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<table>
<thead>
<tr>
<th>Time</th>
<th>Clayton, NC</th>
<th>Raleigh, NC</th>
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<tbody>
<tr>
<td>7:30</td>
<td>Pick-up from recommended hotels</td>
<td>Pick-up from recommended hotels</td>
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<td>8:30-9:00</td>
<td>Registration and welcome</td>
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<tr>
<td>9:00-9:30</td>
<td>Introduction R. Gríols</td>
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<td>11:30-12:00</td>
<td>Break</td>
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<tr>
<td>12:00-1:00</td>
<td>Industrial Capacity and Plasma Capabilities P. Allen/E. Herrero/D. Fleta</td>
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<td>1:00-2:00</td>
<td>Lunch</td>
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<tr>
<td>2:00-2:45</td>
<td>Novel Plasma Therapies Development T. Willis</td>
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<td>2:45-3:30</td>
<td>AMBAR: Grifols’ Alzheimer Trial A. Paez</td>
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<td>3:30-4:00</td>
<td>Break</td>
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<tr>
<td>4:00-4:30</td>
<td>Q&amp;A</td>
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<td>4:30-5:00</td>
<td>Tour Introductions</td>
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<td>5:00-6:30</td>
<td>Site Tour: New Fractionation Building and Ebola plant</td>
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<td>7:00</td>
<td>Dinner</td>
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<td>10:00</td>
<td>Back to recommended hotels</td>
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<td>10:15-10:45</td>
<td>Digital Innovation X. Sueiras</td>
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<td>11:15-12:00</td>
<td>Financials A. Arroyo</td>
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<tr>
<td>12:00-12:30</td>
<td>Grifols: A Socially Responsible Company T. Rione</td>
<td></td>
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<tr>
<td>12:30-12:45</td>
<td>Closing V. Grifols Deu</td>
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<tr>
<td>12:45-1:15</td>
<td>Q&amp;A</td>
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<tr>
<td>1:15</td>
<td>Lunch</td>
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</table>
A New Chapter of Continued Growth and Success

Raimon Grífols Roura
Co-CEO
OVER THE PAST TWO YEARS, EVERY DECISION HAS BEEN A BUILDING BLOCK THAT HAS PAVED OUR WAY INTO THE FUTURE...

...WE BELIEVE EVERYTHING IS NOW IN PLACE, NOW IS A MATTER OF RIGHT EXECUTION...

TO ENSURE OUR CONTINUED GROWTH & SUCCESS

Key priorities moving forward

Corporate Focus areas
A New Chapter of Continued Growth and Success

Past Two Years

OVER THE PAST TWO YEARS, EVERY DECISION HAS BEEN A BUILDING BLOCK THAT HAS PAVED OUR WAY INTO THE FUTURE...

Organization

Talent

Business

Business expansion
Grifols Today
Over the Past Two Years, Every Decision We Made Has Been a Building Block Paving our Way into the Future

ORGANIZATION

- Governance
  - MB/EC
  - Strategy Board
- Corporate Functions
  - Strategy Office
  - Innovation Office
- Divisions: Bio Supplies
- Communication Department
- Data Protection Office

TALENT

- +7,000 new employees
- Executed a successful succession plan coupled with selected external hiring
- Leadership Day
- Enhanced compensations & benefits plans
- Work-life balance measures
- Doubled down training & development
## Grifols Today

Over the Past Two Years, Every Decision We Made Has Been a Building Block Paving our Way into the Future

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>BUSINESS EXPANSION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bioscience</strong></td>
<td><strong>Haema</strong></td>
</tr>
<tr>
<td>• Expansion and Diversification of Plasma Sources</td>
<td>• Biotest</td>
</tr>
<tr>
<td>• Strengthen Industrial Bioscience operations</td>
<td>• First EBOLA lot (dec’18)</td>
</tr>
<tr>
<td>• Albumin franchise</td>
<td>• GigaGen</td>
</tr>
<tr>
<td></td>
<td>• Alkahest</td>
</tr>
<tr>
<td><strong>Diagnostic</strong></td>
<td><strong>Hologic</strong></td>
</tr>
<tr>
<td>• Acquisition of Hologic to gain control over the value chain</td>
<td>• Brasil Plant end construction</td>
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<tr>
<td></td>
<td>• Eflexis</td>
</tr>
<tr>
<td><strong>Hospital</strong></td>
<td><strong>MedKeeper</strong></td>
</tr>
<tr>
<td>• Execute US focus</td>
<td>• InclusIV</td>
</tr>
<tr>
<td>• IV &amp; Anticoagulant (U.S.)</td>
<td>• Kiro</td>
</tr>
<tr>
<td></td>
<td><strong>Across-the-Board</strong></td>
</tr>
<tr>
<td><strong>Across-the-Board</strong></td>
<td><strong>One Grifols</strong></td>
</tr>
<tr>
<td>• One Grifols</td>
<td>• Refinancing $6.3B and several BEI financings</td>
</tr>
<tr>
<td>• Continued CAPEX Investments</td>
<td>• Shanghai RAAS</td>
</tr>
<tr>
<td>• Bio Supplies establishment</td>
<td>• Access Biologicals*</td>
</tr>
<tr>
<td></td>
<td>• Vilajuiga</td>
</tr>
</tbody>
</table>

*Part of Bio Supplies

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Our Future
Everything Is or Soon Will Be in Place

Across
• People & talent
• One Grifols
• China (Shanghai RAAS)

Bioscience
• Plasma availability
• AMBAR
• Innovation
• New manufacturing plants

Diagnostic
• Wide product portfolio
• Leadership position
• Vertical integration
• New manufacturing plants

Hospital
• Expanding product portfolio of compounding control solutions: InclusIV

Now is just a matter of the right execution
A New Chapter of Continued Growth and Success

Our Future, a Matter of Having the Right Execution

Over the past two years, every decision has been a building block that has paved our way into the future...

...We believe everything is now in place, now is a matter of right execution...

...To ensure our continued growth & success

Key priorities moving forward

Corporate Focus areas

Organization

Talent

Business

Business expansion
Corporate Strategy
There Are a Set of Focus Areas in Which We Need to Focus Moving Forward

One Grifols
Operate as one company and leverage on capabilities to unlock synergies

Business Optimization
Identify inefficiencies to improve productivity and optimize value

Innovation Performance
Leverage technological advancements to deliver innovative solutions and transformational breakthroughs

Customer Centricity
Enhance organization wide focus on meeting and exceeding customer needs to build sustainable, competitive advantage

Digital
Build digital capabilities to deliver better outcomes, explore new areas to play in and identify new sources of value

Talent
Ensure that we have the right talent in the right roles and develop our people to strengthen and expand competencies

Focus areas

There are a set of focus areas in which we need to focus moving forward.
Commercial Strategies
Improving the Health of People Around the World

Lafmin Morgan
Chief Commercial Officer
Grifols Today
Global Presence With a Diversified Revenue Base

Leading Position in Bioscience
with a Growing Position in Diagnostic, Hospital and BioSupplies

A leading producer of essential plasma-derived therapies worldwide
A leader in transfusion medicine from donation to transfusion
Advanced pharmacy specialty products for hospital use
Promotes biological products for non-therapeutic use

Headquartered in Barcelona with more than 22,000 employees in 30 countries
Grifols Today

Achieving Lasting Customer Success
Grifols Commercial Is Achieving Lasting Success
Leadership and Successful Track Record

- Talented team with proven ability to execute and overcome obstacles
- Strong market fundamentals across business lines
- Long-term benefit accruing from One Grifols customer focus
- Planned launches building on strong foundation for future growth
- Continued growth through geographical expansion
Grifols has demonstrated the ability to successfully build on growth by offering timely, relevant solutions to customers.

- Expanding our customer base
- Increasing customer trial
- Retaining existing customers
- Introducing new innovative products and solutions

*EUR in millions*

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>3,355</td>
<td>3,935</td>
<td>4,050</td>
<td>4,318</td>
<td>4,487</td>
</tr>
</tbody>
</table>

+9.2% cc
Growing Awareness, Diagnosis & Treatment
Therapeutic uses showing the highest U.S. IG volume growth were driven by:

- **PIDD**: Expanding awareness & discovery of new sub-indications

- **CIDP**: Increased diagnosis rates & preference for IG as a first-line therapy

- **SID**: Expanding immune-modulator use in hematology-oncology patients

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**Total U.S. Volume of IG (grams, M)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>67.0</td>
</tr>
<tr>
<td>2016</td>
<td>73.2</td>
</tr>
<tr>
<td>2017</td>
<td>80.8</td>
</tr>
<tr>
<td>2018</td>
<td>87.9</td>
</tr>
</tbody>
</table>

9.5% CAGR

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**Total U.S. Patients on IG (‘000)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (‘000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>153.9</td>
</tr>
<tr>
<td>2016</td>
<td>166.1</td>
</tr>
<tr>
<td>2017</td>
<td>181.8</td>
</tr>
</tbody>
</table>

8.7% CAGR
Results: 72% of CIDP patients received fewer grams than recommended as per the ICE trial. On average, CIDP patients receive 45% of the grams recommended (587.9/1,300 grams)

<table>
<thead>
<tr>
<th>CIDP</th>
<th>Mean IVIG Total Dose Per Patient /Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Dosing</td>
<td>587.9</td>
</tr>
<tr>
<td>Ideal Dosing per ICE Trial</td>
<td>1,300</td>
</tr>
<tr>
<td>Proportion of Ideal Dose</td>
<td>45%</td>
</tr>
</tbody>
</table>

