Hansa Medical

Year-End Report 2017

IdeS consistently demonstrates strong efficacy and safety in highly sensitized patients awaiting lifesaving kidney transplant

Year-End Report 2017 – Business highlights

October – December 2017 in brief

- Hansa Medical successfully raised SEK 545 million (USD 65 million), gross, through a directed share issue to a number of US, UK and Swedish specialist healthcare investors. The proceeds will enable the timely completion of ongoing clinical studies with IdeS evaluating the efficacy of this drug candidate to enable kidney transplantation in highly sensitized patients. The proceeds are also being used to expand the company's commercial and medical affairs' capabilities. Hansa Medical will also carry out several clinical studies in related transplant indications and in selected acute autoimmune diseases, including anti-GBM disease and Guillain-Barré syndrome (GBS).
- Ulf Wiinberg, the company's Non-Executive Chairman, was appointed Acting CEO, following the tragic and unexpected death of the company's CEO, Göran Arvidson. Board member Birgit Stattin Norinder was appointed chairman. Recruitment of a new CEO is underway.
- Continued patient enrollment in the investigator-initiated Phase II study with IdeS in anti-GBM, a rare and acute autoimmune kidney disease. The study began in June 2017, and as of December 31, five patients have been recruited and treated with IdeS. Limited follow-up data is currently available from three of these five patients who have all responded favorably and IdeS appears to be well tolerated. Patients enrolled in the study will be monitored for six months.

Significant events after the end of the reporting period

- Completed enrollment in Hansa Medical's international multicenter Phase II study Highdes. The primary objective of the study – to turn a positive cross-match test into a negative and thereby enable kidney transplantation - has been accomplished in all 18 treated patients. All patients will be monitored for six months.
- Finalized enrollment in US investigator-initiated Phase II study with IdeS in highly sensitized patients. IdeS effectively reduced the level of DSAs in all 17 treated patients and turned the cross-match tests from positive to negative, thereby enabling transplantation for all patients. All patients will be followed for six months to monitor safety, kidney function and DSA levels.

January – September 2017 in brief

- Combined data from three independent clinical Phase II studies with Hansa Medical's lead candidate IdeS was published in *The New England Journal of Medicine* 2017;377:442-53, August 3, 2017 issue. The published results demonstrate that treatment with IdeS is effective in reducing donor-specific antibodies (DSAs) to levels allowing lifesaving kidney transplantation of highly sensitized patients.
- The European Medicines Agency (EMA) granted access to its Priority Medicines (PRIME) scheme for IdeS in enabling kidney transplantation for highly sensitized patients. Access to PRIME may allow Hansa Medical to accelerate the development of IdeS.
- Lead candidate IdeS was discussed in a two-day workshop titled *Antibody Mediated Rejection in Kidney Transplantation*, organized by the U.S. Food and Drug Administration (FDA). Transcripts from the workshop have been released and are available on the FDA website. The presenters and the audience at the well-attended workshop were generally very optimistic about the potential of IdeS in kidney transplantation.
- New published preclinical data demonstrated that treatment with IdeS could be a novel therapeutic strategy for the treatment of Guillain-Barré syndrome (GBS).
- Published preclinical results utilizing IdeS confirmed the potential in cancer immunotherapy. The findings demonstrate how pre-treatment with IdeS in tumor models may increase the efficacy of currently available antibody-based cancer therapies.

"2017 was a successful year for Hansa Medical, during which we reached several important milestones in our clinical studies and broadened our long-term investor base to include specialist international healthcare funds. We also gained increased attention from the medical research community following the publication of IdeS clinical data in *The New England Journal of Medicine.*"

Ulf Wiinberg
Acting CEO

Financial summary for the Group (KSEK)

	Q4		Year	
KSEK, unless otherwise stated	2017	2016	2017	2016
Net revenue	1,013	543	3,442	2,579
Operating profit/loss	-48,921	-33,562	-176,083	-111,135
Net profit/loss	-48,988	-33,556	-176,660	-111,129
Earnings per share before and after dilution (SEK)	-1.36	-0.99	-4.97	-3.37
Shareholders' equity	630,661	283,693	630,661	283,693
Cash flow from operating activities	-29,142	-27,185	-150,105	-94,563
Cash and cash equivalents including short term investments	616,061	253,578	616,061	253,578

CEO statement

2017 was a successful year for Hansa Medical, during which we reached several important milestones in our clinical studies and broadened our long-term investor base to include specialist international healthcare funds. We also gained increased attention from the medical research community following the publication of IdeS clinical data in *The New England Journal of Medicine*.

A lot of the progress achieved during the year should be attributed to the groundwork of our late CEO Göran Arvidson, who unexpectedly passed away in November. Through his inspirational leadership and dedication, he evolved Hansa Medical into a strong, emerging biopharmaceutical company with a clear, ambitious strategy and a dedicated organization capable of executing and delivering on milestone targets. We are firmly dedicated to continuing the development in the direction outlined by Göran and the board of directors. We are currently recruiting a new CEO for Hansa Medical.

During the year, we received further evidence of the potential of our lead compound IdeS as a new and innovative treatment to enable life-saving kidney transplantation. Our two ongoing clinical Phase II studies in Europe and the US completed enrollment in January 2018, and a total of 35 patients were treated with IdeS prior to kidney transplantation. IdeS effectively reduced the level of donor-specific antibodies (DSAs) in all patients and turned the cross-match tests from positive to negative, thereby enabling transplantation for all patients. Safety, kidney function and DSA levels will be monitored for all patients during a six-month follow-up period in 2018.

We received further validation of the increasing medical need for IdeS as a new treatment option to enable kidney transplantation in highly sensitized patients, when the European Medicines Agency (EMA) granted our IdeS development program access to its Priority Medicines (PRIME) scheme. This allows us to continue to accelerate the development of IdeS. Access to the PRIME scheme was granted on the basis of data from both our finalized and ongoing Phase II studies in sensitized patients.

In line with the clinical progress, we also gained increased attention from the medical research community. In August, data from three of our clinical Phase II studies with IdeS was published in one of the leading medical journals, *The New England Journal of Medicine*. The article, titled *IgG Endopeptidase in Highly Sensitized Patients Undergoing Transplantation*, concluded that treatment with IdeS effectively reduces DSA and thus enables lifesaving transplantation for highly sensitized kidney transplant patients. The publication is an important peer review of our novel treatment concept and now also forms the basis for interactions with global key opinion leaders, both in transplantation and within several autoimmune indications.

In parallel with our work in organ transplantation, we have taken the first important clinical steps to broaden the use of IdeS for both transplant-related indications and acute autoimmune diseases. A phase II study is ongoing in anti-GBM antibody disease, a rare and acute autoimmune kidney disease, where approximately 2/3 of the patients lose their kidney function, resulting in the need of chronic

dialysis. We are also planning a Phase II study in Guillain-Barré syndrome (GBS), a rare acute autoimmune neurological disease.

