteers may prevent emergency staff from doing their job in critical situations. Something that has been shown not to be the case.

“No we have emergency medical services asking to be connected to the system because they see how it makes their job easier,” says Fredman.

**QUICK FACTS**

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When basic research has a clinical impact

Aerocrine developed the world’s first nitrogen monoxide test for asthma sufferers. Today, the product is used around the globe to monitor asthma symptoms and adjust medication accordingly.

However, it all started with a drop of fluid that became stuck in a tube. The plastic tube was connected to an instrument for measuring the level of nitrogen monoxide in different liquids.

“When I put the tube to my lips and blew to remove the drop, we noticed a reading on the nitrogen monoxide gauge. It was as simple as that – blind luck,” says Magnus Persson, MD, PhD, associate professor at Karolinska Institutet. In the early 1990s he was a researcher at Karolinska Institutet and Harvard Medical School.

Initially, there was doubt over the discovery in terms of whether exhaled air contains more nitrogen monoxide than inhaled air, and the research group looked for different flaws in the method. But the team soon understood that this track offered something new. “We realized that this effect had not been described before. And because everyone in the research group was a doctor, it didn’t take long for us to ask: did the levels change in the event of illness?”

Two different research groups, led by professors Lars Gustafsson and Kjell Alving, combined to start Aerocrine.

“This is a good example of basic research at Karolinska Institutet that has become a product used in lung clinics worldwide. It also forms the basis for how we identify, monitor and treat asthma,” says Persson.

About 10 years after the company was founded, British company Circassia Pharmaceuticals made a bid for Aerocrine, valuing it at approximately SEK 1.6 billion. But since then, Persson has moved on. He now devotes his time to board work with Danish, Swedish and US companies. But among the things he enjoys most is working with the research company Attgeno. The researchers behind Attgeno come from the same group at Karolinska Institutet who started Aerocrine.

“We’re developing a new drug based on the same research behind Aerocrine. As a doctor, I can help one patient at a time. But if you participate in the development of a new drug, you can help thousands of people.”

A target-searching cytotoxin

Oncopeptides has a new drug candidate for the treatment of a form of cancer of the blood, multiple myeloma, under development. KI Innovations played a key role in getting the project underway.

Oncopeptides was founded in 2001 by some of Sweden’s leading oncological, clinical and medical researchers. The innovation behind Oncopeptides builds on the development of a cytotoxin that searches for and targets a specific type of cancer cell. However, the development phase took longer than expected due to uncertainty surrounding its effectiveness.

“We then came into contact with the leading multiple myeloma research group at the Dana-Farber Cancer Institute, Harvard Medical School, that was able to confirm our results. They saw so much potential in the project that they wanted to take control completely. This spurred interest among Swedish investors and accelerated the pace of our work,” explains Rolf Lewensohn, professor of oncology at Karolinska Institutet, and consultant at Karolinska University Hospital.

Capital was soon raised in Sweden to conduct Phase 1 and Phase 2 trials in co-operation with, among others, the Dana-Farber Cancer Institute.

“We had early contact with KI Innovations who supported us with investment and contributed to business development and provided advice. We currently anticipate having a new drug ready in the next couple of years,” says Lewensohn.

Oncopeptides was listed in 2017, and work is now underway on the upcoming Phase 3 clinical trial.

“We had early contact with KI Innovations who supported us with investment and contributed to business development and provided advice. We currently anticipate having a new drug ready in the next couple of years,” says Lewensohn.

“An incurable cancer

Every year, close to 700 people in Sweden contract myeloma, a bone marrow cancer. It is a chronic condition, which develops in considerably different ways between individuals. While the condition is incurable, survival rates have improved every year in the past 10 years, thanks to the large number of new drug treatments that have been developed.

“Quick facts

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“It was an instructive journey that provided entirely new perspectives on the opportunities of achieving clinical benefit from discoveries, and showed how we can meet the university’s third responsibility, namely to work with society and industry.”

“One of the strengths behind Oncopeptides was that development was led by clinicians,” he says.

“This was a virtually unique situation because as it was us heading up the project, we understood the potential that lay in the use of the drug. It was a major advantage to have awareness of the patient’s perspective.”

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New drug treatment for the world's most common genetic conditions

Many years’ research has led Mats Wahlgren to a possible first drug treatment for acute manifestations of sickle cell anemia - a genetic condition that affects millions of people.

