UPPDRAGSANALYS

Getting close to patients

News flow continues to progress

ExpreS²ion Biotechnologies has started off the year with important news on the strengthening of its organisation with key personnel and the submission of a clinical trial application by the consortium behind the ABNCoV2 vaccine candidate to the Dutch authorities. Strong preclinical data on the immunogenicity of the COVID-19 vaccine was presented in the online journal Nature Communication on January 12. We expect this stride of news to continue in February and March with announcement of the first human dosing of ABNCoV2 in the COUGH-1 trial as well as a possible preliminary safety readout late Q1 or early Q2. The crowning of the news flow would be the announcing by Bavarian Nordic of full financing of late-stage development, still lacking at this moment.

Transformational deal with AdaptVac

The option to acquire full rights to AdaptVac's therapeutical breast cancer vaccine AV001 expires on February 26. We expect ExpreS²ion Biotechnologies to exercise its option taking the company further in its transformation from service providing platform to a vaccine drug development company. Recent appointments stresses management's determination to follow the rationale set out in October's new share issue of SEK 131m. AV001, which the Company has announced will have the project code ES2B-C001 in future, is in preclinical development and has the potential to initiate first trial in humans in late 2022 after having finalized testing in animals and the development of a solid manufacturing process.

SOTP maintained at SEK 24 / share

In a long-term perspective we find progress for ES2B-C001 to be of at least equal importance to ExpreS²ion shareholders as ABNCoV2 and its race to be included in the worldwide vaccination campaign to the coronavirus. However, in the short term share price performance should continue to depend on the latter, especially in the event of Bavarian Nordic announcing a financing solution for the final stages of development. At this stage we assign ABNCoV2 a 26 percent chance of approval under an accelerated development pathway. Our sum-of-the-parts valuation of the company's parts remains at SEK 24 with the coronavirus vaccine making up SEK 8.2 / share.

ExpreS²ion Biotech

Date	27 januari 2021
Analyst	Sten Westerberg

Facts

Industry	Drug Development
Chairman of the Board	Martin Roland Jensen
CEO	Bent U. Frandsen
Year of Listing	2016
Stock List	First North Growth Market
Ticker	EXPRS2
Share price	14,5 kr
No. of shares 2021, mln.	31,5
Market cap, SEKm	457
Net cash 2021, SEKm	76
Enterprise value (EV)	381
Web site	www.expres2ionbio.com

Share price development, -1y

Source: Refinitiv

Forecasts & Key ratios, SEKm

	2019	2020p	2021p	2022p
Revenues	14	16	28	39
EBIT	-18	-23	-70	-72
Net income	-17	-26	-71	-73
Earnings per share	-0,5 kr	-0,8 kr	-2,3 kr	-2,3 kr
Dividend	0 kr	0 kr	0 kr	0 kr
Revenue growth	55%	17%	12%	38%
EBIT margin	-129%	-141%	-247%	-185%
Cash	5	96	76	3
New share issues	8	140	52	0
P/E ratio	neg	neg	neg	neg
Dividend yield	0%	0%	0%	0%

Source: Bolaget, Analysguiden

Investment case

February deadline for AV001 option exercise

ExpreS^{2}ion Biotechnologies is continuing its strategic shift of business model away from a service providing subcontractor platform to a vaccine developing company. The listed entity ExpreS^{2}ion Biotech Holding AB holds 100 percent of ExpreS^{2}ion Biotechnologies ApS, the operative entity based in Horsholm, Denmark. A key component in this transformation is the proposed deal with its joint venture partner AdaptVac ApS, in which ExpreS^{2}ion holds a 50 percent stake. This deal gives ExpreS^{2}ion the option to acquire rights to AV001, a therapeutical vaccine developed by AdaptVac for immunisation of HER2 positive breast cancer patients no longer responding to first line agents.

The option expires on February 26 and we expect the company to pursue its plans and take over development of AV001/ES2B-C001 based on proceeds from its preferential rights issue of SEK 131m last October. AV001/ ES2B-C001 has shown strong activity and proof-of-concept data in animal testing published 2018 and has the potential to become an important value driver for the company.

COVID-19 vaccine close to start trial in humans

We expect the news flow from ExpreS^{2}ion in February to continue showing good progress. Apart from the AV001/ES2B-C001 option exercise, we anticipate news from the PREVENT-nCoV consortium, along with its partner Bavarian Nordic, announcing that ABNCoV2, a capsid-like particle Covid-19 vaccine candidate, has initiated first human dosing in the COUGH-1 trial. The ambitious goal is to release a first safety readout in humans already late in Q1 or early Q2, followed by the decision to advance to a pivotal phase 2/3 trial. Importantly this latter decision is contingent on Bavarian Nordic succeeding in raising full funding of the remaining clinical program.

