Expedeon AG

Germany / Biotech
Xetra
Bloomberg: EXN GR
ISIN: DE000A1RFM03

Initiation of coverage

RATING	**BUY**
PRICE TARGET	**€2.65**
Return Potential	**85.3**%
Risk Rating	High

LIFE SCIENCE PURE-PLAY ON TRACK FOR FULL YEAR BREAKEVEN

Expedeon AG (previously called Sygnis) is a life science specialist offering premium tools and reagents for research activities in academia and the biopharma and diagnostic industries. The company's main patent-protected technologies include TruePrime for DNA amplification, RunBlue Electrophoresis for the separation and purification of DNA/proteins, plus Lightning-Link and CaptSure for labelling and immobilisation of molecules in immunoassays. On the basis of these technologies, Expedeon has created an attractive portfolio of product families that represent a breakthrough for selected genomic, proteomic and diagnostic applications. Due to superior features such as sensitivity, quality, accuracy, stability and scalability, Expedeon's products overcome the limitations of established technologies. They offer a real alternative in pioneering fields such as singe-cell analysis within next generation sequencing (NGS) and liquid biopsy for cancer diagnostics. We see product innovation and further market penetration driving Expedeon's strong top-line growth. We anticipate that FY/18 will be Expedeon's first EBITDA profitable full year. This is a key milestone in the company's history. We initiate coverage with a Buy rating and €2.65 price target.

We model a 28.3% sales CAGR for 2018-2020E with a 8.6% EBITDA margin in 2018 and 19.0% in 2020 We believe growth will be driven by increasing market penetration by the main products. Thanks to four successful acquisitions performed during 2016-2018, the company has broadened its portfolio and augmented the online channel with an own distribution network. The company now has 30 marketing & sales staff selling in the US, UK, Germany, Singapore and Australia. The company's acquired marketing expertise gives us confidence in Expedeon's ability to achieve our top and bottom line forecasts.

Attractively valued We value the company using a DCF model, which yields a conservative fair value of €2.65 per share. We believe financial performance in 2018 will be strong and have a positive impact on the share price over the coming quarters. With valuation at attractive levels we initiate coverage with a Buy recommendation.

FINANCIAL HISTORY & PROJECTIONS

	2015	2016	2017	2018E	2019E	2020E
Revenue (€m)	0.56	1.79	7.80	13.41	18.11	22.09
Y-o-y growth	41.6%	222.3%	335.8%	72.0%	35.0%	22.0%
EBIT (€m)	-3.86	-4.02	-4.06	-0.46	1.27	2.43
EBIT margin	-695.9%	-224.7%	-52.1%	-3.4%	7.0%	11.0%
Net income (€m)	-4.01	-4.39	-3.26	-0.91	0.67	1.68
EPS (diluted) (€)	-0.27	-0.18	-0.11	-0.02	0.01	0.03
DPS (€)	0.00	0.00	0.00	0.00	0.00	0.00
FCF (€m)	-4.42	-3.89	-5.01	-1.35	0.41	1.44
Net gearing	-23.4%	-3.5%	9.4%	19.9%	18.7%	14.9%
Liquid assets (€m)	4.56	3.80	1.95	1.79	1.19	2.63

RISKS

Risks include, but are not limited to intellectual property and patent challenges, shareholder dilution, competition and retaining management risks.

COMPANY PROFILE

Expedeon develops, manufactures and commercializes tools and reagents (kits) for use in research of biopharmaceutical, diagnostic and academic institutions. Company's patent protected technologies offer superior features compared to solutions existing in the market. The company has production facilities in the US, UK, Spain and Australia, as well as an own distribution network in the US, UK, Germany, Singapore and Australia.

MARKET DATA

As of 8/10/2018

Closing Price	€ 1.43
Shares outstanding	50.37m
Market Capitalisation	€ 72.03m
52-week Range	€ 1.35 / 1.79
Avg. Volume (12 Months)	68,251

Multiples	2017	2018E	2019E
P/E	n.a.	n.a.	114.4
EV/Sales	9.3	5.4	4.0
EV/EBIT	n.a.	n.a.	57.2
Div. Yield	0.0%	0.0%	0.0%

STOCK OVERVIEW

COMPANY DATA

As of 30 Jun 2018

Liquid Assets	€ 1.07m
Current Assets	€ 6.93m
Intangible Assets	€ 51.42m
Total Assets	€ 60.70m
Current Liabilities	€ 7.33m
Shareholders' Equity	€ 43.81m

SHAREHOLDERS

Deutsche Balaton	6.3%
Fernandez Trust	5.2%
Alpenfels Family Trust	3.9%
Dr. Lanckriet	3.1%
Free Float	81.5%

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INVESTMENT CASE

Expedeon, a pure-play life science company offering the biopharmaceutical industry and academia high quality research tools and reagents The company's products are enabling – they facilitate advancement of fundamental research, drug discovery and diagnostic product development. Expedeon's strategy is not to compete directly with standard, well-established and competitive applications. The company targets segments where existing technologies are known not to work properly or perform poorly. The company's products are based on unique patent-protected technologies focusing on pioneering life science applications such as Next Generation Sequencing (NGS), single-cell-analysis, liquid biopsy or biomolecules immobilisation and labelling. The patent protected TruePrime product line, for example, is capable of accurately and reliably amplifying the tiny amount of DNA contained in a single cell (7 picogram or $7x10^{-12}$ gram) in excess of one million times within only three hours, making possible NGS at a single cell level.

Addressed life science tools markets growing at double-digit percentage rate Expedeon's product portfolio is focused on highly innovative segments of the genomics, proteomics and diagnostic markets. These segments include NGS (2016: USD1.2 - 1.6bn, CAGR >20% p.a.) electrophoresis workflow (2016: USD1.8 - 2.4bn, CAGR >10% p.a.) and liquid biopsy / oncology diagnostics (2016: USD6.3bn, CAGR >20% p.a.).

Approaching critical mass during 2016-2018 through well targeted acquisitions Expedeon's predecessor company, Sygnis, pursued an active acquisition strategy in order to expand its technology and product range. Sygnis acquired Expedeon Holding (2016, for approx. €20.5m), C.B.S. Scientific (2016, for approx. €1.0m), Innova Biosciences (2017, for approx. €13.0m) and TGR Biosciences (2018, for approx. €10.4m). Through these acquisitions, the group has expanded its genomic technology platform with a unique and highly valuable patent-protected portfolio of tools & reagents for proteomic and diagnostics research. These subsidiaries brought additional pro-forma sales of some €10-11m to the group and have so far been successfully integrated into the company's organisation (the TGR deal was closed in May 2018). In order to capitalise on Expedeon's strong brand in the life science market, the Sygnis group was renamed Expedeon in July 2018.

Acquisitions also provided Expedeon with an own sales force in key international markets The acquired companies added an established marketing and sales network in the key US, UK, German, Singapore and Australian markets to the existing online commercialisation infrastructure. These countries represent the main markets for every life science specialist. Having an own distribution will promote increased sales volume and improve profitability. On other markets, the company has appointed a mix of large and small local distribution partners. Expedeon now presides over a national and international organisation spanning R&D, manufacturing and commercialisation.

Going forward, marketing strategy may enable enhanced market penetration and commercial traction The company aims to create higher awareness of the superiority of its innovative applications over existing solutions among main target groups: opinion leaders and researchers at academic and pharma/biotech groups. To achieve this, Expedeon, will address target clients with four key marketing approaches: direct marketing (newsletters, brochures and offers), e-commerce, social media (Twitter, Facebook and product video feeds), and conferences at local exhibitions and international events.

We see organic sales growth acceleration and increasing margins in the period 2018-2020 Expedeon is well positioned to gain market share and capture higher margins from its life science portfolio. After becoming EBITDA-positive in Q4/17, we see the company on track to increase sales to €13.4m (+72.0%) and achieve a positive EBITDA of €1.1m (2017: €-2.5m) in 2018E. We expect Expedeon to deliver robust sales growth and margin improvement in the

period 2018-2020, with sales increasing at a CAGR of 28.3% and EBITDA-margin reaching 19.0% in 2020.

Expedeon's shares are in our view undervalued. We initiate coverage with a Buy recommendation and a price target of €2.65 Our proprietary DCF-valuation model suggests a fair value for Expedeon of €146.9m or €2.65 per share. In our view, the stock will benefit from news of strong revenue growth and higher profitability during upcoming quarters.

SWOT ANALYSIS

STRENGTHS

- **Innovative patent-protected products for niche applications in genomics, proteomics and diagnostics** The company's main technologies such as TruePrime for DNA amplification, RunBlue Electrophoresis for the separation and purification of DNA/ proteins, plus the Lightning-Link and CaptSure for labelling and immobilisation of molecules in immunoassays, represent a breakthrough for selected pioneering applications in the life science research field such as next generation sequencing-NGS, single cell analysis, liquid biopsy, etc.

- **Own distribution network selling products globally with a main focus on key countries: US, UK, Germany, Singapore and Australia** In 2016, 2017 and 2018, Expedeon's targeted acquisitions led to a broader product portfolio as well as an upgrade of the company's marketing capabilities. The company is well positioned to capture higher margins and benefit from the growing research market.

- **Experienced management team** Heikki Lanckriet (CEO) and David Roth (CFO), are highly qualified executives each with 15-20 years' experience in the life science and research industry.

- **Sustainable business model established** Thanks chiefly to the successful integration of the acquired companies, Expedeon achieved EBITDA break-even in Q4/17 and is on track to remain EBITDA positive in FY/18 (FBe: EBITDA of €1.1m).

WEAKNESSES

- **Small size compared with large dominant competitors** With a market cap of approx. €70m and sales heading towards €13.4m in 2018, Expedeon is small compared to the main big life science tools players such as Thermo Fisher Scientific, Merck, Roche, Qiagen or Bio-Rad generating sales in the multibillion USD range. Expedeon thus lacks financial and marketing strength compared to the giants of the industry.

- **Young company with short profitability track record** The company's profitable business model is young and management still has to prove its ability to operate sustainably in the long term.

OPPORTUNITIES

- **Target research markets growing at a CAGR of 10-20%** Expedeon's current product portfolio is focused on highly innovative segments of the genomics (next generation sequencing, abbreviated as NGS), proteomics (electrophoresis) and diagnostic markets (liquid biopsy for oncology). With an estimated growth rate of over 20.0% in the coming years, NGS is considered one of the fastest growing and most lucrative areas of the genomics market.

- **Portfolio expansion through acquisitions** Expedeon's management aims to further increase the company's critical mass by means of acquisitions. Our 2020 sales forecast for Expedeon of approx. €22.1m is based on organic growth only. We therefore see upside to our projections coming from acquisitions.

THREATS

- **Intellectual property** Intellectual property and patent protection play a very important role in the research tools industry. Companies that compete primarily on evolving technologies are subject to intense patent litigation. If Expedeon is unable to protect its intellectual property portfolio, its results could be negatively affected.

- **Competitive risks** Although Expedeon's core technologies have unique features, the company competes against more developed, much larger and commercially successful companies, many of which have greater financial resources to fund development programmes and commercial activities. These large peers will constantly challenge Expedeon's market share and its ability to prevail.

- **Low entry barriers** No specific licenses or approval (e.g. drugs) are required to enter the life science market, which facilitates entrance of new potential competitors.

- **Shareholder dilution** While the existing business is currently sustainable, Expedeon plans to conduct further acquisitions with broadly similar characteristics to existing businesses. These acquisitions will be largely accompanied by additional capital increases leading to shareholder dilution.

VALUATION

Our valuation is based on a discounted-cash-flow model. We believe that a DCF valuation methodology is best suited to capture the value of Expedeon's operations, since this is leveraged to the longer-term nature of the life science research industry. Taking into consideration typical life-cycle patterns in the healthcare industry, we have applied a two-stage growth model, which includes detailed projections of future sales, operating profit and free cash flows for the planning period 2016E-2030E. We have assumed a terminal free cash flow growth rate of 2.5%.

Using First Berlin methodology, which accounts for company-specific risk factors, we derive a cost of equity (COE) of 10.5% for Expedeon AG. Our calculation is based on a risk-free rate of 0.5%, a market risk premium of 5.0% and a risk coefficient of 2.0. Based on our forecast of uninterrupted positive free cashflows from 2019, we believe that Expedeon will continue to operate with a low level of debt in the long run leading to a 88% long-term share of equity. Thus we estimate a WACC of 9.7%, which we use to discount the projected cash flows. Including net debt of €3.8m, we value Expedeon at €146.9m. Based on 55.4m fully diluted shares outstanding we calculate a fair value per share of €2.65.