In the third quarter, we announced that five patients had been included in the investigator-initiated Phase II study in severe anti-GBM. Limited follow-up data is currently available from three of these five patients who have all responded favorably. IdeS appears to be well tolerated. The study aims to enroll approximately 15 patients at clinics/centers across Europe. Also, prior to site initiation of this study, three additional patients were treated on a so called named patient basis in Sweden.

GBS is another promising indication in which IdeS' mode of action has the potential to make significant treatment improvements. Early in 2017, preclinical *in vivo* data with IdeS was published in the scientific journal *Experimental Neurology*, demonstrating that treatment with IdeS could be a promising new therapeutic strategy for GBS. A clinical Phase II study in GBS is currently under design.

We made significant investments in the IdeS manufacturing process during 2017. The processes have been transferred to manufacturers in Europe suitable for commercialization. The IdeS product intended for launch is lyophilized for convenient and effective worldwide distribution.

We are in a strong and unique position in the development of our novel immunomodulatory enzymes. Our vision is to become a world-leading IgG-modulating company and bring our products to patients across a range of conditions where IgG plays a key role in disease progression or forms a barrier for patients to receive appropriate treatment.

With this vision in mind, in November, the Board resolved the company to undertake a directed share issue that raised SEK 545 million. The proceeds from this offering are being used to fund the continued development of our existing product portfolio and to expand our medical affairs and commercial capabilities, ahead of a potential US and European approval and subsequent launch of IdeS. We received strong interest from several reputable US, UK and Swedish institutional investors and the share issue was fully completed by December 29, 2017.

During 2017, we continued to build a strong and experienced team expanding our capabilities in R&D, medical affairs and marketing, and we now have a dedicated team of approximately 40 co-workers. We will continue to add more expertise to the organization, particularly within regulatory affairs, medical affairs and commercial competencies.

Looking ahead, we will continue to build on the progress we have made in recent years. The successful financing event enables us to continue implementing our strategy. Our focus will be on completing the development of IdeS in highly sensitized patients and the ongoing Phase II study in anti-GBM as well as initiating additional Phase II studies in closely related transplant indications and in Guillain-Barré syndrome. In addition, we will continue the development of our novel IgG-eliminating enzymes, as well as explore development of potential applications in oncology of these enzymes.

We still have a number of milestones to reach before IdeS is potentially available on the market. During 2018 we plan to continue discussions regarding the regulatory path to approval for IdeS in transplantation with both the FDA and EMA. In addition to the convincing data demonstrating the efficacy and safety of IdeS in enabling kidney transplantation, important items for these discussions will be six-month follow-up data, further improvements of the manufacturing process, and the significant medical need for these highly sensitized patients who today have very limited chances, if any, to be transplanted.

We have made progress in our strategy, the foundations are now in place and we are on track to achieve our vision of becoming a world-leading IgG-modulating company delivering important, life-saving products to patients across a range of conditions where IgG plays a key role in disease progression or forms a barrier for patients to receive appropriate treatment. I look forward to updating you on our continued progress.

Ulf Wiinberg
Acting CEO of Hansa Medical

Hansa Medical in brief

Hansa Medical is a biopharmaceutical company developing novel immunomodulatory enzymes for transplantation and acute autoimmune diseases. The lead product, IdeS, is a proprietary antibody-degrading enzyme currently in late-stage clinical development for kidney transplant patients, with significant potential for further development in other solid organ transplants and in acute autoimmune indications. The company also has a strong pipeline of preclinical projects that may provide a second wave of potential drugs. Under the project name NiceR, novel immunoglobulin cleaving enzymes are developed for repeat dosing with the objective of treating relapsing autoimmune diseases and cancer. Hansa Medical is based in Lund, Sweden, and its shares are listed on Nasdaq Stockholm (ticker: HMED).

Business overview

IdeS is an enzyme, currently in late stage clinical development, that specifically cleaves immunoglobulin G (IgG). Our strategy takes advantage of the ability of IdeS to specifically and efficiently inactivate IgG to prevent and treat patients who have developed pathogenic IgG. IdeS-mediated IgG elimination constitutes a novel therapeutic principle for the treatment of IgG-mediated acute human diseases.

NiceR is a program developing novel IgG inactivating drug candidates for repeat dosing, which may translate to wider usage in relapsing autoimmune diseases and oncology.

EnzE is a preclinical research and development program under which the combination use of approved antibody-based cancer treatments with IgG-modulating enzymes is explored in order to potentiate presently available antibody-based cancer therapies.

EndoS is an IgG-modulating enzyme that has proven efficacious in a range of autoimmune models. Preclinical research and development aiming at enabling clinical trials with EndoS in autoimmune diseases is ongoing.

HBP-assay is a novel diagnostic method to help predict severe sepsis in patients with symptoms of infectious disease. The method has been evaluated in two clinical studies and is available on the market. HBP-assay has been out-licensed to UK-based Axis-Shield Diagnostics and the agreement is associated with royalties to Hansa Medical.

Pipeline

Candidate/ Method/Project	Indication	Research/ Preclinical	Phase I[1]	Phase I/II	Phase II	Pivotal	Registration
THERAPEUTICS							
IdeS	Kidney transplantation in highly sensitized patients[2]						
	Other kidney transplant indications (AMR, ABOi)[3]						
	Anti-GBM antibody disease						
	Other acute autoimmune diseases[4]						
NiceR	Recurring treatment in autoimmune disease						
EndoS	Autoimmune disease						
EnzE	Cancer immunotherapy						
DIAGNOSTICS							
HBP-assay (IVD)	Prediction of severe sepsis[5]						

1) Present and future IdeS Phase II studies to be based on the same Phase I study. Results from the Phase I study have been published, Winstedt el al. (2015) PLOS ONE 10(7).

2) Two separate Phase II studies with IdeS in sensitized patients are currently ongoing. Results from finalized and partly ongoing Phase II studies have been published in N Engl J Med 2017;377:442-53.

3) Phase II studies in antibody mediated rejection (AMR) post kidney transplantation and blood-group incompatible (ABOi) kidney transplantation are being planned.

4) Phase II studies in rare autoimmune conditions like GBS are being planned.

5) Out-licensed to Axis-Shield Diagnostics Ltd.

Lead candidate IdeS

IdeS – A novel therapeutic principle

Our lead candidate drug, IdeS, represents a unique and novel approach to rapidly and effectively eliminate pathogenic IgG-antibodies. IdeS, Immunoglobulin G-degrading enzyme of *Streptococcus pyogenes*, specifically cleaves immunoglobulin G (IgG). Several autoimmune diseases are characterized by pathogenic IgG-antibodies and, in organ and tissue transplantation, pathogenic IgG-antibodies can prohibit patients from being transplanted or cause organ rejection after transplantation. Hansa Medical develops IdeS as a single intravenous treatment for fast and effective elimination of pathogenic IgG-antibodies in transplantation and acute autoimmune diseases.