Source: ICE trial: https://www.thelancet.com/journals/laneur/article/PIIS1474-4422(07)70329-0/fulltext
Improving Health Also Represents a Significant Opportunity

- Average interval between onset of pulmonary symptoms and diagnosis: 8.3 years
- Average number of physicians seen by patients before diagnosis: 2.7 physicians

The longer AAT deficiency remains undiagnosed, the greater the risk for irreparable lung damage

Source: Campos et al., Trends in the Diagnosis of Symptomatic Patients With AATD Between 1968 and 2003, Chest, 2006
Alpha-1 | Making a Significant Change in the Course of a Serious Disease
Patient Diagnosis Continues to Drive Growth

CAGR: 7.0%

Q1 2016: 6,423
Q1 2017: 6,898
Q1 2018: 7,296
Q1 2019: 7,862
Albumin | Healthcare Access Trends Continue to Support Growth
Per Capita Consumption Continues to Grow Consistently Across Grifols Markets

CAGR 2012-2016 for Identified Top 20 Grifols Markets

Source: Grifols internal data
At first opportunity, Grifols R&D team began developing **Zika Virus & Babesiosis** blood screening assays to prevent transmission in the blood supply:

- **Grifols Zika assay** went into use less than 6 months after the epidemic began
- **Grifols Babesia assay** was approved for use by FDA in February 2019
Grifols Diagnostic | The Global Leader in Blood Donor Screening

Global Expansion and Plasma Drive Growth

Blood Donations Tested

38M

10.4M plasma donations tested for Grifols plasma unit

Global Share of Adopted

70+
donations tested every minute with a Procleix assay*

200+
people impacted every minute*

Source: Internal Data. * Does not include plasma collection
The Stage Is Set for Renewed Growth

**MEDIUM TERM**
- BTS USD 400M U.S. market
- Plasma 50M donations growing 8% with unique insight into plasma safety
- China NAT Technology adoption
- Antigen manufacturing

**LONG TERM**
- Innovation in Clinical Diagnostics
- Expanding value to transfusion supply chain (collection to transfusion)
Grifols Hospital | Transformed by Strategy Execution
A Robust Strategy Dynamically Positions the Division

2012 Geo Mix Sales – EUR 96M
- Iberia: 82%
- LATAM: 10%
- ROW: 7%
- N.A.: 1%

2018 Geo Mix Sales – EUR 120M
- Iberia: 61%
- LATAM: 10%
- ROW: 2%
- N.A.: 27%
Grifols Hospital | Transformed by Strategy Execution
A Robust Strategy Dynamically Positions the Division

2012 Product Mix Sales – EUR 96M
- IV Therapy 38%
- Med Devices 20%
- Nutrition 6%
- Pharma-Tech 29%
- Contract Manu 7%

2018 Product Mix Sales – EUR 120M
- IV Therapy 35%
- Med Devices 11%
- Nutrition 6%
- Pharma-Tech 38%
- Contract Manu 10%
Grifols’ Commercial Leadership Team
Experienced Dedicated Leadership

Joel Abelson
President, Bioscience Commercial Division

Carsten Schroeder
President, Diagnostics Commercial Division

Rob Jagt
President, Hospital Commercial Division
Bioscience Division
Expanding Grifols’ Impact and Delivering Growth

Joel Abelson
President, Bioscience Commercial Division
Delivering Continued Sales Growth
Bioscience Revenue Has Grown at 7.9% CAGR at CC Since 2016

Year-over-year variance as reported in constant currency (CC)
## Bioscience Growth Fundamentals Remain Strong

Leading Position Within Core Business of Plasma-Derived Therapies in 2018

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>IVIG</td>
<td>25%</td>
<td>#1</td>
<td>35%</td>
<td>#1</td>
</tr>
<tr>
<td>Alpha-1</td>
<td>67%</td>
<td>#1</td>
<td>66%</td>
<td>#1</td>
</tr>
<tr>
<td>pdFVIII**</td>
<td>17%</td>
<td>#1</td>
<td>45%</td>
<td>#1</td>
</tr>
<tr>
<td>Albumin</td>
<td>15%</td>
<td>#2</td>
<td>33%</td>
<td>#2</td>
</tr>
</tbody>
</table>

* Market shares in revenue
** vWF not included

Source: Grifols Global Plasma Database, Provisional Data 2018

Per capita utilization and diagnosis are growing for IVIG, albumin and alpha-1

Market growth and expansion strategies continue to deliver results

Grifols continues to invest in the Bioscience Division to sustain growth
Grifols Immunoglobulin
Leading Market Growth and Meeting Patient Needs
Global Demand for IG Continues to Accelerate
Multiple Factors Support Continued Growth in Immunoglobulin

Key Factors Driving Growth:
• Demographic trends: pop. growth, aging populations
• Increased physician diagnosis and treatment of CIDP, PIDD
• Increased need to treat SID due to more aggressive therapies

Top Countries Growth Continues in 2018:
• U.S.: +9%
• Germany: +12%
• Spain: +9%
• Australia: +10%

Our plasma investments enable us to deliver a consistent supply to our patients

Source: Grifols Global Plasma Database & Marketing Research Bureau Provisional Data, 2018
Diagnosis and Treatment Drive Global IG Utilization
CIDP, PIDD and SID Are Leading Growth

IG Utilization Growth 2015-2017 (Volume)

2015-2017 CAGR

- PIDD: 10.8%
- CIDP: 10.3%
- SID: 9.8%
- ITP: 4.9%
- MMN: 6.7%
- Other Neuro: 7.0%
- Myasthenia Gravis: 9.4%
- Idiopathic inflammatory myopathies: 6.1%
- GBS: 7.3%

Source: Data on File; US, Canada, Spain, Germany, France, Italy
Grifols Led Industry Response to U.S. IVIG Demand in 2018
Grifols Accounted for 64% of All YoY U.S. IVIG Growth

2018 Growth Over 2017, Grifols vs. All Others
Tons IVIG only (excludes SCIG) (000)

<table>
<thead>
<tr>
<th></th>
<th>Grifols</th>
<th>All Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 Growth</td>
<td>3.6 Tn</td>
<td>2.0 Tn</td>
</tr>
</tbody>
</table>

Source: Grifols Global Plasma Database & Marketing Research Bureau Provisional Data, 2018
Grifols Increased U.S. IVIG Market Share in 2018

Increased Two Points to 35% in the U.S. in 2018

2018 U.S. IVIG Market Share (Volume)

- **Grifols**: 35%
- **Company 2**: 26%
- **Company 3**: 22%
- **All Others**: 17%

▲ 2% MS

Source: Grifols Global Plasma Database & Marketing Research Bureau Provisional Data, 2018
Grifols Grew CIDP Procedures by 23% in the U.S. in 2018, Despite New SCIG Entrant

- 23% Gamunex®-C growth in CIDP procedures (YoY)
- Gamunex®-C grew outpacing market by 6% (market grew at 17%)
- Despite competitors receiving approval for CIDP

Source: Lexis-Nexis, Medical claims data only; Gamunex®-C data includes GammaKed® due to shared J-code
Gamunex®-C Continues as the Recognized Leader in CIDP
Two-Pronged Approach Focuses on Time to Diagnosis and Our Differentiation

Improving Time to Diagnosis

DolHaveCIDP.com

If weakness, fatigue, tingling, or numbness is slowing you down

It could be CIDP

Learn about the symptoms

Have you been diagnosed with CIDP?

Yes

No

200+ patients indicated they ‘have been diagnosed with CIDP’

Why Gamunex®-C Story

IN THE ICE STUDY, THE LONGEST IVIG STUDY FOR CIDP

87%

Relapse-free

Percentage of patients who were relapse-free at 48 weeks

60% of Gamunex®-C responders achieved maximal response by week 48

Adverse reactions in CIDP study

In CIDP, the most common adverse reactions with Gamunex®-C were headache, pain, asthenia, diarrhea, chills, rash, nausea, arthralgia, and allergy. The most serious adverse reactions were pancreatitis, infection, fluid retention, and gastrointestinal symptoms. Please see important safety information on this and refer to accompanying Prescribing Information for Gamunex®-C.