Sum of the parts remains at SEK 24 / share

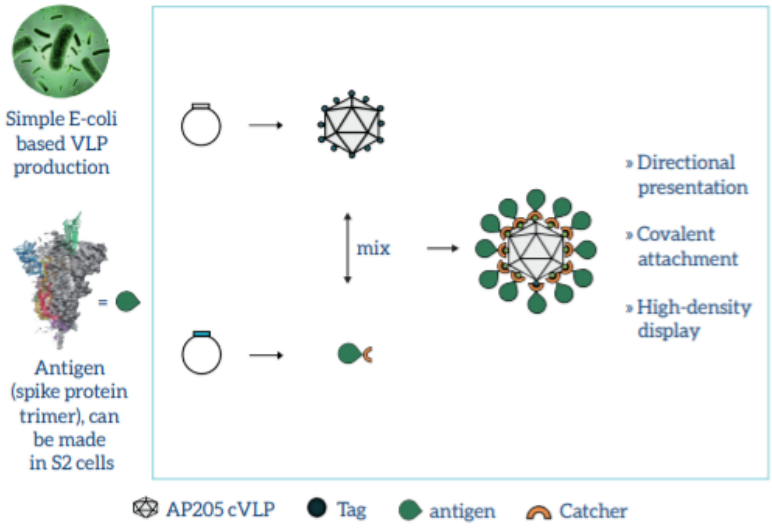
In our modelling of the company we see AV001/ES2B-C001 as an important long-term value driver, making up 42 percent of our sum-of-the-parts (SOTP) valuation at SEK 24. However, in the short term we expect the share price to stay volatile depending on the news flow from the ABNCoV2 program, which makes up 34 percent of our SOTP. A phase 1 initiation in Q1 should partly be anticipated, while we believe investors are not yet convinced of Bavarian Nordic announcing financing of the later stages in the development of the COVID-19 vaccine candidate. Such an announcement would allow for a rebound in the share price. And on the reverse, a negative announcement, or continued lack of financing in the ABN program, will put a dent in the share price.

Preclinical data on COVID 19 Vaccine

ExpreS^{2}ion Biotech announced on January 12 the release of preclinical data on the ABNCoV2 cVLP vaccine, which is being developed by a consortium, PREVENT-nCoV including ExpreS^{2}ion, alongside with the Danish vaccine developer Bavarian Nordic, which has acquired rights to the project. The article, which is written by 47 scientists at different academic and industrial centres, describes ABNCoV2, ABN standing for AdaptVac Bavarian Nordic, as a strong immunizing agent to infections of the SARS-CoV-2 coronavirus in infected mice. Researchers developed two vaccines based on AdaptVac's technology, consisting of capsid virus-like particles (cVLP or CLP). On the surface of the capsid-like particle the researchers glued an antigen, produced by ExpreS^{2}ion Biotechnologies' expression system ExpreS^2, based on *Drosophila* S2 insect cells. The antigen (see schematic figure below) is a protein fragment of the receptor binding domain (RBD) of the virus and elicits strong virus neutralisation activity with antibodies of the adaptive immune systems in the mice model.

The capsid-like particle, which can be compared to a vaccine adjuvant, was coated with 60-80 particles of the recombinant RBD protein fragment and the animals were injected with two consecutive doses of the vaccine, a primer and a second booster dose. After exposure to the ABN vaccine, mice serum was tested for antibodies to the receptor binding domain of SARS-CoV-2. The researchers show in the article that RBD proteins glued to the CLP had a 3-4 fold higher immunogenicity compared to soluble RBD proteins injected without being mounted to the capsid-like particle, displaying a strong rationale for the technology of the ABNCoV2 cVLP vaccine, formerly named PREVENT-nCoV.