Using our ten-factor risk analysis, we derive a High risk rating for Expedeon AG. The main risk factors we identify are patent challenge, shareholder dilution, ability to retain management and key staff, and competition risks.

DCF MODEL

Figure 1: DCF Model

All figures in EUR '000	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E
Net sales	**13,414**	**18,109**	**22,093**	**26,954**	**32,614**	**39,463**	**47,356**	**56,827**
NOPLAT	**-463**	**1,191**	**2,204**	**4,400**	**6,878**	**9,147**	**11,197**	**13,715**
+ depreciation & amortisation	1,610	1,720	1,767	1,887	2,120	2,170	2,368	2,614
Net operating cash flow	1,147	2,912	3,971	6,287	8,998	11,318	13,565	16,329
- total investments (CAPEX and WC)	-2,046	-1,986	-2,007	-1,932	-1,934	-1,920	-2,199	-2,468
Capital expenditures	-1,054	-978	-992	-916	-913	-908	-947	-1,137
Working capital	-993	-1,008	-1,015	-1,015	-1,020	-1,012	-1,252	-1,332
Free cash flows (FCF)	-899	926	1,964	4,355	7,064	9,398	11,365	13,860
PV of FCF's	**-867**	**815**	**1,576**	**3,185**	**4,710**	**5,713**	**6,300**	**7,005**

All figures in EUR '000	
PV of FCFs in explicit period	63,689
PV of FCFs in terminal period	86,940
Enterprise value (EV)	150,629
+ Net cash / - net debt	-3,759
+ Investments / minority interests	0
Shareholder value	146,870
Shares outstanding	55,379
Fair value per share in EUR	**2.65**

Cost of equity	10.5%
Pre-tax cost of debt	5.0%
Tax rate	22.0%
After-tax cost of debt	3.9%
Share of equity capital	87.5%
Share of debt capital	12.5%
WACC	**9.7%**

WACC \ Terminal growth rate	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
6.7%	4.11	4.39	4.72	5.14	5.68	6.38	7.35
7.7%	3.34	3.52	3.73	3.99	4.29	4.67	5.15
8.7%	2.79	2.91	3.05	3.21	3.40	3.63	3.90
9.7%	2.36	2.45	2.54	**2.65**	2.78	2.92	3.10
10.7%	2.03	2.09	2.16	2.24	2.32	2.42	2.54
11.7%	1.76	1.81	1.86	1.91	1.98	2.05	2.12
12.7%	1.55	1.58	1.62	1.66	1.70	1.75	1.81

*Please note our model runs through 2030 and we have only shown the abbreviated version for formatting purposes

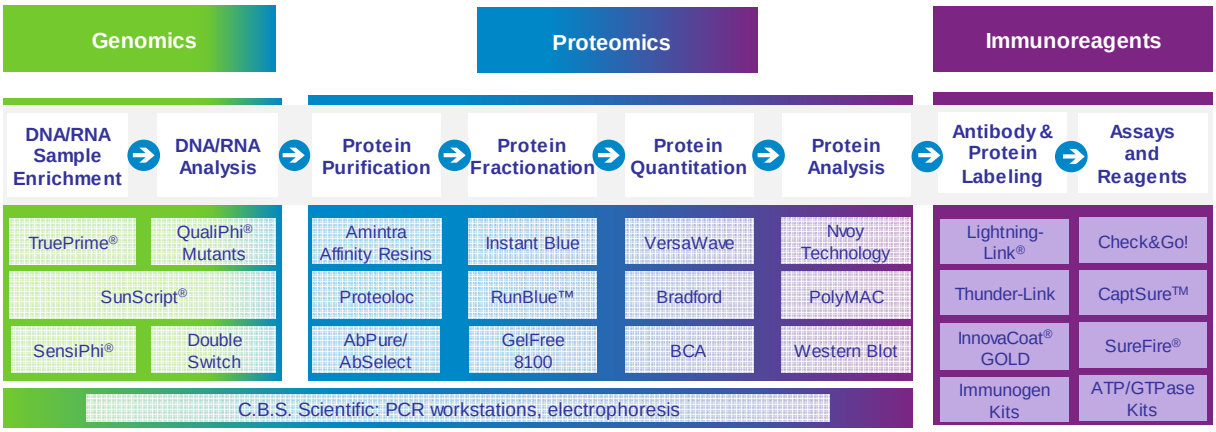
Source: First Berlin Equity Research

COMPANY PROFILE

OVERVIEW

Expedeon AG (formerly known as Sygnis) is a life science tools company focusing on the development and commercialisation of premium sample preparation kits and reagents in genomic, proteomic and diagnostic applications for academic and biopharma R&D institutions. The company's product portfolio targets innovative life science fields such as next generation sequencing (NGS), electrophoresis, liquid biopsy, single cell analysis (e.g. cancer diagnostic) and lateral flow tests. The company owns high value added technologies with unique features that are patent protected, such as True Prime for DNA amplification, RunBlue Electrophoresis for the separation and purification of DNA/proteins, the Lightning-Link and CaptSure for labelling and immobilisation of molecules in immunoassays (see figure 2).

Figure 2: Snapshot of the product portfolio



Source: First Berlin Equity Research, Expedeon AG

Expedeon is headquartered in Heidelberg, Germany, and has own operations in Germany, UK, USA, Singapore and Australia, with approximately 110 employees, of which more than 30 are active in marketing and sales. The company is listed on the open market of the German stock exchange.

ACHIEVING CRITICAL MASS BY MEANS OF SUCCESSFUL ACQUISITIONS

Sygnis was created in December 2012 through the merger of the two complementary life science specialists, X-Pol Biotech (founded in Madrid, Spain in 1998) and Sygnis Pharma AG (founded as Lion Biosciences in Heidelberg, Germany in 1997). Sygnis halted the drug development activities of the German company and focused on the polymerases expertise of the Spanish subsidiary in order to develop molecular biology products for genomics applications. Sygnis completed development and launched the first products in 2015 through its website, as well as through several distribution partners worldwide.

The company has continued to acquire new technologies needed to round off its product range and build up a national and international position. Management have been careful in their acquisition strategy. Business relationships were often developed into cooperation agreements; which, in some cases, later culminated in full acquisitions. In August 2016, Sygnis purchased the UK based proteomics specialist Expedeon Holding for approx. €20.5m. Through the Expedeon acquisition, Sygnis launched its own marketing and distribution network. The company gained access to commercial operations in the UK, the US and Singapore. The purchase also included the manufacturing facility in Cambridge. Expedeon was a debt-free, profitable company which generated revenues higher than €2.5m with growth

of more than 20% in 2015. Shortly after, in December 2016, Sygnis acquired the US based electrophoresis- and PCR-workstations specialist C.B.S. Scientific (C.B.S.) for approx. €1.0m. C.B.S. was also a profitable and debt-free company, which generated sales in excess of USD1.5m in 2016. As part of the integration, Sygnis consolidated the sites of Expedeon and C.B.S., both located in San Diego, into a single manufacturing and engineering facility at the former C.B.S. location with a total space just under 1,115 m² (12,000 ft²).

In June 2017, Sygnis took over the UK based proteomics specialist Innova Biosciences for a total price of approx. €13.0m. Innova generated pro-forma sales of approx. €3.0m in 2016, and was also profitable and debt-free. Innova brought a first-in-class technology for antibodies-, proteins-, peptides- and DNA-labelling to Sygnis, thereby enabling superior features in the preparation of immunoassays. Innova also provided a well established tele-sales and e-marketing team. Sygnis relocated the Innova R&D, manufacturing and logistics to the Sygnis facility in Cambridge-UK by adding an area of about 280 m² (3,000 ft²), The Cambridge facility now has total space of 1,115 m² (12,000 ft²).

After having successfully integrated the acquired companies under the Expedeon brand name, in March 2018 Sygnis announced the 100% acquisition of the Australian reagents company TGR Biosciences for approx. €10.4m. TGR generated proforma sales of €3.6m (3-year CAGR of 23%) and EBIT of €1.3m in 2017. TGR has provided manufacturing, R&D and sales infrastructure and added a best-in-class technology for immobilisation of antibodies, leading to faster, simpler and cheaper immunoassays. TGR and Innova technologies offer complementary features, the group's future product development should benefit significantly from the combination of the two. Due to the strength of the Expedeon brand in the life science market, the company changed its name from Sygnis AG to Expedeon AG as of July 2018 (see figure 3).

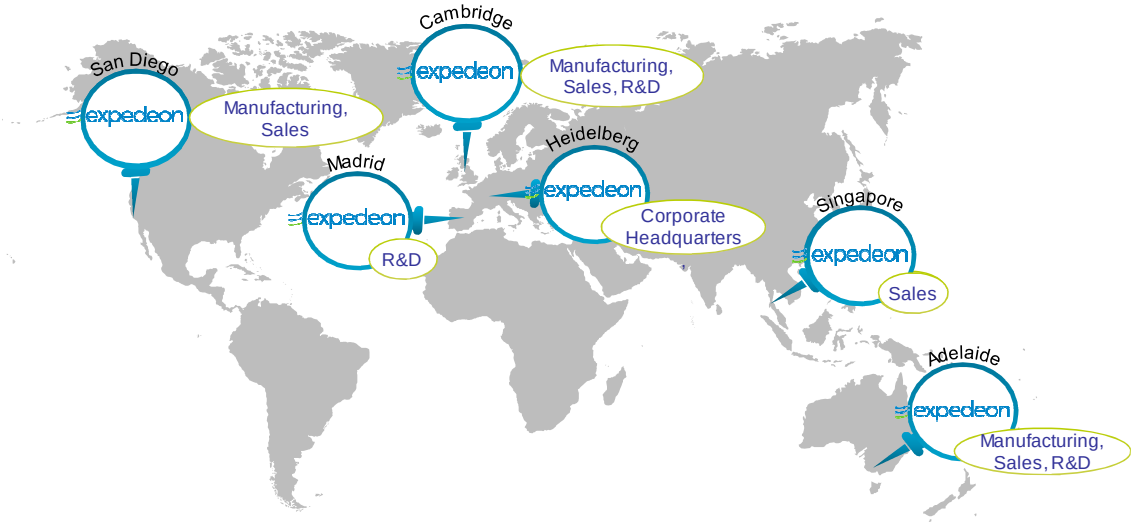
Figure 3: Key milestones in Expedeon's history

Time	Corporate events
Dec. 2012	Sygnis Pharma AG (former name: LION Bioscience AG), based in Heidelberg, Germany, merged with the molecular biology company X-Pol Biotech, based in Madrid, Spain.
2013	Company renamed Sygnis AG.
2015	Launch of the first two own product lines, TruePrime (amplification of various DNA and RNA species) and Sunscript (Reverse Transcriptase of RNA to DNA), a series of kits for genomic applications.
Aug. 2016	Acquisition of Expedeon Holding, which added a proteomics tools and reagents portfolio, sales infrastructure in the UK, US and Singapore, R&D, and manufacturing infrastructure. Mr. Lanckriet, CEO of Expedeon, joined Sygnis' management board as Co-CEO and CSO.
Dec. 2016	Acquisition of US company C.B.S. Scientific, which added an electrophoresis equipment / reagent portfolio and increased critical mass in the US.
June 2017	Acquisition of UK company Innova Biosciences, which added a portfolio of labelling technologies and strengthened the commercial infrastructure.
May 2018	Acquisition of the Australian company TGR Biosciences, which added a portfolio of protein immobilisation assay technologies as well as manufacturing, R&D and sales infrastructure in Australia.
July 2018	Change of name from Sygnis AG to Expedeon AG

Source: First Berlin Equity Research, Expedeon AG

Through strategic acquisitions Expedeon has assembled a unique and highly valuable patent-protected portfolio of tools & reagents for proteomic and diagnostics research. As a result, Expedeon presides over a national and international organisation spanning R&D, manufacturing and commercialisation, which allows the company to exploit the big opportunities offered by the expanding life science tools market (see figure 4).