Uncover the Difference

GRIFOLS

200+ patients indicated they ‘have been diagnosed with CIDP’
Grifols Is Well-Positioned in the U.S. PIDD Market With IVIG

We Are Preparing to Enter the Growing SCIG Market in 2019


- SCIG: 61%
- IVIG: 39%


- Grifols: 28%
- Company 1: 31%
- Company 2: 23%
- All Others: 18%

Source: Lexis-Nexis, Medical claims data only; Gamunex-C data includes GammaKed® due to shared J-code

Source: Internal Grifols Estimates
Introducing Xembify™, a New 20% SCIG Option for U.S. Patients
Expanding Our U.S. IG Portfolio to Meet the Large, Unmet Medical Need in PIDD

• New 20% SCIG option for patients in search of an alternative treatment
• Continued large unmet need to diagnose and treat patients with PIDD
• Anticipate Q3 2019 FDA approval
• Launch preparation underway
Grifols Successfully Launched New HyperRAB® in 2018
First Advancement in Rabies IG Administration in 40+ Years

HyperRAB® is the #1 prescribed rabies IG in the U.S. with a market share of 85-90%

Grifols launches higher potency formulation (300 IU/mL):
- 2x the rabies antibodies delivered at wound site (compared to existing products)
- Treatment with 50% the volume in a total dose
- Fewer injection sites

Feb. 2018 FDA New Formulation Approval. May 2018 Launch:
- 100% conversion to selling new formulation
- 90%+ awareness of new formulation among treaters
- New competitor restricted to minimal market share (6-7%)
- Nearly 80% of previous customers have already transitioned to new formulation
Key Takeaways
Immunoglobulin: Leading Market Growth and Meeting Patient Needs

- Multiple drivers support continued Immunoglobulin market growth
- In 2018 Grifols increased IVIG share in both the U.S. and EU
- Our recent significant plasma investments have allowed us to ensure a continuous supply of IG to our patients
- Grifols led industry in increasing U.S. IVIG volume in 2018, delivering 64% of IVIG growth
- Gamunex®-C experienced strong growth in CIDP procedures at 23% in 2018 in the U.S.
- Grifols well positioned in U.S. PIDD market with IVIG - preparing to enter SCIG market
  - Xembify™, our 20% SCIG treatment, license expected Q3 2019
- Grifols retained 90% of the rabies market after new competitor launch in mid-2018
Grifols Alpha-1 Antitrypsin
Accelerating Growth Through Strategic Investments
Over 25 Years of Commitment to Alpha-1 Patients
Grifols Has Led the Market With Innovations in Diagnosis and Treatment Since 1988

1989 Prolastin® (US, Germany)
1995 Prolastin® (US, Germany)
1999 AlphaKit testing program (US)
2001 Prolastin®-C (U.S.)
2009 20M infusions reached
2010 AlphaCare (Germany)
2014 4M infusions reached
2017 Prolastin®-C Liquid (U.S.)
2018 AlphaID™ (Spain)
2019 $150M+ invested in Alpha-1 R&D since 2014
2019 AlphaID™ (U.S.)

20 years to reach the first 2M infusions.
<10 years later doubled to over 4M infusions globally
**Grifols Is the Global Market Leader in Alpha-1**

*Grifols Alpha-1 Volume Growth Has Consistently Outpaced the Market*

**Global Alpha-1 2018 Market Share**

<table>
<thead>
<tr>
<th>Company</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company 2</td>
<td>13%</td>
</tr>
<tr>
<td>Company 3</td>
<td>8%</td>
</tr>
<tr>
<td>Company 4</td>
<td>8%</td>
</tr>
<tr>
<td>Company 5</td>
<td>4%</td>
</tr>
<tr>
<td><strong>GRIFOLS</strong></td>
<td><strong>67%</strong></td>
</tr>
</tbody>
</table>

**Global Alpha-1 2013-2018 Volume Growth**

- **Market:** 7.4%
- **Grifols:** 8.3%

Source: Grifols Global Plasma Database & Marketing Research Bureau Provisional Data, 2018
Less than 10% of WW Patients With Severe Alpha-1 Deficiency Have Been Diagnosed

Global Alpha-1 Growth Opportunity Remains Significant

Significant opportunity still remains to increase diagnosis of AATD patients

Sources and assumptions: Grifols patients based in 1Q19 patient counts (last update 24APR2019); assume Grifols holds 66% of the total patients based in Grifols BI database (see market overview slide); assume 2/3 of patients diagnosed receive treatment based in market knowledge and affiliate input.
Grifols Continues to Innovate in the Diagnosis of Alpha-1

New Diagnostic Test Offers More Convenience: Launched in Spain, U.S. to Follow

Spanish Testing Program (2019)
Physician Test Kit Usage When Given a Choice

Grifols Alpha-1 Testing Program*

Grifols continues to innovate via the newly launched AlphaID cheek swab

- Improved testing convenience compared to the dried blood spot test
- Presents an opportunity to further expand into the PCP market

Based on the success in Spain we plan to launch the buccal swab in the U.S. in 2019

- Pilot begins mid-year will a full launch by year-end

*Testing Technology from Progenika Biopharma, a Grifols Company
Grifols Differentiates in Patient Treatment and Support
Once Diagnosed, We Have Novel Treatment Options and Support Programs for Patients

U.S. Liquid Launch (July 2018)
- Successful Execution: 85% of patients successfully converted to Prolastin®-C Liquid

Disease Management Programs
- U.S. Prolastin Direct program has **over 95%** treatment regimen adherence
- Strong patient participation in global Prolastin disease management programs
  - U.S. (Prolasin Direct)
  - Germany & Spain (AlphaCare)

EU Nursing Program Launches: New home infusion programs launched in Germany (H1 2019) and Italy (H2 2019)
Untapped Markets Represent Opportunities for Continued Growth

Expanding to New Geographies

- **Turkey**: recently launched (1st to market)
- **Japan**: application submitted
- **APAC**: new registrations & market assessments underway
- **Australia**: application submitted
- **LATAM**: optimize existing markets

**Grifols Alpha-1 Markets**

**Currently Under Licensing or Reimbursement Review**
Key Takeaways
Alpha-1: Accelerating Growth Through Strategic Investments

• Prolastin®/Prolastin®-C continues to be the global market leader in Alpha-1
  • Outgrowing the market from 2013-2018 (8.3% CAGR)
• Significant opportunities remain to identify and treat additional patients, with 90%+ of the global market still undiagnosed
• Innovations in product development, diagnosis, education, home infusion and direct-to-consumer initiatives will further differentiate and position Grifols for continued leadership
• The new AlphaID™ cheek swab test offers a faster, more convenient diagnostic test for patients and physicians
  • 2018 launched in Spain and 2019 in U.S.
Grifols Albumin
A Key Driver of Bioscience Growth
Global Albumin Market Continues Strong Growth
Per Capita Utilization of Albumin Grew 7% in Top 10 Countries, Primarily Driven by China

- Global Albumin market grew in volume (grams) at 7% CAGR from 2013-2018
- Per Capita Utilization in the top 10 countries matched global market growth at 7% CAGR over the same period
- Italy and U.S. led in terms of overall utilization, with China and Germany leading in growth
- Consumption continues to increase across nearly all top countries

Source: Grifols Global Plasma Database & Marketing Research Bureau Provisional Data, 2018
Grifols’ Global Albumin Growth Outpaces Competitors

Grifols Holds #2 Global Position, Captured Market Share in U.S. and EU in 2018

**Global Growth Among Top Manufacturers 2016-2018 (Albumin Tons)**

2016-2018 CAGR

- **Company 1**: 5.8%
- **Grifols**: 10.2%
- **Company 3**: 10.0%
- **Company 4**: 2.6%
- **Company 5**: 0.1%

**Grifols Albumin Market Share Evolution 2018 vs. 2017 (Volume)**

- **2017**: EU 24%, US 27%
- **2018**: EU 26%, US 32%

*Source: Grifols Global Plasma Database, Provisional Data 2018*
Grifols Continues Robust Upward Momentum in China
Grifols Expansion Strategy in World’s Largest Albumin Market

2012-2018 Official Release CAGR:
- China Albumin: +13.3%
- Domestic: +8.9%
- Imported (incl. GRF): +17.2%

2012-2018 Grifols CAGR +19.0%:
- 15% Market Share in 2018 (+1% YoY)
- 24.6% Imported Market Share in 2018

Grifols expansion strategy in China is delivering positive results

Focus on providing increased supply to Top 11 provinces and driving penetration in the retail sector:
- Top 11 provinces overall sales growth of 32.9% (2016-18)
- Retail channel sales growth of +140% (2016-18)

Source: Institutes of Food and Drug Control Batch Released in China 2012-2018 CAGR
## Opportunities in New Indications and Utilization Methods

Grifols Leads in Albumin Clinical Research Investment (PRECIOSA, APACHE, AMBAR)

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<thead>
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<th>Population, Use</th>
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<td>(Long-Term Albumin Use)</td>
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**ANSWER STUDY**

April 2017 Published Results

*Long-term Albumin use in moderate cirrhotic patients reduces mortality by 38%*

At peak, 24 additional tons of albumin would be needed to treat chronic cirrhosis patients with Albumin in EU4** as per Answer Study protocol.

--

* Grifols-sponsored clinical programs
** EU4 includes Spain, Germany, Italy, UK
Grifols Albutein® FlexBag 25% Approved in the U.S.

New Flexible Container Designed to Enhance Customer Experience

Flexible container compliments vials to broaden Grifols offering to customers

- Improved flexible container with overwrap in two sizes
- Launch preparation underway

Albumin Bag

Overwrap
Key Takeaways
Albumin: A Key Driver of Bioscience Growth

• Grifols holds the #2 global Albumin position, leading growth among top 5 manufacturers (2016-2018)
• Grifols outperformed competitors in 2018 in the U.S., China and Europe
• We believe the Albumin market will continue to grow - significant opportunity exists with new indications for long-term/chronic use of Albumin
  • Liver Cirrhosis (including long-term Albumin use) and Sepsis will drive increased consumption and fuel future growth
  • Investing in untapped potential for Albumin that will drive further growth
• Grifols Albutein® FlexBag 25% will enhance customer experience
Grifols pdFVIII/VWF
The Key Role of pdFVIII in Bleeding Disorders
Paradigm Shift in pdFVIII Continues, Business Impact Absorbed
Grifols Has Weathered the Business Challenge, Growth Opportunities Remain

- **A changing market:** there is a new treatment paradigm in Hemophilia since the Hemlibra® launch in Q4 2017

- In spite of pdFVIII decline, the Bioscience business continues to grow at ~8% CAGR

- We believe pdFVIII has a pivotal role in mature Hemophilia A markets along with a large, unmet need in emerging markets
Patients in Mature Markets Continue to Rely on pdFVIII Therapy

Grifols pdFVIII/VWF Plays a Key Role in the New Therapeutic Environment

In mature Hemophilia A markets there continues to be an ongoing need for pdFVIII therapy in bleed/surgery management and the prevention/eradication of inhibitors

**Eradication of Inhibitors**: Grifols R&D provided evidence that pdFVIII/VWF can be safely used in combination with new therapies

- Episodic treatment (management of bleeds, in surgery)
- Eradication of inhibitors

**Patients Requiring/Preferring Plasma-Derived Therapies**:

- Patients satisfied with traditional prophylaxis or those requiring on-demand treatment
- Treatment of **von Willebrand disease** (these patients can only be treated with factor therapies)
Underlying Demand Is Driving Growth in Emerging Markets
Opportunity to Build on Our Leadership Position to Meet Patient Needs

A large population of underdiagnosed and untreated hemophilia patients exists within emerging markets.