Schematic figure of cVLP expression and construct



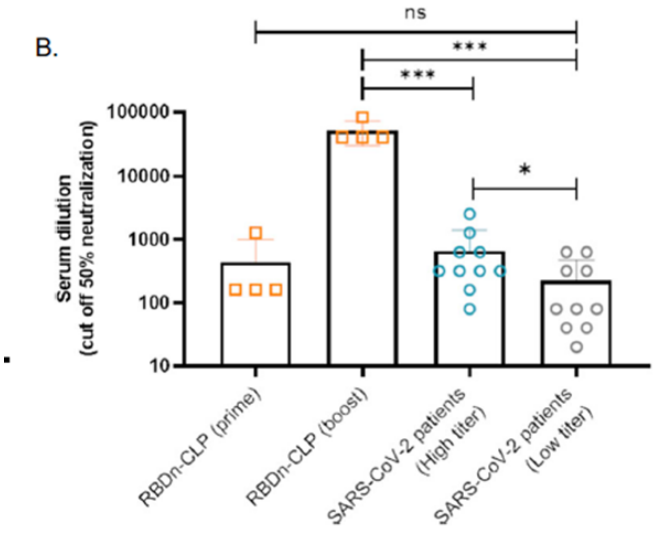
Source: Company prospectus

The SARS-CoV viruses use spike proteins on their surface to engage angiotensin-converting enzyme 2 (ACE2) on human host cells to initiate cell entry into the human cell and start infection and replication. Consequently, the spike protein has become a primary target for vaccine development, with emphasis on the protein's receptor-binding domain (RBD), which appears to be the target for most neutralizing antibodies in Covid-19 vaccines. The article also presents data from exposure of the ABNCoV2 vaccine candidate to blood samples from patients recovered from coronavirus infection.

Already at the first injection of the ABNCoV2 vaccine in mice it elicited virus neutralization antibody responses comparable to those found in patients that had recovered from infection with coronaviruses. After the second injection the research shows that serum from mice had a 50 percent neutralization of the virus in highly diluted samples of the serum (1:60 000).

Below we are showing two different diagrams. The first is a figure in the Nature article comparing the ABNCoV2 data after one injection (first staple), two injections (second staple) as well as in human blood samples from recovered patients with low and high levels of SARS-CoV-2 antibodies. The Y axe shows the serum dilution cut-off where 50 percent of the viruses are neutralized by antibodies from vaccinated mice serum or patient samples exposed to the ABNCoV2 vaccine candidate. The second staple shows a value of 1:60 000 titer (6 x 10^4), which can be compared to the second diagram below, published in a recent review of preclinical data from different competing vaccine candidates[1]

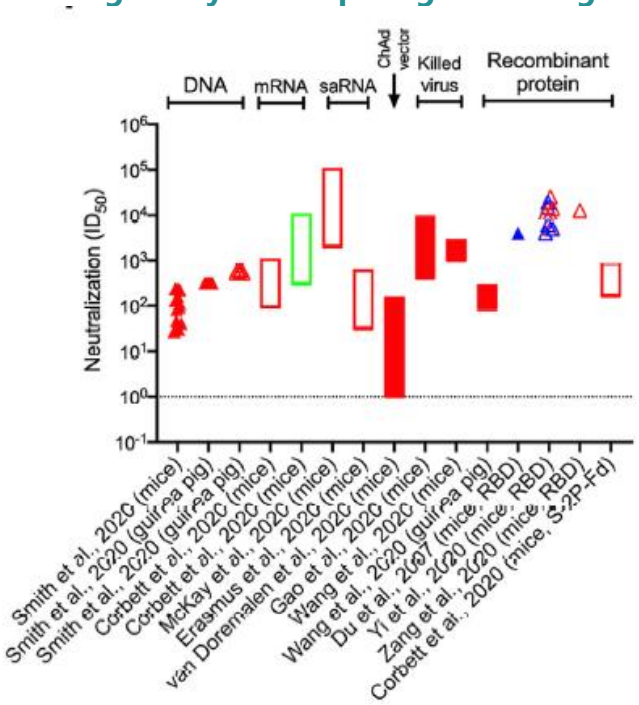
Immunogenicity of the ABNCoV2 vaccine



Source: Nature

[1] Moore et al, Journal of Virology (2020)

Immunogenicity of competing technologies



Source: Moore et al, Journal of Virology (2020)

The ABNCoV2 data in the first diagram, 6 x 10^4, compares favorably to animal data from most other vaccine candidates shown in the second diagram. It is difficult to compare data from two different articles, but the immunogenicity of ABNCoV2 appears to be in line or slightly superior to the RNA based technologies as well as the vaccine candidates based on recombinant proteins, the type of technology generating the antigen on ABNCoV2. These programs display a 50 percent neutralization in a span ranging from titers at 10^2 to 10^5.

Potential advantages with ABNCoV2

ABNCoV2 has the potential to be a best-in-class COVID-19 vaccine. The readouts from preclinical animal data shown above suggests an equal or stronger activity of neutralizing antibodies after two dosages compared to most other published preclinical animal data, also from currently approved COVID-19 vaccines, such as Pfizer-BioNTech's, Moderna's, and AstraZeneca-Oxford's vaccines. On the other hand, it should be said that the >90 percent vaccination efficacy of some of these approved vaccines sets the bar at a difficult level in the clinical testing yet to be done with ABNCoV2.

Also, the preclinical evidence in mice of the potency for ABNCoV2 opens for a possibility of single shot dosing. This prospect would be shared by some of the other vaccine candidates which are currently under development, but none of the so far approved. It is also speculated that the capsid based antigen display induces long-lived plasma T-cells, thus potentially conferring immunity for decades, as seen with the Human Papilloma Virus vaccines, which are also based on a VLP construct. This

would be a differentiating factor to other recombinant proteins, which run the risk of not eliciting long-lasting responses by T-cells.

