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Karolinska Development

A unique investment company

A life sciences investment company

Karolinska Development is an investment company that focuses on businesses in the Nordic life science environment. The company has a long history on the stock exchange, but has undergone major operational and financial changes in recent years and has strengthened its position. We are able to see attractive aspects of Karolinska Development's management, its portfolio of companies and its valuation.

Attractive portfolio

Karolinska Development today consists of a focused portfolio of high-quality projects. It is close to the Nordic research world, and its management has an attractive combination of financial and medical expertise. We believe the company is well positioned for a continued successful investment journey.

Attractive valuation

At current levels, Karolinska Development is trading at a substantial discount to its net assets. We value the portfolio companies using a mixture of book value, market value and model-based value. Our sum-of-the-parts approach indicates a value of SEK 6.00-6.20 per share.

Estimate Changes (SEK)

	Now	Before	
EPS, adj 21e	1	1	0.0%
EPS, adj 22e	-0.18	-0.18	0.0%
EPS, adj 23e	-0.18	-0.18	0.0%

Calendar Events

Q3	2021-11-18

Key Figures (mkr)

Number of Shares	175.7m
Market cap	674
Net Debt	58
EV	731
Free Float	37.00%
Avg. No. of Daily Traded Sh.	269.0(k)
Reuters/Bloomberg	KDEV.STf/KDEV:SS

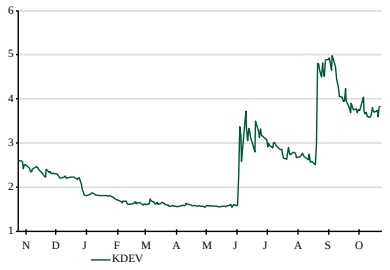
Estimates (SEK)

	20	21e	22e	23e
Sales,m	3	3	3	3
Sales Growth	(21.7)%	(5.2)%	0.4%	0.1%
EBITDA, m	(201.7)	171	(26.6)	(26.8)
EBIT, m	(202.4)	170.0	(27.3)	(27.4)
EPS, adj	(1.18)	1.00	(0.18)	(0.18)
EPS Growth	(128.9)%	(184.5)%	(118.4)%	0.2%
Equity/Share	4.6	5.6	5.4	5.2
Dividend	0.00	0.00	0.00	0.00
EBIT Marginal	(7,635.8)%	6,767.8%	(1,080.2)%	(1,087.2)%
ROE (%)	(25.9)%	18.0%	(3.4)%	(3.6)%
ROCE	(22.7)%	15.7%	(2.4)%	(2.5)%
EV/Sales	275.92x	291.19x	289.94x	289.74x
EV/EBITDA	(3.6)x	4.3x	(27.5)x	(27.3)x
EV/EBIT	(3.6)x	4.3x	(26.8)x	(26.6)x
P/E, adj	(3.2)x	3.8x	(20.9)x	(20.8)x
P/Equity	0.8x	0.7x	0.7x	0.7x
Dividend yield	0.0%	0.0%	0.0%	0.0%
FCF yield	(1,252.4)%	(1,269.8)%	(1,396.4)%	(1,342.2)%
Net Debt/EBITDA	(0.0)g	0.4g	(4.0)g	(5.2)g

Risk and Potential

Motivated value	**6.00 - 6.20**
Current price	SEK3.84
Risk level	High

One Year Performance Chart



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Overview

A unique investment company

Investment Case

From being a company with a broad portfolio, few exits and an unfavourable financing structure, Karolinska Development has since 2016 pushed through extensive restructuring on multiple fronts. The company has now transformed into an investment company with a clearly defined strategy and a new team with extensive and relevant experience, while its financing solutions have been significantly improved. We see several attractive operational and financial aspects to Karolinska Development:

- Access to unlisted companies originating in the Nordic research world, where direct investments are only available to selected investors.
- A natural diversification of the portfolio in that Karolinska Development has a large portfolio of listed and unlisted life science companies.
- Attractive valuation.

Company Profile

Karolinska Development is an investment company that invests in Nordic life science companies. Its strategy is to be an active owner in medical companies with pharmaceutical projects or medical technology products that have great commercial potential. Karolinska Development's acquisition strategy is facilitated by its proximity to the Nordic research world, access to an extensive network of people who can be appointed to the portfolio companies, and a combination of medical and financial expertise.

Karolinska Development was founded in 2003 and early on had a clear connection to the Nordic research world. After eight years of operations, the company was listed on the stock exchange in 2011. Since 2017, Karolinska Development has an updated acquisition strategy, new management and more advantageous ownership and financing structures in the portfolio companies. We believe that Karolinska Development has a good outlook for a continued successful investment journey.

Historically, Karolinska Development has had a portfolio that, among many others, has included Oncopeptides, Aprea, X-spray and Bioarctic. At present, the portfolio of companies in KDev Investments consists of Aprea, Modus Therapeutics, Dilafor, Promimic and Biosergen.

Valuation approach

We value Karolinska Development using an SOTP approach. Dilafor and Umecrine Cognition are valued using separate valuation models with individual assumptions, see the valuation section for details. We value other companies either at book value (adjusted for an estimated reasonable premium), or using the last price paid for listed companies. The reasonable premium is estimated relative to listed investment companies in the sector and other investment companies in general. Our total fair value of Karolinska Development's stakes in the portfolio companies is then adjusted by dividends to joint ventures, net debt and discounted future operating costs to generate a fair value. We see a fair value of SEK 6.0 – 6.2 per share.

Introduction

Karolinska Development has a long history as an investment company in the Nordic life science sector. Its proximity to the Nordic research world and advanced medical know-how alongside financial expertise give Karolinska Development good prospects of being able to conduct a successful investment journey. Since 2016, the company has changed its structure, including a redemption of its convertible loan and the structural arrangement involving joint ownership with Rosetta.

Investment strategy

Karolinska Development's strategy is based on investments in pharmaceutical projects and medical technology products with significant commercial potential. Through its proximity to the Nordic research world and its combination of good medical and financial expertise, Karolinska Development is positioned to identify and invest in attractive projects. Karolinska Development also has knowledge of the market potential and conditions for commercialization of the portfolio companies. Its acquisition strategy has developed from its historical design, and today is characterized by a clear vision for investment, management and divestment, while the portfolio is more concentrated.

Karolinska Development invests in companies in a relatively mature phase that are close to IPO or already listed. This means that it normally invests in companies that can take their projects to a Phase II stage within a few years. The phase II stage provides indications of the potential effects of a drug, and is therefore indicative of the commercial potential. Through a traditional VC-like approach, it invests together with specialist investors, normally VC companies, with an active strategy that involves appointing board members and participating in business development. By making VIPE investments, Karolinska Development also has a strategy for identifying undervalued listed companies on the Nordic stock exchanges. This type of investment also entails greater ownership, with an active board role.

Karolinska Development typically invests in companies where the potential is very high for a project to reach commercialization. However, there is a large risk that projects will not reach the market, which means that a typical project has great potential at high risk, and the projects normally have a binary outcome. However, the potential in lucrative projects is often so great that a single successful project compensates for a large number of projects that do not achieve commercial status. Karolinska Development also works with development programmes to identify new indications for the projects, with the aim of reducing the risk profile by increasing the number of areas of use for a project.

Karolinska Development's strategy normally includes a plan for exit after successful phase II trials or in the early commercialization phase, normally within 3-4 years. Karolinska Development invests through syndication with other leading specialist investors in life science. An example of this is Forendo, where it has invested together with Novo Seeds, Sunstone, Vesalius, Novartis and M Ventures. Karolinska Development's checklist for investments in drug discovery companies is as follows.

- *Potentially revolutionary medical innovations with clear competitive advantages*
- *Management team and board with extensive experience and knowledge*
- *Well-defined strategy for achieving regulatory approvals*
- *Well-defined strategy for commercializing the product*
- *Potential for market exclusivity through strong intellectual property platform or orphan drug status*
- *Opportunity to syndicate investments with other international life science investors*
- *Potential to list or sell the investment within a reasonable time*

Three parts of the strategy

In the past, Karolinska Development had a broad portfolio consisting of 30–40 companies, and the company in its previous structure did not necessarily have the financial scope to fully support the portfolio companies. Before 2016, Karolinska Development had made only one exit. Given the company's current positioning, it is clear that it has made an operational change to now having good potential to assist and facilitate the development and commercialization of the portfolio companies. The acquisition strategy is described in more detail below.

Identification

Karolinska Development has expanded access to potential acquisition targets through its proximity to universities and research institutions, not least the Karolinska Institute. Companies affiliated with the Karolinska Institute are able to benefit from the nearby cluster to handle issues related to business development, networking and financing. For example, the institute's incubator, KI Innovations, helps start-up companies to find financing solutions and investors. The proximity to KI therefore gives Karolinska Development the opportunity to screen companies that match its selection criteria. Karolinska Development bases its selection on three main verticals, which are drug discovery companies, medical technology and e-health.

One strength of Karolinska Development's acquisition strategy is the combination of medical and financial expertise. The investments are typically made together with specialist investors, such as VCs. Collaborations lead to increased access to capital, broader expertise and a larger network. The combination of financial and medical know-how is a strength as many potential portfolio companies lack the knowledge of business combinations and the opportunities to commercialize a project. The proximity to the companies, the phase of the acquired targets, the medical expertise and the business know-how mean that Karolinska Development is able to acquire new portfolio companies at multiples that we regard as very attractive.

Ownership

As a shareholder, Karolinska Development is active in its portfolio companies. It has good access to a network of experienced business leaders with relevant backgrounds, and is therefore able to appoint the right management in the portfolio companies. An example is Simon Cartmell, who is chairman of OSSDSIGN. Simon was appointed in 2016 and has previous experience as the CEO of British ApaTech, where he was involved in the sale of the company in 2010.

In addition, Karolinska Development helps with the design of studies and the evaluation of potential new indications. We believe that the broad experience and knowledge at Karolinska Development is a significant asset that means lower risk in the portfolio companies. For example, Karolinska Development has extensive experience of study design and issues related to commercialization.

Exit process

Since 2016, Karolinska Development has made exits from a large number of portfolio companies. Although it has a concrete exit strategy, divestments of portfolio companies can have opportunistic elements. For pure pharmaceutical projects, the ambition is to reduce ownership once the portfolio company has reported positive phase II data. For medical technology companies, Karolinska Development reduces its ownership after an initial product launch and once the company is cash flow positive. As to the form of divestment, Karolinska Development has a track record of both IPOs and divestments. In our assessment, the company mainly intends to divest portfolio companies, with IPOs as an alternative.

Team

The investment team is central to successfully managing the portfolio. We see great strength in the experience and knowledge of Karolinska Development's team. One strength lies in their background from the research world, which provides an understanding of the effect and market potential of a drug candidate. We also regard the financial background of people like Viktor Drvota as a significant asset, including his background at SEB.

Viktor Drvota, CEO

Viktor took office as CEO in June 2017 and was Chief Investment Officer 2016-2017. Viktor is a licensed medical doctor and an associate professor of cardiology. Viktor has more than 17 years of experience in the venture capital industry with a focus on life science. He has experience of transactions, IPOs and capital raising for companies in the industry. During 2002-2016, Viktor was responsible for life science investments at SEB Venture Capital. During that period, Viktor was on the boards of Arexis AB, SBL Vaccin AB, Nuevolution AS, InDex Pharmaceuticals AB, Scibase AB and Airsonett AB.