Figure 4: Expedeon's footprint in key international markets



Source: First Berlin Equity Research, Expedeon AG

As of FY/17, about 40% of product sales are generated through Expedeon's own distribution network and this figure is expected to increase gradually over time. A further 40% were generated through a combination of small to medium size local distributors (e.g. Europe, Far East) as well as large global distribution partners such as Thermo Fisher, VWR, Merck/Sigma Aldrich. The remaining 20% is generated through partnerships with OEMs (Original equipment manufacturers) such as the Tanon Science & Technology (China) and VWR International (US), and technology licensors (e.g. Qiagen). The existing product portfolio is currently marketed in over 75 countries worldwide.

The company is nevertheless still small compared to large market players such as Thermo Fisher, Merck (Sigma Aldrich) and Qiagen. Expedeon therefore plans to continue its active acquisition strategy to gain critical mass. Management envisages making acquisitions synergistic with the current portfolio.

MARKETING STRATEGY FOCUSED ON INCREASING PENETRATION AND AWARENESS

Going forward, we expect Expedeon to generate significant growth through highly focused marketing and sales efforts in its core markets of UK, Germany, the US, Australia, and Singapore, leading to higher market penetration, exploiting cross selling opportunities and a consolidation of the market position. Expedeon's goal is in our view to create higher awareness of the superiority of its innovative applications against existing solutions among main target groups: opinion leaders and researchers at academic and pharma/biotech groups. The company has identified four key marketing approaches to address target clients:

- Direct marketing through newsletters, brochures and offers
- E-Commerce
- Social media through Twitter, Facebook, and Product video feeds
- Conferences at local exhibitions and international events

We additionally anticipate that Expedeon will expand its commercial network by opening new offices in further territories such as China.

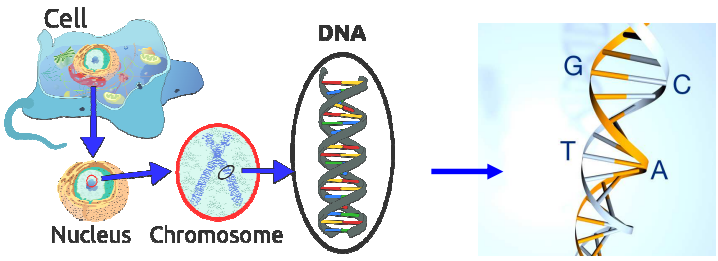
LIFE SCIENCE TOOLS: DESCRIPTION, MARKET & COMPETITION

Before we analyse Expedeon's markets, we briefly describe what deoxyribonucleic acid (DNA) is, the importance of DNA-sequencing, why scientists pursue increased genetic understanding and why there is an increasing demand for life science tools. Further, we describe the main three international target markets for life science tools and reagents: genomics, proteomics and diagnostics.

DESCRIPTION

DNA definition, characteristics DNA (deoxyribonucleic acid) is found in the nucleus of every cell and has been called the building block of life. DNA is a molecule that carries the genetic instructions required for growth, development, functioning and reproduction of all known living organisms. At the most basic level, DNA is composed of a series of smaller molecules called nucleotides. There are four different DNA nucleotides: Adenine (abbreviated "A"), Thymine (abbreviated "T"), Guanine (abbreviated "G"), and Cytosine (abbreviated "C").The order, or sequence, of these nucleotides determines what biological instructions are contained in a strand of DNA. The discovery of the DNA double-helix in 1953 by Watson and Crick began a new era in molecular biology (Source: NIH, Genom.gov). Researchers initially investigated genes and small fragments and later entire genomes, the study of which is referred to as genomics (see figure 5).

Figure 5: Understanding genes and genomics



Source: First Berlin Equity Research, Wikipedia, thinkexponential.com

Role of sequencing for development of genomics The emergence of DNA sequencing technology made possible gigantic advances in the genomics field. Sequencing is the process of identifying the specific order of nucleotides in each strand of DNA, and it is comparable to having a genetic map of an organism. As a result, knowing the precise order of DNA nucleotides, or sequencing, understanding their structure, and identifying the role of specific genes has long been considered a key to advancing scientists' understanding of life and diseases.

Next generation sequencing (NGS) became a "game-changing" technology in genomics According to the Human Genome Project, it is estimated that it cost around USD2.7 bn over a decade to deliver the first nearly-complete reference human genome in 2001. The cost to sequence a human genome is currently below USD1,000 and can be performed within less than a day (National Human Genome Research Institute). Moreover, the genomics tools giant Illumina recently announced a new machine that in the near future will be able to sequence the whole genome for less than USD100 in under an hour. There are currently several NGS platforms using different next generation sequencing technologies. In

general, the typical working principle requires that the target DNA is first randomly fragmented into millions of pieces and then amplified (to do millions of copies). Each of the pieces is sequenced multiple times, providing high depth to deliver accurate data and an insight into unexpected DNA variation. The chief advantage is that NGS platforms perform the sequencing of millions of small fragments of DNA in parallel, speeding up the process compared to the predecessor generation (Thudi M et al., 2012).

Progress in genomics led to development of proteomics Specific sequences of DNA, which are defined as a gene, act as instructions to produce small molecules called proteins. Proteins such as enzymes, hormones or antibodies, are composed of amino acids and play a crucial role in cells. They are required for the structure, function and regulation of the body's tissues and organs. Scientists hypothesise that proteins can trigger disease (e.g. cause a normal cell to behave like a cancer cell). As a result, research into proteins has increased in importance over time. The appearance of proteomics can be viewed as a direct result of advances made in large-scale nucleotide sequencing and genomic DNA (Kavallaris et al., 2005).

Proteomics today involves the large-scale study of proteins, their structure and physiological role or functions (Tapan et al., 2011). Mass spectrometry (MS) combined with bioinformatics is the technology of choice for the analysis of proteomes (sum of all the proteins in an organism) and for identifying proteins present in biological systems such as a cell, tissue, or the full organism (Hu A et al., 2016). However, proteomics research is more complex than its genomics counterpart. Proteins can be present in vastly different abundances, expressed in various sizes, shapes, and charges. Their structure is also much more complex – comprised of 20 amino acid forms – compared with the four nucleotides of the genome. Proteins also undergo dynamic changes in different cells, tissues, and organs during development, in response to environmental stimuli and in disease processes (Mehdi Mesri, 2014).

New diagnostic applications have emerged thanks to new findings in genomics and proteomics Most genomic and proteomic research efforts to date have been mainly focused on the areas of cancer research, drug and drug target discovery as well as biomarker research for diagnostic purposes (Husi et al., 2014). The field of diagnostic biomarkers has benefited significantly from the application of genomic and proteomic platforms over the last decade. At present, clinical applications of molecular diagnostic products can be found in at least six general areas: infectious diseases, oncology, pharmacogenomics, genetic disease screening, human leukocyte antigen typing, coagulation.

Molecular diagnostic tests usually detect specific sequences in DNA or RNA (ribonucleic acid) that are or are not associated with disease, including single nucleotide polymorphism (SNP), deletions, rearrangements, insertions and others. Molecular diagnostics can have a large positive impact on patients' therapeutic treatment by adding value through screening for disease prevention, through diagnosis at earlier stages, which makes diseases easier to treat, through more accurate diagnosis as well as patients treatment monitoring (Biomerieux, 2017). In the oncology field, molecular diagnostics have led to the emergence of simple non-invasive tests that can indicate cancer risk, allow early cancer detection and classify tumours so that the patient can receive the most appropriate therapy. They have also made possible the monitoring of disease progression, regression, and recurrence (Poste et al., 2011).

Molecular assays require three basic steps. These three steps can be performed by three separate devices or combined into one device:

- extraction and purification of nucleic acid
- amplification or copying of the targeted nucleic acids or attaching multiple copies of a dye to a single target copy

- detection of the amplified target using a real time polymerase chain reaction (PCR) or end-product detection including microarrays, Luminex (similar to flow cytometry), or sequencing.

Diagnostic tests require an approval in the US and a CE-certification in Europe In the US, diagnostic products require an approval from the registration agency FDA and the CLIA (Clinical Laboratory Improvement Act), either a pre-marketing approval (PMA) or a 510(k) approval. However, reference laboratories can carry out diagnostic tests before market approval has been granted. Sales in reference laboratories are a source of revenue and contribute to increased product awareness. In Europe, a self-warranted CE mark in accordance with the In-Vitro Diagnostic Devices Directive (98/79/EC) suffices for commercialisation.

MARKET

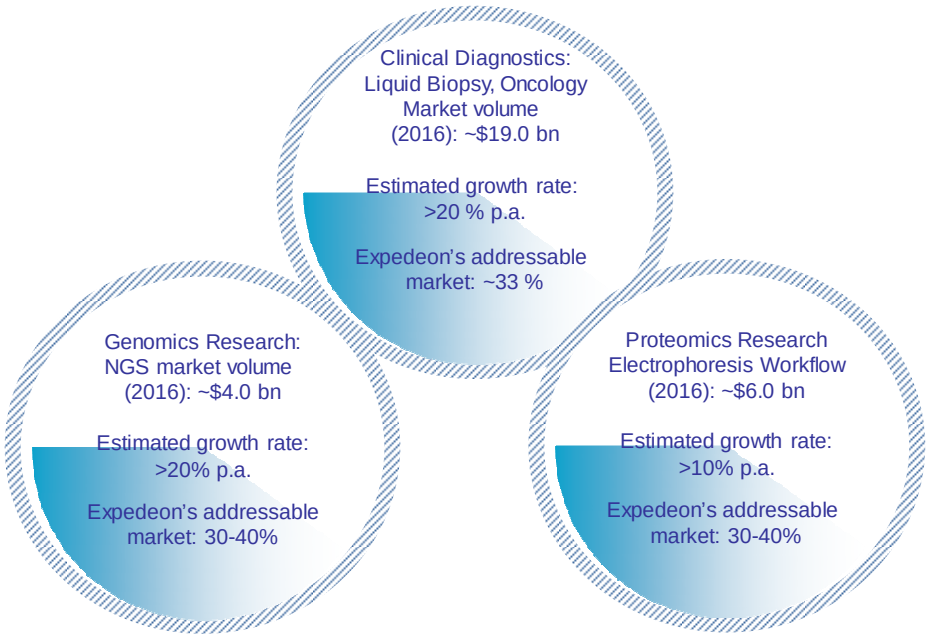
Reagents and research tools used in the life sciences are essential parts of routine laboratory research Advances in technology and the demand for high-quality reagents and techniques required for the research and development needs of pharmaceutical companies and research organisations have driven innovation in the life science tools industry. Unlike drug development or diagnostic development companies that conduct long and expensive clinical trials, life science tools and reagents are not closely regulated. As a result, they can reach the market substantially more quickly and require only a fraction of the R&D investment. Today, the life science tools and reagents market consists of several different segments, each offering different types of products such as consumables and laboratory equipment as well as services. The major market segments are genomics, proteomics and diagnostics (source: BCC Research).

Overall genomics and proteomics markets will continue to grow at double-digit percentage rate The global genomics market is expected to grow at a CAGR of 10.2% from USD14.7bn in 2017 to USD23.9bn in 2022. The main growth drivers include technological advances, an aging population, longer-life expectancy, favourable government policies, increase of R&D activities, the growing prevalence of chronic diseases, growing demand for personalised medicine and the falling cost of sequencing services (source: markets and markets, 2017). The global proteomics market is projected to grow at a CAGR of 11.7% to USD21.87bn by 2021, driven by the increasing need for personalised medicine, R&D expenditure, technological advancements, and increased funding for proteomics projects. (source: markets and markets, forecast 2016-2021).

Diagnostics market to achieve single-digit percentage rate growth The molecular diagnostics market is an attractive sector worth approx. USD60.2bn in 2016 growing by approximately 5.5% y/y (source: Markets and Markets). We anticipate that the use and significance of diagnostic testing will grow in the near future as the population ages and early detection becomes an increasing focus of patients, doctors and healthcare authorities.

Expedeon's target markets show double digit percentage rate growth Expedeon's current product portfolio is focused on highly innovative segments of the genomics, proteomics and diagnostic markets. These segments include Next Generation Sequencing – NGS (Genomics), Electrophoresis Workflow (Proteomics) and Liquid Biopsy and Oncology (Diagnostics). With an estimated growth rate of over 20.0% in the coming years, NGS is considered one of the fastest growing and most lucrative areas of the genomics market. We give an overview of Expedeon's target markets in the figure below. Considering that Expedeon focuses its portfolio on consumables, the potential market excludes 30-40% of the respective markets comprising laboratory equipment.