An additional advantage with the technology being used by AdaptVac and ExpreS^{2}ion is that it would be relatively easy to replace the current vaccine RBD antigen in the event that the SARS-CoV-2 virus should acquire mutations in the RBD domain and thereby reducing the efficacy of an existing vaccine. Another advantage being mentioned by the authors of the Nature article is that the vaccine does not contain any viral material and thus cannot infect or replicate in the human cell.

Furthermore, preliminary stability data on the ABNCoV2 vaccine candidate potentially allows it to be stored at fridge temperatures for long time periods, and at room temperature for shorter time periods, which would make it easier to handle compared to the mRNA based vaccines from Moderna and Pfizer, which requires temperatures for storing as low as minus 70-80 C.

Summary of potential advantages

- Potent immunogenicity by neutralizing antibodies,
- No genetic content in the vaccine may confer better safety,
- One single shot administration may be enough,
- Long-lasting response with the cVLP adjuvant,
- Easy to handle compared to some other vaccines

Minor delay in the development

In its prospectus from September ExpreS^{2}ion stated its ambition to initiate a phase 1 study on humans before the end of the 2020. This goal was not achieved and we may speculate in different reasons. We believe one reason may be the relative complexity which is involved in the manufacture process of a recombinant protein based VLP vaccine. A cited drawback with vaccines based on protein subunit and CLP technologies is the experience that it may take a long time to establish a stable cell line (an expression system) that can produce large amounts of the recombinant RBD-protein and establish good manufacturing procedures. According to an often cited review article this has historically shown to take up to 1-2 year[2]

We also conclude that there are many different parties involved in the ABNCoV2 project which may complicate the process when approaching a regulatory agency for a submission of a clinical trial application, at least compared to a process involving only one or two companies.

On January 8 ExpreS^{2}ion announced that the PREVENT-nCoV consortium, alongside with Bavarian Nordic, had submitted a clinical trial application (CTA) to the Dutch authorities for the first human trial of the ABNCoV2 vaccine, the COUGH-1 study. The CTA is expected to be approved under an accelerated review (fast-track procedure) by the Dutch authorities, which allows for an approval within a maximum duration of 25 days. The CTA

[2] Moore et al, Journal of Virology (2020)

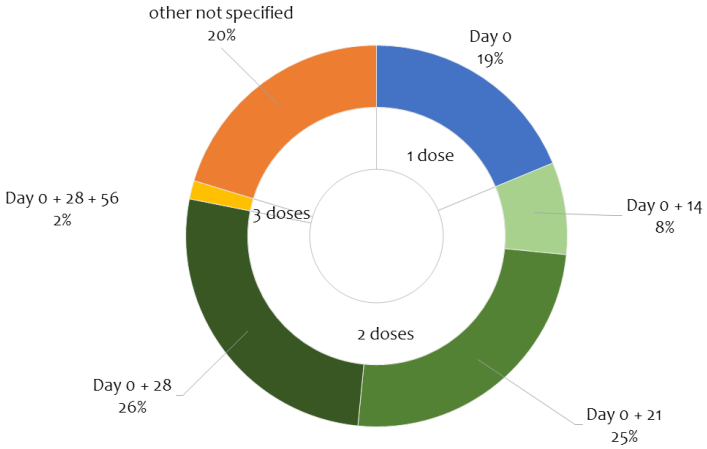
document is based on achieved aspects of the vaccine development project so far, including rodent data and Bavarian's non-human primate data, which are aimed to document a fast, strong, and long-lasting vaccine efficacy, even after one dose.

In spite of a tight schedule, ExpreS^{2}ion maintains that it expects headline data on human participants in the study to be released already by the end of Q1 or beginning Q2 this year, which would be an important milestone as long as it can be reached. If clinical headline data in phase 1 can be reached in this soon, it is possible that Bavarian Nordic can start its scheduled registration-enabling phase 2/3 trial in late H1 or early H2. However, this comes with some caveats, both that it is contingent upon Bavarian Nordic finding EUR 300-400m in financing of the studies and that Bavarian Nordic can act swiftly in Q2. To us it looks more probable that a registration-enabling study is initiated in early second half of this year, assuming Bavarian Nordic has arranged financing by then.

Expanding number of COVID-19 vaccines

The number of vaccines under development for the COVID-19 disease has continued to grow rapidly and now amounts to 237 compounds, of which 64 are in clinical development. This is a 40 percent increase since we last looked into the WHO database in August last year. The number of compounds in clinical development have increased by 113 percent, further stressing the accelerated timeline which is allowed in the race for a cure of Covid-19. Nineteen percent of the vaccines developed in clinical settings claims to be a one dose vaccine. See figure of dosing schemes below.