Overview of Hansa Medical's clinical program with IdeS

The clinical development program is currently focused on treatment prior to kidney transplantation. The long-term vision for Hansa Medical is to establish IdeS as a therapy for fast and efficient elimination of pathogenic IgG in several transplant related indications and acute autoimmune diseases.

IdeS has been evaluated in a Phase I study[1] in healthy subjects and in two finalized Phase II studies in sensitized patients awaiting kidney transplantation[2]. The results from these studies demonstrate that IdeS is highly effective in reducing anti-HLA antibodies to levels acceptable for transplantation and is well tolerated. The efficacy and safety of IdeS is currently being investigated in two ongoing Phase II studies in highly sensitized kidney transplantation patients. Patient recruitment was completed in early January 2018 to these two Phase II studies and the patients will be monitored for six months with respect to safety, kidney function and DSA levels.

An investigator-initiated Phase II study with IdeS in the rare and acute autoimmune kidney disease anti-GBM antibody disease is ongoing in collaboration with several European nephrology clinics.

Additional Phase II studies with IdeS are under planning within acute antibody mediated rejection (AMR), pre-treatment ahead of blood group incompatible (ABOi) kidney transplantation and treatment of the acute autoimmune neurological disease Guillain-Barré syndrome (GBS).

Ongoing clinical studies with IdeS

IdeS – Pre-treatment of patients with donor-specific antibodies

Latest developments

In January 2018, patient enrolment was completed in two ongoing open label single arm Phase II clinical studies with IdeS in highly sensitized patients; the Hansa Medical-sponsored multicenter study named Highdes and an investigator-initiated study at Cedars-Sinai Medical Center in Los Angeles, led by Professor Stanley Jordan.

The ongoing Highdes study (ClinicalTrials.gov Identifier: NCT02790437) has enrolled and transplanted a total of 18 patients at NYU Langone Medical Center in New York, Cedars-Sinai Medical Center in Los Angeles, The Johns Hopkins Hospital in Baltimore, Necker Hospital in Paris and Uppsala University Hospital in Uppsala, Sweden. The primary objective of the study is to

evaluate the efficacy of IdeS in patients who are on the waiting list for kidney transplant and have previously undergone desensitization unsuccessfully or in whom effective desensitization with currently available methods will be highly unlikely. At study entry, the patients had an available deceased or live donor with a positive crossmatch test. The study assesses IdeS' efficacy and safety in removing donor-specific antibodies (DSAs) and thereby converting a positive crossmatch test to negative. All treated and transplanted patients will be followed up for six months. The primary objective of the study – to turn a positive cross-match test into a negative and thereby enable kidney transplantation - has been accomplished in all 18 treated patients.

The ongoing US investigator initiated Phase II study has enrolled and transplanted a total of 17 patients at Cedars-Sinai Medical Center with Professor Stanley Jordan as principal investigator (ClinicalTrials.gov identifier: NCT02426684). Included patients had donor-specific antibodies (DSAs) and a positive cross-match test prior to IdeS treatment. Attempts to desensitize these patients using currently available methods had been made prior to inclusion in the IdeS study. IdeS effectively reduced the level of DSAs in all patients and turned the cross-match tests from positive to negative, thereby enabling transplantation for all patients. All patients will be followed for six months to monitor safety, kidney function and DSA levels.

Results from the US investigator-initiated study together with results from the two finalized Hansa Medical-sponsored Phase II studies, were published in *The New England Journal of Medicine* on August 3, 2017 (Vol. 377 No. 5, pages 442-53). In the article, titled *IgG Endopeptidase in Highly Sensitized Patients Undergoing Transplantation*, researchers demonstrate that treatment with IdeS in 25 patients was effective in reducing donor-specific antibodies (DSAs) to levels allowing lifesaving kidney transplantation of highly sensitized patients. Of the 25 treated and transplanted patients, 24 patients had good kidney function at last follow-up. One graft loss occurred in the U.S. study due to non-HLA IgM and IgA antibodies. Five biopsy confirmed episodes of acute antibody-mediated rejection (meeting the Banff criteria, Loupy et al., *American Journal of Transplantation* 2017; 17: 28–41) occurred but all patients responded well to treatment. The article concludes that IdeS is generally well tolerated and effective in eliminating HLA antibodies including DSAs, thus enabling successful transplantation in highly sensitized patients.

The New England Journal of Medicine publication may be found online at: www.nejm.org, DOI: 10.1056/NEJMoa1612567

IdeS – Treatment of anti-GBM antibody disease

Anti-GBM antibody disease, also known as Goodpasture disease, is a rare and acute autoimmune disease where autoantibodies directed against type IV collagen cause acute inflammation of the kidney and/or the lungs. In severe anti-GBM, the disease may progress to renal failure or death. Anti-GBM antibody disease is a rare disease affecting one in a million annually[3] and less than one third of the patients survive with a preserved kidney function after six months follow-up[4].

Latest developments

In June 2017, an open label investigator-initiated Phase II study in severe anti-GBM antibody disease was initiated. The study (ClinicalTrials.gov identifier NCT03157037) is coordinated by Professor Mårten Segelmark at Linköping University Hospital, Sweden, who is also the principal investigator/sponsor. Approximately 15 patients will be recruited to the study at up to 15 clinics in Europe. The primary objective of this study is to evaluate the safety and tolerability of IdeS in patients with severe anti-GBM antibody disease in addition to standard-of-care. IdeS efficacy will be assessed by evaluating renal function at six months after IdeS treatment.

As of December 31, five patients had been included in the study. Limited follow-up data is currently available from three of these five patients, who have all responded favorably. IdeS appears to be well tolerated in these patients. In addition, prior to site initiation of this ongoing study, three patients were treated on a named patient basis in Sweden. Hence, a total of eight patients with anti-GBM disease have been treated with IdeS as of December 31, 2017.

Overview of completed and ongoing clinical trials with lead candidate IdeS

Study	Study site	Subjects	Status
Phase I	Lund University Hospital, Sweden	29 healthy subjects, randomized placebo controlled dose-escalation study.	● Completed 2014. Conclusion: IdeS is efficacious and well tolerated with a favorable safety profile.
Phase II in kidney transplantation	Uppsala University Hospital, Sweden	8 sensitized patients, dose finding study.	● Completed 2015. Conclusion: IdeS treatment resulted in HLA levels acceptable for transplantation in all patients.
Phase II in kidney transplantation	Uppsala University Hospital, Sweden Karolinska University Hospital, Sweden	10 sensitized patients, with transplantation.	● Completed 2016. Conclusion: IdeS enabled kidney transplantation for all patients with a favourable safety profile.
Phase II in kidney transplantation (Investigator initiated)	Cedars Sinai Medical Center, Los Angeles, USA	17 highly sensitized patients, with transplantation.	● Ongoing. Enrollment completed. IdeS effectively reduced the level of DSAs in all patients and has enabled transplantation for all patients. All patients will be followed for six months.
Highdes – Phase II in kidney transplantation	Cedars Sinai Medical Center, Los Angeles, USA NYU Langone Medical Center, New York, USA Johns Hopkins Medicine, Baltimore, USA Uppsala University Hospital, Sweden Necker Hospital, Paris, France	18 highly sensitized patients, with transplantation.	● Ongoing. Enrollment completed. All patients will be followed for six months. The primary objective of the study – to turn a positive cross-match test into a negative and thereby enable kidney transplantation - accomplished in all 18 treated patients.
Phase II in anti-GBM (Investigator initiated)	Europe. Several sites.	Approximately 15 patients with anti-GBM antibody disease.	● Ongoing.