Figure 6: Targeting growth markets

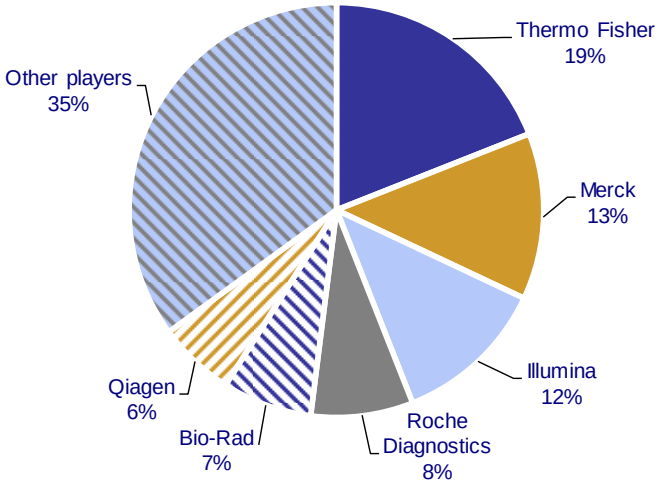


Source: Expedeon 2017, Markets and Markets 2016/2017

COMPETITION

Large specialised as well as diversified healthcare companies control the life science tool market The global life science reagents tool market has been traditionally dominated by large companies that have been present in this market for years focusing on continuously expanding their installed base of high-throughput platforms. According to PricewaterhouseCoopers, this market is fragmented with Thermo Fisher Scientific (includes Life Technologies), Merck KGaA (includes EMD Millipore and Sigma-Aldrich), and Illumina being the top three players. Further significant players are: Roche Diagnostics, Bio-Rad Laboratories, Qiagen N.V., Perkin Elmer Inc., Becton Dickinson (includes BD Life Sciences), and Promega Corp. Considering the strong market fragmentation, M&A activity has become a dominant force in shaping the industry in the last decade. Most dominant players such as Thermo Fisher, Merck or Qiagen consolidated their leading positions through acquisitions.

Figure 7: Key life science research players



Source: PWC 2014, BCC Research 2014

Some big diversified players such as Merck or Roche Diagnostics have only a small life science tools business compared to their overall size whereas for other players, such as Illumina or Bio-Rad, life science tools is their key market. Below, we give a brief overview of the top six life science players. We also include the life science specialist Abcam plc., which is a comparable peer to Expedeon.

Thermo Fisher Scientific (Life Technologies) is the largest vendor in the biotechnology tools market. The company offers reagents for various applications such as an immunogenic adjuvant, protein gel buffers, nucleic acid gel buffers, flow cytometer buffers and reagents, immunoassay buffers and reagents, protein purification buffers, and diagnostic testing. The company has a market cap. of USD84.4bn and achieved sales of USD20.9bn in 2017. The company consolidated its top position in the market in 2014 through the acquisition of the competitor, Life Technologies for USD13.6bn. Life Technologies is considered to be no. 2 behind Illumina Inc. in the race to produce faster and less expensive gene sequencing technology. The company's other relevant acquisitions were Affymetrix for USD1.3m (2016), FEI Company for USD4.2bn (2016) and Patheon for USD7.2bn (2017).

Merck (Millipore and Sigma-Aldrich) is part of the Merck healthcare conglomerate and is the second largest life science tools specialist worldwide. The company provides a wide range of reagents and solvents for different functions such as DNA and RNA synthesis, in vitro diagnostics, and instrumental inorganic analysis. With a market cap. of approx. €38.0bn, the company generated sales of €15.3bn in 2017. In order to consolidate its leading market position, Merck acquired the life science filtration and laboratory supplier Millipore in 2010 for USD7.5bn and in 2015 the leading E-commerce life science supplier Sigma Aldrich for USD17bn. The combined life science business generates sales in excess of €6bn.

Illumina is the leading provider of sequencing- and array-based solutions for genetic analysis. The company develops, manufactures and markets integrated systems for the analysis of genetic variation and function. The company provides sequencing and array-based solutions for genetic analysis, genotyping, NIPT and whole-genome sequencing services. Illumina holds about 70% of the market for genome-sequencing equipment. The company surprised the industry in 2017 with the CEO's promise to produce NGS equipment capable of sequencing the genome for USD100. The company has a market cap. of USD43.3bn and achieved revenues of USD2.8bn in 2017.

Roche Diagnostics is part of the Roche Group which is one of the world's leading healthcare companies. Roche is the world's largest supplier of clinical diagnostics products, with sales almost twice the level generated by its nearest competitor. Roche is also the world leader in in vitro diagnostics and tissue-based cancer diagnostics. The company has a market cap. of CHF 227.7bn and generated sales of CHF12.1bn in the Diagnostic division in 2017.

Bio-Rad Laboratories is a global provider of life science research and clinical diagnostic products. As one of the key vendors for the biotechnology reagents market, the company provides biotechnology reagents for clinical diagnostics, PCR technology, protein assay, and immunodetection reagents. Bio-Rad has a market cap. of USD8.9bn and achieved sales of USD2.2bn in 2017.

Qiagen is a leading provider of sample and assay technologies for life science research and molecular diagnostics. The company provides tissue and liquid biopsy-based tests for personalized healthcare using companion diagnostics to guide the use of medicines for treatment of cancer and other diseases. The company covers a broad range of molecular biomarkers running on PCR, multi-modal and next-generation sequencing platforms. In order to build up its leading molecular diagnostic position, Qiagen maintained an active acquisition strategy having digested companies such as Digene (2007, acquisition price: USD1.6bn), Cellestis (2011, acquisition price: USD374m) and Ipsogen (2011, acquisition price: USD101m). Qiagen has a market cap. of USD8.4bn and achieved sales of USD1.4bn in 2017.

Abcam is a leading supplier of life science research tools headquartered in the UK. The company offers validated antibodies, proteins and other binders, as well as assays to the research and clinical communities to help advance the understanding of biology and causes of diseases. Abcam has its own international sales and distribution network comprising 12 locations worldwide. The company also sells its products online serving over 600k researchers. In order to expand the business, Abcam completed three acquisitions in the last six years with transactions value ranging USD28m-USD170m each. The company is listed on the AIM (UK), has a market cap. of GBP2.7bn and achieved sales of GBP217.1m in FY 2016/17.

PORTFOLIO'S MAIN PRODUCT-FAMILIES

Expedeon offers products for selected applications across the entire molecular biology spectrum, covering the genomic, proteomic and diagnostic market segments. The company has developed 3,148 products so far. We will describe the four main product lines, which we believe account for over 80% of group sales.

TRUEPRIME - HIGHEST DNA AMPLIFICATION QUALITY WITHOUT USING PRIMERS

Product-family profile TruePrime is a novel product line of kits developed by Expedeon's subsidiary Sygnis which enables accurate and reliable amplification (copying) of DNA molecules in biological samples including the whole genome without the use of synthetic primers**.** TruePrime is an easy to use kit based on the gold standard enzyme Phi29 DNA polymerase plus the DNA primase Thermus thermophilus (Tth) PrimPol, discovered and characterised by Expedeon. Like many other DNA polymerases, Phi 29 needs synthetic DNA molecules, called oligonucleotides or primers, which "jumpstart" the reaction. The enzyme PrimPol shows dual features as a DNA primase and DNA polymerase. The primase function of PrimPol allows reading and copying of DNA to start without the need for random primers, as required by all other commercially available polymerases. These primers are usually the main source of bias and amplification errors. The polymerase function of PrimPol displays a high specific activity, being very efficient also when copying DNA with different lesions. This innovative amplification technology is patent-protected by Expedeon until 2033 and is fully compatible with all commonly used NGS platforms such as Illumina and Ion Torrent.

Figure 8: Overview of the TruePrime Kit and quality comparison against competitors

Source: First Berlin Equity Research, Expedeon AG

Unprecedented quality of DNA amplification Before DNA can be sequenced, several processing steps such as DNA amplification are required to obtain sufficient, high quality DNA suitable for the NGS process. However, the amplification of DNA is an extremely sensitive step subject to bias, inaccuracy and contamination. TruePrime enables accurate and highest quality amplification of the smallest amounts of DNA to a quantifiable level. TruePrime's superior amplification quality is reflected in the absence of contamination in the reaction products, excellent coverage breadth and uniformity, low nucleotide error rates and the capacity to recover single-nucleotide variants (SNVs) or copy number variants (CNVs) (Angel J. et al., Nature 2016). These remarkable features of TruePrime compared to peer products can be seen in figure 8, right picture. The TruePrime amplification measures are closest to the original non-amplified DNA, while competing methods suffer from inaccurate or biased amplification, resulting in poor coverage across the genome.

The key advantages of TruePrime, described in the article "TruePrime is a novel method for whole-genome amplification from single cells based on TthPrimPol" published in the renowned scientific journal Nature (Angel J. et al., Nature 2016), are:

- superior quality
- superior sensitivity,
- superior accuracy
- entire genome coverage.

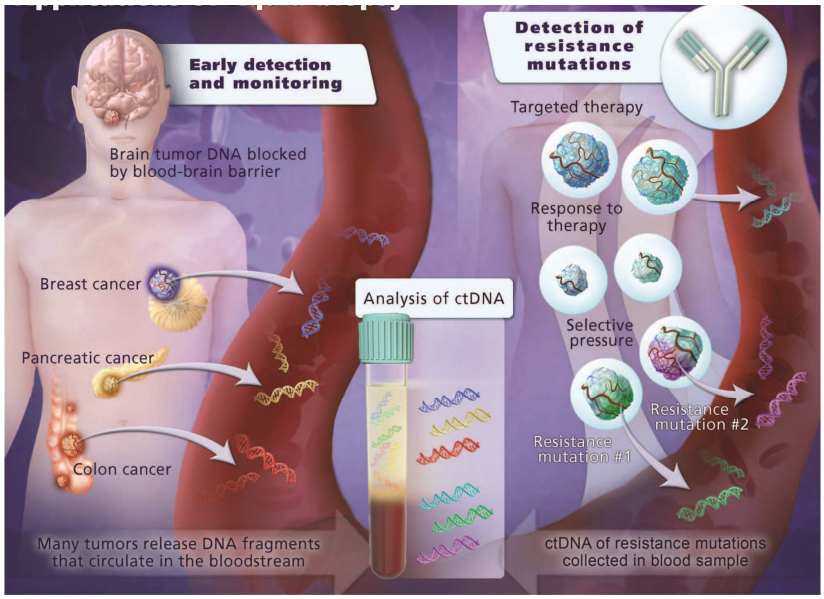
TruePrime's unique features are at a premium in pioneering applications where the amount of DNA is critically low such as single-cell analysis… Single-cell analysis is a rapidly evolving approach to characterise DNA information at the individual cell level. Particularly in oncology, the genome study of individual cells has led to a completely new understanding of the complexity of tumor biology. Due to genetic changes and environmental differences, a single tumour in a patient can be composed of a variety of populations of cells each with their own mutations. Specific mutations, which can be present in only a few cells, may be responsible for poor treatment outcomes. As a result, DNA sequencing at a single cell level is essential and a focus for researchers seeking to identify key rare mutations responsible for the reoccurrence of tumours or metastases (Saadatpour et al., 2015). Such crucial rare mutations cannot be detected with the previous methods of sequencing a larger tissue sample of the tumor. Therefore, single-cell sequencing was appointed as the method of the year by the journal Nature Methods in 2013 (Procerpio et al., Single-cell technologies are revolutionising the approach to rare cells, 2015).

One of the fundamental challenges of single-cell analysis is the amplification of the small amount of initial DNA material available in order to reach the detection threshold level (Saadatpour et al., 2015). A single human cell contains approximately 7 picogram (10^{-12} gram) of DNA. TruePrime however, is able to accurately and reliably amplify this small amount of DNA in excess of one million times within only three hours providing researchers with ample material from a single cell for NGS analysis.

…and liquid biopsy for cancer diagnostics Liquid biopsy refers to the analysis of tumour-derived DNA fragments circulating in the blood. While tumour tissue biopsy is still considered the gold standard for detecting and obtaining information about cancer, major barriers exist in terms of acquisition and utility. Tissue biopsies are usually highly invasive procedures requiring surgical intervention, which increases the cost of patient care and is inconvenient for the patient (Diaz et al., 2011). In some patients, it may also not be possible to obtain a tissue biopsy due to the inaccessibility of their tumours or because of other health conditions that prevent them from undergoing the procedure. Further, the major limitation of tissue biopsy is heterogeneity, which characterises most advanced cancers (Gerlinger et al., 2012, Vogelstein et al., 2013).