Dosing schedule of candidates in development



Source: WHO

In our opinion, the best way to understand the chances of Bavarian Nordic finally reaching commercialization of its product is to assess the number of programs based on a similar technologies, since each technology has its own

merits and drawback and may complement vaccines developed by a different technology platform.

In the WHO database, somewhat confusingly, AdaptVac and ExpreS^{2}ion are listed as two different programs, both characterized as protein-subunit technologies, not as Virus-Like Particle platforms. As for the expression system applied by ExpreS^{2}ion to produce the receptor-binding domain protein we can perfectly well understand this classification, but it is questionable to view the capsid delivery platform of Adaptvac as a protein subunit platform. It may be fair to say that the ABNCoV2 vaccine is based on a combination of both a protein subunit expression technology and a VLP delivery platform, which makes it fall outside the definitions by WHO.

There are only 2 candidate vaccines based on VLP technology in clinical development as compared to 20 candidate vaccines termed as protein subunits. In such a perspective the prospects for the ABNCoV2 candidate looks more promising. It then comes down much to looking at the adjuvant solutions which the protein subunit vaccine candidates are making use of, such as the Matrix M in the case of the Novavax product candidate. We also note that the clinical path for vaccines based on the protein subunit technology in some cases, such as with Novavax, has not been as straightforward as with the mRNA and inactivated virus platforms thus far.

Clinical programs sorted after its technology platform

Protein subunit	20	31%
Viral Vector (non-replicating)	10	16%
DNA	8	13%
Inactivated Virus	9	14%
RNA	7	11%
Viral Vector (replicating)	4	6%
Virus Like Particle	2	3%
VVr + Antigen Presenting Cell	2	3%
Live Attenuated Virus	1	2%
VVnr + Antigen Presenting Cell	1	2%
Total	64	100%

Source: WHO

AV-001 option expires in February

ExpreS^{2}ion has acquired an option to gain full rights to AdaptVac's breast cancer vaccine AV001. The lion's share of the money raised in the preferential rights issue in October (58%) is aimed at investing in the development of AV-001 and advancing this compound to a first-in-human trial by late 2022. The AdaptVac option was signed in February last year, at the same time as the companies embarked on the program for ABNCoV2,

the COVID-19 vaccine candidate originally named PREVENT-CoV2, and it expires on February 26 this year.

According to a press release, the terms of the Agreement are that ExpreS^{2}ion will pay an upfront payment to AdaptVac at signature of DKK 2.5M (SEK 3.5M), a payment at approval of release of clinical-ready production material of DKK 2.5M (SEK 3.5M) (estimated to be in 2021), a payment for initiation of a clinical Phase I safety trial of DKK 2.5M (SEK 3.5M) (estimated to be in late 2022), a payment for initiation of a clinical Phase II efficacy trial of DKK 10M (SEK 14M) (estimated to be in 2023-24) and thereafter aggregated clinical Phase III development and regulatory milestone-based payments of DKK 200M (SEK 285M), as well as lower single-digit royalty rates of net sales. As a part of an agreement with AdaptVac in September, ExpreS^{2}ion will reduce its ownership in AdaptVac to 34 percent from the current 50 percent, disposing of 16 percent of the shares to the other AdaptVac shareholder NextGen Vaccines, but still maintaining a substantial financial interest also in the ABNCoV2 program.

ExpreS^{2}ion plans to develop ES2B-C001/AV001 (HER2-cVLP) until it is clinically validated and ready for partnering. Furthermore, the License Agreement includes licensing rights allowing ExpreS^{2}ion to partner with a larger biopharmaceutical company on the commercialisation of AV001, against a fixed percentage of partner payments to be paid by ExpreS^{2}ion to AdaptVac, in which case other financial consideration towards AdaptVac falls away.

Assuming an exercise of its option in February, ExpreS^{2}ion will develop the process for scaling up manufacturing of the antigen in 2021 as well as the formulation and analytical methods for the vaccine, which needs to be in place before starting clinical studies in late 2022. It may also remain to repeat the proof-of-concept in animal studies on mice data which was first published in 2018 before a final decision can be made to embark on a phase 1 trials in humans.

Rationale of an anti-HER2 vaccine

An anti-HER2 vaccine would be capable of triggering the patient's own immune system to produce anti-tumor antibodies, an immunotherapy by a self-antigen. The main hurdle with a vaccine based on a self-antigen has been to generate robust and durable anti-tumor immune responses and to induce high-titer therapeutically potent anti-HER2 IgG. In animal data published in 2018 researchers showed that 1) the vaccine candidate AV001 prevented tumor growth in genetically modified mice grafted with mammary carcinoma cells expressing human HER2 and 2) that it prevented spontaneous development of human HER2-positive mammary carcinomas in transgenic mice.