Per Aniansson, CFO and Investment Director

CFO since 2021 and has previously been CEO of two medtech companies and CFO in another VC backed start-up. He has been responsible for investments in multiple areas at Fouriertranform AB and has held board positions at OssDsign AB, Scibase AB, Renewcell AB, Powercell AB, SmartEye AB and AAC Clydespace AB.

John Öhd, Chief Scientific Officer/Venture Partner

Appointed 2020 and has several years of experience in drug development in areas such as CNS, cancer and blood disorders. He has held several leading research roles at companies such as AstraZeneca and Medivir, and was Chief Medical Officer at Modus Therapeutics.

Johan Dighed, General Counsel and Deputy CEO

General Counsel since 2020 and previously Head of Legal at German bank SEB AG and Legal Counsel at SEB AB. Prior to that, he worked at the law firm Baker & McKenzie and in the Swedish Judiciary.

Yan Cheng, President Asia
Appointed 2020 and has many years of experience in the venture capital industry with a focus on European life science. He has acted as an advisor to European life science companies on business development, especially in technology transfer and merger and acquisitions activity between Asia and Europe.

Linda Spahiu, Investment Manager

Linda has 13 years of experience from the Life Science industry. She received her PhD from the Karolinska Institute, has worked with strategic management consulting at Boston Consulting Group, and was CEO of a Swedish start-up in cancer diagnostics.

History

Karolinska Development was founded in 2003. Until 2011, the company had a high investment rate and more than 1,300 innovations were evaluated. The high pace meant that the portfolio was diverse, and at the IPO in 2011 Karolinska Development had 27 companies in its portfolio, with 36 projects. At the IPO, Torbjörn Berke was CEO.

In 2012, Karolinska Development began a collaboration with Rosetta Capital, a British VC that invests in life science. Through this arrangement, Rosetta Capital acquired a minority stake in Karolinska Development's portfolio companies. At the time of the investment, Rosetta acquired a minority stake in 13 of the portfolio's 25 companies for SEK 220 million. The arrangement meant that Rosetta Capital was entitled to a portion of the return generated in the portfolio companies according to a predetermined structure (see the valuation section below for details).

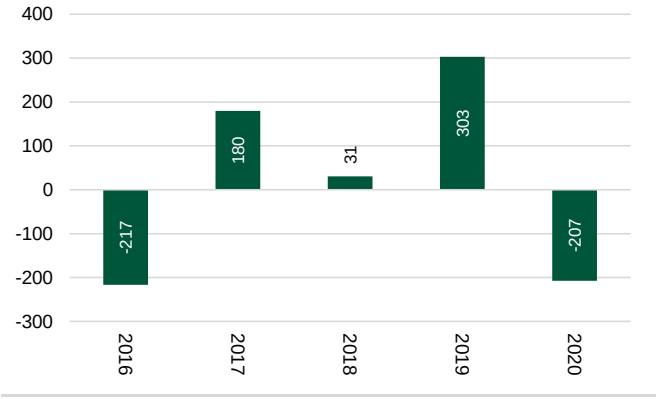
In 2014, a strategic shift began as Karolinska Development divested portfolio companies that had a low level of innovation and low commercial potential. The strategic work also included improving the potential of the remaining companies, partly by increasing the number of indications for them.

Convertible loans and financing
In 2015, Sino Biopharmaceutals entered as a major owner by participating in the signing of a convertible loan. Convertible loans mean that holders or issuers can demand conversion to shares. Karolinska Development's convertible from 2015 attracted a nominal interest rate of 8% with an exercise price of SEK 22. Given that the share price was significantly lower than this for a long time, the probability of an imminent redemption around 2018-19 was low.

The convertible (KDEV KV1) was then redeemed in 2019. The major shareholders that owned a total of 96% of the loan agreed to participate in the set-off procedure, which initially included 87.5% of the loan. As a result, Karolinska Development was released from the relatively expensive financing, which opened the door to a continued acquisition journey.

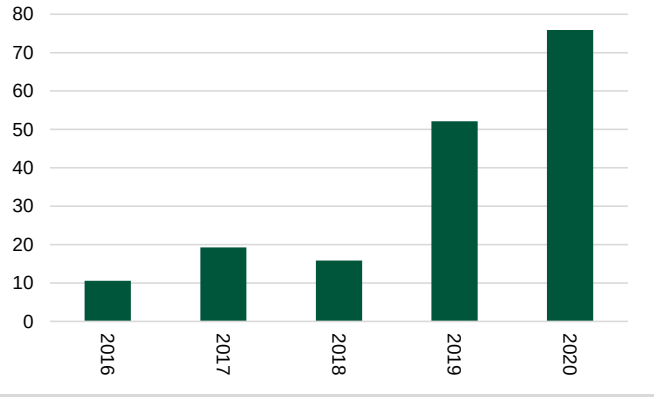
In 2017, the portfolio consisted of ten companies, all of which matched the sought criteria following the operational changes. Karolinska Development reported a positive annual profit in 2017, which further underlined the success of divestments of the portfolio companies. In 2019, Karolinska Development conducted a private placement to Sino Biopharmaceuticals with the aim of redeeming the convertible loan. In 2019, the convertible loan was approximately SEK 484 million and after a major effort Karolinska Development was able to repay it in January 2020. This meant that investments no longer needed to include the same sharing structure with Rosetta Capital that was previously the case.

Profit after tax (SEK m)



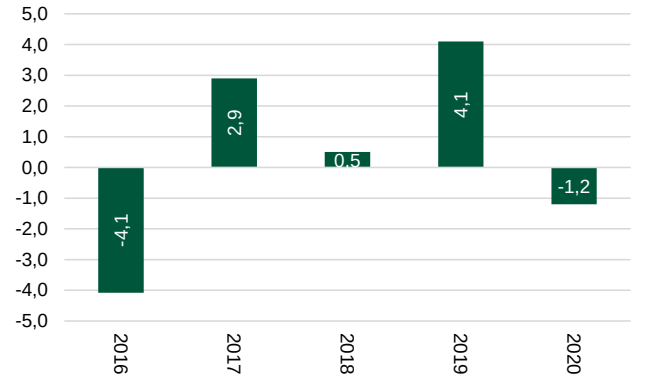
Source: Company reports

Cash and cash equivalents (SEK m)



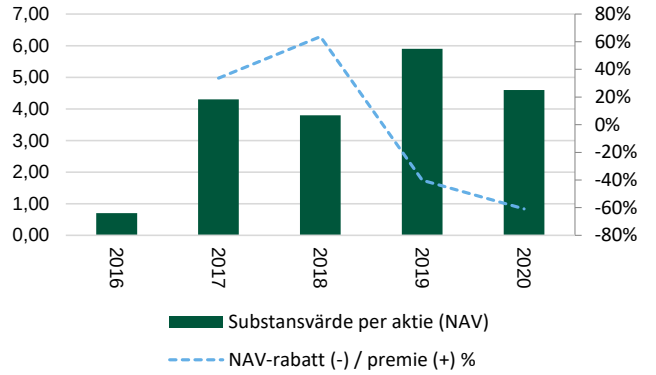
Source: Company reports

EPS (earnings per share, SEK)



Source: Company reports

NAV (SEK), discount (%)



Source: Company reports

Strong track record

During the period from 2016 until Q3 2021, Karolinska Development conducted seven IPOs: BioArctic, Asarina Pharma, OssDsign, Aprea Therapeutics, Xspray Lipidor and Modus Therapeutics.

BioArctic

Karolinska Development made its first investment in BioArctic in 2005 and invested a total of SEK 0.6 million in the company. In 2017, Karolinska Development made a partial exit at a realized value corresponding to 80 times the initial investment. In 2018, the entire holding was then sold.

Earn-out agreement in Xspray

In 2005, Karolinska Development joined with KCIF Co-Investment Fund in Xspray. When Karolinska Development sold its shares in 2015, it entered into an earn-out agreement with the buyer. The agreement gave Karolinska Development the right to 3.75% of the total number of shares in the company, provided that certain criteria were met. The company received these shares, and they were sold for a value corresponding to SEK 13.3 million.

Aprea Therapeutics

In 2019, Aprea Therapeutics was listed on the US stock exchange at a valuation of USD 288 million. The offer to the public at IPO corresponded to 5.7 million shares. Prior to the IPO, Karolinska Development owned 13% of the shares in Aprea, and the net profit that Karolinska Development made in connection with the IPO amounted to SEK 58 million.

Portföljbolag

Dilafor

Dilafor is a pharmaceutical company that develops the drug candidate Tafoxiparin for obstetric indications. Tafoxiparin acts mainly on the cervix of first-time mothers. Tafoxiparin is used to initiate labour by softening and enlarging the cervix. The drug candidate thus has the intended effect of speeding up the birth and minimizing the risk of prolonged childbirth and associated complications. About a quarter of all pregnant women receive treatment to initiate labour, but more than half of the treatments currently fail, leading to protracted labour.

Tafoxiparin has been shown to have a statistically significant positive effect, leading to shortened delivery time and an accelerated ripening of the cervix. In June 2021, Dilafor reported positive results from its phase IIb study of tafoxiparin. Dilafor conducted a double-blind, placebo-controlled phase IIb study involving 170 first-time mothers. The effect of the drug candidate was evaluated as the score on the Bishop scale, which is used internationally to measure cervical ripening.

Dilafor	
Project	*Tafoxiparin*
Primary indication	*Birth induction*
Development phase	*Fas 2b (positive results june 2021)*
Owned by	*Kdev Investments 30%*
	Karolinska Development 1%
Other large shareholders	*Östersjöstiftelsen, Opocrin*
Origin	*Karolinska Institutet*

Source: Karolinska Development

Dilafor now intends to continue with an extended phase IIb study to further document the effects of tafoxiparin. For tafoxiparin in the induction of labour, the plan is to initiate a phase III study in 2022 and to obtain regulatory approval in 2025.

Dilafor: The market

An estimated one-quarter of all pregnant women require an induction of labour. Current treatment methods include Oxytocin, a hormone that controls the strength and frequency of cervical contractions. Treatment with Oxytocin has mental and physical effects. Prostaglandin is a drug that accelerates the cervical ripening and has been used since the 1980s. In more than 50% of cases, these two treatments lead to failed induction or extended delivery and emergency caesarean section. No new alternative has been presented since the 1980s, and the existing treatment methods have an FDA “black box” warning. This means that the existing drugs are judged to be able to cause potentially fatal side effects.

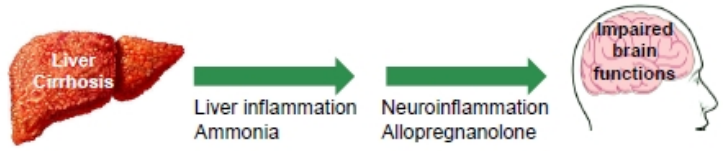
The market in the United States consists of 75 million women of childbearing age. In Europe, the same figure is 117 million. The annual growth rate in the US is 0.3%, and in Europe -0.7%. In the USA, about 3.7 million births take place annually (5% of women) and in Europe the same figure is 4.2 million (3.6%). The value of the market amounts to more than USD 1 billion annually in the United States alone.

Dilafor: Management and board

The CEO of Dilafor is Lena Wikingsson. Lena has a PhD in pharmaceutical science and more than 20 years of experience in the pharmaceutical industry. She was previously CEO of Independent Pharmaceutica AB and Avaris AB. She has also held leading positions at Avaris AB, Eurocrine Vaccines AB, and has held positions at SBL Vaccines and Accuro Immunology.