In contrast, liquid biopsy can be performed on a regular basis thereby allowing frequent monitoring of the patient's response to treatment. Moreover, considering the dynamic nature of tumours liquid biopsy provides the clear benefit that it can provide information about the entire tumour mutation profile rather than the fractional view which is obtained through the conventional biopsy approach. Using NGS methods, key fragments can be investigated and conclusions can be drawn about tumour mutations.

Figure 9: Applications of liquid biopsy in cancer detection



Source: First Berlin Equity Research, Bettagowda et al.

The scientific community has high expectations of liquid biopsy analysis. However, the major challenge of liquid biopsy analysis is assay sensitivity (Thorac et al., 2017). Limitations due to low abundance of cell-free DNA (cfDNA) are a significant problem particularly in cases where tumour-derived DNA fragments are analyzed by NGS. However, NGS is scientists' method of choice as it enables analysis of the whole mutation landscape. In order to increase detection of circulating cells in several cancer types, different experimental solutions focusing on the increase of the sample volume have been investigated delivering modest results (Coumans et al., 2012, Manicone et al., 2017).

TruePrime enables generation of sufficient DNA material permitting reliable NGS for every liquid biopsy sample. It can therefore overcome previous limitations in methodological sensitivity, and thus enable early diagnosis of cancer in broad populations. TruePrime has the potential to take up a central role in the diagnosis and monitoring of cancer. According to Expedeon, conservative estimations for the global liquid biopsy market in 2020 are in excess of USD1.3bn.

RUNBLUE FOR DNA, RNA AND PROTEIN ELECTROPHORESIS

Product-family profile Expedeon's Runblue product line was developed by its subsidiary C.B.S. Scientific and offers a diverse range of electrophoresis products with attractive features, such as gels for molecule separation, stains for immediate protein visualisation and electrophoresis tanks. Electrophoresis is a widely-used laboratory technique using an electric field and molecular sieve (e.g. using a gel containing small pores) to separate and purify biomolecules such as DNA, RNA, or proteins. In gel electrophoresis, the molecules travel through the pores in the gel at a speed that is inversely related to their lengths, which is why the molecules are classified according to their molecular size.

Figure 10: RunBlue Electrophoresis product line

Source: First Berlin Equity Research, Expedeon AG

RunBlue gels offer superior features Expedeon's gels are produced using a proprietary process using a novel photo-initiator, through which it is possible to generate cross-linked-polyacrylamide gels with a small amount of agarose. This technology enables the production of gels with superior performance, such as higher resolution and reproducibility of separated protein bands and the possibility to store the processed gel solutions at high temperatures for a long period of time (2 years at 4°C and 6 months at room temperature while normal agarose gels need refrigeration). Many solutions available on the market still require refrigerated storage. Further gel features are very high strength (up to 10 times stronger than conventional hand-cast gels) and elasticity to simplify handling and processing. This practically eliminates the risk of torn and unusable gels encountered during normal gel manipulation.

Expedeon's gels also have more lanes than the standard gels, allowing 12 – 17 samples to be run simultaneously. Lanes can be loaded with 20 µl (17 lanes) or up to 35 µl (12 lanes). The cassettes have no comb or tape to remove and no excess gel to trim, all of which improves the speed and efficiency of the loading and running process. Expedeon's gels provide a separation profile similar to Invitrogen's polyacrylamide Nupage Bis-Tris gels, but with enhanced separation of higher molecular weight proteins and better overall resolution.

InstantBlue enables easy and rapid gel visualization In order to visualise the results, Expedeon offers InstantBlue, which is the only true single step Coomassie based gel stain available on the market. The scientist can simply take the gel from its cassette, put it in stain and leave. The unpleasant and time consuming (easily some 30 minutes) washing, microwaving or destaining process is not necessary. All bands will be visible within only 15 minutes, while most peers' stains take at least 30 minutes to show results.

Practical gel tank rounds up the RunBlue product offering Expedeon commercializes a gel tank with high functionality. The core module hinges open to accept gel cassettes or buffer dam and then simply clips in place to provide a completely sealed cathode chamber. This allows RunBuffer to be added and samples to be loaded outside of the tank. The Dual Run & Blot system utilises a unique, patent pending, gradient electric field for blotting which provides greatest potential for the largest proteins and less for the smaller proteins, giving a highly uniform blotting.

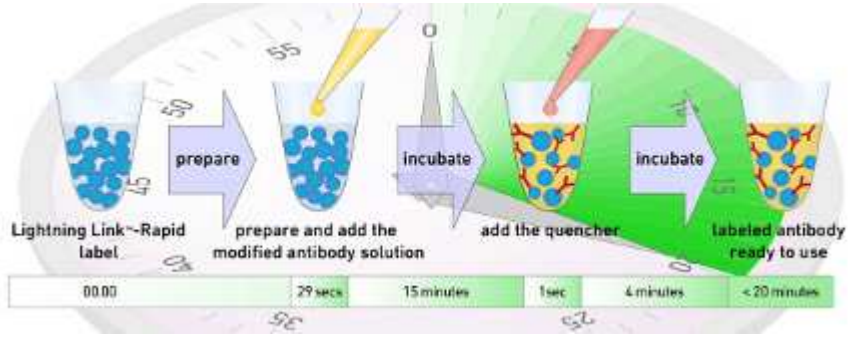
LIGHTNING-LINK LABELLING FOR BIOMOLECULE DETECTION IN IMMUNOASSAYS

Product-family profile Lightning-Link is an innovative technology developed by its subsidiary Innova Biosciences that enables direct labelling of antibodies, proteins, peptides or other biomolecules for use in immunoassays in R&D applications, drug discovery and the development of diagnostic kits. Immunoassays are quick and accurate tests used in life science research to detect specific molecules of interest, such as potential therapeutic targets or diagnostic markers. Immunoassays rely on the inherent ability of an antibody to bind with

high accuracy to the specific structure of a molecule, the so-called antigen. The second key feature of immunoassays is the ability to produce a measurable signal in response to the binding. Most immunoassays therefore involve chemically linking antibodies with a detectable label. Generally the label is coloured or is able to produce, under the appropriate conditions, a coloured substance or light at a characteristic wavelength. Labels include organic dyes, fluorescent proteins, coloured particles and enzymes.

Lightning-Link is the simplest, fastest and most efficient direct labelling kit on the market Expedeon's easy-to-use, one step (also called direct) procedure based on Lightning-Link kits offers the fastest and most efficient method of labelling antibodies or proteins currently available on the market. The labelling preparation process is very simple. The researcher pipettes the biomolecule into a vial of lyophilized mixture containing the label of interest and incubates it. The kits require only 30 seconds hands-on time and there are no complicated separation steps involved (such as xed-column chromatography or spin columns), through which it is possible to retain 100% of the materials used.

Figure 11: Lightning-Link technology



Source: First Berlin Equity Research, Expedeon AG

The main advantages of the Lightning-Link product family are:

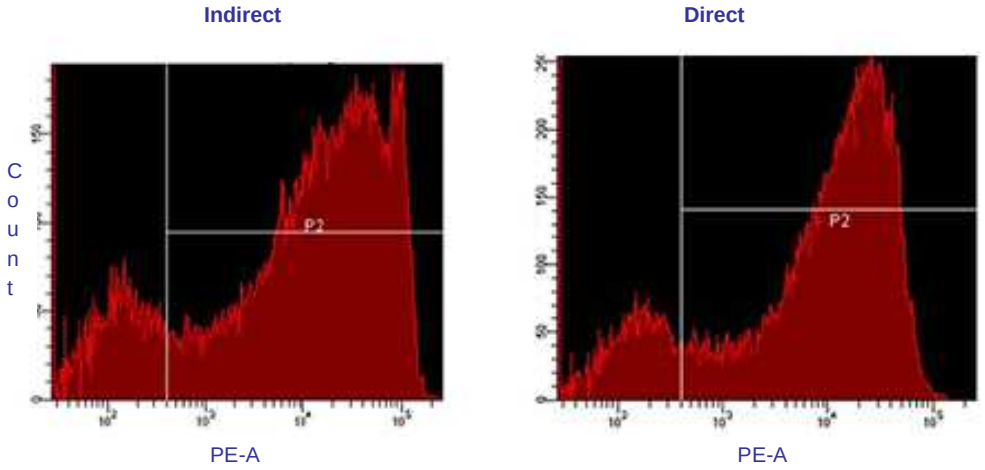
- 100% antibody recovery
- fully scalable from R&D to production
- virtually eliminates batch to batch variability
- long term stability
- fast procedure, with product in two presentations, traditional (2 hours incubation) and rapid (15 minutes incubation)

Traditional indirect labelling methods have a number of disadvantages Labelled primary antibodies or labelling kits can be ordered from a large number of commercial antibody suppliers (e.g. Bio-Rad). There are two types of labelling/detection procedures, direct with one-step (using one antibody) or indirect multistep (using two antibodies - a primary unconjugated antibody that recognizes the antigen and a secondary antibody directed against the primary antibody which is typically conjugated to a detection label). Traditionally, the indirect procedure has been the most popular, since labelled secondary antibodies for the indirect procedure have the advantage of being relatively inexpensive and easy to find with the required validated, high-quality features. However, indirect procedures can be "dirtier", since the more antibodies used in an assay, the higher the background. As a result, the level of unwanted non-specific binding in the assay is increased, especially in assays where antibodies from different species are present.

Lightning-Link overcomes shortcomings of direct labelling methods, delivering a superior performance By using a directly-labeled primary antibody, secondary antibodies can be avoided altogether. However, in many cases the directly conjugated primary antibody

reagents required are unavailable commercially. Furthermore, methods of antibody labelling can be technically challenging and require specialist knowledge of chemical modification techniques. To overcome these issues and allow researchers to quickly and easily perform direct antibody labeling in-house, Expedeon (Innova Biosciences) developed Lightning-Link. Expedeon offers a wide range of over 50 labels including enzymes, fluorescent proteins, fluorescent dyes, tandems and biotin. The Lightning-Link process generates labels with performance characteristics identical to, or better than, those prepared with laborious multistep conjugation procedures. The figure below shows a direct comparison of direct Lightning-Link and indirect method antibody labelling for flow cytometry, where both methods show a similar level of staining. Nevertheless, the direct method with Lightning-Link (right picture) generates a more accurate peak value.

Figure 12: Performance comparison of indirect and direct antibody labelling (Lightning-Link)



Source: First Berlin Equity Research, Expedeon AG

Numerous chemical labelling methods are used in the scientific community, each one with own strengths and weaknesses depending on the requirements. In the following table we give an overview of the standard chemical approaches to antibody labelling.

Table 1: Overview of competitors' antibody labelling technologies

Features	**Lightning-Link**	NHS ester	Isothiio-cynate	Carbodimide	Two-tag	Periodate
Avoids tagging of antibody	**Yes**	Yes	Yes	Yes	No	Yes
Avoids post conjugation separations	**Yes**	No	No	No	Yes	Yes
Used to attach enzymes	**Yes**	No	No	No	Yes	Yes
Used to attach dyes or small molecules	**Yes**	Yes	Yes	No	No	No
Scalability	**Easy**	Hard	Hard	Easy	Very difficult	Hard
Hands-on time	**30 seconds**	1-3 minutes	>15 minutes	>15 minutes	>60 minutes	>15 minutes
10 µg possible?	**Yes**	No	No	No	No	Yes
Typical antibody yield	**100%**	50-80%	50-80%	50-80%	20-50%	70-80%
Other comments	**One step, no losses**	NHS esters unstable	High pH needed	Used with particle labels	Complex multi-step process	Chemical hazards

Source: First Berlin Equity Research, Expedeon AG and

Lightning-Link ranks best-in-class against competing methods The comparison in table 1 demonstrates that Lightning-Link offers by far the best performance of all procedures. The simplicity of the Lightning-Link approach also means that it is easy to scale up the amount of antibody to be labeled without any change in conjugate performance. For any new antibody, or in situations where the antibody is extremely valuable and in limited supply, trial conjugates can be made at just 10 µg scale (because there are no separation steps). Further, most conjugation methods require knowledge of chemistry and experience in separation techniques e.g. xed-column chromatography or spin columns in order to remove low-molecular-weight activation reagents from the label and/or antibody. Separation steps result in losses of material, batch-to-batch variation of conjugates and complications in scaling up. The main advantageous features of Lightning-Link make this technology ideal for use in a wide range of diagnostic immunoassay formats, including Lateral Flow Immunoassays, ELISAs (enzyme-linked immunosorbent assay) and fluorescent immunoassays.