Wahlgren is known worldwide as a leading malaria researcher, and he has made significant contributions to the understanding of the disease. He is one of the founders of Modus Therapeutics, which was formed to search for a variant of the drug heparin that would not affect blood coagulation. Once the research group discovered how malaria made red blood cells aggregate, Modus Therapeutics was on the track of developing a solution.

“We developed a new substance that broke up blood cells, which could later be replicated in human testing” says Wahlgren, professor of parasitology at Karolinska Institutet. Findings from the malaria research have enabled Modus Therapeutics’ work in cell anemia.

Life-threatening disease
“There’s a fascinating connection between malaria and acute sickle cell anemia. Both cause similar cell aggregates in blood vessels and we believe that these can be broken down by our substance, sevuparin.”

Given the considerable medical need and the opportunities for a small biotech company to take this product to market, Modus Therapeutics has chosen to focus on sickle cell anemia.

Sickle cell anemia is a life-threatening illness and is one of the world’s most common genetic diseases. Every year some 300,000 children are born with the condition, the vast majority in Africa. Life expectancy is typically severely shortened, with many sufferers dying at around 40 to 45 years of age.

Closing the circle
“We’re in an unbelievably exciting phase right now. Our drug sevuparin, become the first to treat acute sickle cell disease manifestations, which otherwise can result in stroke and organ failure to name but two of the most severe consequences. A treatment would of course be in high demand from patients and the healthcare sector.”

There’s a historical resonance as well because it was at Karolinska Institutet that Erik Jorpes developed heparin in the 1930s, coveted specifically for its anti-coagulative effects. Heparin has since been used at every hospital around the world to protect people from blood clots. However, due to the risk of bleeding, it’s not possible to use it to treat a large number of conditions where its other blood flow promoting properties and anti-inflammatory effects are needed.

“In a way, we’re closing the historical circle with the development of sevuparin, which basically has the same chemical structure as its cousin, heparin, but lacks its anti-coagulative properties,” he says.

This makes it possible to use sevuparin to treat illnesses such as sickle cell anemia where bleeding represents a significant risk.

“Fantastic feeling”
“It’s a fantastic feeling to have come so far, but it’s been a long journey that has required a great deal of determination,” says Wahlgren, who continues: “We’re of course grateful for all the support we’ve received, especially from all those who have participated in our clinical studies and from our investors.”

Investors include Karolinska Development, HealthCap, Östersjöstiftelsen, Ergomed and Praktikerinvest.

First drug to combat sickle cell disease
Modus Therapeutics is developing a drug to treat severe sickle cell anemia - one of the world’s most widespread genetic conditions. Its founders include Mats Wahlgren, professor of parasitology at Karolinska Institutet. In 2016, development of the sickle cell anemia drug reached Phase II clinical trials, the results of which are due in the first half of 2019.

Quick facts

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QUICK FACTS

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KI Innovations’ mission is to inform and inspire Karolinska Institutet students and staff to take another look at their ideas and research results, a look from the perspective of patients and society. With the right support and advice these ideas can grow into fruitful innovations that can help solve challenges in today’s healthcare.

Our task is to provide each idea with the best possible support and network needed to harness its benefit for society. We strive to provide the support needed to transform ideas into innovations that can be implemented and make a genuine difference. This has so far resulted in many ideas ultimately having a significant influence on the development of today’s healthcare.

This booklet highlights a few of the many examples of how research at Karolinska Institutet creates value. It also highlights how innovation, by creating bridges to other fields of expertise, can enrich the research of the inventors. And it illustrates the impressive power of commitment that drives the inventors. Also, the creativity and drive from our idea-rich students is resulting in a raft of innovations. They provide fresh eyes and new solutions in situations we take for granted. This freedom of thought can offer unexpected ways to improve things.

We are here for all Karolinska Institutet staff. Our support is most useful when we are in a position to coach a project throughout its lifetime: from academic research results to commercial deal or product.

Our aim is to inspire others to make the step towards taking their ideas to the next level. There is so much to be gained - for individuals and for the development of society as a whole.

The wellbeing of tomorrow is built with the raw material of knowledge, and research is the engine that drives its development.

Our support is provided without any demand other than your commitment to succeed.

Lilian Wikström
CEO KI Innovations
The journey from a research breakthrough to an innovation that improves the lives for people can vary in any number of ways. We have collected a selection of such journeys from Karolinska Institutet in the fields of Diagnostics, Medtech, Biotech, Digital Health, Social Innovation and Pharma. We hope that every one of them gives you an inspirational snapshot of the process that takes ideas to innovation.