Umecrine Cognition

Umecrine Cognition is a Solna-based company that develops drugs used to treat diseases of the central nervous system. In practice, patients who have suffered from reduced liver function get what is called brain fog, a condition that results in limited cognition and impaired sleep. The condition is due to overproduction of a steroid in the brain, in what is called the GABA system. The company's drug candidate counteracts the increased activation of the GABA system, which in turn should lead to a reduction of brain fog in these patients.



Cirrhosis of the liver can cause hepatic encephalopathy, which leads to impaired cognitive ability

In 2020, Umecrine Cognition completed a phase IIa study of the drug candidate Golexanolon. The company presented positive data for Golexanolon for the indication hepatic encephalopathy (a neurological disorder in liver disease) at The Liver Meeting Digital Experience in November 2020. The study showed that Golexanolon is tolerated, safe and exhibits beneficial characteristics. Another effect that could be discerned was that Golexanolon had a significant effect on changes in brain activity through improved reaction time (CRT), normalized brain signalling (EEG) and improved sleep status (ESS).

Umecrine Cognition is scheduled to begin phase II studies in 2022. One study will examine patients with hepatic encephalopathy (HE) and another phase II study will look at patients with primary biliary cholangitis (PBC). Karolinska Development announced in 2021 that it intends to list Umecrine Cognition. The company intends to raise capital in connection with the IPO. The purpose is to use the capital raised to finance the further development of the drug candidate. The listing is planned on First North Growth Market.

Umecrine Cognition	
Project	*Golexanolon (GR3027)*
Primary indication	*Leverencefalopati*
Development phase	*Fas 2a*
Owned by	*Karolinska Development 70%*
Other large shareholders	*Norrlandsfonden, Fort Knox Förvaring*
Origin	*Umeå Universitet*

Source: Karolinska Development

Umecrine Cognition: The market

In the EU and the US, patients with cirrhosis make up about 1% of the population. About 180,000 and 290,000 patients with cirrhosis are admitted annually due to problems related to hepatic encephalopathy. The mortality for advanced HE is 22-25% after five years. The total cost of HE in the US was estimated in 2009 at USD 2 billion. The company estimates that breakthroughs in the market could have a major commercial impact.

Umecrine Cognition: Management and board

The CEO of Umecrine Cognition is Magnus Doverskog. Magnus has a PhD from KTH and previous experience from Astra Pain Control, Biovitrum and as CEO of IMED AB. Magnus has more than 20 years of experience in drug

discovery. Torbjörn Bäckström sits on the board. He is the founder and also a professor at the Department of Clinical Science at Umeå University.

The CDO is Eva Arlander. Eva has extensive experience from AstraZeneca, Medivir and Affibody. She has led development of products from phase II to commercial status. Lars Öhman (CBO) has extensive experience in the drug discovery industry and more than 25 years of experience in research and business development. Lars was responsible for project development at Karo Bio between 2004 and 2012. Viktor Drvota from Karolinska Development is a board member.

SVF – Svenska Vaccinfabriken

Karolinska Development invested in Svenska Vaccinfabriken during 2020. Svenska Vaccinfabriken develops therapeutic proteins and DNA vaccines against hepatitis B and hepatitis D, as well as vaccines to prevent infections by SARS-CoV-2 and potential future coronaviruses. Despite the availability of preventative vaccines and antiviral treatments, over 250 million people live with a chronic hepatitis B infection. One million chronic carriers die each year due to complications caused by the virus, such as liver cirrhosis and liver cancer. Svenska Vaccinfabriken aims to develop a therapeutic vaccine that, unlike today's preventive vaccine, can cure already infected patients. Drug candidate SVF-001 shows good results in studies on mice. Mice with human liver received antibodies to SVF-001 and then showed complete protection against hepatitis B and D.

Svenska Vaccinfabriken has a proprietary immunotherapy to produce a specific type of antibodies that block the hepatitis virus' ability to invade human cells. The company has shown promising efficacy in a preclinical animal model and currently has the goal of initiating a phase I study in 2021. SVF has also developed a platform that is expected to be used to quickly produce vaccines against current and potential future forms of coronavirus. The platform has been developed by researchers at the Karolinska Institute in Huddinge. Svenska Vaccinfabriken's business model is to run vaccine projects to clinical development phase and then license them to large pharmaceutical companies with established distribution networks. SVF's business model thus means that licensing takes place before the costly clinical development projects begin.

SVF - Svenska Vaccinfabriken	
Project	*SVF-001*
Primary indication	*Hepatit B och D, SARS-CoV-2*
Development phase	*Preklinik*
Owned by	*Karolinska Development 31 %*
Origin	*Karolinska Institutet*

Source: Karolinska Development

SVF - Svenska Vaccinfabriken: The market

Svenska Vaccinfabriken is currently concentrating with its platform on the market for therapeutic vaccines against hepatitis B and D as well as preventive vaccines against viral diseases like Covid-19. The WHO has estimated that there are 250 million people globally living with chronic hepatitis B. Estimates have been made about the annual value of the market for hepatitis B at USD 4-5 billion, a value that in 2023 is expected to amount to USD 5-6 billion. The market for hepatitis D is estimated at about USD 1 billion. The market is relatively competitive, and competitors include both international pharmaceutical companies and smaller biotechnology companies.

SVF: Management and board

The CSO and founder is Matti Sällberg. Matti is a professor at the Karolinska institute, head of the department of laboratory medicine at KI, and a board member of Prebona. He has more than 20 years of experience in vaccine development. SVF's CEO is Jens Bäck. Jens has more than 15 years of experience from large pharmaceutical companies, and extensive experience of launching and marketing drugs.

Promimic

Promimic manufactures and markets a coating for medical implants. Promimic's HAnano Surface coats the outside of the implant and stimulates better bone growth, which improves the anchoring strength. The coating can be applied to all types of implant materials and geometries, including porous materials and 3D structures, and thus covers all areas where implants are used that need to quickly integrate with the bone. In 2019, Promimic received its first FDA approval for an orthopaedic implant that used HAnano Surface.

The HAnano Surface is nanometer-thin, which helps to preserve the structure of the implant and reduces the risk of cracks in the coating. The technology is FDA-approved, which means that new implants coated with HAnano Surface can receive market approval via the 510(k) process. The coating process is easy to introduce in the industrial facilities that manufacture implants. HAnano Surface helps to reduce costs and improve the products for implant companies. Through the company's surface treatment of implants, manufacturing companies need invest only one tenth of the cost of a traditional process for treating implants.

Promimic has a sales operation in the USA and a number of partnerships for development and commercialization. One example is the collaboration with Sistema de Implante Nacional (S.I.N), a leading supplier of dental implants in Brazil that works with the commercialization of dental implants coated with HAnano Surface in countries including the USA. In June 2021, it was announced that Promimic was investigating the possibility of a listing on Nasdaq First North Growth Market. The listing is scheduled for 2022.

Promimic	
Project	*HAnano surface*
Primary indication	*Implants*
Development phase	*Market*
Owned by	*KDev Investments 20%*
Other large shareholders	*K-Svets Ventures, ALMI Invest*
Origin	*Chalmers tekniska högskola*

Source: Karolinska Development

Promimic: The market

Promimic's customers are all manufacturers of implants. These include orthopaedic companies that manufacture implants for knees, shoulders and backs, and dental implant companies. The markets for dental and orthopaedic implants have an estimated value of USD 600-800 million. The implant industry is large and fast-growing, and has high margins. All market segments typically have 4-8 major dominant global players. Large players normally have a strategy based on applying new technologies in their implants, and Promimic licenses its technology for application to the products sold by the market-leading players.

Promimic: Management and board

The CEO is Magnus Larsson, who was appointed in 2017. Magnus Larsson has a background in sales and marketing and has held multiple positions at global companies operating in the market for dental implants. Among other things, Magnus was responsible for Global Market Development at Dentsply Sirona Implants.

OssDsign

OssDsign designs and manufactures implants and material technology for bone tissue repair. OSSDSIGN Cranial and OSSDSIGN Facial are already commercial and are sold in several markets in Europe, including Germany, the UK and the Nordic countries. Outside Europe, the products are sold in countries including Singapore and Israel. The company is commercializing its cranial implant in the United States and is also working with regulatory and commercial activities in Japan. The company is headquartered in Uppsala.

OssDsign carried out a rights issue during May 2021, which raised SEK 270 million before transaction costs. The company has recently launched an addition to its product portfolio in the form of OssDsign Catalyst, a new synthetic bone graft based on a nanocrystalline structure and chemistry. The product is designed to stimulate the growth of healthy bone tissue, and is approved for sale in the United States. The estimated US market value is USD 2.6 billion.

OSSDSIGN	
Project	*OSSDSIGN Cranial & Facial*
Primary indication	*Kranieimplantat, bengraftsubstitut*
Development phase	*Market*
Owned by	*Karolinska Development 10%**
Other large shareholders	*SEB Venture Capital*
Origin	*Karolinska Sjukhuset, UU*
Source: Karolinska Development	** (inkl KCIF)*

OssDsign: The market

OSSDSIGN focuses on the market for craniomaxillofacial implants. The value of this market was estimated at USD 1.8 billion in 2016, and global growth is expected to be 5-9% over the next five years. The market value of OSSDSIGN's product is estimated at approximately USD 200 million. The indications for OSSDSIGN are relatively price insensitive and easy to register in many markets.

OddDsign: Management and board

Morten Henneveld has been CEO of OssDsign since 2020. Morten has experience from companies in medtech product industries. In 2008-2012, Morten was responsible for Commercial Excellence at Coloplast. He was also previously Regional Vice President Nordics at Biomet, and Vice President EMEA Spine at Zimmer Biomet. Before becoming CEO of OssDsign, Morten was Senior Vice President Business Transformation & Strategy at GN Group. The CFO is Anders Svensson (MBA focused on Strategy/Finance from the Australian Graduate School of Management).

Biosergen

Biosergen is 3% owned via KDev Investments. Biosergen is a Norwegian company that is currently in the preclinical development phase for BSG005, a drug candidate with a primary indication in systemic fungal infections. Biosergen mainly conducts development and is therefore what is known as a *no research development company*. The primary application for the drug candidate is fungal infections, which can be divided into three categories: opportunistic fungal infections, hospital-acquired infections and community-acquired infections. It is estimated that various types of fungal infections kill 1.5 million people each year.

Biosergen	
Project	*BSG005*
Primary indication	*Systemic fungal infection*
Development phase	*Preklinik*
Owned by	*KDev Investments 3%*
Other large shareholders	*Östersjöstiftelsen*
	Sintef Venture II AS
Origin	*SINTEF, NTNU*

Source: Karolinska Development

Biosergen: The market

It has been estimated that around 1.5 million people die each year as a result of various fungal infections. Serious disease and death related to fungal infections are largely caused by four specific fungal pathogens: Candida, Aspergillus, Cryptococcus and Pneumocystis. Candida affects about 750,000 people a year. Aspergillus causes aspergillosis, which mainly develops in people with weakened immune systems or lung diseases. Invasive aspergillus affects about 300,000 people per year. Cryptococcus and pneumocystis, respectively, affect about 200,000 and 500,000 people per year. Biosergen itself has estimated that the drug candidate has a unique market position with its broad coverage, high level of safety and low risk of resistance development. (Source: IPO prospectus, 2021)

Biosergen: Management and board

The CEO of Biosergen is Peder M. Andersen. Peder has a Doctor of Medicine from the University of Copenhagen and was previously CEO of Forward Pharma A/S, where he was a driving force for the listing in New York in October 2014. The CFO is Niels Laursen, who has an MSc from Copenhagen Business School. The CTO is Richard Forster, who has a PhD and a Bachelor of Science in Chemistry from Imperial College London. The Chairman is Torsten Goesch, who is also chairman of the board of Dilafor.