Lightning-Link kit applied in Lateral Flow Immunoassay (LFA) for point-of-care-diagnostic (POC) Expedeon has developed LFA kits which provide a tool for the easy and quick development of customised sandwich lateral flow assays. The company has filed a patent application in October 2017 to protect this newly developed product. The lateral flow assay is the most common commercially available POC diagnostic tool available. Basically, it is a simple to use testing device to confirm the presence or absence of target analytes, such as pathogens or biomarkers in humans or animals, or contaminants in water supplies, foodstuffs, or animal feeds. They can be used to detect target analytes in a wide range of sample types including serum, plasma, whole blood, urine, or swabs of nasal passages, throat or urogenital tracts. POC diagnostics are simple tests that do not involve the use of laboratory staff or facilities to provide the result and can be performed by a healthcare professional or by the patient himself (Sajid et al., 2015). The most commonly known type of lateral flow rapid test is the pregnancy test.

LFA is performed using a test strip, different parts of which are assembled on a plastic cassette (see figure 13). At the heart of the immunoassay and responsible for the quality of the LFA are a binding reagent, mostly an antibody or DNA-based aptamer and the detection moiety or label. The antibody or aptamer can be tuned to bind the target analyte with high specificity and give a binding-signal through the applied label, enabling tiny concentrations to be detected by the test. The typical labels in LFA assays are gold nanoparticles or latex beads which produce a colour readout without the requirement of further development for visualisation. However, fluorescent labels, enzymes, colloidal metals and magnetic particles can also be used (Source: Innova Biosciences).

Figure 13: Lateral Flow Assay

Source: First Berlin Equity Research, DCN Diagnostics

Partnership with Abingdon Health may accelerate Expedeon's market penetration in the LFA market In November 2017 Expedeon entered a cooperation agreement with Abingdon Health, a UK-based company offering development and manufacturing services for immunoassay tests to be implemented as an LFA format. Expedeon is now Abingdon's preferred colloidal gold supplier for LFA tests. Through this cooperation, Expedeon also gains access to Abingdon's manufacturing and can offer a full custom LFA service from proof-of-principle to small commercial or bulk manufacture. This deal may therefore boost LFA kit sales and market penetration. According to Expedeon, the global market for lateral flow assays is growing at 16% per annum and projected to be worth USD8.2 billion by 2022.

CAPTSURE ANTIBODY IMMOBILISATION SYSTEM FOR IMMUNOASSAYS

Product-family profile TGR's patented CaptSure offers a cutting edge antibody immobilisation system which replaces other types of binding molecules, such as streptavidin/biotin, thereby providing greatly improved performance in complex samples. The technology is applicable to different formats of immunoassays such as ELISA (gold standard), beads, LFA and microfuidics. CaptSure also provides the potential for multiplexing applications (detect multiple proteins in a single sample), which represent a clear trend in the diagnostic market. Many scientists have shown that an appropriate antibody immobilisation strategy significantly affects the analytical performance of an immunoassay (Wong et al., 2009; Jung et al, 2009). According to Sandeep et al., the immobilization of antibodies on sensing platforms is the first critical step in the development of immunoassays in order to achieve a superior bioanalytical performance. An ideal immobilization technology should be leach-proof, rapid, and not labour-intensive so as to provide high detection sensitivity and specificity without the requirement for a highly skilled workforce and high-end instrumentation. Further, it must be adaptable to automation for the development of high-throughput devices. However, many widely used procedures still employ a complex multi-step procedure involving costly cross linking agents.

Captsure complements Lightning-Link nicely – this has been reflected in Expedeon's marketing cooperation with TGR since 2014 Expedeon, through its subsidiary Innova, has had a co-marketing agreement with TGR since January 2014 in order to leverage the complementary features of both technologies. This cooperation has enabled clients to benefit from the simplification of the development process of ELISA immunoassays, leading to faster development, an increase in assay detection performance and cost reduction. We believe the synergies between both technologies were a strong driver of management's decision to acquire TGR.

FINANCIAL HISTORY AND OUTLOOK

FINANCIAL HISTORY

In April 2018, Expedeon AG published its FY/17 financial report in accordance with IFRS standards. The company achieved several relevant milestones in 2016, 2017, and early 2018 that strongly impacted the FY/17 group figures and the financial outlook. They will shape future financial performance as well. The main highlights were the acquisition of the companies Expedeon, C.B.S., Innova and TGR. We provide an overview of some key data on these transactions in the table below.

Table 2: Overview of acquisitions and key data

	Expedeon Holding	C.B.S. Scientific	Innova Biosciences	TGR Biosciences
Date of closing	August 2016	January 2017	June 2017	May 2018
Technology (products)	Proteomics product-line (reagents and tools)	"RunBlue" product-line for electrophoresis (equipment and consumables)	"Lightning-Link" Labelling Technology (reagents and tools)	"CaptSure" Antibody Immobilization Technology (reagents and tools)
Commercial Infrastructure	commercial operations in the UK, US and Singapore	sales team in the US	tele-sales team in the UK	sales team in Australia
Production infrastructure	UK facility	US facility	UK facility	Australian facility
Sales	approx.€2.5m	approx. USD1.5m	approx. €3.0m	approx. €3.6m
Sales growth	>20% p.a.	n.a.	approx. 23% p.a.	approx. 23% p.a.
EBIT	profitable	profitable	EBIT approx. €0.6m (approx. 20% margin)	EBIT approx. €1.3m (approx. 36% margin)
Price	approx.€20.5m	approx. €1.0m	approx.€13.0m	approx. €10.4m
Price / Sales	8.2x	0.6x	4.3x	2.9x

Source: First Berlin Equity Research, Expedeon AG

Income Statement FY/17 Group revenues amounted to €7.8m (up from €1.8m in FY/16). Besides sound double digit organic growth of 24%, revenue growth was driven by the impact of the Expedeon (consolidated from August 2016), C.B.S. (consolidated from the beginning of January 2017) and Innova (first full quarterly consolidation in Q3/17) acquisitions.

In FY/17, company's gross profit increased to €4.9m (up from €0.8m in FY/16), which thus implied a gross margin increase to 63.0% of sales compared to 42.6% in the previous year. This figure reflects the new higher margin product mix emerging from the consolidation of Expedeon, C.B.S. and Innova, as well as a one-off non-cash negative accounting effect amounting to €0.8m from products booked at fair market price instead of historical production costs following the acquisition. Adjusted for one-off items, the FY/17 gross margin was 72.8%.

Sales and marketing expenses increased substantially to €1.9m (FY/16: €0.9m) mainly due to the expansion of the distribution network following the Expedeon, C.B.S. and Innova acquisitions. General and administrative expenses also increased to €6.3m in FY/17 (FY/16: €2.8m) which largely reflects the company's larger structure following the acquisitions. However, this position includes one-off transaction and reorganisation expenses amounting to €0.8m following the acquisitions. Adjusted for one-off items, general and administrative expenses were €5.5m in FY/17.

Research and development expenses declined slightly to €0.8m (FY/16: €1.2m) and in our view reflected the positive effect of synergies emerging from the consolidation of the acquired companies. We show reported as well as adjusted EBIT and net income results in table 3.

Table 3: Income Statement (selected items), reported and adjusted figures

	Reported figures			Figures adjusted for one-offs*		
All figures in EUR '000	**FY/17**	**FY/16**	***Delta***	**FY/17***	**FY/16**	***Delta***
Revenues	**7,797**	**1,789**	***336%***	**7,797**	**1,789**	***336%***
Gross profit	4,916	763	*544%*	5,680	1,289	*341%*
OpEx	-8,975	-4,783	*88%*	-8,134	-4,545	*88%*
Operating Income (EBIT)	**-4,059**	**-4,020**	***1%***	**-2,454**	**-3,256**	***-25%***
Net financial result	-163	-128	*27%*	-163	-128	*27%*
Tax income (expense)	961	-240	*-500%*	961	-240	*-500%*
Net income / loss	**-3,261**	**-4,388**	***-26%***	**-1,656**	**-3,624**	***-54%***
Margins in %						
Gross profit	*63.0%*	*42.6%*		*72.8%*	*72.1%*	
Operating Income (EBIT)	*-52.1%*	*-224.7%*		*-31.5%*	*-182.0%*	

**FY/17 figures adjusted on one-off acquisition-related transaction and reorganisation expenses*

Source: First Berlin Equity Research, Expedeon AG

Expedeon AG reported an operating loss of €-4.1m in FY/17, slightly higher than €-4.0m in FY/16. However, the FY/17 one-off acquisition-related expenses totalled €1.6m. Adjusted for one-off items, the operating loss declined to €-2.5m, which reflects the company's successful efforts to move the company towards operational break-even. The net financial result increased to €-163k (FY/16: €-128k), mainly due to short and long term debt acquired to finance operations for further business growth. The reported net result totalled €-3.3m, down from €-4.4m in FY/16. The adjusted net result amounted to €-1.7m. Further, the company achieved ÊBITDA breakeven of €11k in Q4/17 in line with management guidance.

Balance Sheet FY/17 The balance sheet total was €50.0m. The company reported a lower cash position of €2.0m (2016: €3.8m), which in view of the company's operational break-even achieved in Q4/17, suggests sufficient funds to finance ongoing operations and organic growth. Due to the consolidation of Innova, the company's receivables increased significantly from €0.8m in 2016 to €1.7m in FY/17. The higher post-acquisition level of receivables however represents an improved "Days Sales Outstanding" (DSO) coefficient of 77, down from 157 the previous year. Inventories increased slightly to €1.2m (2016: €1.1m). Current assets showed a slight reduction to €6.0m (2016: €6.3m), reflecting the lower cash position in the period.

Non-current assets increased to €44.0m (2016: €31.7m), mainly driven by an acquisition-related 36.3% increase in intangible assets to €41.9m (2016: €30.8m), as well as a 114.2% surge in tangible assets to €2.1m (2016: €1.0m).

Table 4: Balance sheet (selected items)

All figures in EUR '000	**FY/17**	**FY/16**	***Delta***
Cash and cash equivalents	1,954	3,795	*-48.5%*
Receivables	1,655	771	*114.7%*
Inventories	1,234	1,092	*13.0%*
Current assets, total	**5,990**	**6,330**	***-5.4%***
Goodwill & other intangibles	41,932	30,755	*36.3%*
Property, plant & equipment	2,050	957	*114.2%*
Non-current assets, total	**43,982**	**31,712**	***38.7%***
Accounts payable	849	656	*29.4%*
Financial debt (ST+LT)	5,713	2,706	*111.1%*
Shareholders' equity	40,043	31,407	*27.5%*
Equity ratio	*80.1%*	*82.6%*	*87.7%*
Balance sheet, total	**49,972**	**38,042**	***31.4%***

Source: First Berlin Equity Research, Expedeon AG

Total equity amounted to €40.0m, which corresponds to a solid equity ratio of 80.1% (2016: 82.6%). Total liabilities (ST+LT), which include interest free soft loans amounting to approx. €2.4m from the Spanish government to promote R&D, increased to €5.7m in FY/17 (2016: €2.7m). The debt increase was mainly driven by the inclusion of the Innova earn-out liability which amounted to €2.2m.

Cash Flow Statement FY/17 In FY/17, cash flow from operating activities came in at €-2.9m and was slightly better than the previous period (FY/16: €-3.2m). Capital expenditures increased to €2.1m in FY/17 (FY/16: €0.7m) mainly due to investments in manufacturing facilities and intangible assets relating to the acquired companies C.B.S. and Innova. Free cash flow decreased to €-5.0m (FY/16: €-3.9m). Other investments were €-7.2m in FY/17 (FY/16: €-1.1m) due to the impact of the Innova acquisition. Cash flow from financing activities amounted to €10.4m (FY/16: €4.2m). The increase is largely attributable to the raising of new equity capital. Expedeon financed the Innova acquisition and the corresponding integration measures through the placement of €7.3m shares at €1.38 raising €10.0m before placement costs. Thus, net cash flow came in at €-1.8m (FY/16: €-0.8m).