Table A. IdeS has been evaluated in a Phase I study in healthy subjects and in two Phase II studies in sensitized patients awaiting kidney transplantation. The results in these studies indicate that IdeS is highly effective in reducing anti-HLA antibodies to levels acceptable for transplantation with a favorable safety profile. Currently, two additional Phase II studies are ongoing with IdeS in sensitized patients prior to kidney transplantation – an investigator-initiated US Phase II study at Cedars-Sinai Medical Center in Los Angeles, and a Hansa Medical-sponsored multi-center study, Highdes, in the US, Sweden and France. In addition, a Phase II in the rare autoimmune disease anti-GBM is ongoing.

Manufacturing of IdeS

During 2017, Hansa Medical has made significant investments in process development and the IdeS manufacturing processes have been transferred to manufacturers in Europe suitable for commercialization. The manufacturing processes have been improved and the product for commercialization is lyophilized rather than a frozen solution, which has been used in clinical studies with IdeS to date. A lyophilized version of IdeS brings the advantages of easy off-the-shelf use and is convenient and effective for world-wide distribution.

The first GMP batch for further clinical studies and commercial supply was produced in late 2017. Full process characterization and validation for commercial supply will be completed during 2018.

Regulatory strategy for IdeS in desensitization

The Highdes study has enrolled patients with a positive cross match test against their available live or deceased donor. The patients have either failed on previous attempts of desensitization or are highly likely to fail desensitization with currently available methods due to their immunological state.

In May 2017, EMA granted IdeS access to its Priority Medicines (PRIME) scheme for desensitization of highly sensitized kidney patients. Under the PRIME scheme, Hansa Medical is working in close collaboration with EMA for accelerated development of IdeS towards submission of a Market Authorization Application (MAA) for the EU marketing authorization. Similarly, Hansa Medical will seek

scientific advice from the FDA through an end of Phase II meeting for accelerated development of IdeS towards submission of a Biologics License Application (BLA) in the US. Hansa Medical will meet with both FDA and EMA as soon as six months follow up data from the ongoing Highdes study is available.

Planned clinical studies with IdeS in additional indications

Treatment of kidney transplant antibody-mediated rejection (ABMR)

Approximately 10 percent[5] of all transplant patients experience AMR post-transplant. Although different experimental protocols are used in the treatment of AMR, there is currently no approved treatment. Consequently, the unmet medical need is high for an effective treatment of AMR. It is anticipated that IdeS with its ability to instantly remove donor specific antibodies (DSA) damaging the kidney, can make a big difference in the treatment of these patients.

Blood-group incompatible (ABOi) kidney transplantation

ABOi transplantations have increased worldwide in order to shorten the long waiting times for transplantation[6]. If levels of preformed antibodies to donor blood group antigens are not decreased to low levels prior to ABOi transplantation they may result in severe AMR and early graft loss.

Treatment of Guillain-Barré syndrome (GBS)

GBS is an acute autoimmune disease in which the peripheral nervous system is attacked by the immune system and IgG-antibodies. It affects one in 100,000 people annually[7]. In February 2017, preclinical data demonstrating the treatment potential of IdeS in GBS were published[8]. In a model of GBS, inactivation of IgG by IdeS treatment significantly promoted the recovery and reduced the degeneration of peripheral nerves. The data show that treatment with IdeS could potentially become a novel therapeutic strategy for the treatment of GBS.

Preclinical development projects

NiceR

Hansa Medical develops novel IgG-degrading enzymes under the project name NiceR (Novel Immunoglobulin Cleaving Enzymes for Repeat dosing). The aim of project NiceR is to create novel IgG-inactivating biopharmaceuticals which can be used for repeated dosing in acute autoimmune conditions where patients would benefit from more than one dose of an IgG-modulating enzyme. Several novel IgG-eliminating enzymes have been designed and the program is currently in preclinical development.

EnzE – Enzyme-based antibody Enhancement

Recently published findings[9] demonstrate how pre-treatment with IdeS in tumor animal models can increase the efficacy of currently available antibody based cancer therapies. This treatment concept is investigated under the project name EnzE, Enzyme-based antibody Enhancement. The published data demonstrate the potential of an IgG-clearing agent as a pre-treatment for cancer patients. High levels of plasma IgG have been shown to limit the efficacy of therapeutic antibodies, as plasma IgG can saturate the receptors of the patient's immune cells preventing them from efficiently killing the tumor cells. Removing inhibiting IgG antibodies with IdeS or novel IgG-clearing enzymes prior to dosing the patient with a therapeutic antibody can potentially increase the efficacy of the given cancer therapy. Hansa Medical is currently evaluating strategic options for EnzE.

EndoS – Treatment of autoimmune diseases

EndoS, Endoglycosidase of *Streptococcus pyogenes*, is an enzyme that specifically hydrolyzes the functionally important glycan in IgG. EndoS has proven to be active in a range of preclinical autoimmune models, including rheumatoid arthritis (RA), immune thrombocytopenic purpura (ITP), autoimmune hemolysis, multiple sclerosis (MS) and autoimmune blistering skin disorder. EndoS may have the potential to become a novel therapy for autoimmune diseases.

Out-licensed royalty generating programs

HBP – Prediction of severe sepsis

The HBP-assay for measurement of Heparin Binding Protein in plasma is a novel diagnostic method originally developed and patented by Hansa Medical to assist in predicting severe sepsis in patients with infectious disease symptoms at emergency departments[10].

Hundreds of thousands of patients die every year due to severe sepsis as a complication to infections, e.g. urinary tract infection and pneumonia. Many of these infections can be effectively treated with antibiotics in order to prevent progression to severe sepsis although early prediction of risk patients is crucial for successful treatment. Severe sepsis affects 300 of 100,000 people annually[11].

The HBP-assay has been out-licensed by Hansa Medical to UK-based Axis-Shield Diagnostics, a subsidiary to Abbott and Hansa Medical holds the right to royalty payments from Axis-Shield. Axis-Shield is engaged in further product development and clinical development with the HBP-assay. For more information, please visit: www.heparinbindingprotein.com

Financial review January–December 2017

Net revenue

Net revenue for the fourth quarter 2017 amounted to SEK 1.0 m (0.5) and to SEK 3.4 m (2.6) for the full year 2017 and is comprised of royalty income from Axis-Shield Diagnostics and re-invoiced expenses.

Other operating income and expenses

Other operating income and expenses amounted to SEK -0.5 m for the fourth quarter 2017 and other operating income to SEK 1.5 m for the full year 2017 and is comprised mainly of a grant from Vinnova.