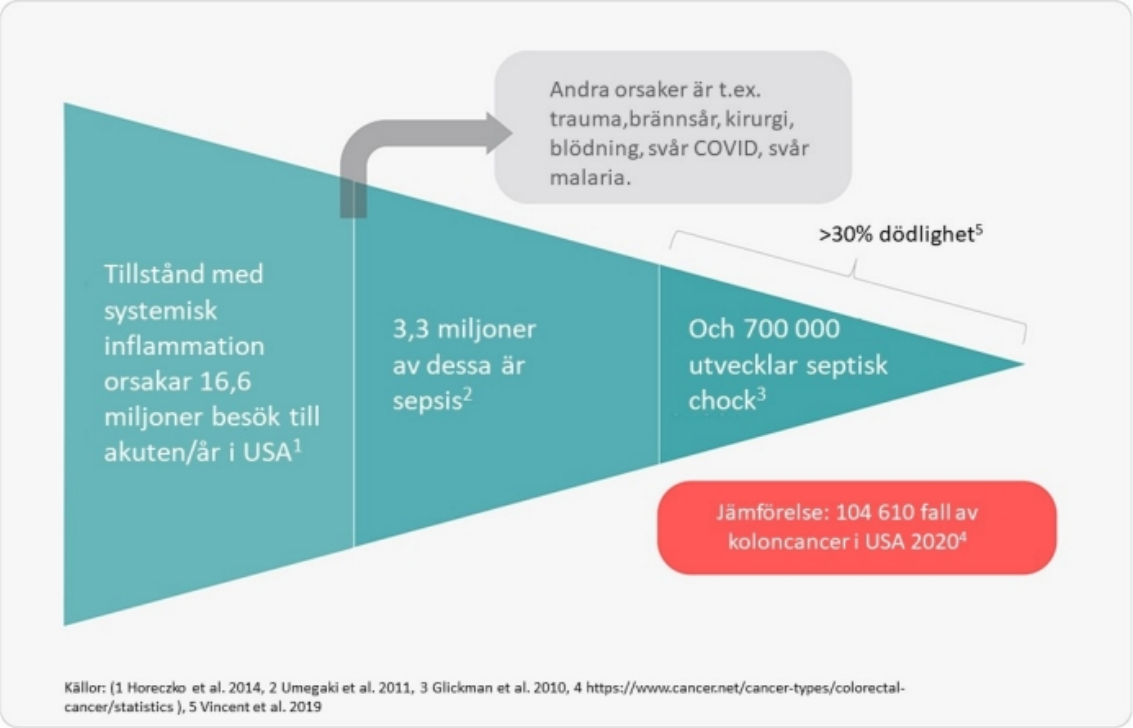
Modus Therapeutics

Modus Therapeutics focuses on the development of the drug candidate Sevuparin, a treatment method for mainly sepsis and septic shock. Sevuparin is a patented polysaccharide, and research into its effects has a long history. Modus owns the rights to a patent that has been granted globally until 2032. The company currently has a goal that includes initiating a phase Ib study where the ambition is to present data from the Ib LPS provocation study in H2 2022.

Patients suffering from sepsis are at risk of developing multi-organ failure, and severe cases can result in death. Sevuparin acts by interfering with the harmful agents generated by white blood cells associated with systemic inflammation. There are currently no treatments for septic shock. Modus Therapeutics conducted a capital raising in connection with its IPO in July 2021. The purpose of raising capital was to carry out a phase Ib study, as well as to begin a phase IIa study.

Modus Therapeutics	
Project	*Sevuparin*
Primary indication	*Sepsis/septic chock*
Development phase	*Fas 2*
Owned by	*Karolinska Development 38%*
	KDev Investments 17%
Other large shareholders	*Östersjöstiftelsen*
	Praktikerinvest
Origin	*KI, UU*

Source: Karolinska Development



Annual emergency visits caused by systemic inflammation, how many of them are sepsis, and the proportion that develop into septic shock. Source: Karolinska Development

Modus Therapeutics: The market

Septic shock is a common cause of death in intensive care units. The WHO estimates that sepsis is the leading cause of death in the world. In 2017, sepsis accounted for about 11 million deaths, which corresponds to about 20% of global mortality. In 2019, it was estimated that the United States had expenses related to patients with sepsis amounting to USD 23 billion. This figure has increased by about USD 5 billion since 2012. In the UK, the direct cost of sepsis treatments was estimated at around GBP 0.8 billion in 2017.

At present, there is no available product that specifically treats patients with sepsis and septic shock. Broad treatment methods are used, such as fluid therapy, vasopressors, oxygen, corticoid steroids, and mechanical ventilation. Below is an illustration of how many emergency visits annually are due to systemic inflammation, how many of these are sepsis, and the proportion that develop into septic shock.

Modus Therapeutics: Management and board

The CEO of Modus Therapeutics is John Öhd, who has been CEO since 2020. John Öhd is a licensed medical doctor and has a PhD in medicine. He has extensive experience of drug development and previously worked in several different indication areas, including CNS, cancer, and blood disorders. John was previously Group Director at Astra Zeneca's research organizations and Chief Medical Officer at Medivir. The board of Modus includes Viktor Drvota.

Forendo Pharma

Forendo Pharma is developing a new treatment to eliminate endometriosis while maintaining normal hormone cycles. In addition, the company is active in treatments for liver diseases. Forendo is developing the FOR-6219 project, which is a drug candidate that primarily focuses on the indications endometriosis and chronic liver disease. In addition, Forendo Pharma is collaborating with Novartis to develop new drugs for chronic liver disease.

FOR-6219 is a drug candidate that inhibits the enzyme HSD17B1, which in turn regulates tissue-specific hormone mechanisms. The enzyme regulates, among other things, the sex hormone oestrogen in women. In December 2019, the company announced that it had entered into an agreement with Swiss pharmaceutical company Novartis. This gave Forendo an initial cash payment as well as the right to milestone payments and sales-based royalties.

Forendo Pharma	
Project	*FOR-6219*
Primary indication	*Endometrios*
	Cronic liver disease
Development phase	*Fas 1b*
Owned by	*Karolinska Development 10%**
Other large shareholders	*Novo Seeds*
	Novartis Venture Fund
Origin	*Åbouniversitetet*
Source: Karolinska Development	** (inkl KCIF)*

Forendo Pharma: The market

Drug candidates for endometriosis have large global potential. Endometriosis is a chronic inflammation of the tissue around the uterus and occurs in about 10% of all women of reproductive age. This corresponds to about 176 million people. Endometriosis has an estimated market that is worth approximately USD 2 billion annually.

Forendo Pharma: Management and board

The CEO of Forendo Pharma is Risto Lammintausta. Risto has more than 30 years of experience in drug development and has worked with research at Farmos Group, Orion Pharma, Hormos Medical and QuatRx. Risto co-founded the company in 2013 and has been CEO ever since. Viktor Drvotasits on the board.

Aprea

Aprea is developing a method for treating many types of cancer. The company's anticancer substances target the p53 tumor-suppressing protein. About half of all human tumours have mutations in the gene that encodes the p53 protein, which means that tumour cells can grow unhindered and develop resistance to cancer drugs. Aprea's drug candidate APR-246 (eprenetapopt) has been shown to reactivate mutated p53 proteins, leading to apoptosis, or programmed cell death, in many human cancer cells. In October 2020, the FDA accepted an investigational new drug application for APR-548 to treat patients with TP53 mutant myelodysplastic syndromes. Aprea has been listed in the US since 2019.

Aprea Therapeutics	
Project	*Eprenetapopt (APR-246), APR-548*
Primary indication	*Myelodysplastiskt syndrom (MDS)*
	Akut myeloisk leukemi (AML)
Development phase	*Fas 3*
Owned by	*KDev Investments 6,5%*
Other large shareholders	*Fidelity Investments*
Origin	*Karolinska Institutet*

Source: Karolinska Development

Aprea: The market

P53 mutations occur in 50% of all cancers diagnosed. This means that eprenetapopt has the potential to be applied in the treatment of many different types of cancer. Advanced indications include hematologic malignancies, including myelodysplastic syndromes (MDS) and acute myeloid leukaemia (AML). Treatments for MDS are expected to have a market value of USD 2.2 billion in 2020, which is expected to grow to USD 2.9 billion by 2026.

Aprea: Management and board

The CEO is Christian S Schade. Christian has been CEO since 2016 and has been chairman since 2020. Christian has more than 30 years of experience from listed and private companies in life science. He was previously Chairman of Novira Therapeutics, and also CFO of Omthera Pharmaceuticals.

AnaCardio

AnaCardio is developing a drug to treat heart failure. The technology originates from research conducted by Lars Lund, who is a professor of cardiology at the Karolinska Institute. AnaCardio is considered to have projects that are ready for clinical studies. To cover the costs ahead of a major capital raising, the company raised money in 2021, and it was here that Karolinska Development made an investment in the company. Karolinska Development owns 21%. AnaCardio is expected to establish new management and a new organization during Q3 2021.

AnaCardio	
Project	*AC01*
Primary indication	*heart failure*
Owned by	*Karolinska Development 21%*
Origin	Karolinska Universitetet

Source: Karolinska Development

AnaCardio: The market

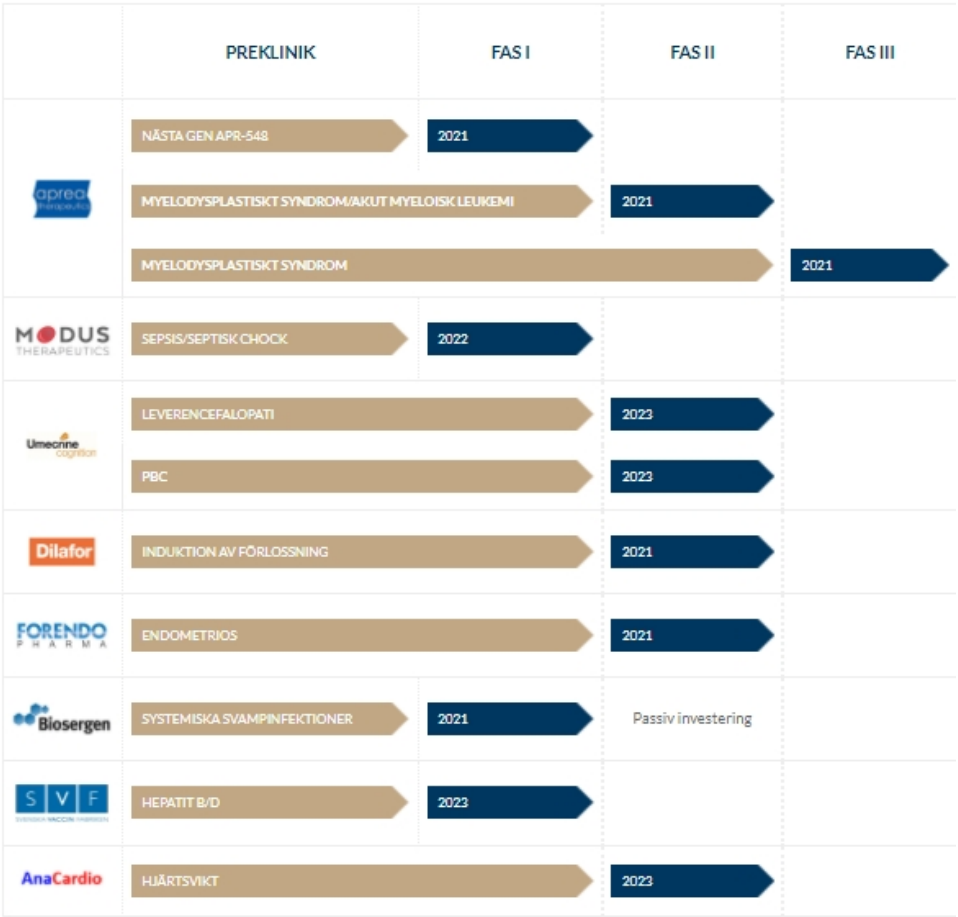
The market for medical treatments for heart failure is very large. An estimated 20 million people suffer from chronic heart failure and approximately 3 million are treated in hospitals each year. It is further estimated that about 10-20% of the elderly population suffers from chronic heart failure. The sales value for heart failure treatments is expected to grow from USD 3.8 billion to USD 16.1 billion in the seven largest markets.