Patients with HER2 positive breast cancer have mammary tumours expressing elevated levels of the protein Human Epidermal Growth Factor

Receptor 2 (HER2). 20-30 percent of all invasive breast cancer tumours are HER2-positive. This form is also one of the more aggressive cancers and responds poorly to traditional anti-hormonal treatment. The outlook for these patients improved significantly in 1998 when Genentech received approval for its Herceptin (trastuzumab, Roche) antibody therapy. Nearly half of the patients receiving anti-HER2 treatment with Herceptin respond to treatment, but nevertheless, poor prospects remain for a large proportion, which is the medical rationale in focus for the ES2B-C001 / AV001 project.

Among the drawbacks with the anti-HER2 mAb Herceptin we note reactions of hypersensitivity, requiring premedication with cortisol or anti-histamine. Also, anti-HER2 mAb therapy can cause cardiac adverse effects via mechanisms, which are not completely understood. Finally, the majority of patients with HER2-positive breast cancer acquire resistance to treatment with trastuzumab already within the first year.

Multibillion sales potential for ES2B-C001

The commercial potential of a therapeutic vaccine against HER2-positive breast cancer is substantial. Herceptin hit a peak sales level of close to USD 7bn in 2019 before turning generic with eroding prices as a consequence. Initially it is likely that ExpreS^{2}ion will focus on a second-line treatment for ES2B-C001 in patients who have relapsed anti-HER2 antibody regime.

The most important aspect of active immunotherapy and anticancer vaccination is the provision of long-lasting immunity against tumor antigens and thus preventing tumor relapse. Some clinical trials have been conducted using different HER2 peptide based vaccines alone or in combination with trastuzumab. NeuVax or E75 (Sellas Life Science Group) is a well-studied HER2 peptide-based vaccine in phase III clinical trial and has been studied in combination with trastuzumab also in phase II. The Danish partner to AdaptVac, Bavarian Nordic, has also completed a phase II trial of MVA-BN-HER2, a cancer vaccine immunotherapy for HER2 positive breast cancer patients.

Financial position after share issue

In August last year the Board of Directors of Expres2ion Biotechnologies proposed a new share issue of SEK 131 million with preference for shareholders to be subscribed for during October at SEK 12/share. The offer also includes two warrants for free, TO4 and TO5, which during this year can bring an additional up to SEK 85 million depending on the share price development. Three warrants of TO4 can be exercised for one new share during the period 12 April-26 April this year at a subscription price amounting to 70 percent of the volume-weighted average share price during the period March 29-April 9. The subscription price cannot be less than SEK 6 per share and not more than SEK 22 per share.

The warrants of TO5 can be exercised for one new share during the period September 6-September 20 this year at a subscription price amounting to 70

percent of the volume-weighted average share price during the period August 23-September 3. The subscription price cannot be less than SEK 6 per share and not more than SEK 25 per share. We expect ExpreS^{2}ion will have to turn to its shareholders for more cash in late 2022.

Financing of ABNCoV2 yet to be found

If the AV001 option is exercised this project emerges as an important value driver alongside the ABNCoV2 vaccine candidate. The proceeds for the new share issue last year, together with TO4 and TO5, gives the company the possibility to bring ES2B-C001 into preparations of a clinical phase 1/2 study late 2022. As for ABNCoV2, the full financing of clinical trials and manufacturing capabilities is yet to be concluded by Bavarian Nordic, which we believe could be a factor behind the sluggish share price development in ExpreS^{2}ion. It is our understanding that a registration-enabling phase 3 trial will cost EUR 300-400m. As for ExpreS^{2}ion, its financial commitment to the ABNCoV2 program is substantially lowered after last year's deal between Bavarian Nordic and AdaptVac. With the proceeds from last year's preferential rights issue, the company will have resources to:

- Invest in preclinical and clinical trials for AV001, where we expect the funds to be sufficient to complete at least Phase 2a (58 percent of proceeds);
- Continue to cover the costs of ExpreS^{2}ion 's contribution to the PREVENT-nCoV consortium (COVID-19), including the company's optimization of the vaccine antigen (four percent of proceeds);
- Strengthen the company's opportunities to invest in various activities both internally and with AdaptVac (24 percent of proceeds).
- Move forward one or more of the projects for an influenza vaccine in the INDIGO consortia (12 percent of the proceeds),
- Promote one or more of the company's preclinical and clinical projects for vaccination against malaria (2 percent of the proceeds)