Table 5: Cash flow statement (selected items)

All figures in EUR '000	FY/17	FY/16	*Delta*
Operating cash flow	**-2,885**	**-3,215**	***n.a.***
CapEx	-2,122	-673	*n.a.*
Free cash flow	**-5,007**	**-3,888**	***n.a.***
Other investments and disposals	-7,194	-1,129	*n.a.*
Cash flow from financing	10,425	4,244	*145.6%*
Exchange differences	-65	11	*n.a.*
Net cash flow	**-1,841**	**-762**	***n.a.***

Source: First Berlin Equity Research, Expedeon AG

H1/18 results On 09 August, Expedeon published strong H1/18 results, which show the company on track to achieve full year guidance. Group revenues increased by 89% y/y to €5.6m (H1/17: €3.0m), driven by organic as well as acquisition-related growth. The operating loss narrowed significantly to €-1.0m (H1/17: €-2.2m). As a result, the company achieved a positive EBITDA of €23k (H1/17: €-1.6m). Adjusted for acquisition related non-cash items such as equity-settled share compensation and fair value charge for acquired inventories, EBITDA amounted to €164k in H1/18 (H1/17adj.: €-989k). This positive result reflects the company's commitment to building on its first EBITDA-profitable quarter in Q4/17 and achieving an EBITDA-profitable FY/18. During H1/18, Expedeon announced the acquisition of TGR Biosciences, which was completed in May 2018 following a capital increase of €4.2m and a financing arrangement of €2.0m (convertible bond), totalling €6.2m. The acquisition deal entails further fixed and earn-out payments worth up to €4.2m due over the next 2 years, which will likely be mostly financed by new shares and will further dilute current investors. We have taken the corresponding dilutive effect into account in our financial model.

FINANCIAL OUTLOOK

Company guidance 2018E Expedeon is guiding towards total revenues of €13-14m (including the acquisition of TGR Biosciences which was closed in May 2018). Management is guiding towards positive EBITDA in 2018E.

Income Statement – On track for positive EBITDA in 2018E We forecast sales will grow by 72.0% to €13.4m in 2018E driven by solid double-digit organic growth and the effect of TGR Biosciences' consolidation. We assume the consolidation of TGR from mid-May 2018 contributing sales of €2.1m. Going forward, we estimate that group revenues will increase at a

CAGR of 28.3% (2018-2020). We see significant room for further penetration of the core product families TruePrime, RunBlue and Lightning-Link, as well as the recently acquired CaptSure, which we expect to remain the company's main growth drivers.

In 2018E, we project gross profit of €9.7m (2017: €4.9m) which implies a gross margin of 72.5% (FY/17: 63.0%). We note that COGS for Expedeon's main product-families are to a large extent fixed costs. As a result, increasing sales volume will enable further margin improvement due to economies of scale. We conservatively forecast a further increase in the group gross margin to 73.5% in 2020E.

We forecast operating expenses will increase during the period but at a slower pace than sales due to economies of scale. Expedeon acquired a marketing and distribution network during 2016 and 2017. The staff and infrastructure necessary to manage higher sales volume are thus already in place. We forecast sales expenses of €2.7m in 2018E (2017: €1.9m). We also project higher R&D costs of €1.3m in 2018E (2017: €0.8m). We expect that the company will achieve positive EBITDA of €1.1m in 2018E (2017: €-2.5m), which equates to an EBITDA margin of 8.6%. We expect EBIT of €-0.5m in 2018E and project that economies of scale will lead to continuously higher EBIT and EBITDA margins in coming years progressively growing to respectively 11.0% and 19.0% in 2020.

Expedeon had a tax loss carry forward (TLCF) of €18.1m at the end of December 2017, which we expect to lower tax paid. We have assumed a 10-15% effective tax rate on profit for our financial projections in the period 2018E-2020E.

Due to Expedeon's improving operating performance, we project the net result to improve significantly in the period 2018-2020. We forecast a net result of €-0.9m (EPS: €-0.02) in 2018E and a net profit of €1.7m (EPS: €0.03) in 2020E (see table 6).

Table 6: Revenue, gross profit, EBIT forecasts

All figures in EUR '000	2015	2016	2017	2018E	2019E	2020E
Revenues	555	1,789	7,797	13,414	18,109	22,093
Gross profit	528	763	4,916	9,725	13,220	16,239
EBITDA	-3,514	-3,208	-2,461	1,147	2,986	4,200
Operating income (EBIT) reported	-3,862	-4,020	-4,059	-463	1,266	2,432
Operating income (EBIT) adj.*	-3,862	-3,256	-2,454	-463	1,266	2,432
Net income / loss reported	-4,011	-4,388	-3,261	-906	670	1,676
Margins in %						
Gross profit	*95.1%*	*42.6%*	*63.0%*	*72.5%*	*73.0%*	*73.5%*
EBITDA	*n.m.*	*n.m.*	*n.m.*	*8.6%*	*16.5%*	*19.0%*
Operating income (EBIT) reported	*n.m.*	*n.m.*	*n.m.*	*n.m.*	*7.0%*	*11.0%*
Operating income (EBIT) adj.*	*n.m.*	*n.m.*	*n.m.*	*-3.4%*	*7.0%*	*11.0%*
Y-Y Growth						
Revenues	*41.6%*	*222.3%*	*335.8%*	*72.0%*	*35.0%*	*22.0%*
EBITDA	*n.m.*	*44.5%*	*544.3%*	*97.8%*	*35.9%*	*22.8%*
Operating income (EBIT) reported	*n.m.*	*n.m.*	*n.m.*	*n.m.*	*n.m.*	*92.2%*
Operating income (EBIT) adj.*	*n.m.*	*n.m.*	*n.m.*	*n.m.*	*n.m.*	*92.2%*

**EBIT in 2016 and 2017 have been adjusted for one-off items related to acquisitions*

Source: First Berlin Equity Research, Expedeon AG

Balance Sheet We project the company will increase its receivables in 2018E to €2.5m (2017: €1.7m), which we project to expand further to €3.9m in 2020. Due to the acquisition of TGR in 2018, we anticipate that goodwill, other intangibles and property plant and equipment will grow to a total of €52.4m in 2018E (2017: €44.0m). Going forward, our forecast does not

factor in acquisition activity, which is why we project roughly stable tangible and intangible assets. The attractiveness of Expedeon's business model is that it will become self-sustainable in 2018E. The company will be generating enough cash to finance further organic growth. This is reflected in a progressively growing cash position.

Table 7: Balance sheet KPIs 2015-2020E

All figures in EUR '000	2015	2016	2017	2018E	2019E	2020E
Cash and cash equivalents	4,557	3,795	1,954	1,785	1,191	2,627
Receivables	206	771	1,655	2,462	3,175	3,874
Inventories	100	1,092	1,234	1,587	1,996	2,390
Current assets, total	**5,440**	**6,330**	**5,990**	**6,981**	**7,510**	**10,038**
Goodwill & other intangibles	7,620	30,755	41,932	50,496	49,953	49,200
Property, plant & equipment	269	957	2,050	1,903	1,704	1,682
Non-current assets, total	**8,593**	**31,712**	**43,982**	**52,399**	**51,657**	**50,881**
Accounts payable	322	656	849	1,011	1,126	1,202
Financial debt (ST+LT)	2,117	2,706	5,713	10,613	9,613	9,613
Shareholders' equity	10,413	31,407	40,043	44,389	45,060	46,736
Equity ratio	*74%*	*83%*	*80%*	*75%*	*76%*	*77%*
Balance sheet, total	**14,033**	**38,042**	**49,972**	**59,380**	**59,166**	**60,919**

Source: First Berlin Equity Research, Expedeon AG

Cash Flow Statement We expect increasing revenues and earnings to result in a large improvement in operating cash flow in 2018E. We forecast an operating cash flow of €-0.3m in 2018E (2017: €-2.9m) and expect this figure to improve substantially to €2.4m in 2020E. Capital expenditures should amount to €1.1m in 2018E (2017: €2.1m), largely due to a slight increase in intangibles related to the TGR Biosciences acquisition. The current R&D laboratories and manufacturing plants are well suited for further growth and we project only maintenance or minor additional investment of about €1.0m p.a. in the period 2019E-2020E. We expect 2018E free cash flow to improve to €-1.3m compared to €-5.0m in the prior year. We anticipate this figure will grow to €1.4m in 2020E. Our forecast cash inflow from financing of €6.9m as well as other investments amounting to €5.7m in 2018E are chiefly attributable to the TGR acquisition. We anticipate net cash flow to total €-0.2m in 2018E and €1.4m in 2020E. Going forward we estimate that the positive trend of strengthening operating performance and cash flow will continue having a positive impact on the company's free cash flow and net cash flow.

Table 8: Cash Flow Statement (selected items) 2015 – 2020E

All figures in EUR '000	2015	2016	2017	2018E	2019E	2020E
Operating cash flow	**-3,815**	**-3,215**	**-2,885**	**-294**	**1,384**	**2,428**
CapEx	-601	-673	-2,122	-1,054	-978	-992
Free cash flow	**-4,416**	**-3,888**	**-5,007**	**-1,348**	**406**	**1,436**
Other investments and disposals	71	-1,129	-7,194	-5,674	0	0
Cash flow from financing	4,741	4,244	10,425	**6,852**	**-1,000**	**0**
Exchange differences	397	11	-65	0	0	0
Net cash flow	**793**	**-762**	**-1,841**	**-169**	**-594**	**1,436**

Source: First Berlin Equity Research, Expedeon AG

MANAGEMENT

MANAGEMENT BOARD

Heikki Lanckriet, PhD, CEO & CSO

Mr. Lanckriet has over 15 years of experience in the Life Science Tools and Reagents area. In 2003, whilst at Cambridge University, Mr. Lanckriet co-founded Expedeon. He accumulated a deep knowledge of the many facets of business by evolving through the roles of COO, CSO and CEO at Expedeon, which was acquired in 2016 by Sygnis. Mr. Lanckriet joined the group's management board as Co-CEO and CSO in September 2016, and became sole CEO and CSO in June 2017, when Ms Pilar de la Huerta, the hitherto Co-CEO, left her position to join the Supervisory Board.

Mr. Lanckriet holds a Bachelor's and Master's degree in Biochemical Engineering from the University of Ghent, Belgium and a PhD in Biochemical Engineering from the University of Cambridge, UK. He has published papers in high impact peer-reviewed international scientific journals and is named inventor on a multitude of patents.

David Roth, CFO

Mr. Roth has over 20 years' experience in audit and accounting, with a special focus on the healthcare sector. He is a chartered accountant having worked with KPMG, Deloitte and Arthur Andersen in the U.K., where he became a director and partner within the audit and advisory practice. Here he acted for a wide range of clients which included biotech as well as advising listed companies both in the UK and the US.

More recently he has worked as CFO in several multi-location organizations, all of them in high growth healthcare businesses, leading financial and operational teams. This included reporting accountant on a USD100m secondary NASDAQ listing and subsequent reporting roles, as well as analysis and financial support in several business acquisition and corporate transactions. Mr Roth has been CFO of Expedeon since March 2017. He is a German national living in the U.K. He graduated from the University of Hertfordshire where he studied business.

SUPERVISORY BOARD

Dr. Cristina Garmendia Mendizábal, Chairwoman

Ms. Garmendia served as Minister for Science and Innovation of Spain from April 2008 to December 2011, leading some of the most groundbreaking reforms ever made in this area, including the Spanish Innovation Strategy and the Law for Science, Technology and Innovation. In 2001, she founded and developed the biotechnology holding Genetrix, with successful private fundraising of €90 million. In 2008 she founded Ysios Capital, the largest Spanish Biotech capital fund.

She also served as President of the Spanish Bioindustry Association (ASEBIO), as Member of the board at the Spanish Confederation of Employers' Organizations (CEOE), and as member

of various scientific or advisory boards. She is currently a member of the Advisory Board at the Productive Transformation Program, led by the government of Colombia and chaired by Colombian President, Juan Manuel Santos.