AnaCardio: Management and board

The founder and chairman of the board is Lars Lund, who heads a research group at the Karolinska Institute in cardiology with a focus on heart failure. The CEO is Patrik Strömberg. He has experience from a leading position at Sobi. The board includes Johan Dighed and Per Aniansson from Karolinska Development.

Portfolio

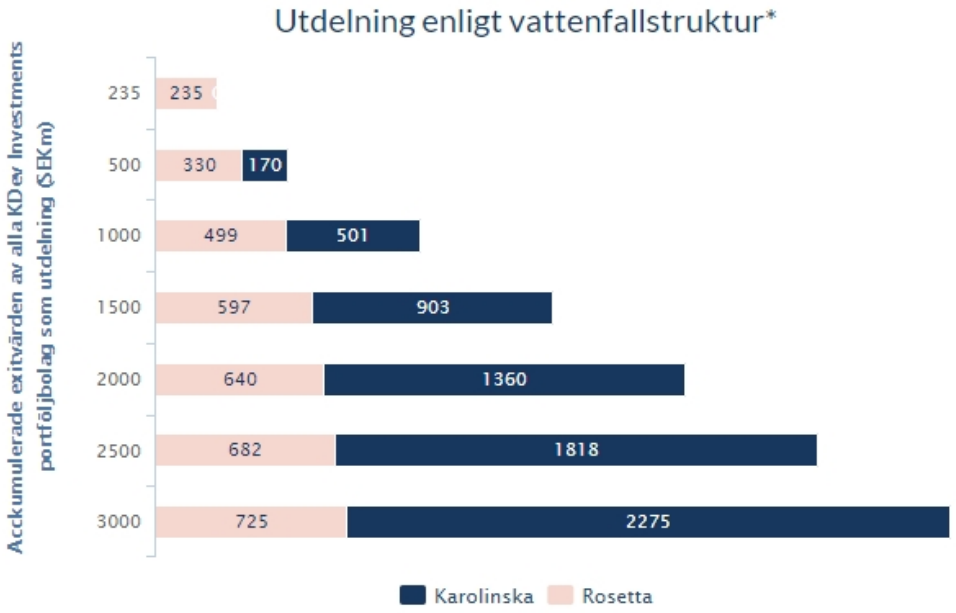
Below is a summary of the various phases and planned development of the portfolio companies in the coming years.



Source: Karolinska Development

Ownership structure: Rosetta Capital

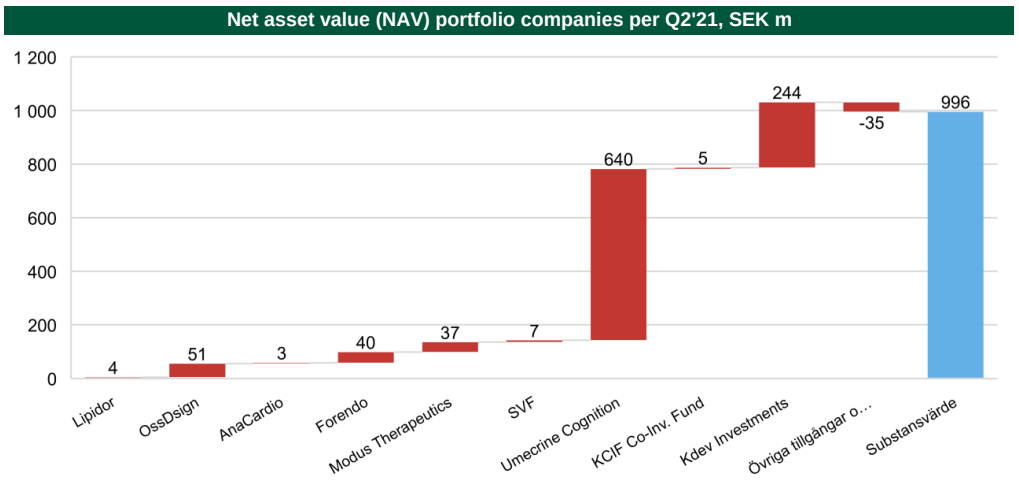
Since 2012, Karolinska Development has co-owned a number of companies together with Rosetta Capital. Rosetta is a British venture cap in life science and has contributed a total of SEK 220 million as a co-investor in a number of investments. Companies jointly owned with Rosetta Capital are placed into KDev Invstments AB. All holdings will generate a distribution, with the proportions based on the value of the dividend (values realized in a transaction). With its current shareholding, Karolinska Development's share of the dividend is 0% for accumulated dividends up to SEK 220 million, 65% for accumulated dividends between SEK 220 million and SEK 880 million, 75% for accumulated dividends between SEK 880 million and SEK 1,320 million, and 92% for accumulated dividends in excess of SEK 1,320 million. The full structure is made shown below.



Source: Karolinska Development

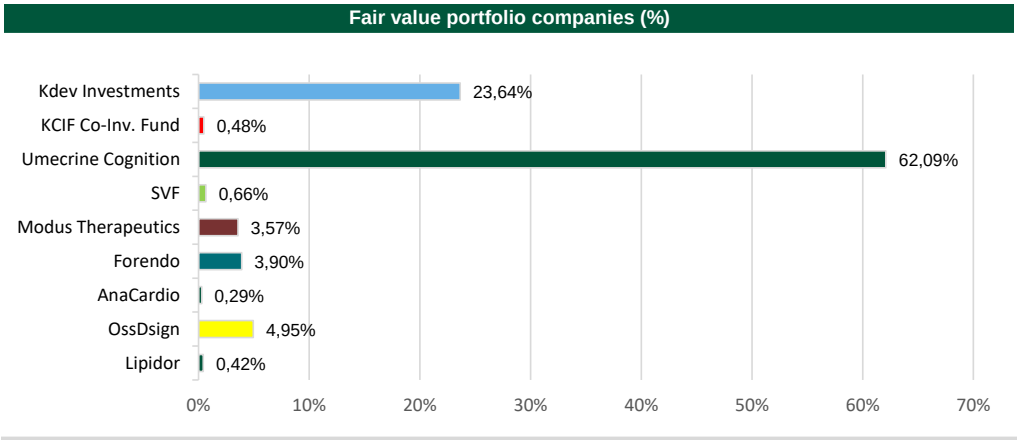
Portfolio companies

The portfolio companies are all the companies in which Karolinska Development has invested, and therefore include subsidiaries, joint ventures, associated companies and listed shares. The fair value may be either the total portfolio fair value or the net portfolio fair value. The total portfolio fair value is the aggregate return that would be obtained by Karolinska Development for the portfolio companies in a transaction at the year-end. The net portfolio fair value adjusts the total fair value for the dividend payment to Rosetta Capital. The net asset value is defined as fair value adjusted for liabilities and cash and cash equivalents in Karolinska Development. Below is the net asset value distributed across the company's portfolio companies per Q2 2021.



Source: Company reports

Below is an indication of the proportion of fair value represented by each portfolio company. UmeCrine accounts for a large share of the value, together with Dilafor which is reported under KDev Investments. The fair value below (as opposed to net asset value) does not adjust for debt.

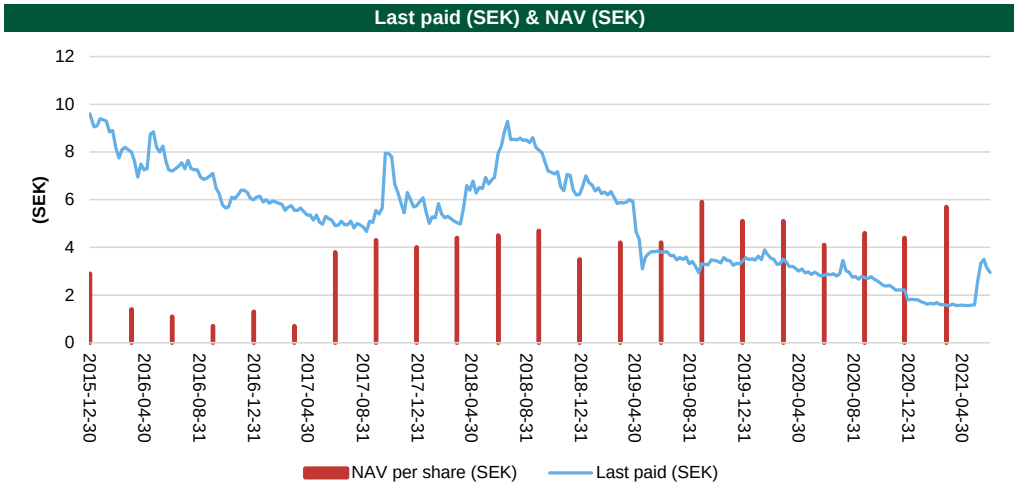


Source: Company reports

Net asset value

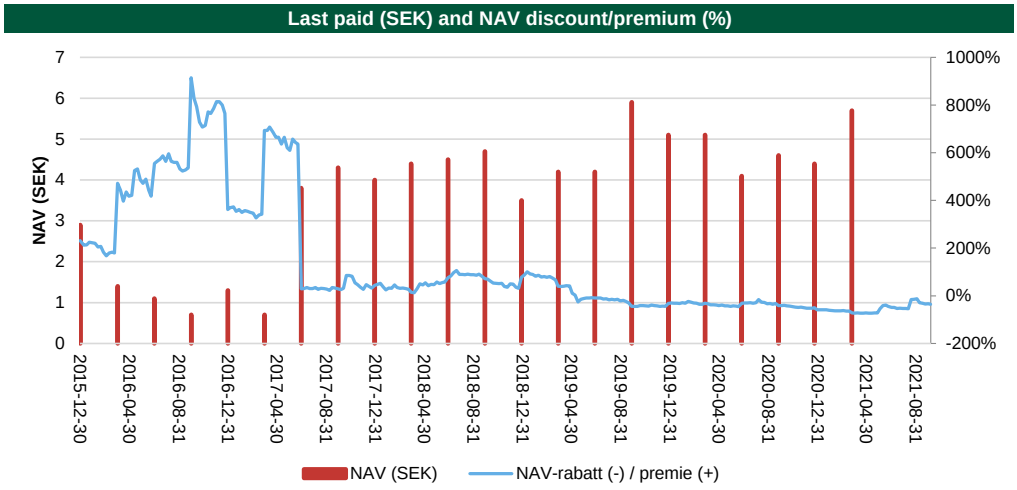
History: Net asset value and discount

Below is the last price paid per share (SEK) and the net asset value per share (NAV). The net asset value per share is the net fair value adjusted for net debt as of the balance sheet date. The below shows that the company started to report significantly higher net asset value per share starting in 2016.