**Grifols in emerging markets: Focus on improving standards of care and access to treatment together with geographical expansion**

- Clinical trial to support low-dose prophylaxis in Indonesia.
- Partnerships to accelerate care in Indonesia, India, Philippines via centers of excellence, support in diagnosis, etc.
- Participation in new tenders and further expansion into the Middle East and North Africa.

![Evolution of diagnosed HA patients in emerging markets, 2011-2017](image)

Key Takeaways
pdFVIII/VWF: The Key Role of pdFVIII in Bleeding Disorders

• Hemophilia experts foresee an ongoing need for the prevention and eradication of inhibitors, bleed/surgery management and VWD treatment with pdFVIII/VWF

• Grifols research shows that pdFVIII/VWF can be safely used in combination with new therapies

• Additional opportunities for pdFVIII/VWF come from emerging markets focusing on access to treatment
Key Takeaways
### Bioscience Growth Fundamentals Remain Strong

**Product Strategies Will Deliver Continued Growth**

| Immunoglobulin                          | - Grifols is the global & U.S. IVIG market leader, delivering 64% of all U.S. IVIG volume growth in 2018  
|                                        | - Our robust plasma investments support a continuous IG supply to patients  
|                                        | - Xembify™, our 20% SCIG treatment for U.S. PIDD patients, is expected to be licensed Q3 2019 |
| **Albumin**                            | - Grifols holds #2 global Albumin position, leading growth among top 5 manufacturers (2016-18)  
|                                        | - Albumin market growth opportunity exists with new indications for long-term/chronic use  
|                                        | - Grifols Albutein® FlexBag 25% to be launched in the U.S. |
| **Alpha-1**                            | - Grifols Alpha-1 franchise continues as global market leader, outgrowing the market (2013-18)  
|                                        | - The new AlphalD™ cheek swab test offers more convenience – launches in Spain & U.S. |
| **pdFVIII**                            | - Hemophilia experts foresee ongoing need for the prevention and eradication of inhibitors, bleed/surgery management and VWD treatment with pdFVIII/VWF  
|                                        | - Additional growth will come from emerging markets focusing on access to treatment |
Diagnostics Division
Global Leader in Transfusion Medicine

Carsten Schroeder
President, Diagnostic Commercial Division
The Diagnostic Division is a global organization

1,450+ full-time employees supporting Diagnostic success
Integrated from assay/instrumentation development through commercialization
FDA, GMP & CE Licenses

A Global Leader in Transfusion Medicine
During 2018 We Have Sales in ~100 Countries

AT-A-GLANCE

UNITED STATES
DIAGNOSTIC HEADQUARTERS
(Commercial)
Emeryville, CA
DX MANUFACTURING
and R&D
Emeryville, CA
San Diego, CA

SWITZERLAND
DX MANUFACTURING
and R&D
Düdingen

SPAIN
DIAGNOSTIC
HEADQUARTERS
(Manufacturing and R&D)
Barcelona
REGIONAL COMMERCIAL
OFFICES
Barcelona
DX MANUFACTURING and R&D
Barcelona
Bilbao
Murcia

BRAZIL
DX MANUFACTURING
Curitiba

CHINA
REGIONAL COMMERCIAL OFFICE
Hong Kong

AUSTRALIA
DX MANUFACTURING
Melbourne

AT-A-GLANCE

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Barcelona
Bilbao
Murcia

BRAZIL
DX MANUFACTURING
Curitiba

CHINA
REGIONAL COMMERCIAL OFFICE
Hong Kong

AUSTRALIA
DX MANUFACTURING
Melbourne

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A Global Leader in Transfusion Medicine
During 2018 We Have Sales in ~100 Countries
The Diagnostic Division Reached EUR 702M in Sales in 2018
Sustainable Mid-Single Digit Growth Over the Last 5 Years

Grifols is the 15th largest Diagnostic company

702M

Creative Testing Solutions and Ortho Clinical Diagnostics and logo are registered trademarks of their respective owners
The Journey of Blood
Grifols Plays a Vital Role Ensuring the Safety of the Blood Supply

- Courier
- Blood Bank
- Hospital
- Typing
- Blood Bags
- Testing Lab
- Test Results
- Serology
- Molecular
- Typing

Grifols Plays a Vital Role Ensuring the Safety of the Blood Supply
Global Leader in Blood Donor Screening
Stable NAT Adoption Worldwide Enables Grifols to Grow Around 2% in 2018

Blood Donations Tested

38M

Global Share of Adopted

Grifols continues to lead the global NAT donor screening with a 55% market share

70+ donations tested every minute with a Procleix assay*

200+ people impacted every minute*

Source: Internal Data. * Does not include plasma collection
Top 6 Customers Account for ~21M Donations

Multi-Year Agreements in Place With All Six Customers

Creative Testing Solutions, Japanese Red Cross Society and Australian Red Cross Blood Service and logos are registered trademarks of their respective owners.
Emerging Pathogens & Panther and Procleix Assays received FDA approval

ZIKA  BABESIA

New Assay Development: Ultrio Plex E

HIV-1  HIV-2  HCV  HEV  HBV

Automation Ready Technology

Creative Testing Solutions, Japanese Red Cross Society and Australian Red Cross Blood Service and logos are registered trademarks of their respective owners.
Automation Project Is Approaching Market Launch
Modular Design to Address Specific Customer Needs and Variable Workflows

Panther ART

A modified Panther designed to:
• Connect to a network of Panthers
• Connect to track transport system
• Includes waste drain, MTU capacity, other software & hardware modifications

Panther ART is designed to interface with any CLSI-compliant track system

Panther ART Workcell

• Track-based sample transport
• Up to 16 Panthers
Panther Automation Is Today a Reality
Functional Track-Based Demo System Installed in Emeryville
Middleware and Panther Dashboard
Visual Tools That Manage and Prioritize Work in the Laboratory

Focus operations on what needs to be done in the next minutes, next hours, and next shift
Above Market Growth Driven by New Products

Record Number of Gel Cards Sold

**Blood Typing**

9.3% Growth (cc) vs 2017

**Gel Cards**

42M Units sold

**New Distributor**

Runda Medical and logos are registered trademarks of their respective owners.
Successful New Erytra Eflexis® Launch
250+ Customer Placements Since End Q2 2017

Instrument Placements
250+
Since launch in Q2 2017

Competitive Conversions
+50%

Countries
36

U.S. Launch
20+
Since FDA approval in Q1 2019

“Flexible, reliable and easy-to-use”
M. Maresca
(Gemelli Policlinico, Rome, Italy)
Launch of New Products Will Continue to Fuel Grifols’ Growth

50% Growth (cc) vs 2017

New FDA Approved
Leverage Manufacturing Facilities in Spain and Brazil
Strengthen Our Position in LATAM and Expansion Plans in EMEA

Blood Collection

13.4%
Growth (cc) vs 2017

Leucored RC T&B, new Asahi Filter
We produce high-quality blood collection bags for collecting and processing whole blood and storing blood components

Key initiatives
• Take full advantage of manufacturing facility in Brazil
• Re-launching in EMEA with a soft filter product

CURITIBA
BRAZIL

MURCIA
SPAIN

Grifols
Leader in Antigen Supply for Immunoassays
Worldwide Market Leader in Hep/retro Immunoassays Antigens*

- CMF manufacturing site
- HCr43 and HBCore antigens

134,759 Antigen shipped (milligrams)

Future Growth Drivers
- Continuous expansion of antigens portfolio
- Exploring contract manufacturing opportunities outside of the agreement

### Expanding the Possibilities of the New Emeryville Facility

**Center of Excellence for Recombinant Protein Design and Development**

**Protein Expression Platforms**

<table>
<thead>
<tr>
<th>BACTERIA</th>
<th>YEAST</th>
<th>MAMMALIAN CELLS</th>
</tr>
</thead>
</table>
| • Good for proteins not requiring post-translational modifications  
• New vectors in design and development | • Good for complex protein production  
• Workhorse for legacy antigen expression | • Excellent for expression of glycoproteins  
• Enables post-translational modifications |

**Robust Immuno-Reagent Pipeline**

<table>
<thead>
<tr>
<th>Donor Screening</th>
<th>Immunohematology</th>
<th>Neurodegenerative</th>
</tr>
</thead>
</table>
| • New or improved antigens and mAbs (i.e. HIV, HCV, HBV)  
• New antigens and mAbs for additional pathogens (Zika, Dengue, Babesia, etc.) | • Novel rare blood group antigens (stable reagents for extended blood typing menu)  
• Fc fusion blocking protein (to resolve interference of daratumumab in antiglobulin testing) | • New antigens and mAbs to support Alkahest’s drug discovery process in aging related diseases |