Dr. Joseph M. Fernández, Deputy Chairman

Mr. Fernandez is a serial entrepreneur and has co-founded several successful companies in the biotech arena. He co-founded Invitrogen, Inc. (currently Life Technologies), where he developed and helped launch Invitrogen's first commercial products and was pivotal in licensing, R&D, operations, business development and marketing. As a member of the senior management team for over ten years, he helped build Invitrogen into a leading worldwide supplier of molecular biology tools for cloning and expression. Mr. Fernandez left Invitrogen after their Nasdaq IPO in 1999. That same year, Mr. Fernandez founded Active Motif, which specializes in novel tools and platform technologies for genomics-driven cell biology and pathway elucidation. Mr. Fernandez also founded alma bioinformatics S.L. in 1999 and started selling products in summer 2000.

Mr. Fernandez has been a Member of the Supervisory Board at Expedeon AG since October 2012 and has been Deputy Chairman of its Supervisory Board since June 2016. Mr. Fernandez is the author of a number of scientific papers, patents and has edited chapters in several molecular biology textbooks. Mr. Fernandez received his undergraduate degree from Hiram College in Ohio where he also pursued post-graduate research.

Pilar de la Huerta, Board Member

Ms. de la Huerta has over 20 years' business experience in the pharma and biotech sector. During the early years of her career, she was CEO at Neuropharma (Noscira, Zeltia Group) and assumed various management responsibilities within the Zeltia Group, the biggest listed biotech company in Spain. From 2006 to 2010, she was a strategic consultant within several companies, such as Viamed Salud Group, where she was responsible for R&D and New Business and was appointed CEO of the two most innovative companies within the Group: Araclon Biotech, SL. and Viamed Technology Investments. She joined Genetrix group as a CEO in 2010, moving to Expedeon after the merger between Genetrix' subsidiary Xpol and Sygnis Pharma AG in October 2012. Since July 2017 she has been CEO and Board Member of Antibióticos de Leon (ADL, S.A.).

Ms. de la Huerta holds a Masters Degree in Business and Administration from UCM (Universidad Cumplutense de Madrid) and has completed the Advanced Management Program (AMP) and Programme for Management Development (PMD) in the IESE business school at Navarra University.

Peter Llewellyn-Davies, Board Member

Mr. Llewellyn-Davies is a strategic CFO/CBO with over 25 years of experience in financing activities, international M&A deals, company turnarounds, licensing transactions, with a focus on the chemical and healthcare industries. Currently Mr. Llewellyn-Davies supports small and medium sized companies with his consulting company Accelerate Partners. He is a Non-executive Director and Chair of the Audit Committee of Shield Therapeutics plc, which completed an AIM listing in 2016 in London. Mr. Llewellyn-Davies was CFO at several German listed companies such as Medigene AG (2012-2016) and Wilex AG (orchestrated their IPO in 2006). Prior to this, he was Executive Director of Müller Dairy (UK) Ltd and Executive Director Finance at Süd-Chemie AG. He has a certificate in business studies from the University of London.

Mr. Tim McCarthy, Board Member

Mr. McCarthy has 35 years of international business experience in high growth healthcare, biotech and technology companies and is currently Chairman and Non-Executive Director for a number of companies, including Immupharma Plc, Incanthera, Expedeon Holdings and Harvard Healthcare. He is a former CEO and Finance Director of public and private companies, including Alizyme plc, Peptide Therapeutics Group plc. He has co-founded a number of healthcare and biotechnology companies, raising substantial amounts of equity capital and also advised and/or worked at Board level, for a diverse range of companies internationally, in areas such as business strategy, fund raising, mergers & acquisitions, due diligence and licensing. A Fellow of the Association of Chartered Certified Accountants, he also has an MBA from Cranfield School of Management.

Dr. Trevor Jarman, Board Member

Mr. Trevor Jarman is a biochemist who has been involved in founding and developing several companies in the life sciences and healthcare arena. He was a co-founder and Business Development Director of the drug development company Alizyme PLC. He has been Chairman of the Board of Directors of Expedeon Holdings Ltd since its initial founding in 2003. He obtained a BSc and PhD in biochemistry from University of Hull and was a postdoctoral researcher in the Chemistry Department, Imperial College, London.

NEWSFLOW

Financial Schedule

08 November 2018 Q3 2018 results

SHAREHOLDERS & STOCK INFORMATION

Stock Information	
ISIN	DE000A1RFM03
WKN	A1RFM0
Bloomberg ticker	EXN:GR (previously LIO1:GR)
No. of issued shares	50,372,557
Transparency Standard	Open market
Country	Germany
Sector	Healthcare
Industry	Biotechnology

Source: Börse Frankfurt, First Berlin Equity Research

Shareholder Structure	
Deutsche Balaton	6.3%
Fernandez Trust	5.2%
Alpenfels Family Trust	3.9%
Dr. Lanckriet	3.1%
Free Float	81.5%
Total	100.0%

Source: Expedeon AG

INCOME STATEMENT

All figures in EUR '000	2015	2016	2017	2018E	2019E	2020E
Revenues	**555**	**1,789**	**7,797**	**13,414**	**18,109**	**22,093**
Cost of goods sold	-27	-1,026	-2,881	-3,689	-4,890	-5,855
Gross profit	**528**	**763**	**4,916**	**9,725**	**13,220**	**16,239**
Marketing & sales expenses	-646	-895	-1,870	-2,683	-3,622	-4,286
Administration expenses	-1,990	-2,771	-6,315	-6,171	-6,592	-7,401
Research & development	-1,411	-1,219	-794	-1,315	-1,720	-2,099
Other operating income (expenses)	-343	102	4	-20	-20	-20
Operating income (EBIT)	**-3,862**	**-4,020**	**-4,059**	**-463**	**1,266**	**2,432**
Net financial result	-178	-128	-163	-403	-521	-528
Pre-tax income (EBT)	**-4,040**	**-4,148**	**-4,222**	**-866**	**745**	**1,905**
Tax result	29	-240	961	-40	-74	-229
Net income / loss	**-4,011**	**-4,388**	**-3,261**	**-906**	**670**	**1,676**
Other comprehensive income (currency related)	396	376	-1,468	0	0	0
Total comprehensive income	**-3,615**	**-4,012**	**-4,729**	**-906**	**670**	**1,676**
Diluted EPS (in €)	**-0.27**	**-0.18**	**-0.11**	**-0.02**	**0.01**	**0.03**
EBITDA	**-3,514**	**-3,208**	**-2,461**	**1,147**	**2,986**	**4,200**
One-off expenses*	**0**	-764	-1,605	**0**	**0**	**0**
Adjusted EBIT stripping out one-off expenses	**0**	**-3,256**	**-2,454**	**-463**	**1,266**	**2,432**

**In 2016 and 2017 Sygnis incurred one-off integration and restructuring expenses related to the acquisitions of C.B.S. Scientific, Expedeon and Innova Biosciences*

Ratios						
Gross margin	95.1%	42.6%	63.0%	72.5%	73.0%	73.5%
EBIT margin on revenues	n.m.	n.m.	n.m.	n.m.	7.0%	11.0%
EBITDA margin on revenues	n.m.	n.m.	n.m.	8.6%	16.5%	19.0%
Net margin on revenues	n.m.	n.m.	n.m.	n.m.	3.7%	7.6%
Tax rate	0.7%	-5.8%	22.8%	3.0%	10.0%	12.0%
Expenses as % of revenues						
Marketing & sales expenses	116.4%	50.0%	24.0%	20.0%	20.0%	19.4%
Administration expenses	358.6%	154.9%	81.0%	46.0%	36.4%	33.5%
Research & development	254.2%	68.1%	10.2%	9.8%	9.5%	9.5%
Y-Y Growth						
Revenues	41.6%	222.3%	335.8%	72.0%	35.0%	22.0%
Operating income (EBIT)	n.m.	n.m.	n.m.	n.m.	n.m.	92.2%
Net income/ loss	n.m.	n.m.	n.m.	n.m.	n.m.	150.0%

BALANCE SHEET

All figures in EUR '000	2015	2016	2017	2018E	2019E	2020E
Assets						
Current assets, total	**5,440**	**6,330**	**5,990**	**6,981**	**7,510**	**10,038**
Cash and cash equivalents	4,557	3,795	1,954	1,785	1,191	2,627
Receivables	206	771	1,655	2,462	3,175	3,874
Inventories	100	1,092	1,234	1,587	1,996	2,390
Other current assets	577	672	1,147	1,147	1,147	1,147
Non-current assets, total	**8,593**	**31,712**	**43,982**	**52,399**	**51,657**	**50,881**
Property, plant & equipment	269	957	2,050	1,903	1,704	1,682
Goodwill	5,942	23,829	30,665	34,838	34,838	34,838
Intangible assets	1,678	6,926	11,267	15,658	15,115	14,362
Other assets	704	0	0	0	0	0
Total assets	**14,033**	**38,042**	**49,972**	**59,380**	**59,166**	**60,919**
Shareholders' equity & debt						
Current liabilities, total	**1,707**	**3,198**	**4,605**	**6,767**	**5,583**	**5,660**
Short-term debt	204	421	1,766	3,766	2,466	2,466
Accounts payable	322	656	849	1,011	1,126	1,202
Other current liabilities	1,181	2,121	1,990	1,990	1,991	1,991
Long-term liabilities, total	**1,913**	**3,437**	**5,324**	**8,224**	**8,524**	**8,524**
Long-term debt	1,913	2,285	3,947	6,847	7,147	7,147
Other liabilities	0	1,152	1,377	1,377	1,377	1,377
Shareholders' equity	**10,413**	**31,407**	**40,043**	**44,389**	**45,060**	**46,736**
Total consolidated equity and debt	**14,033**	**38,042**	**49,972**	**59,380**	**59,166**	**60,919**
Ratios						
Current ratio (x)	3.2	2.0	1.3	1.0	1.3	1.8
Quick ratio (x)	3.1	1.6	1.0	0.8	1.0	1.4
Net debt/(net cash)	-2,440	-1,089	3,759	8,828	8,422	6,986
Net gearing	-23.4%	-3.5%	9.4%	19.9%	18.7%	14.9%
Book value per share (in €)	0.78	1.43	0.96	0.86	0.84	0.85
Return on equity (ROE)	-38.5%	-14.0%	-8.1%	-2.0%	1.5%	3.6%

CASH FLOW STATEMENT

All figures in EUR '000	2015	2016	2017	2018E	2019E	2020E
Net income	**-4,011**	**-4,388**	**-3,261**	**-906**	**670**	**1,676**
Depreciation and amortisation	348	812	1,598	1,610	1,720	1,767
Changes in working capital	-312	-653	-1,184	-998	-1,007	-1,016
Other adjustments	419	1,129	0	0	0	0
Operating cash flow	**-3,556**	**-3,100**	**-2,847**	**-294**	**1,384**	**2,428**
Interest expense	-259	-115	-38	0	0	0
Net operating cash flow	**-3,815**	**-3,215**	**-2,885**	**-294**	**1,384**	**2,428**
CapEx	-601	-673	-2,122	-1,054	-978	-992
Free cash flow	**-4,416**	**-3,888**	**-5,007**	**-1,348**	**406**	**1,436**
Other investments and disposals	71	-1,129	-7,194	-5,674	0	0
Cash flow from investing	**-530**	**-1,802**	**-9,316**	**-6,727**	**-978**	**-992**
Debt financing, net	-345	129	1,095	2,300	-1,000	0
Equity financing, net	5,086	4,115	9,330	4,552	0	0
Cash flow from financing	**4,741**	**4,244**	**10,425**	**6,852**	**-1,000**	**0**
Exchange differences	397	11	-65	0	0	0
Net cash flow	**793**	**-762**	**-1,841**	**-169**	**-594**	**1,436**
Cash, start of the year	3,764	4,557	3,795	1,954	1,785	1,191
Cash, end of the year	**4,557**	**3,795**	**1,954**	**1,785**	**1,191**	**2,627**
EBITDA/share (in €)	**-0.26**	**-0.15**	**-0.06**	**0.02**	**0.06**	**0.08**
Y-Y Growth						
Operating cash flow	n.m.	n.m.	n.m.	n.m.	n.m.	75.4%
Free cash flow	n.m.	n.m.	n.m.	n.m.	n.m.	253.4%
EBITDA/share	n.m.	n.m.	n.m.	n.m.	149.4%	37.3%

FIRST BERLIN RECOMMENDATION & PRICE TARGET HISTORY

Report No.:	Date of publication	Previous day closing price	Recommendation	Price target
Initial Report	13 August 2018	€ 1.43	BUY	€2.65

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