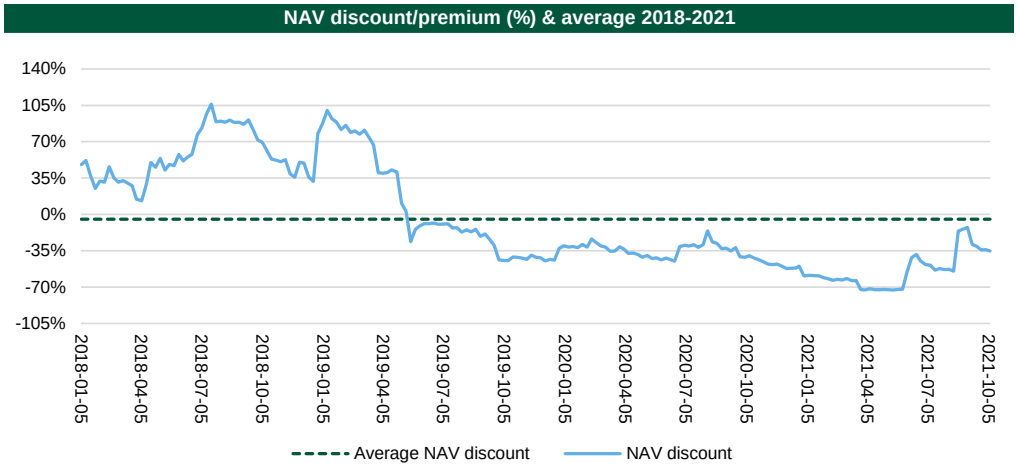
Source: Company reports

It is shown below that the rising NAV since 2016 coincided with a reduction in the discount to the reported net asset value. We note that the company has gone from a historical premium to being traded at a discount to the underlying net asset value.



Source: Company reports

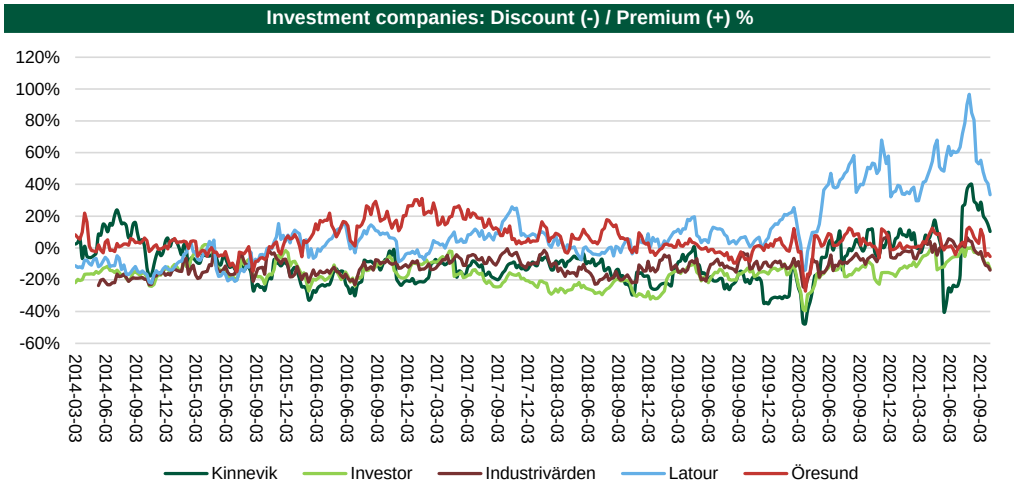
The development of the NAV discount since 2018 is shown below. At the beginning of October 2021, Karolinska Development was traded at a discount of 35% against net asset value. This discount has averaged 5% since January 1, 2018, and has expanded since the start of 2019.



Källa: Company reports, Factset

History: Net asset value for investment companies

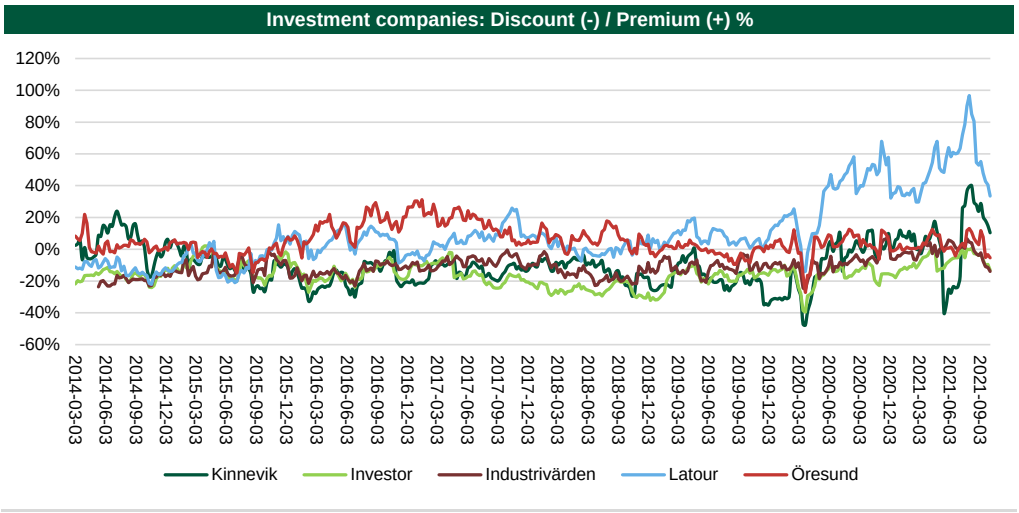
Below are the historical NAV discounts (-) and premiums (+) for major Swedish listed investment companies. Included in the selection are Kinnevik, Investor, Industrivärden, Latour and Öresund. One trend that can be noted is that most investment companies in the last 12 months are traded at a discount or premium that deviates from the historical levels. We analyse these deviations further below.



Source: Company reports, Factset

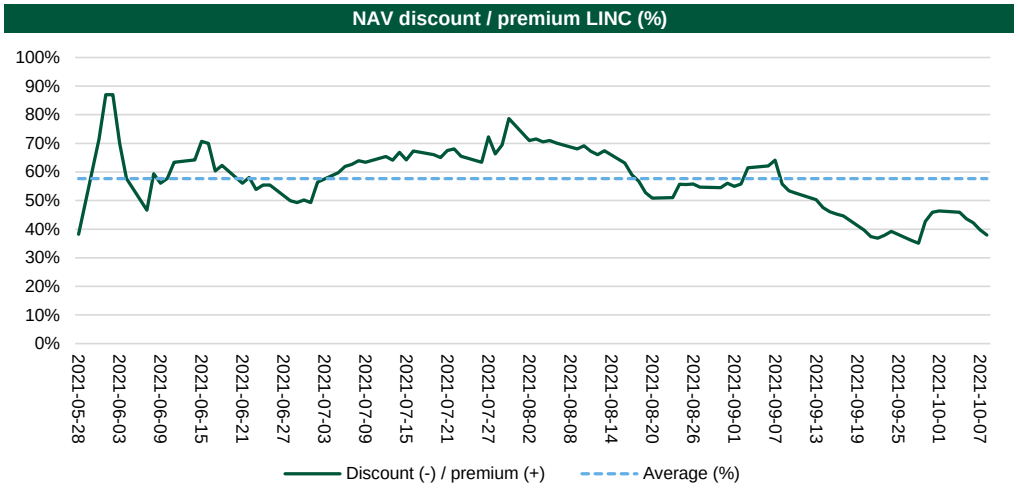
Below are historical levels of NAV discount (-) and premium (+) for the same companies. On average, all companies (excluding Karolinska Development) have been traded at a discount for the past seven, five and three years. In the past year, these companies have traded at an average premium of 10%. However, the difference between premium and discount levels between the individual investment companies is relatively high on all time horizons. Karolinska

Development has large deviations in levels depending on the time horizon, but on average the discount is 52% for the past 12 months, which is a sharply different level relative to other investment companies.



Source: Company reports, Factset

Investment company Linc has been traded on the Stockholm stock exchange since mid-2021. Linc focuses on the life science sector and can therefore provide further insight into sector valuations. Despite a relatively short time on the stock exchange, there is a pattern of premium/discount levels. Since its IPO, Linc has traded at a strong premium that has averaged 58% against net asset value.



Source: company report, Factset

Nedan visas en jämförelse mellan bolagen. Vid utgången av Q2 hade Linc en portfölj som bestod av 26 % kassa, 70 % noterade innehav och 4 % onoterade innehav. Linc hade 12 noterade innehav och 12 onoterade. Till större innehav hör Calliditas, MedCap och Sedana Medical. Bolagen har därmed fundamentalt olika struktur i fördelningen mellan noterade och onoterade bolag. Bolagen har även olika rabatt i relation till substansvärde.

Investment companies: Discount (-) / Premium (+) %								
	Kinnevik	Investor	Industriv.	Latour	Öresund	KDEV	Average	Average ex. KDEV
Avg. 7 y	-10%	-16%	-11%	10%	5%	N/A	-4%	-4%
Avg. 5 y	-11%	-17%	-9%	18%	6%	86%	12%	-2%
Avg. 3 y	-10%	-15%	-8%	27%	1%	-20%	-4%	-1%
Avg. 12 m	6%	-9%	-1%	52%	3%	-52%	0%	10%

Source: Company reports, Factset

Valuation

Valuation: Sum of the parts

We apply a sum of the parts (SOTP) model to value Karolinska Development. This means that we conduct individual valuations of each portfolio company, which are adjusted for dividends to Rosetta as well as costs and net debt in the investment company. This valuation method means that we can apply individual valuation methods for each portfolio company. Below is a summary of our valuation methodology for each company.

Portfolio companies and valuation method

			Ownership (%)		
Form	Company	Ownership	KDEV	KDev inv	Valuation model
Unlisted	AnaCardio	Direct	21,4%	0,0%	Book value + premium/discount
Unlisted	Forendo	Direct*	10,0%	0,0%	Book value + premium/discount
Unlisted	SVF	Direct	31,0%	0,0%	Book value + premium/discount
Unlisted	UmeCrine	Direct	70,0%	0,0%	Individual model
Unlisted	KCIF Co-Investment Fund KB	Direct	26,0%	0,0%	Book value + premium/discount
Kdev Investments					
Unlisted	*KDev Investments ex Dilafor*	Direct	90,1%		Book value + premium/discount
Unlisted	Dilafor	Indirect	1,0%	30,0%	Individual model
Unlisted	KDev Investments tot	Direct*			
Noterade					
Listed	Modus	Direct, indirect	38,0%	17,0%	Last paid
Listed	OssDsign	Direct*	10,0%	0,0%	EPB est. fair value

** Inkl indirect ownership via KCIF*

The ownership stakes in AnaCardio, Forendo, SVF and KCIF Co-Investment Fund KB (a holding company co-owned with the European Investment Fund) are valued based on book value multiplied by a factor for discount (-) or premium (+). The factor is based on our estimates of a reasonable valuation level, which derives from premiums for relevant comparison companies.