Sales, general and administration expenses

Sales, general and administration expenses for the fourth quarter 2017 amounted to SEK 13.6 m (8.4) and to SEK 43.7 m (29.7) for the full year 2017. The increase for the full year is explained by commercial build-up and recorded non-cash costs for the company's employee long term incentive program (LTIP 2016) amounting to SEK 4.5 m.

Research and development expenses

Research and developments expenses amounted to SEK 35.8 m (25.0) for the fourth quarter 2017 and to SEK 137.1 m (82.8) for the full year 2017 and include recorded non-cash costs for the company's long term incentive programs (LTIP 2016) amounting to SEK 5.4 m. The increase for the full year was mainly due to intensified CMC development and continued build-up of the clinical, medical affairs and regulatory organization.

Financial result

Operating result for the fourth quarter 2017 amounted to SEK -48.9 m (-33.6) and SEK -176.1 m (-111.1) for the full year 2017.

Net profit/loss for the fourth quarter 2017 amounted to SEK -49.0 m (-33.6) and to SEK -176.7 m (-111.1) for the full year 2017.

Cash flow and investments

Cash flow from operating activities amounted to SEK -29.1 m (-27.2) for the fourth quarter 2017 and to SEK -150.1 m (-94.6) for the full year 2017. The cash flow after financing was positively impacted by the share issue in December. Cash and cash equivalents including short term investments amounted to SEK 616.1 m on December 31 2017, as compared with SEK 130.9 m at the end of third quarter 2017.

Investments for the fourth quarter 2017 amounted to SEK 0.7 m (0.7) and to SEK 2.4 m (1.0) for the full year 2017.

Shareholders' equity

On December 31, 2017 equity amounted to SEK 630.7 m compared with SEK 283.7 m at the end of the corresponding period 2016.

Share issue 2017

In the fourth quarter, Hansa Medical finalized a directed share issue, which brought the company SEK 545 m before deduction of costs. The directed issue was comprised of 2,752,526 shares at SEK 198 per share. The number of outstanding shares amounts to 37,807,386 shares after the share issue. The rights issue is anticipated to enable the company to finalize its ongoing clinical studies with IdeS in the lead indication highly sensitized kidney transplantation, to prepare for market approval in US and EU and enable continued investments into the company's development of the next generation of IgG-eliminating enzymes for repeat dosing. Moreover, the rights issue has resulted in a broader ownership structure of the company with strategic and institutional investors.

Parent company

The parent company's net revenue for the fourth quarter 2017 amounted to SEK 1.3 m (0.5) and to SEK 3.7 m (2.6) for the full year 2017. Profit/loss for the parent company amounted to SEK -48.8 m (-33.5) for the fourth quarter and to SEK -176.4 m (-108.4) for the full year 2017. On December 31, 2017, cash and cash equivalents including short term investments amounted to SEK 613.8 m compared with SEK 128.6 m at the end of third quarter 2017.

The parent company's equity amounted to SEK 625.5 m as per December 31, 2017, as compared with SEK 281.8 m at the end of the corresponding period 2016.

The Group consists of the parent company Hansa Medical AB and the subsidiaries Cartela R&D AB and Immago Biosystems Ltd, in which no business is currently conducted.

Financial summary for the Group (KSEK)

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Shareholders' equity	630,661	283,693	630,661	283,693
Cash flow from operating activities	-29,142	-27,185	-150,105	-94,563
Cash and cash equivalents including short term investments	616,061	253,578	616,061	253,578

Other information

Employees and organization

The number of employees at the end of the fourth quarter 2017 was 33, compared to 27 at the end of corresponding period 2016.

Share warrant program

On September 2, 2015, Hansa Medical's Annual General Meeting adopted a share warrant program for the company's employees. 355,000 warrants have been acquired by the company's employees during 2015 and 2016. Each warrant entitles the holder to subscribe for one new share in Hansa Medical. Subscription for shares in accordance with the terms of the warrants may take place during the period from June 15, 2018 to June 15, 2019. The warrants were sold to the company's employees on market terms at a price established on the basis of an estimated market value of the warrants using the Black & Scholes model calculated by an independent valuation institute.

The increase in the company's share capital upon full exercise of the share warrants will amount to SEK 355,000, and corresponds to a dilution of 1.1 percent of the total number of shares and the total number of votes in the company. The option program is subsidized by the company, and the employees, except the former CEO, have been given a one-time bonus as part of the stock option purchase. The options are linked to continued employment with the company only in the sense that, if the employment would be terminated, the stock option owner shall offer the warrants to the company and repay the resulting subsidy. The subsidy will affect the company's results proportionately during the option period in accordance with the same principles as in IFRS 2.

Long-term incentive program (LTIP 2016)

The Hansa Medical's Extraordinary General Meeting November 21, 2016 resolved to adopt a long-term incentive program (LTIP 2016) in the form of a performance based share program for all employees of the Hansa Medical Group, meaning that not more than 30 individuals within the group may participate. The rationale for LTIP 2016 is to create conditions for motivating and retaining competent employees of the Hansa Medical group and for the alignment of the targets of the employees with those of the shareholders and the company, as well as to increase the motivation of meeting and exceeding the company's financial targets. A maximum of 305,000 rights may be allotted to participants under LTIP 2016 and 289,750 rights have been totally allocated at December 31, 2017. Participants will, provided that certain conditions are fulfilled, be granted the opportunity to obtain ordinary shares free of charge, i.e. so-called "Performance shares" after the vesting period. The rights allocated on December 31, 2017, are divided into two vesting periods, the first of which ends November 28, 2019 and the second May 18, 2020.

The general meeting further resolved, in order to implement LTIP 2016 cost effectively, to authorize the Board to decide on a directed share issue of a maximum of 401,000 Class C shares to a participating bank, of which a maximum of 96,000 Class C shares to be issued to cover any social costs arising from the program and to authorize the Board to resolve to repurchase all issued C-shares. The directed share issue of the 401,000 Class C-shares and the repurchase were executed in May 2017. After the conversion of C shares to ordinary shares, these shall partly be transferred to participants in LTIP 2016 and partly divested in the market for cash flow purposes to secure certain payments related to LTIP 2016, mainly social security costs. Not more than 305,000 ordinary shares can be transferred to participants under LTIP 2016 and 96,000 common shares can be used to cover any social security contributions due to the LTIP 2016, which means a dilution of 1.2 percent of the ordinary shares and votes in the company.

LTIP 2016 will be reported in accordance with IFRS 2 which means that rights should be expensed as a personnel cost over the vesting period. The cost of LTIP 2016, calculated in accordance with IFRS 2, including social security contributions is expected to amount to approximately SEK 31.5 m, of which SEK 9.9 m is included in the results for the parent company and the group for the full year 2017. The program is not expected to have any net effect on cash flow provided it is secured fully in the manner described above.