**Hemostasis**  
• Novel vWF receptor derivatives  
• Recombinant tissue factor  
• Proprietary mAb for improved thrombosis assay
The Journey of Plasma
Contributing to the Safety of the Plasma Supply

GRIFOLS
Plasma Offers Growth Opportunity
Leveraging on Grifols’ Plasma Testing

10.4M
Donations

Tigris to Panther transition
EU in P96 FDA approved

Converting accounts to Procleix
and increasing the number of tested donations

Dedicated sales & marketing team
Strategic Alliance in China: Shanghai RAAS
Long-Term Growth Opportunities for Diagnostic

Fast Growing IVD Market
10.9%
CAGR (2016-2021)

Great IH Opportunity
$310M
IH IVD Testing Market

New NAT Blood Donations
+2.5M
(From 2018 to 2020)

NAT Mandate Plasma Donations
+15.5M
New plasma donations tested

Sources: NIFDC 2018; InterChina survey 2017
A Global Leader in Transfusion Medicine
Building a Specialty Diagnostics Portfolio

Transfusion Medicine

- Donor Screening
  - Global leader in donor screening
- Immunoassays
  - New manufacturing in Emeryville
- Blood Typing space
  - Complete portfolio of instruments, gel cards and reagents
- Blood Collection
  - Manufacturing in Spain and Brazil

Clinical Diagnostics

- Hemostasis
  - Distribution agreement with Beckman
- Specialty Diagnostics
  - Aesku Promonitor
New Organization for Grifols Specialty Diagnostics
Provide Focus for Future Growth, Following Strategic Plan

Specialty Diagnostics
Growth (cc) vs 2017: 3.5%

New Org Chart

Promonitor
Growth (cc) vs 2017: 15%
We Have a Bright and Exciting Future
Grifols Diagnostic Has Multiple Growth Opportunities

- **Global Leader in Transfusion Medicine**
  - Blood & Plasma Donor Screening
  - Antigen Manufacturing
  - Blood Typing Solutions

- **Growing Loyal Customer Base**
  - Top 6 NAT Customers
  - BTS Competitive Conversions
  - Sales in 100+ Countries

- **Manufacturing Excellence & R&D**
  - Excellent GMP Facilities
  - Increasing vertical integration
  - Innovative R&D

- **Bright & Exciting Future**
  - Emerging Pathogens
  - Geographical Expansion, esp. China
  - Robust pipeline of new products
Hospital Division
Successful Execution of a Transformational Strategy

Robert Jagt
President, Hospital Commercial Division
OUR FOCUS is on delivering products, integrated technology solutions and services that improve safety, quality and efficiency in operational pharmacy.
In 2017 we embarked on a journey to become a comprehensive solutions provider for Operational Pharmacy. Transformational investments in Kiro and MedKeeper to create GRIFOLS COMPLETE have changed the vision and strategic focus for this division.

**Accelerated Performance:**
- Double-digit growth in 2018, following low growth in prior years
- Growth coming from the U.S.
- Fueled by IV Compounding Portfolio and IV Fluids

---

The Hospital Division will continue its strategic evolution to become a comprehensive solutions provider for the Operational Pharmacy - enabling the division to become a meaningful contributor to the GRIFOLS group.
Clear Path to Strengthening Portfolio for Growth
U.S. and Pharmatech Drove 16% cc Growth in 2018

- Growth across all lines
- Dramatic increase in N. America

Key events:
- MedKeeper acquisition
- Kiro stake increased to 90%
- Saline launch in U.S.
**Strengthening Vertical Integration**

Utilizing Own Manufactured Saline in Grifols’ Plasma Centers

<table>
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<tr>
<th>Quarter</th>
<th>Accumulated Shipments (M Units)</th>
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<tr>
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<tr>
<td>Q3 '18</td>
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<tr>
<td>Q1 '19</td>
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</tr>
</tbody>
</table>

100% Biomat Saline
Hospital on the Path to Profitability

LTM EBITDA Trend at Constant Currency

(EUR in millions)

-3.6  -3.8  -3.6  -2.5  -1.4  +
Dec 16  Jun 17  Dec 17  Jun 18  Dec 18  Dec ’19
Maintaining a Strong Position and Reputation in Iberia While Accelerating Penetration in the U.S. Market

By Leveraging Our Strong Position, Reputation and Legacy in IBERIA and LATAM

- Broad portfolio including Pharmatech, IV therapy base, medical devices and clinical nutrition
- Advanced hospital pharmacies
- Established leaders; learning, trialing
- Manufacturing and engineering advantages

By Accelerating U.S. sales - Offering a Solution Aligned with U.S. Market Drivers & Grifols Strengths
Current Market Conditions for IV Compounding in the U.S.
Tailwinds Support Market Expansion and Dynamics

- **Population Health**
  Personalized medicine and aging population are driving a growing number of compounded sterile preparations

- **Regulatory Compliance**
  Regulatory pressures are driving clean room improvements and investments in automation
  Tougher FDA, USP & SBoP requirements are leading to new challenges for compounding pharmacies (503a and 503b)

- **Quality & Safety Challenges**
  Dynamic conditions exist as many organizations are receiving notification from regulators regarding quality issues
  Closures or “cease of operations” occurring in compounding pharmacies within health systems and outsourcing companies
Pharmatech Ambition for IV Compounding Ecosystem

Toward Strategy Execution

**WE ARE HERE**
- **U.S. penetration and growth of own products**

**Build business foundations**
- **Leading provider of scalable systems for sterile IV compounding in the U.S.**

**Continued growth of integrated, data-driven suite of solutions for pharmacy operations; global expansion**

Investor and Analyst Meeting 2019 | North Carolina
Global IV Compounding Market Is Set for Sustained Growth
Strategy Poised to Meet Growing Market Needs and Future Demands

U.S. Growth:

- **GRIFOLS Inclusiv** portfolio sales in the U.S. have more than doubled in one year.
- Continued strength is expected as ~6k hospitals deal with challenging new requirements.
- Current adoption of IV workflow software is estimated at ~20% and experiencing high growth.
- Adoption of automation solutions in IV compounding is low and expected to experience sustained growth.

Global Growth:

- Other markets have already begun to adopt stricter standards for IV compounding and this trend is expected to continue to expand globally.

---

**Global IV Compounding market**

$1.3bn

in 2017

**Global Pharmacy Automation market**

$6bn

in 2017

Complete Solution to Meet IV Compounding Needs

Most Comprehensive IV Compounding Portfolio: A Key Opportunity

- Clean Room Environment
- Workflow
- Automation
- Material Management
- Quality Assurance
- Data & Insights

**Devices**
- Misterium
- Phocus Rx
- KIRO Oncology
- KIRO Fill
- Gri-fill

**Software**
- **MedKeeper** suite of apps
  - Verification
  - Carts
  - Activities
  - Training
  - Inspections
  - Tracking

**Service**
- GRIFOLS ENGINEERING
## Complete Solution to Meet IV Compounding Needs

Most Comprehensive IV Compounding Portfolio: A Key Opportunity

<table>
<thead>
<tr>
<th></th>
<th>Compounding Inventory</th>
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<th>Cleanroom</th>
<th>IV Workflow Management</th>
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* Under development: Kiro Fill for Grifols. Little is known about the Loccioni product.

** ARxIUM claims that RIVA could be used for Oncology/HZ drugs, they report one installation but not confirmed results yet Baxter, ICU (Hospira) and Becton Dickinson (Alaris) have smart infusion pumps (IV Delivery & Administration)
Positioning for a Comprehensive and Integrated Portfolio

Strengthening Grifols’ Portfolio

Customer Experience
Moves from an isolated product offering to an integrated system in which each product plays a key role

Partner vs. Product expert
Core Insight
It Is All About Safety

• **Pain points** included the need to meet regulatory requirements, demands for efficiency, and a host of other daily pressures

• However their **underlying motivation** was safety:

  • Safety was far and away their primary motivation – specifically, patient safety
  
  • Most pharmacy directors had **chosen to work** in hospitals to work more closely with patients
  
  • In their **leadership roles** they felt they could have a **larger impact** on safety
New Branded Portfolio
Strengthening Grifols’ Portfolio

A single over-arching portfolio of integrated products – customer focused.

- Power is in the system vs components -
Protecting patients is your most important responsibility.

inclusiv is an IV compounding portfolio that integrates technology, software and services.

Designed to keep your patients safe through:
- IV Workflow Management Systems
- Modular Cleanroom Systems & Consulting
- Robotics & Other Machines for Sterile Compounding
- Pharmacy Operations Software

And that's all backed by 75 years of proven experience in sterile manufacturing environments.

Visit www.inclusiv.com to learn more.

HELPS ENSURE USP <797> AND USP <800> COMPLIANCE
Portfolio Offers Strong Value Proposition

Strengthening Grifols’ Portfolio

- Customers felt the range of products in the **portfolio presented was comprehensive** and few considered it to be missing any components.
- They **responded very positively to the idea of a single provider** that could offer a **full portfolio of solutions** for the IV compounding area and also found it unique.

"It seems like a one-stop shop. It's good. I haven't seen anybody actually present it in a complete package like this."

"I haven't seen anybody that has breadth of services like this."