Dilafor

We base our valuation on assumptions about factors such as launch year, addressable market, pricing, required rate of return and probabilities. Our market assumptions are based on the United States and Europe. We make an assumption of about 8 million births annually, with about 25% requiring treatment. In addition, we remove 5% that are not treated. Furthermore, we assume a market share of 35% at most. These assumptions are applied to both the United States and Europe. The difference between these regions is primarily in the pricing, with Europe assumed to have a lower pricing of USD 665 per treatment (USD 950 in the United States). We assume that sales will gradually start in 2027 and will peak in 2033.

We also assume that launch costs will amount to approximately USD 100 million. Marketing costs are estimated to amount to 15% of sales, and distribution and other operating costs about 5% of sales. The valuation is otherwise based on a discount rate of 14%. The total risk-adjusted value of Karolinska Development's share of the company is assumed to be SEK 526 million. Our probability assumptions are listed below:

Risk-adjustment	Phase	Cum.
Fas 2b	100%	100%
Fas 3	67%	67%
Filing	85%	57%
Approval	100%	57%
Launch	100%	57%

Umecrine

Our valuation of Umecrine is based on assumptions about factors such as launch year, addressable market, pricing, required rate of return and probabilities. The Umecrine valuation applies separate assessments of hepatic encephalopathy (HE)and primary biliary cholangitis (PBC). For HE, we assume an incidence of liver cirrhosis in the USA, Europe and Japan respectively of about 630, 780 and 250 thousand cases, with growth of 1% annually. We assume the prevalence of HE among these amounts to 40%. We further assume a market share of 25% and pricing of USD 20,000 in the United States and USD 10,000 in the EU and Japan.

For PBC, we assume that 80% of patients are treated. We further assume that the company achieves at most a market share of 45% with pricing of USD 20,000 in the United States and USD 10,000 in the EU and Japan. We assume that the company achieves a market share of 45% at most. Adjusted for probability, we achieve a value for Karolinska Development's share of the company that amounts to SEK 729 million. Below is a summary of our assumptions about the probabilities that form the basis for the valuation.

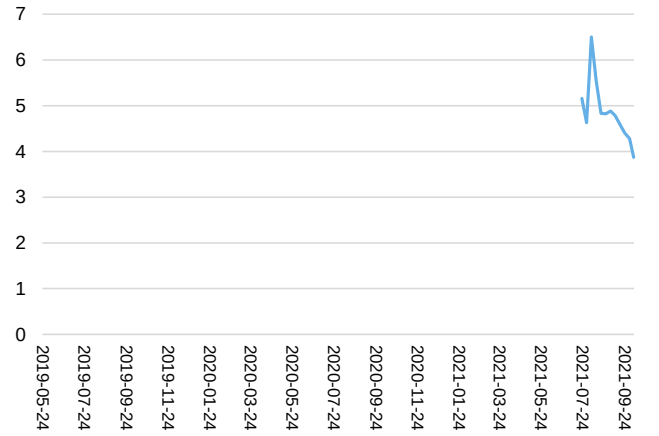
Risk-adjustment	Phase	Cum.
Phase I	90%	100%
Phase II	30%	90%
Phase III	61%	27%
Filing	82%	17%
Approval	100	14%

Valuation: Listed companies

Modus Therapeutics (MODTX) and OssDsign (OSSD) are both listed on First North. Modus is valued based on Karolinska Development's ownership share and current market value. The value of OssDsign is based on Erik Penser Bank's fair value of the company when its most recent analysis was published. This corresponds to a fair value of SEK 108 million for Karolinska Development. The price trend of the two listed companies is summarized below. OssDsign has been listed since 2019 and Modus Therapeutics has been listed since July 2021.

OssDsign: Last paid 2019–2021

Modus Therapeutics: Last paid 2021



Valuation: Other companies and summary

Other companies are valued on the basis of the most recently reported fair value (value of Karolinska Development's share before distributions to Rosetta Capital), which is adjusted with a fair premium based on valuation levels for listed comparable companies. As we have previously highlighted, the large general investment companies have traded at an average premium for the last 12 months of 10%. Investment company Linc, which differs from other investment companies because of its exposure to life science, was traded at a premium of 72% against the underlying net asset value at the end of Q2 2021. We choose to apply a premium of 25% to the book value of the companies that we do not value using an individual model, on the last price paid or on EPB's fair value. The companies that are valued at book value plus a premium are therefore AnaCardio, Forendo, SVF, the ownership in KCIF Co-Investment Fund KB, and KDev Investments (excluding Dilafor).

Adjustments: OPEX for Karolinska Development

The value generated using our approach is then adjusted to generate a fair value for the entire Karolinska Development. We adjust the value by the dividend to Rosetta Capital using the predetermined waterfall structure. Then we adjust the fair value for costs payable by Karolinska Development. This adjustment consists of assumed costs (OPEX) of SEK 30 million per year, which are discounted in perpetuity at 30%, giving a present value of SEK 100 million. We then adjust for net debt in Karolinska Development. The entire valuation is detailed below.

Company	Fair value (per Q2'21)	Premium/ discount	Value EPB est (pre Rosetta, OPEX, Net debt)
AnaCardio	3 000	25%	3 750
Forendo	40 224	25%	50 280
SVF	6 827	25%	8 534
UmeCrine	640 054		739 727
KCIF Co-Investment Fund k	4 938	25%	6 173
KDev Inv. ex Dilafor	123 300		123 300
Dilafor	486 700		532 533
KDev Investments tot	610 000		655 833
Modus	36 752		36 479
OssDsign	50 977		107 534

Summa:	1 594 669
Adj. Rosetta	-380 470
Net debt and other adj.	-35 294
Costs KDEV	-100 000
Value	1 078 905
Shares	175 665
Per share	6,1

Valuation: Sensitivity analysis

Below is a summary of how our fair value is sensitive to key assumptions in our valuation. The first two graphs below show how the fair value is affected by our assumptions about the costs for Karolinska Development (OPEX, operating expenses), as well as premiums on the companies valued at book value – AnaCardio, Forendo, SVF, KCIF, and KDev Investments (excluding Dilafor). Operating expenses are assumed to be SEK 100 million, which is an annual cost of SEK 30 million discounted in perpetuity at a discount rate of 30%. If operating expenses were assumed to be 0, the fair value would be SEK 6.71 per share (compared with 6.14 with an assumed cost base of SEK 100 million).

Sensitivity: NAV Premium (inv. Companies life science) & OPEX

OPEX (SEK m) \ NAV premium	50%	60%	70%	80%	90%
-80 000	6,3	6,4	6,4	6,4	6,5
-90 000	6,3	6,3	6,3	6,4	6,4
-100 000	6,2	6,3	6,3	6,3	6,3
-110 000	6,2	6,2	6,2	6,3	6,3
-120 000	6,1	6,1	6,2	6,2	6,2

Sensitivity: NAV Premium (inv. Companies general) & OPEX

OPEX (SEK m) \ NAV premium	-15%	-5%	5%	15%	25%
-80 000	6,1	6,2	6,2	6,2	6,3
-90 000	6,1	6,1	6,1	6,2	6,2
-100 000	6,0	6,0	6,1	6,1	6,1
-110 000	6,0	6,0	6,0	6,1	6,1
-120 000	5,9	5,9	6,0	6,0	6,0

The below shows how assumptions about the discount rate (WACC) affect the value of Umecrine and the fair value per share for Karolinska Development. The table on the right shows how the value is affected by the pricing of Golexanolone for the indication HE.

Sensitivity: WACC, Umecrine (%)

	WACC (%) 12%	13%	14%	15%	16%
UmeCrine (SEK m)	1083	896	731	585	454
KDEV, per share (SEK)	8,9	7,8	6,1	6	5,3

Sensitivity: Pricing HE USA (USD)

	Price (USD, JAP & EU 50 % av US) 16 000	18 000	20 000	22 000	24 000
UmeCrine (SEK m)	438	585	731	878	1024
KDEV, per share (SEK)	5,2	6,0	6,1	7,7	8,5

The below shows how assumptions about the discount rate (WACC) affect the value of Dilafor and the fair value per share for Karolinska Development. The table on the right shows how the value is affected by the pricing of the candidate Tafoxiparin.

Sensitivity: WACC, Dilafor (%)

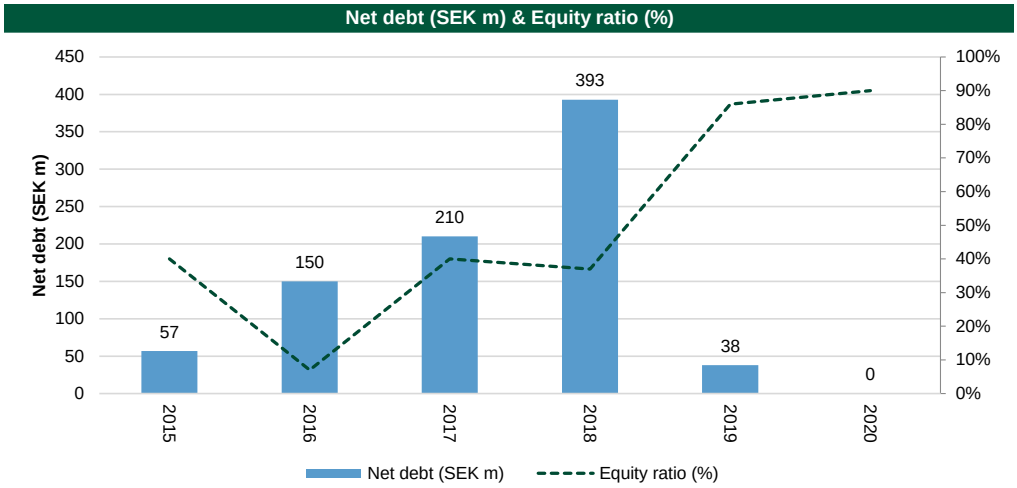
	WACC (%) 12%	13%	14%	15%	16%
Value Dilafor (SEK m)	697	608	527	455	389
KDEV, per share (SEK)	6,7	6,4	6,1	5,9	5,6

Sensitivity: pricing Tafoxiparin USA (USD)

	Pricing (USD, EU 70 % av US) 750	850	950	1 050	1 150
Value Dilafor (SEK m)	328	428	527	627	726
KDEV, per share (SEK)	5,4	5,8	6,1	6,5	6,9

Debt

The significantly improved financial position that the company has been in since 2015 is shown below. Net debt has been adjusted to SEK 0 million in 2020 and the equity/assets ratio has improved significantly. The reason for the improved situation is that the convertible loan was redeemed in 2019 for shares. We believe that its level of debt previously limited the company's development and that the situation has now improved. Our estimates for the period 2021-2023 do not include assumptions about potential future divestments. We have therefore assumed a capital injection in the form of SEK 75 million in borrowing during 2022, primarily intended to cover ongoing operating expenses. In order to successfully continue its communicated investment strategy, we believe the company may need a larger capital injection. As we have not projected any exit from the current major holdings in our forecasts for the coming years, we believe that capital will need to come from one or more rights issues. At present, we have not modelled any capital injection beyond our estimated loan in 2022.



Source: company reports

Ownership structure

The largest shareholder in Karolinska Development is Sino Biopharmaceutical (where Karolinska Development's Vice Chairman Tse Ping is Founder and CEO) with 43% of capital and 40% of votes. The second largest shareholder is Worldwide International Investments Limited, with 18% and 17%, followed by Insamlingsstiftelsen för främjande och utveckling av medicinsk forskning vid KI with 2.4% and 9.3%.