Committee for the 2018 Annual General Meeting

Hansa Medical AB's Nomination Committee for the AGM 2018 consists of Erika Kjellberg Eriksson representing Nexttobe AB, Max Mitteregger representing Gladiator AB and Sven Sandberg representing Thomas Olausson. It also includes the chairman of the board Birgit Stattin Norinder.

Financial calendar

Annual report 2017	11 April 2018
Interim report for January–March 2018	25 April 2018
Annual General Meeting	29 May 2018
Interim report for January–June 2018	19 July 2018
Interim report for January–September 2018	1 November 2018

Shareholder information

The Hansa Medical share is listed on Nasdaq OMX Stockholm, under the ticker HMED and in the following indexes:

- OMX Nordic Mid Cap
- OMX Nordic Health Care index
- OMX Stockholm Benchmark Index
- OMX Stockholm Health Care
- OMX Stockholm Pharmaceuticals & Biotechnology
- MSCI Global Small Cap
- NASDAQ Biotechnology Index

Brief facts, the HMED share

Listing	Nasdaq OMX Stockholm
Number of shares	38,208,386
	(37,807,386 A-shares and 401,000 C-shares)
Market capitalization December 31, 2017	SEK 9,433 m
Ticker	HMED
ISIN	SE0002148817

10 largest shareholders, December 31, 2017

Name	Number of shares	Share (%)
Nexttobe AB	9,443,761	24.7
Försäkringsbolaget, Avanza Pension	1,346,278	3.5
AFA Försäkring	1,193,000	3.1
Gladiator	1,168,530	3.1
Thomas Olausson	1,135,095	3.0
Handelsbanken fonder	801,591	2.1
BWG Invest	600,370	1.6
Tredje AP-Fonden	572,594	1.5
Polar Capital Funds PLC	551,089	1.4
Sven Sandberg	539,700	1.4
Other	20,856,378	54.6
In total	**38,208,386**	**100.0**

According to the shareholder register maintained by Euroclear Sweden AB, as of December 31, 2017, Hansa Medical had 11,469 shareholders. On December 31, 2016, Hansa Medical had 7,470 shareholders. Information regarding shareholders and shareholdings is updated each quarter on the company's website, www.hansamedical.com.

Legal disclaimer

This financial report includes statements that are forward looking, and actual future results may differ materially from those stated. In addition to the factors discussed, among other factors that may affect results are development within research programs, including development in preclinical and clinical trials, the impact of competing research programs, the effect of economic conditions, the effectiveness of the company's intellectual property rights and preclusions of potential second party's intellectual property rights, technological development, exchange rate and interest rate fluctuations and political risks.

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Condensed financial statements

Consolidated statement of comprehensive income

	Q4		Year	
KSEK	2017	2016	2017	2016
Net revenue	1,013	543	3,442	2,579
Direct cost of net revenue	-53	-54	-221	-217
Gross profit	**960**	**489**	**3,221**	**2,362**
Other operating income	115	–	1,479	–
Sales, general and administration expense	-13,620	-8,431	-43,723	-29,703
Research and development expenses	-35,768	-25,013	-137,060	-82,850
Other operating expenses	-608	-607	–	-944
Operating profit/loss	**-48,921**	**-33,562**	**-176,083**	**-111,135**
Financial income/expenses	-77	-17	-616	-17
Profit/loss for the period before tax	**-48,998**	**-33,579**	**-176,699**	**-111,152**
Tax	10	23	39	23
Net profit/loss for the period	**-48,988**	**-33,556**	**-176,660**	**-111,129**
Attributable to				
Parent company shareholders	-48,988	-33,556	-176,660	-111,129
Earnings per share				
Before dilution (SEK)	-1.36	-0.99	-4.97	-3.37
After dilution (SEK)	-1.36	-0.99	-4.97	-3.37
Other comprehensive income				
Items that have been, or may be reclassified to profit or loss for the period				
Translation differences	44	6	-22	-26
Changes in fair value on available-for-sale financial assets	-4,754	509	3,535	4,690
Other comprehensive income for the period	**-4,710**	**515**	**3 513**	**4,664**
Total net comprehensive income	**-53,698**	**-33,041**	**-173,147**	**-106,465**

Consolidated balance sheet

	December 31	
KSEK	2017	2016
ASSETS		
Non-current assets		
Intangible fixed assets	33,749	36,554
Tangible fixed assets	3,976	2,570
Financial fixed assets	18,508	14,566
Total non-current assets	**56,233**	**53,690**
Current assets		
Current receivables, non-interest bearing	8,121	3,404
Short-term investments	34,983	39,990
Cash and cash equivalents	581,078	213,588
Total current assets	**624,182**	**256,982**
TOTAL ASSETS	**680,415**	**310,672**
EQUITY AND LIABILITIES		
Shareholders' equity	**630,661**	**283,693**
Long term liabilities		
Deferred tax liabilities	538	581
Other provisions	5,017	114
Long term liabilities, interest bearing	601	552
Total long term liabilities	**6,156**	**1,247**
Current liabilities		
Current liabilities, interest bearing	–	44
Current liabilities, non-interest bearing	11,056	8,390
Accrued expenses and deferred income	32,542	17,298
Total current liabilities	**43,598**	**25,732**
TOTAL EQUITY AND LIABILITIES	**680,415**	**310,672**

Consolidated changes in equity

	Year	
KSEK	2017	2016
Opening shareholders' equity	**283,693**	**211,526**
Result for the period	-176,660	-111,129
Other comprehensive income for the period	3,513	4,664
Net comprehensive income	**-173,147**	**-106,465**
Transactions with the group's owner		
New share issue [1]	545,401	185,000
Expenses attributable to new share issue	-30,049	-7,504
Repurchase own shares [1]	-401	–
Issued warrants	190	772
Long term incentive program	4,974	364
Total transactions with the group's owner	**520,115**	**178,632**
Closing shareholders' equity	**630,661**	**283,693**

1) Values for 2017 refer to directed share issue and repurchase of 401,000 class C shares for financing of the company's long term incentive program (LTIP 2016) and directed share issue in Q4 2017 of 2,752,526 ordinary shares.

Consolidated cash flow statement

	Q4		Year	
KSEK	2017	2016	2017	2016
Operating activities				
Operating profit/loss	-48,921	-33,562	-176,083	-111,135
Adjustment for items not included in cash flow [1]	4,360	1,500	13,827	4,269
Interest received and paid, net	-57	-23	-638	-78
Cash flow from operations before change in working capital	**-44,618**	**-32,085**	**-162,894**	**-106,944**
Change in working capital	15,476	4,900	12,789	12,381
Cash flow from operating activities	**-29,142**	**-27,185**	**-150,105**	**-94,563**
Investing activities				
Acquisition of business, net cash effect	–	–	–	-1,924
Investments in intangible fixed assets	-214	-57	-214	-57
Investments in tangible fixed assets	-518	-629	-2,195	-927
Investment of financial assets	–	–	–	-2,588
Short term investments	-34,989	-29,991	-240,898	-194,918
Divestment short term investments	105,000	40,000	246,000	155,000
Cash flow from investing activities	**69,279**	**9,323**	**2,693**	**-45,414**
Financing activities				
New share issue [2]	545,000	185,000	545,401	185,000
Issue expenses	-29,940	-7,504	-30,050	-7,504
Repurchase own shares [2]	–	–	-401	–
Issued warrants	–	–	–	429
Repayment of leasing liabilities	-15	-11	-48	-43
Cash flow from financing activities	**515,045**	**177,485**	**514,902**	**177,882**
Net change in cash	**555,182**	**159,623**	**367,490**	**37,905**
Cash and cash equivalents, beginning of period	25,896	53,965	213,588	175,683
Cash and cash equivalents, end of period	**581,078**	**213,588**	**581,078**	**213,588**

1) Values for 2017 pertain mainly to costs of share based incentive program (LTIP 2016) including social contributions.