Three scenarios of commercial outcome of ES2B-C001

	Weak scenario	Main scenario	Strong scenario	Comments
Aggregated sales , EURm	3 000	4 589	9 000	394 mln doses sold in main scen
EUR per dosis	12	12	12	Our assumption
Adaptvac royalty from Bavarian	7%	10%	13%	Single digit to double digit
ExpreS^{2}ions royalty from Adaptvac	11%	11%	11%	Double digit number
royalty from vaccine sales	*0,8%*	*1,1%*	*1,4%*	
ExpreS^{2}ion revenues, EURm	23	50	129	Over period 2022-2026
in SEKm	*231*	*505*	*1 287*	
Milestone from Adaptvac, SEKm	20	20	20	EUR 2m in 2021-22
ExpreS^{2}ion revenues, SEKm	251	525	1 307	
SEK/share	8,0	16,6	41,4	
Tax rate	20%	20%	20%	Assuming full taxation
Likelihood of Approval (LOA)	26%	26%	26%	40 % phase 1/2, 65 % phase 3
Risk-adjusted after tax, SEK/share	1,7	3,5	8,6	Not discounted, see SoTP

Forecasts by Analysguiden

Royalty-driven model

In the table above, we show that ExpreS^{2}ion's royalties per share from Bavarian Nordic's commercial sales can amount to SEK 16.6 / share in our de-risked main scenario. Risk-adjusted and after tax, income sinks to SEK 3.5 / share. To this value must be added ExpreS^{2}ion's stake in AdaptVac, which will be 34 percent after the exercise of the AV-001 option. If our scenario materializes, AdaptVac will turn into a large bag of money from milestones and royalties from Bavarian Nordic. In this situation, we expect AdaptVac in 2024 will be able to distribute 75 percent of the company's cash position, which by then could be SEK 3.5 billion.

In our main scenario, we expect ExpreS^{2}ion to receive 1.1 percent of total vaccine sales as royalty, which is a product of the two royalty rates we have adopted in the table above. For AdaptVac's part, we believe that the royalty extends between 7-13 percent. AdaptVac's agreement with Bavarian entitles to milestones corresponding to a maximum of EUR 136 million, but only EUR 2 million of these are shipped down to ExpreS^{2}ion in our model. On the positive side, it is noticeable that our assumption of the likelihood of approval in the current corona landscape and after the Bavarian deal is substantially improved. We estimate the chances of an approved vaccine (LOA) to be 26 percent if and when the clinical phase 1 study begins. The final phase 3 study, involving at least 10,000 patients, is planned to run in parallel with the phase 2 safety study and possibly start around mid-year, somewhat later than the initial estimate.

Financial discussion and triggers

In our sum-of-the parts approach to a valuation of Expres2ion Biotechnologies we arrive at SEK 10 / share for ES2B-C001 / AV001, assuming a 9 percent chance to reach the market. We expect an outlicensing of the product to a partner before starting pivotal phase 2b study. This makes the ES2B-C001 program, assuming the AdaptVac option is exercised before February 26, a slightly more valuable assets than the COVID-19 vaccine candidate program. As for the COVID-19 vaccine candidate we include two possible revenue streams:

- The low-single digit royalty stream and milestones on commercial sales of ABNCoV2 vaccine
- The 34 percent holding in AdaptVac

We have also put a value of SEK 120m on the service providing business, mostly based on the company's EXPRES^2 protein expression platform.

Sum-of-The-Parts valuation of ExpreS^{2}ion Biotech

	Project value (MSEK)	Value / share (SEK)	Peak sales (MEUR)	LOA*	WACC	Share of NPV	Comments
AV001 (breast cancer)	316	10,0	1 171	9%	14%	100%	
Royalty, ABNCoV2	99	3,1	4 589	26%	10%	100%	11% of Adaptvac
Adaptvac, dividend	218	5,2		26%	10%	75%	distributed in 2024
Platform	121	3,8	2,6	100%	7%	100%	cash flow based
Malaria project	40	1,3	175	12%	14%	10%	of consortium
Indigo (influenza)	30	0,6	952	5%	12%	8%	of consortium
Sum	823	24,0	*based on the no. of shares by end of 2021, mln*				*31,5*

**) Likelihood of approval*

Forecasts by Analysguiden

ExpreS^{2}ion currently holds half of the ownership in AdaptVac with the Danish academic group NextGen Vaccines ApS holding the other half of the shares in AdaptVac. NextGen is a spin-out from the University of Copenhagen's Institute of Immunology and Molecular Biology, controlled by a handful of researchers at this institution. As a part of the agreement with AdaptVac/NextGen to license full rights to AV011, we understand that ExpreS^{2}ion will dispose of 16 percent of shares in AdaptVac to NextGen Vaccines, reducing its stake to a 34% holding. Our approach to valuing this stake is by assuming that AdaptVac will distribute 75 percent of it's the cash position accumulated by 2024 if the vaccine reaches the market. At that time, the cash pile may amount to SEK 3.5 billion. However, the valuation of the holding in AdaptVac is surrounded by various uncertainties, partly because we are not aware of the priority of the future majority shareholder in AdaptVac, NextGen Vaccines ApS.