---

GRIFOLS
Inclusiv Brand Communicates Breadth and Depth
Strengthening Grifols’ Portfolio

• The winning brand name and logo successfully communicated the **breadth of a connected IV portfolio** consistent with the value proposition presented to customers

“Is when they have everything that’s needed for compounding”

“Initially, when I looked at it, it said to me **it’s everything** …**which tells me that it’s all things IV**”
New Campaign Communicates Safety and Strongly Resonates

Strengthening Grifols’ Portfolio

• The advertising concept successfully **communicated patient safety** in a way that **connected emotionally** with customers

• The **portfolio** was seen as the **solution** that could help customers **protect their patients**

> We have the ability to either care for the family through the baby or not; it's more than the little one there. **It's about the patient, protecting our patients,** and that's the most important thing we do, that's why we're pharmacists”

> As a healthcare provider it's our responsibility, sort of like a parent to a baby, because they can't protect themselves. **It starts with somebody overseeing the protection and the safety process.** It's relatable, **especially if you have children,** as well as some of the history causing the movement in safety in the compounding space”
“What does GRIFOLS signify for me? Stability. Commitment. They are there to develop long-term relationships and that’s what I like about them”
Key Takeaways

Near-Term

Strengthen

Leverage leadership and expertise in IBAM to accelerate growth and profit in U.S.

Drive value of MedKeeper & Kiro acquisitions

Execute core strategies in IV Compounding Control, Contract Manufacturing and IV Solutions

Mid-Term

Expand

As growth accelerates, resource for sustainability, including expanded Multichannel Marketing capabilities

Consider growth through adjacent strategies

Longer-Term

Lead

Leading provider of scalable systems for sterile IV compounding in the U.S.

Continued growth of integrated, data-driven suite of solutions for pharmacy operations through global expansion

Grifols Hospital Division Will Continue Its Strategic Evolution to Become a Comprehensive Solutions Provider for the Operational Pharmacy
One Grifols Panel

From Opportunistic to Systematic

Lafmin Morgan
Chief Commercial Officer
Evolution in Our One Grifols Approach
From Opportunistic to Systematic and Strategic

Research
Customer Needs & Expectations
  • Strategic Partnerships: Fully understand customer goals and priorities - offer tailored, strategic solutions
  • Ease of Doing Business: One account manager as single-access point for each customer

Act
Strategic Account Management
  • Cross-training: Knowledge of full commercial portfolio
  • Cross-pollination: Businesses meet/discuss common customers
  • Education: Interpret buying signals/purchasing process across all businesses

Measure
Monitoring Our Impact
  • New Opportunities: As the broader portfolio has been socialized new opportunities for all businesses have emerged
  • Awareness: Evolution in customer awareness of our full portfolio & how new opportunities impact our existing baseline business
IDNs Are Key to Build the U.S. Immunohematology Business

Leverage Existing Relationship to Open Doors for Our BTS Products

IDNs and GPOs Organizations

Consolidation is a key trend on the industry

+500

M&A ACTIVITIES (SINCE 2014)

IDNs and GPOs goal is to reduce members’ operating costs

Grifols Organization

ONE GRIFOLS

We are structured to ensure that each buying experience promotes our corporate values in terms of:

• Patient Safety
• Operational Ease
• Financial Transparency

Best Portfolio to Meet Customer Needs

IDNs Are Key to Build the U.S. Immunohematology Business

Leverage Existing Relationship to Open Doors for Our BTS Products
Self-Sustainability with IV Solutions
Saline Today and Anti-Coagulant in the Future

• 100% of Normal Saline for Biomat is from GRIFOLS
• NDA for anti-coagulant solution (sodium citrate) has been submitted to FDA
One Grifols Panel
Impact on Customer Engagement
Grifols, the Provider of the Portfolio
A Robust Strategy Dynamically Positions the Division

- Most customers were familiar with Grifols pharmaceutical products and had positive impressions
  - Reliability (consistency of supply) and product quality were mentioned
- Only a minority of customers were aware of the products and services offered by Grifols in the IV compounding area. Those who were familiar with them had positive experiences with clean room design and consultation
- Most found it credible that Grifols could offer the portfolio, citing our ability to meet rigorous cGMP standards required of an FDA-approved pharmaceutical manufacturer

"I think they have a good brand name associated with them. Positive connotation"

"They are the experts in this. They are living it through their manufacturing arm. They have the ability to help you out"
Improving A1AT Genetic Diagnosis
Partnerships With Local Laboratory or In-house Testing Services

Model A
local partner laboratory

- Reduction on diagnostic times
- Decrease need for sequencing
- Positive user feedback

6,500
SAMPLES TESTED

Model B
Service at Progenika laboratory

Progenika Biopharma
GRIFOLS

Significant Reduction of
Laboratory Turnaround Time

- 3,500 samples processed
- 29 new patients candidate for treatment

60
Previously
TAT (DAYS)

5
A1AT Genotyping Test

Partner with local laboratory or in-house testing services
AATD Testing
First Buccal (Cheek) Swab on the Market for Alpha-1 Diagnosis

Benefits to Healthcare Providers and Patients
Technology, innovation and services improve ease of use and convenience for HCPs and patients

Easy to use
Non-invasive
Detects 99.9% of AATD cases
Rapid results (<1 week)
Reliable results (EU and FDA approval)
Creation of Global Commercial Technical Services

New Global Function Will Support Customers Across All Divisions and Regions

New Ways of Working
- Identify and use common technologies and approaches
- Strengthen collaboration between industrial and commercial functions by building a customer first framework
- Optimize the customer experience and leverage internal synergies to the benefit of all divisions
Grifols Plasma Special Program

Identification of donors with Rho D Antibody to make Rho(D) Immune Globulin

AB Test Validation

CLIA validation for the investigation of Alzheimer’s disease

Genetic Testing Services

Clinical Study on patients with mild-to-moderate Alzheimer’s disease
One Grifols Awards
Enterprise-Wide Incentives Support a One Grifols Culture
Grifols Commercial Is Achieving Lasting Success
Leadership and Successful Track Record

• Talented team with proven ability to execute and overcome obstacles
• Strong market fundamentals across business lines
• Long-term benefit accruing from One Grifols customer focus
• Planned launches building on strong foundation for future growth
• Continued growth through geographical expansion
Plasma Procurement Strategy
Capacity Leadership in Plasma to Optimize Growth

Peter Allen
President and CEO, Biomat USA
Grifols Plasma Procurement Is Strong and Well Positioned
Capacity Leadership Drives Growth Opportunities

- 122 additional centers since 2016
- Global network of +290 centers on two continents; pending three
- Collection network will expand to approximately 370 by 2024
- Advance strong self-sufficiency position
- Focus on donor segmentation
- Excellence in logistics and lab testing; accuracy and throughput
- Improving efficiencies through technology and programs
Double-Digit Collections Growth With Strong Performance
Capacity Leadership Drives Growth Opportunities

• Plasma obtained have increased significantly, driven by improved processes, extension of hours, facility expansions, and acquisitions

• Benefitting our plasma collection growth is a fully integrated and balanced plasma procurement organization

• Substantial work has been done to focus on both donor and center employee recruitment and loyalty

• Continued focus on quality performance

Grifols Plasma Volume Performance in Liters

<table>
<thead>
<tr>
<th>Year</th>
<th>Plasma Volume (Liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
</tr>
</tbody>
</table>
Grifols’ Global Plasma Procurement

Grifols’ Global Plasma Procurement

Grifols’ Plasma Donor Centers Worldwide: 293 (June 2019)

Establishment of the Biomat USA Holding and business units

IBBI (49%)
Establishment of the Biomat USA Holding and business units
Acquisition of Biotest U.S. Corporation and 12 Kedplasma donor centers
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First Grifols DC’s in Europe with acquisition of Haema AG. Also, joint venture with Plasmavita Gmbh
Establishment of the Biomat USA Holding and business units.

- Acquisition of Biotest U.S. Corporation and 12 Kedplasma donor centers
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- Intention to have strategic alliance in China, with 26.2% stake in Shanghai RAAS
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Acquisition of the remaining 51% of IBBI
Grifols’ Global Plasma Procurement
Grifols’ Plasma Donor Centers Worldwide: 293 (June 2019)

- Capitalize on best practices
- Leverage global and local balance

- Diversified talent pool
- Effective learning, trials, pilot studies

Establishment of the Biomat USA Holding and business units
Acquisition of Biotest U.S. Corporation and 12 Kedplasma donor centers
First Grifols DC’s in Europe with acquisition of Haema AG. Also, joint venture with Plasmavita Gmbh
Intention to have strategic alliance in China, with 26.2% stake in Shanghai RAAS
Acquisition of the remaining 51% of IBBI

2017-2019
Plasma Procurement Strategy: Expansion and Diversification
Capacity Leadership in Plasma to Optimize Growth Opportunities

### Growth Above the Plan

- **2019 FC**: 271
- **2020 FC**: 297

### Grifols U.S. & EU Donor Centers

- **2015**: 160 (Grifols U.S. centers), 190 (Grifols EU centers)
- **2017**: 252 (Grifols U.S. centers), 45 (Grifols EU centers)
- **2019FC**: 297 (Grifols U.S. centers), 54 (Grifols EU centers)
- **2022FC**: 316 (Grifols U.S. centers), 52 (Grifols EU centers)
- **2024FC**: 370 (Grifols U.S. centers), 52 (Grifols EU centers)