2) Values for 2017 refer to directed share issue and repurchase of 401,000 class C shares for financing of the company's long term incentive program (LTIP 2016) and directed share issue in Q4 2017 of 2,752,526 ordinary shares

Consolidated key ratios and other information

	Q4		Year	
KSEK, unless otherwise stated	2017	2016	2017	2016
Profit numbers				
Net revenue	1,013	543	3,442	2,579
Operating profit/loss	-48,921	-33,562	-176,083	-111,135
Net profit/loss	-48,988	-33,556	-176,660	-111,129
Per share data				
Earnings/loss per share before and after dilution (SEK)	-1.36	-0.99	-4.97	-3.37
Shareholders' equity per share (SEK)	16.68	8.09	16.68	8.09
Other information				
Equity ratio (%)	93	91	93	91
Cash and cash equivalents including short term investments	616,061	253,578	616,061	253,578
Number of outstanding shares at the end of the period	37,807,386	35,054,860	37,807,386	35,054,860
Weighted average number of shares before and after dilution	36,149,280	33,872,074	35,519,029	33,008,693

Parent company – Statement of comprehensive income

	Q4		Year	
KSEK	2017	2016	2017	2016
Net revenue	1,310	543	3,739	2,579
Direct cost of net revenue	-53	-54	-221	-217
Gross profit	**1,257**	**489**	**3,518**	**2,362**
Other operating income	115	–	1,479	–
Sales, general and administration expenses	-13,621	-8,428	-43,740	-29,690
Research and development expenses	-35,910	-24,898	-137,015	-82,735
Other operating expenses	-608	-607	–	-944
Operating profit/loss	**-48,767**	**-33,444**	**-175,758**	**-111,007**
Result from other securities and receivables which are fixed assets	–	–	–	2,628
Result from short term financial receivables	28	–	97	–
Other financial expenses	-105	-17	-712	-14
Profit/loss for the period (before and after taxes)	**-48,844**	**-33 461**	**-176,373**	**-108,393**
Other comprehensive income for the period	**–**	**–**	**–**	**–**
Total net comprehensive income	**-48,844**	**-33,461**	**-176,373**	**-108,393**

Parent company – Balance sheet

	December 31	
KSEK	2017	2016
ASSETS		
Non-current assets		
Intangible fixed assets	30,709	33,513
Tangible fixed assets	3,976	2,554
Financial fixed assets	17,317	17,317
Total non-current assets	**52,002**	**53,384**
Current assets		
Current receivables, non-interest bearing	8,588	3,504
Short-term investments	34,992	39,995
Cash and cash equivalents	578,795	211,329
Total current assets	**622,375**	**254,828**
TOTAL ASSETS	**674,377**	**308,212**
EQUITY AND LIABILITIES		
Shareholders' equity	**625,528**	**281,786**
Long term liabilities		
Other provisions	5,017	114
Long term liabilities, non-interest bearing	601	548
Total long term liabilities	**5,618**	**662**
Current liabilities		
Liabilities to group companies	98	98
Current liabilities, non-interest bearing	10,606	8,368
Accrued expenses and deferred income	32,527	17,298
Total current liabilities	**43,231**	**25,764**
TOTAL EQUITY AND LIABILITIES	**674,377**	**308,212**

Parent company – Changes in equity

	January – December	
KSEK	2017	2016
Opening shareholders' equity	**281,786**	**211,547**
Result for the period	-176,373	-108,393
New share issue [1]	545,401	185,000
Expenses attributable to new share issue	-30,049	-7,504
Repurchase own shares [1]	-401	–
Issued warrants	190	772
Long term incentive program	4,974	364
Total transactions with the group's owner	**520,115**	**178,632**
Closing shareholders' equity	**625,528**	**281,786**

1) Values for 2017 refer to directed share issue and repurchase of 401,000 class C shares for financing of the company's long term incentive program (LTIP 2016) and directed share issue in Q4 2017 of 2,752,526 ordinary shares.

Financial notes

Note 1 Basis of Preparation and Accounting policies

This consolidated interim report has been prepared in accordance with IAS 34 Interim Financial Reporting and applicable rules in the Swedish Annual Accounts Act. The interim report for the parent Company has been prepared in accordance with the Swedish Annual Accounts Act chapter 9, Interim Financial Reporting. A full description of the accounting principles applied in this interim report can be found in the Annual Report 2016. The Annual report 2016 was published on April 26, 2017 and is available on www.hansamedical.com. Disclosures in accordance with IAS 32.16A are as applicable in the notes or on the pages before the consolidated income statement.

Change of accounting principle

As of December 31, 2017, the Group has changed to settlement date accounting for purchases and sales of financial assets. Previously, trade date accounting was applied. On December 28, 2017, the Group purchased interest rate funds for an amount of SEK 430 m. Due to the change of accounting principles, the funds are not recognised on the balance sheet until the settlement date of January 2, 2018, aside from the change in fair values between the trade date and the balance sheet date of SEK -403 k that has been recognised as a short term liability against other comprehensive income. The change of accounting principle has not had any effect on the comparative periods. All other accounting principles for the Group remain unchanged compared with the 2016 annual report. The accounting principles for the parent company has been changed in the same way as for the Group.

Effects of IFRS 15 Revenue from contracts with customers

IFRS 15 comes into effect as of January 1, 2018. The Group's revenue from contracts with customers currently consists mainly of royalty revenue from the agreement with Axis-Shield Diagnostics (ASD). The transition to IFRS 15 will not affect how Hansa Medical recognises revenue from the agreement with ASD.

Effects of IFRS 9 Financial instruments

IFRS 9 comes into effect as of January 1, 2018 and replaces IAS 39 Financial Instruments: Recognition and Measurement as the standard on recognition and measurement of financial instruments in IFRS. Compared with IAS 39, IFRS 9 primarily brings changes regarding classification and measurement of financial assets and financial liabilities, impairment of financial assets and hedge accounting. IFRS 9 will affect how the Group accounts for investments in interest rate funds. Under IAS 39 the funds have been measured at fair value through other comprehensive income. However, the funds do not meet the criteria in IFRS 9 for changes in fair values to be recognised in other comprehensive income. Instead, under IFRS 9 the changes in the fair values of the funds will be reported in profit or loss. Therefore, accumulated changes in fair values of the funds of SEK -403 k will be transferred from the "Fair value reserve" to "Retained earnings" in the opening balance as per January 1, 2018.