Our summation of the values in the individual projects amounts to SEK 24, ending up just above the upper part of the range of the SEK 6-22 subscription price for TO4, which starts running in April. However, as long as we do not have news about Bavarian Nordics efforts to finance the phase 2/3 trial we do not expect the share price to make a move against the SEK 20 mark.

In the short term we see two triggers consisting of the initiation of a phase 1 trial, financed by a grant from Horizon 2020, which we expect will happen in February, and the announcement of the exercise of the AV001 option, serving as a good move on the path to become a vaccine developing company. According to management it expects to release a headline safety readout of the COUGH-1 already in late Q1, paving the way for a phase 2/3 study to be initiated around mid-year.

Potential risks with an investment in ExpreS^{2}ion

As for potential risks for a negative share price development, we would expect the share price to drop substantially were Bavarian Nordic to announce that it abandons plans of finding financing for late-stage development of the ABNCoV2 vaccine candidate. We would also regard it as disappointing were ExpreS^{2}ion to announce that it will not exercise the

option to gain full rights to AdaptVac's cancer vaccine AV001. The risk for the Dutch Pharmaceutical Authority of turning down the Clinical Trial Application (CTA) in February, a third risk factor, should be small in our view, less than 10 percent. It is also likely that news flow from the most advanced vaccines currently in phase 3 will have an impact on Bavarian Nordics financing efforts as well as the ExpreS^{2}ion share price, with negative news or suspended programs turning into a positive event for the Danish vaccine developer.

Assumptions in Net Present Valuation of ExpreS²ion Biotech

SEKm	2019	2020p	2021p	2022p	2023p	2024p	2025p	2026p	2027p	2030p
Sales	13,8	16,4	28,4	39,0	373,2	72,0	114,9	25,2	26,4	26,4
PREVENT-nCoV		*0*	*10*	*21*	*42*	*52*	*28*	*7*	*0*	*0*
AV001					*309*	*-2*	*63*	*-2*	*89*	*80*
platform/services	*14*	*13*	*15*	*18*	*22*	*22*	*24*	*25*	*26*	*26*
EBIT	-18,1	-23,1	-70,1	-72,4	315,3	28,1	85,0	6,3	7,9	
Cash	5	82	63	-10	304	331	415			

PREVENT-nCoV	2020p	2021p	*Lansering*	2023p	2024p	2025p	2026p	2027p	2030p
Sales, EURm			505	1 352	1 393	883	455	0	
EUR/dosis			*11*	*11*	*12*	*12*	*12*		
No. of doses, mln total of 394			*45*	*118*	*119*	*74*	*37*		
ExpreS²ion milestones, EURm		1	1	0	0	0	0		
Royalty, MEUR			4	16	20	11	3	0	
Royalty rate			*0,8%*	*1,2%*	*1,4%*	*1,2%*	*0,6%*		
Expres2ion revenues, SEKm		10	52	162	201	106	27	0	0
Risk-adjusted		*1,00*	*0,40*	*0,26*	*0,26*	*0,26*	*0,26*	*0,26*	
Risk adjusted revenues, NPV (SEKm)			11,0	42,2	52,2	27,6	7,1	0,0	

WACC	10%
NPV, AV001 (SEKm)	98
NPV/share, SEK	3,1
LOA	26%

AV001 - SEKm	2020p	2021p	2022p	*Licens*	2024p	2025p	2026p	*Lansering*	2030p
Costs, preclinical / clinical	-7	-46	-54	-20	-14	0	-50	0	-75
incl milestones to Adaptvac	*-3,5*	*-3,5*	*-3,5*	*0*	*-14*	*0*	*-50*	*0*	*-75*
Sales, EURm								147	921
Milestones, licensing partner 975 MEUR				75	0	100	0	200	200
Royalty 10%								*15*	*92*
Expres2ion revenues, SEKm				765	-14	1020	-50	998	2904
Risk-adjusted	*1,00*	*0,75*	*0,53*	*0,53*	*0,21*	*0,11*	*0,09*	*0,09*	*0,09*
Risk adjusted revenues, NPV (SEKm)				309	-2	63	-2	89	80

WACC	14%
Net present value (SEKm)	316
NPV/share, SEK	10,0
LOA	9%

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The analyst Sten Westerberg does not own and may not own shares in the analysed company.

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