The largest shareholder, Sino Pharmaceuticals, is a Chinese investment company that mainly focuses on life science. It is active in the development, sale and distribution of pharmaceuticals. In its investment business, Sino Pharmaceuticals is a shareholder in life science companies worldwide. Sino Pharmaceuticals has a long-term investment horizon in companies held within the investment segment. The company was listed on the Hong Kong stock exchange in 2000 and is headquartered in Hong Kong.

Board of Directors

Karolinska Development's board currently consists of 4+1 directors, as below.

Björn Cochlovius, Chairman
Chairman of the Board since 2019, independent of the company and its executive management, and in relation to the company's major shareholders. Other assignments include Chairman of Isogencia Ltd, Founder and General Manager of BC BioMed Consulting GmbH, Partner of Jürg Kurmann Merger and Acquisitions AG, Associate Professor Immunology at Ruprecht-Karls Universität Heidelberg. He was formerly Senior Director Development Asia-Pacific at Abbvie Inc., Director and Head Oncology at Otsuka, Co-Founder Interim CEO and Chairman at Ciliatech AG, Director Business Development Oncology at Roche AG, Internal Strategy Consultant with Alpharma AS (now Axellia), Acting CEO at OnTarget Neurology AS, and Head R&D at Affitech AS.

Tse Ping, Vice Chairman
Vice Chairman since 2015, independent of the company and its executive management. Not independent in relation to the company's major shareholders. Other assignments include Founder and CEO of Sino Biopharmaceutical Limited (listed in Hong Kong), Chairman of Hong Kong-listed Lamtex Holdings Ltd, Vice Chairman of Charoen Pokphand Group (CP Group), where he has experience of major merger and acquisition activity including Ping An Insurance, CITIC Group, China Mobile, ITOCHU Corporation and Marko Group. Previous appointments include Member of the Ninth, Tenth and Eleventh National Committees of the Chinese People's Political Consultative Conference.

Theresa Tse, Board Member
Board Member since 2017, independent of the company and its executive management. Not independent in relation to the company's major shareholders. Other appointments include Executive Director, the Chairlady of the Board and the Chairlady of the Executive Board Committee and the Nomination Committee, respectively, of Sino Biopharmaceutical Ltd (listed in Hong Kong).

Anna Lefevre Skjöldebrand, Board Member
Board Member since 2021, independent of the company and its executive management, and in relation to the company's major shareholders. Other appointments include CEO Swedish Medtech Service AB, Sweden Medtech4Health AB (Chairman), Dedicare AB, Swecare, COCIR, Life Science Office of Sweden. Previous assignments include Head of Legal Swedish Medtech Service AB, Lawyer Delphi & Co, Lawyer GLS Legal, Lawyer Ernst & Young Law, Legal Counsel Front Capital Systems AB. Previous board assignments include the e-Health Agency, SIS AB and Medtech Europe. She has also been a Director at the Board for Public Procurement.

Ben Toogood, Board Member
Board Member since 2021, independent of the company and its executive management. Not independent in relation to the company's major shareholders. Other appointments include Head of Global Business Development, Sino Biopharmaceuticals Limited. Previous assignments include Head Global BD & M&A Sandoz AG, Group New Business Development Executive Aspen Pharmacare Holdings, Vice President Global Business Development Pharmathen SA,

International Licensing Executive Niche Generics (Unichem Laboratories), and Regulatory Affairs Merck Generics (Mylan).

Management

Viktor Drvota, CEO

CEO since 2017, and previously Chief Investment Officer since 2016. He was previously responsible for life science investments at SEB Venture Capital and has served as a board member at companies including Arexis AB, SBL Vaccin AB, Nuevolution AS, InDex Pharmaceuticals AB, Scibase AB and Airsonett AB. Previously Viktor Drvota worked as a Senior Consultant and Associate Professor at the Karolinska Institute and also has significant experience from preclinical and clinical research at various pharmaceutical and medical technology companies.

Johan Dighed, General Counsel and Deputy CEO

General Counsel since 2020 and has previously been Head of Legal at German bank SEB AG and Legal Counsel at SEB AB. Previously he worked at law firm Baker & McKenzie and in the Swedish Judiciary.

Per Aniansson, Chief Financial Officer and Investment Director

CFO since 2021 and has previously been CEO of two medtech companies and CFO in another VC backed start-up. He has been responsible for investments in multiple areas at Fouriertranform AB and held board positions at OssDsign AB, Scibase AB, Renewcell AB, Powercell AB, SmartEye AB and AAC Clydespace AB.

John Öhd, Chief Scientific Officer/Venture Partner

Appointed 2020 and has several years of experience in drug development in areas such as CNS, cancer and blood disorders. He has held several leading research roles at companies such as AstraZeneca and Medivir, and was Chief Medical Officer at Modus Therapeutics.

Elisabet Gimbringer, Financial Manager

Financial Manager since 2015 and previously worked as a Financial Manager, Business Controller and Financial Controller for a number of different companies and fields. Board Member of KD Incentive AB.

Eva Montgomerie, Head of Accounting

Head of Accounting since 2013. Eva has many years of experience in the banking and finance sector, the food sector and the life science industry. In addition to her position at Karolinska Development, she is Finance Manager at Dilafor AB and Pharmanest AB.

Yan Cheng, President Asia

Appointed 2020 and has many years of experience in the venture capital industry with a focus on European life science. He has acted as an adviser to European life science companies on business development, especially in technology transfer and merger and acquisitions activity between Asia and Europe.

Appendix: Risks

The composition of the portfolio and future development are dependent on Karolinska Development being able to identify and acquire new companies. If it fails to identify companies that are potential acquisitions, the future investment journey may be made more difficult. In addition, the pace of future investments may depend on financing. If Karolinska Development fails to secure the necessary capital, the acquisition journey may be made more difficult.

We believe that a strong factor in Karolinska Development is its key people in management and on the board. Because these people are important for the continued investment strategy, this is a risk for the company. In addition, Karolinska Development often appoints people to the boards of its portfolio companies. If it fails to identify individuals or gain access to people to appoint, this may limit the development of the portfolio companies.

Furthermore, the portfolio companies themselves are a large risk. The portfolio companies conduct advanced research, where many projects are in the clinical development phase. This contributes to risks related to the operational activities of the portfolio companies. Also, the companies often have a long time to market and to a potential commercial breakthrough.

Income statement

	2016A	2017A	2018A	2019A	2020A	2021E	2022E	2023E
Revenue	5	2	3	3	3	3	3	3
Change in fair value of shares in portfolio companies	-147	252	58	415	-215	212	0	0
Change in fair value of other financial assets and liabilities	0	2	41	-28	43	-15	0	0
Other expenses	-15	-13	-14	-18	-8	-7	-7	-7
Personnel costs	-17	-24	-15	-23	-24	-22	-22	-22
Depreciation of right-of-use assets	0	0	0	-1	-1	-1	-1	-1
EBIT / Operating profit	**-174**	**221**	**74**	**348**	**-202**	**170**	**-27**	**-27**
Other financial gains and losses	1	-2	-1	-15	0	5	-5	-5
Profit before taxes	**-217**	**180**	**31**	**303**	**-207**	**175**	**-32**	**-32**
Taxes	0	0	0	0	0	0	0	0
Profit for the year	**-217**	**180**	**31**	**303**	**-207**	**175**	**-32**	**-32**

Balance sheet

	2016A	2017A	2018A	2019A	2020A	2021E	2022E	2023E
ASSETS								
Right-of-use assets	0	0	0	1	1	1	1	1
Shares in portfolio companies at fair value through profit or loss	149	448	619	1 048	770	1 031	1 031	1 031
Loans receivable from portfolio companies	1	3	5	2	0	0	0	0
Other financial assets	38	41	27	0	0	0	0	0
Total non-current assets	**188**	**492**	**651**	**1 050**	**771**	**1 031**	**1 031**	**1 031**
Short term receivables	2	2	5	2	2	2	2	2
Other financial assets	238	150	123	63	41	41	42	43
Cash and cash equivalents	11	19	16	52	76	8	48	14
Total current assets	**250**	**171**	**143**	**117**	**119**	**52**	**92**	**59**
Total assets	**438**	**663**	**794**	**1 167**	**890**	**1 083**	**1 124**	**1 091**
EQUITY AND LIABILITIES								
Equity	30	267	296	1008	800	976	943	911
Total Equity	**30**	**267**	**296**	**1008**	**800**	**976**	**943**	**911**
Convertible loan	394	379	428	20	0	0	0	0
Other non-current liabilities	5	5	11	0	0	79	154	154
Totalt long-term liabilities	399	384	440	20	0	79	154	154
Accrued expenses and prepaid income	7	9	6	7	6	22	21	21
Other current liabilities	2	3	52	132	84	7	5	5
Total current liabilities	**9**	**12**	**59**	**139**	**90**	**29**	**26**	**26**
Total liabilities	**409**	**396**	**498**	**159**	**90**	**108**	**180**	**180**
Total equity and liabilities	**438**	**663**	**794**	**1167**	**890**	**1083**	**1124**	**1091**

Cash flow statement

	2016A	2017A	2018A	2019A	2020A	2021E	2022E	2023E
Operating profit/loss	-174	221	74	348	-202	170	-27	-27
Depreciation	0	0	0	1	1	1	1	1
Change in fair value	147	-255	-100	-387	172	-197	0	0
Other items	**-1**	**0**	**-2**	**-1**	**0**	**0**	**0**	**0**
Proceeds from short-term investments	0	0	-1	1	0	0	0	0
Interest paid	0	0	0	-2	0	-6	-6	-6
Cash flow before changes in working capital and operating investments	-29	-34	-29	-40	-29	-33	-33	-33
Increase (-) / Decrease (+) in operating receivables	**8**	**0**	**-4**	**0**	**30**	**0**	**-1**	**-1**
Increase (+) / Decrease (-) in operating liabilities	-3	3	47	33	-34	1	-2	0
Cash flow from operating activities	-23	-31	13	-7	-33	-32	-35	-34
Partial payment for/ from earn-out deal	0	0	9	12	-5	-2	0	0
Sale of shares in portfolio companies	0	46	12	23	102	4	0	0
Acquisitions of shares in portfolio companies	**-27**	**-90**	**-117**	**-47**	**-39**	**-37**	**0**	**0**
Proceeds from sale of short-term investments	41	87	80	69	0	0	0	0
Cash flow from investing activities	**14**	**43**	**-17**	**57**	**58**	**-36**	**0**	**0**
Cash flow from financing activities	**0**	**-3**	**0**	**-14**	**-1**	**0**	**75**	**0**
Cash flow for the year	**-9**	**9**	**-3**	**36**	**24**	**-68**	**40**	**-34**

Growth and margins

	2017	2018	2019	2020	2021E	2022E	2023E
Sales growth	-54%	25%	10%	-22%	-5%	0%	0%
EBIT growth	N/A	-66%	370%	-158%	-184%	-116%	1%
EPS growth	-171%	-83%	720%	-129%	-183%	-118%	1%
Gross margin	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EBITDA margin	86%	72%	89%	119%	85%	N/A	N/A
EBIT margin	86%	72%	89%	119%	85%	N/A	N/A

EPS and other ratios

	2017	2018	2019	2020	2021E	2022E	2023E
EPS	2,93	0,48	4,10	-1,18	1,00	-0,18	-0,18
FCF per share	-23,33	-31,21	13,15	-7,41	-33,20	-31,90	-35,23
Dividend per share	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Shares outstanding after dilution at period end (million)	53,46	64,36	64,36	175,67	175,67	175,67	175,67

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