Location TBD
Plasma Procurement Strategy: Lab Expansion
Capacity Leadership in Plasma to Optimize Growth Opportunities

Grifols U.S. & EU Lab Capacity

(Million Donations)

- Grifols U.S. Labs
- Grifols EU Labs

2015, 2017, 2019FC, 2022FC, 2024FC
Regulatory Inspections in 2018
Grifols’ High Standards Ensure Operational Efficiency and Sustainable Growth

<table>
<thead>
<tr>
<th>Agency</th>
<th>Inspection Days</th>
<th>Admin Actions(^{(2)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDA(^{(1)})</td>
<td>405</td>
<td>0</td>
</tr>
<tr>
<td>EU</td>
<td>313</td>
<td>0</td>
</tr>
<tr>
<td>COLA/CLIA</td>
<td>86</td>
<td>0</td>
</tr>
<tr>
<td>PPTA</td>
<td>82</td>
<td>0</td>
</tr>
<tr>
<td>Other(^{(3)})</td>
<td>116</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,002</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

A proven track record: no administrative actions or other regulatory issues promote cost savings across the value chain

---

1. More than 90% of FDA inspections resulted in 0 observations
2. Suspension, revocation or loss of any license or certification; warning letter; imposed suspension of any regulated activity, etc.
3. State environmental agencies, OSHA, ex-US/EU Agencies
4. Number of FDA inspections with “0” issues (Form-483)
Plasma Procurement Strategy
Focus on Grifols’ Competitive Advantage

Growth
- Acceleration in growth of plasma centers
- ↑ Number of donor centers
- x2 Collections 1 year in advance
- ↑ EU plasma supply; diversifying supply
- Expand business development capabilities

Operational efficiencies
- Standardizing processes
- Continuous quality assurance best practices
- Leverage current and new technologies
Market and Self-Sufficiency
**Consistent Growth**

- Plasma collection has continued to be a large, growing industry year-on-year
- In 2018, the U.S. plasma market collected c.40 million liters
- The number of donor centers reached 737 by the end of 2018
- Increasing collections and recruiting qualified staff are main challenges
- Growth in volume with CAGR +10%
- Growth in centers with CAGR +11%

---

1 Source: PPTA - The Plasma Protein Therapeutics Association data

Plasma figures corresponds to plasma from plasmapheresis
Restrained Growth

- In 2018, the EU plasma market collected c.2.4 million liters (Germany 1.6, Austria 0.5 and Czech Rep and Hungary 0.3 million liters)
- The number of donor centers reached 111 by the end of 2018
- Increasing collections and recruiting qualified staff are main challenges, as volume growth is flat in the last years.
- Main players, Grifols (Haema), Octapharma, CSL, Biotest, TMD and KedPlasma
- Growth in centers with CAGR +5%

---

1 Source: PPTA EPCC - The Plasma Protein Therapeutics Association data
Plasma figures corresponds to plasma from plasmapheresis
## European Collection Dynamics Continue to Evolve

### European Collection Requirements Differ From the U.S.

<table>
<thead>
<tr>
<th></th>
<th>EU</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td>Varies; From 2x/7 days (48h Lapse) to 1x/14 days</td>
<td>2x/7 days (1 day btw 2);</td>
</tr>
<tr>
<td></td>
<td>From 24 to 60 donations/year</td>
<td>104 donations/year</td>
</tr>
<tr>
<td><strong>Collection volume</strong></td>
<td>Varies, based on weight or estimation % blood</td>
<td>Std. volume based on weight;</td>
</tr>
<tr>
<td></td>
<td>From 600 ml to 850 ml</td>
<td>690, 825, 880 ml</td>
</tr>
<tr>
<td><strong>Donor compensation</strong></td>
<td>Reimbursement only in 4 countries (CZ, DE, AT &amp; HU)</td>
<td>Not regulated;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compensation for time/effort at market rates</td>
</tr>
<tr>
<td><strong>Donor culture</strong></td>
<td>Creating donor cultures: centers smaller/newer</td>
<td>Developed culture in most markets</td>
</tr>
</tbody>
</table>

- U.S. utilizing more of its collection capacity; less for export
- EU dependency on U.S. source plasma must be replaced
- EU nations vary in regulatory statutes impacting viability for collectors
Plasma Procurement Strategy: Update 2019
Expanding Plasma Capacity While Working Toward Self-Sufficiency\(^1\) Ahead of Plan

Regular Source Plasma – 2018 IAD

<table>
<thead>
<tr>
<th>Year</th>
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<th>2019FC</th>
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<th>2023FC</th>
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<tr>
<td>Grifols collections</td>
<td>85%</td>
<td>94%</td>
<td>95%</td>
<td>96%</td>
</tr>
<tr>
<td>3rd party</td>
<td>15%</td>
<td>6%</td>
<td>5%</td>
<td>4%</td>
</tr>
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Regular Source Plasma – Update 2019

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1. As % of total liters of fractionated plasma
Plasma Procurement Strategy: Update 2019
Expanding Plasma Capacity While Working Toward Self-Sufficiency\(^1\) Ahead of Plan

Hyperimmune Plasma – 2018 IAD

<table>
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<tbody>
<tr>
<td>Grifols collections</td>
<td>64%</td>
<td>71%</td>
<td>79%</td>
<td>91%</td>
</tr>
<tr>
<td>3rd party</td>
<td>36%</td>
<td>29%</td>
<td>21%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Leadership on Hyperimmune Plasma\(^2\) – Update 2019

<table>
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<tr>
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<td>3%</td>
<td>1%</td>
<td>1%</td>
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</table>

1. As % of total liters of fractionated plasma
2. Anti-Hepatitis B, Anti-D, Anti-Tetanus, Anti-Rabies, CMV and RSV programs
Plasma Procurement Strategy: Update 2019
Expanding Plasma Capacity While Working Toward Self-Sufficiency\(^1\) Ahead of Plan

**Regular Source Plasma**

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<th>2023FC</th>
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**Leadership on Hyperimmune Plasma\(^2\)**

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<td>1%</td>
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1. As % of total liters of fractionated plasma
2. Anti-Hepatitis B, Anti-D, Anti-Tetanus, Anti-Rabies, CMV and RSV programs
Positioned for Self-Sufficiency in Plasma Collection
One Grifols and Long-Term Contracts Protect Our Market Position and Growth

- Plasma collection centers
- Source plasma
- Hyperimmune plasma
- Testing
- Logistics
- Saline (Biomat USA centers 100%)
- Anti-coagulant (2019 approval)
Plasma Procurement: Future Growth
Segmentation analysis seeks to identify natural segments in the market by **MAXIMIZING SIMILARITIES WITHIN SEGMENTS** and **MAXIMIZING DIFFERENCES BETWEEN SEGMENTS**.
Five Segments Identified, Representative Across Fleet

Shift from Differentiating by Donor Frequency to Personalizing by Life Philosophy and Donation Attitudes
Technology Ecosystem Enables Engagement
Uniquely Positioned to Deliver With Internal Development and Partnerships
Plasma Productivity Journey
Journey Status on Track

Journey achievements

• Plasma technology plan defined in alignment with 4 goals

• Acquisitions providing essential insights
  • Collection technology
  • BECS

• Business Process Management tool
Plasma Supply Chain Efficiencies
Logistics: Integrated Plasma Supply Chain
Capable Multi-Site System Drives Cost Reductions

- 125% throughput increase with a modest increase in labor
- One shared database among multiple locations (LA, Clayton and Ireland)
- Grifols U.S. centers and warehouses currently operate with centralized release, enabling efficiencies in inventory management
- Semi-automated plasma clearing lines
- Automated freezer, conveyors and pallet automatic retrieval systems
- Back-up systems to support emergency situations
Logistics: Integrated Plasma Supply Chain
Capable Multi-Site System Drives Cost Reductions

Alignment across the supply chain drives cost reductions

Highly automated plasma logistics centers (7.7m liters global storage) capacity

<table>
<thead>
<tr>
<th></th>
<th>Clayton/Benson</th>
<th>Los Angeles</th>
<th>Barcelona</th>
<th>Dublin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>4.4m liter</td>
<td>1.5m liter</td>
<td>1.0m liter</td>
<td>0.8m liter</td>
</tr>
</tbody>
</table>

Dedicated trucking companies • Specialized ocean freight carriers

Infrastructure

Processes

- Geographic alignment of centers to plasma logistic warehouse
- Ocean container shipments to Europe
- Ocean container load maximization

- 50% U.S. freight cost/l reduction since 2011
- 40% transit time reduction since 2016
- 20% ocean freight cost reduction since Q1 2017

- Integrated global plasma supply chain
- On-Test plasma shipments to plasma logistics centers

Coordinated movements of material between U.S., Ireland, and Spain
65% center inventory reduction since 2011
Key Takeaways
Key Takeaways
Capacity Leadership to Optimize Growth

FOCUS ON SOURCING AND DIVERSIFICATION

• Grifols is committed to maintaining its leadership through a sustainable growth in plasma collection by promoting a fully integrated plasma procurement organization
• Grifols is investing in new centers to continue the plan to reach approximately 370 by 2024
• Plasma procurement is now on three continents, further diversifying plasma supply
• Self-sufficiency positions Grifols for stable performance and cost benefits

FOCUS ON DONOR ATTENTION AND EFFICIENCIES

• Donor focus and attention is continuously refined and supported
• Grifols’ commitment to highest quality and safety standards remains top priority
• Operational efficiency improvements include continuous upgrades of plasma centers and customer service to increase donor recruitment and loyalty
• Excellent testing turnaround times and flexibility in testing laboratories
Bioscience Manufacturing Operations
Excelling at the Fundamentals