The Group also has investments in commercial papers, which under IAS 39 has been measured at fair value through other comprehensive income. Under IFRS 9, investments in commercial papers will instead be measured at amortised cost. The accumulated change in the fair values of the commercial papers of SEK -9k will be removed from the "Fair value reserve" and booked against the carrying amount of the commercial papers in the balance sheet. The commercial papers will therefore be reported at a carrying amount of SEK 34 992 k in the opening balance for the Group as per January 1, 2018.

The transition to IFRS 9 will not have any other material effects for the Group.

Note 2 Fair value of financial instruments

The reported value is assessed as being a fair approximation of the fair value for all of the Group's financial instruments. The financial instruments reported at fair value in the balance sheet are comprised partly of the Group's holding of shares in Genovis, which are listed on Nasdaq First North and partly of holdings of short-term commercial papers. The fair value of the shares as per the balance sheet date December 31, 2017 was SEK 18,507 k and SEK 14,566 k on December 31, 2016. The fair value of the commercial papers as per the balance sheet date December 31, 2017 was SEK 34,983 k and SEK 39,990 k on December 31, 2016. The fair value of the financial instruments is calculated on the basis of the closing price. The valuation of the holdings is, thereby, in accordance with Level 1 in the valuation hierarchy.

Reference list

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2. Jordan et al., “IgG Endopeptidase in Highly Sensitized Patients Undergoing Transplantation”, N Engl J Med 2017;377:442-53.

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4. Hellmark et al., Journal of Autoimmunity 48-49 (2014) 108e112. “Diagnosis and classification of Goodpasture’s disease (anti-GBM)”

5. Puttarajappa et al., “Antibody-Mediated Rejection in Kidney Transplantation: A Review”, J. Transplant.Volume 2012 (2012), Article ID 193724

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8. Wang et al. “IgG-degrading enzyme of Streptococcus pyogenes (IdeS) prevents disease progression and facilitates improvement in a rabbit model of Guillain-Barré syndrome”, Exp Neurol. 2017 May;291:134-140

9. Järnum et al., “Enzymatic inactivation of endogenous IgG by IdeS enhances therapeutic antibody efficacy”, Molecular Cancer Therapeutics, 2017, May 22

10. Linder et al., “Heparin-binding protein improves prediction of severe sepsis in the emergency department”,

11. Mayr et al., “Epidemiology of severe sepsis”, Virulence 5:1, 4-11, January 1, 2014

Glossary

AMR
Antibody mediated transplant rejection.

Antibody
One type of proteins produced by the body's immune system with the ability to recognize foreign substances, bacteria or viruses. Antibodies are also called immunoglobulins.

Anti-GBM disease (Goodpasture disease)
Anti-GBM antibody disease is a disorder in which circulating antibodies directed against an antigen intrinsic to the glomerular basement membrane (GBM) in the kidney, thereby resulting in acute or rapidly progressive glomerulonephritis.

Autoimmune disease
Diseases that occur when the body's immune system reacts against the body's own structures.

Biopharmaceutical
A pharmaceutical drug that is manufactured using biotechnology.

Biotechnology
The use of live cells or components of cells, to produce or modify products used in health care, food, and agriculture.

Clinical studies
Investigation of a new drug or treatment using healthy subjects or patients with the intention to study the efficacy and safety of a not-yet-approved treatment approach.

Clinical Phase I
The first time that a drug under development is administered to humans. Phase I studies are often conducted with a small number of healthy volunteers to assess the safety and dosing of a not yet approved form of treatment.

Clinical Phase II
Refers to the first time that a drug under development is administered to patients for the study of safety, dosage and efficacy of a not yet approved treatment regimen.

Clinical Phase III
Trials that involve many patients and often continue for a longer time; they are intended to identify the drug's effects and side effects during ordinary but still carefully controlled conditions.

EMA
The European Medicines Agency (EMA) is a European Union agency for the evaluation of medicinal products.

EndoS
A bacterial endoglycosidase of *Streptococcus pyogenes*. An enzyme with the unique ability to modify a specific carbohydrate chain of immunoglobulins.

Enzyme
A protein that accelerates or starts a chemical reaction without itself being consumed.

FDA
US Food and Drug Administration.

Guillain–Barré syndrome
GBS, Guillain–Barré syndrome, is an acute autoimmune disease in which the peripheral nervous system is attacked by the immune system and IgG antibodies.

HBP
Heparin Binding Protein is a naturally occurring protein that is produced by certain immune cells, i.e. neutrophilic granulocytes, to direct immune cells from the bloodstream into the tissues.

HLA
Human Leukocyte Antigen is a protein complex found on the surface of all cells in a human. The immune system uses HLA to distinguish between endogenous and foreign.

IdeS
IdeS, immunoglobulin G-degrading enzyme of *Streptococcus pyogenes*, a bacterial enzyme with strict specificity for IgG antibodies. The enzyme has a unique ability to cleave and thereby inactivate human IgG antibodies.

IgG
IgG, Immunoglobulin G, is the predominant type of antibody in serum.

In vitro
Term within biomedical science to indicate that experiments or observations are made, for example in test tubes, i.e. in an artificial environment and not in a living organism.

In vivo
Term within biomedical science to indicate that experiments or observations are made on living organisms.

IVD
IVD, *In vitro* diagnostics, are tests that can detect diseases, conditions, or infections, usually from blood samples or urine samples. Some tests are used in laboratory or other health professional settings and other tests are for consumers to use at home.

Milestones
Payments a company receives in accordance with a cooperation agreement after the company reaches a pre-set target, such as "proof-of-concept".

Pivotal trial
A clinical trial intended to provide efficacy and safety data for NDA approval at e.g. FDA or EMA. In some cases, Phase II studies can be used as pivotal studies if the drug is intended to treat life-threatening or severely debilitating conditions.

PRA
Panel Reactive Antibody (PRA) is an immunological laboratory test routinely performed on the blood of people awaiting organ transplantation. The PRA score is expressed as a percentage between 0 percent and 99 percent. It represents the proportion of the population to which the person being tested will react via pre-existing antibodies.

Preclinical development
Testing and documentation of a pharmaceutical candidate's properties (e.g. safety and feasibility) before initiation of clinical trials.

Sepsis
Diagnosed or suspected infection in combination with the patient being in a systemic inflammatory state (SIRS). Clinical symptoms of systemic inflammation may be a combination of fever, increased heart rate and increased respiratory rate.

Severe sepsis
Sepsis is progressing into severe sepsis when the patient may suffer circulatory effects and reduced functions of vital organs such as the brain, heart, lungs, kidneys or liver.

Streptococcus pyogenes
A Gram-positive bacterium that primarily can be found in the human upper respiratory tract. Some strains can cause throat or skin infections.

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