Eduardo Herrero
President, Bioscience Industrial Group
Bioscience Manufacturing Operations
Grifols’ Global Footprint Today

30+ million packaged vials in 2018

16,000+ Bioscience operations employees

3,500+ employees in manufacturing sites

450+ R&D employees

12,500+ employees in plasma operations sites

4 Manufacturing sites

USD 1.3+ billion in CAPEX investments over the last 5 years

290+ plasma collection centers across the U.S. and Europe

State-of-the-Art Manufacturing Sites

Los Angeles, CA

Clayton, NC

Dublin

Barcelona

Investor and Analyst Meeting 2019 | North Carolina
Bioscience Manufacturing Operations

Core Pillars

1. Capacities
   - Continuous manufacturing expansion
   - Manufacturing sites operations
   - Fractionation
   - Purification
   - Filling
   - Packaging operations
   - Warehouses and QC laboratories

2. Efficiencies
   - Manufacturing cost per liter
   - Quality- and safety-driven
   - Digitalization
   - Supply chain
   - Global sourcing
   - Main achievements

3. Business model
   - L-T growth sustainability
   - Toll plasma fractionation
   - Flexibility and versatility
   - Biosurgery partnership
## Manufacturing Sites Operations

### A Dynamic and Flexible Approach

<table>
<thead>
<tr>
<th>Manufacturing activities</th>
<th>Talent*</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractionation</td>
<td>1,200+</td>
<td>Immunoglobulin Albumin pd Coag. Factors Alpha-1 Antitrypsin Specialty IG, Antithrombin III</td>
</tr>
<tr>
<td>Purification</td>
<td>1,100+</td>
<td>Immunoglobulin Albumin pd Coag. Factors</td>
</tr>
<tr>
<td>Filling</td>
<td>800+</td>
<td>Immunoglobulin Albumin pd Coag. Factors</td>
</tr>
<tr>
<td>Packaging</td>
<td>100+</td>
<td>Immunoglobulin Albumin pd Coag. Factors Alpha-1 Antitrypsin Solvents</td>
</tr>
</tbody>
</table>

* It includes direct and indirect headcount in manufacturing plant

---

*GRIFOLS*

Investor and Analyst Meeting 2019 | North Carolina | 159
Fractionation Capacity
Global Capacity Availability at Constant Growth

General Remarks

• Process efficiencies allow continuous incremental capacities: 3% fractionation capacity increase over 2018

• Target fractionation capacity accelerated to be reached in 2021

• Global demand is becoming more complex as new and emerging markets start to play decisive roles

• Grifols Engineering solutions for ABOs in plasma in bags and bottles represent new opportunities (recover and source)

Fractionation Capacity per Year
(Million liters)

2014 2019 2023
8.6 15.2 19.0
3.0 7.9 11.6
2.4 2.4 5.0
3.2 5.0 5.0

CAGR 14-23 = 9.2%

*BCN Fr.IV *CLY NFF *CLY NFB

Barcelona Los Angeles Clayton
Key Proteins Purification Capacity (I)
Adapting to Demand Variability

**General Remarks**

- Immunoglobulin and albumin are expected to continue driving the hemoderivatives market and Grifols is committed to meeting this demand.

- Albumin production increase and additional bag presentation to address the needs of a growing market.

- Balanced ratio fractionation and purification.

**Immunoglobulin**

- CAGR 14-23 = 9.3%

- Capabilities:
  - 2014: 9.0 million liters, 8.6 million liters
  - 2019: 14.1 million liters, 15.2 million liters
  - 2023: 20.1 million liters, 19.0 million liters

**Albumin**

- CAGR 14-23 = 12.9%

- Capabilities:
  - 2014: 8.3 million liters, 8.6 million liters
  - 2019: 16.1 million liters, 15.2 million liters
  - 2023: 24.8 million liters, 19.0 million liters

*DBL, *BCN 4th Line, *CLY PFF, *LA 2nd Train

CAGR = Compound Annual Growth Rate
Investments and execution of new facilities, along with validation and regulatory submissions ensure Prolastin®-C facilities in the U.S. and Spain will meet global demand.

pd FVIII will continue balancing Grifols’ performance. Equipment upgrades and process optimization both support product availability at a competitive cost.

**Key Proteins Purification Capacity (II)**

**Adapting to Demand Variability**

### General Remarks

**Alpha-1 Antitrypsin**

- **CAGR 14-23 = 13.5%**
- **2014** 3.9
- **2019** 8.6
- **2023** 15.2

**PD FVIII**

- **CAGR 14-23 = 4.5%**
- **2014** 9.1
- **2019** 11.5
- **2023** 13.5

*BCN Pro-C*

*CLY Impro.*

**Capacities**

![Capacities Diagram](Diagram.png)
Evolution of Filling Production
Generating Reliability and Sustainable Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Albumin</th>
<th>IVIG</th>
<th>Alpha-1</th>
<th>pd Factor VIII</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
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<tr>
<td>2017</td>
<td>+23%</td>
<td>+15%</td>
<td>+43%</td>
<td>-10%</td>
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<tr>
<td>FC2019</td>
<td>+43%</td>
<td></td>
<td>+60%</td>
<td>-12%</td>
</tr>
</tbody>
</table>

Growth rates are projected on 2015 year 100 basis.
**Packaging Operations**

Standardized Packaging Process Enhances the Supply Chain

<table>
<thead>
<tr>
<th>Today</th>
<th>2024</th>
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<tbody>
<tr>
<td>Clayton</td>
<td>Clayton</td>
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<tr>
<td>U.S.</td>
<td>EU &amp; RoW</td>
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<tr>
<td>Canada</td>
<td>U.S.</td>
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<td>EU &amp; RoW</td>
<td>EU &amp; RoW</td>
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<td>Clayton</td>
<td>Dublin</td>
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<td>U.S.</td>
<td>EU &amp; RoW</td>
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<tr>
<td>Barcelona</td>
<td>Spain</td>
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<tr>
<td>Spain &amp; EU</td>
<td>U.S.</td>
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<td>U.S.</td>
<td>RoW</td>
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<td>Los Angeles</td>
<td>U.S.</td>
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<td>U.S.</td>
<td>Canada</td>
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<td>EU &amp; RoW</td>
<td></td>
</tr>
<tr>
<td>Barcelona</td>
<td>Spain</td>
</tr>
</tbody>
</table>

- U.S. plants to cover domestic market
- BCN plant to cover local market and EU toll fractionation
- Increased capacity by site market dedication

- Dublin centralization of packaging activities globally boosts flexibility and efficiency
- Standardized packaging process enables executing on margin recovery at all sites
Warehouses and QC Labs
Enhancing Manufacturing Chain

North Carolina Final product Warehouse
- CAPEX ~ USD 12M
- +6,000 pallet positions → 31,250 ft²
- More efficient storage
- Improve physical & IT control over final product
- Risk reduction and no 3rd party

Los Angeles Packaging Operations
- CAPEX ~ USD 17M
- +17,000 pallet positions → +105,000 ft²
- Two new packaging lines
- Future Albumin in Bags packaging line
- +6% of final product storage capacity

Warehouses

Los Angeles Packaging Operations

QC Laboratories in Barcelona
- CAPEX ~ EUR 2.2M
- 6 Kardex carousel → +1.3 M samples
- Clinical archive of samples Library → up to 0.7 M in 2021
- R+D Lab enlargement (+450 m²)

QC Labs

QC Laboratories North Carolina & LA
- CAPEX ~ EUR 5M
- Micro / Sterility Lab
- +107% of area expansion
- Improve performance of assays
- Sterility testing area based on isolators
Bioscience Manufacturing Efficiencies
Evolution of Manufacturing Cost per Liter
Capacity Leadership in Manufacturing to Optimize Growth Opportunities

General remarks

• New facilities are deployed to work optimally to reduce cost per liter
• Constant upgrades in manufacturing operations lead to continuous yield increases
• Skilled workforce able to produce more per headcount

Manufacturing Cost Per Liter\(^1\) vs. Throughput

1. - Manufacturing cost per liter does not include amortizations and depreciations
Driven by Quality and Safety
Grifols’ Value Proposition

Regulatory inspections 2017 - 1Q 2019 by site

- USA: 16
- Spain: 3
- Ireland: 12

Regulatory inspections 2017 - 1Q 2019 by entity

- EMA: 7
- US FDA: 6
- Others*: 18

> 30 inspections without critical observations

*Taiwan FDA, Health Canada OSE, CFDI Chinese FDA, MoH of Rep. Kazakhstan, ANVISA Brazil, South Korea MFDS, PPTA…
Digitalization
Preparing for a New Era in Manufacturing

**Ecosystem**

Manufacturing plants will collect significant data from operational processes:
- Big Data
- Predictive analysis
- Artificial Intelligence

Data collected will be leveraged to develop an integral Manufacturing Plant Information System based on KPIs → Productivity driven by an efficient ecosystem

**Ongoing Projects**

**Segmentation**
- Automatically guarantee fulfillment of required characteristics for each product license and destination in batches produced
- Production planning based on the capacity of specific lines and manufacturing equipment
- Management of batch allocation according to specific market requirements and prioritization in cases with multiple options
- Cost reduction by ~ EUR 5M for disposal of raw materials and repackaging

**Online Notification**
- IT systems in plants connected to an MRP
- Stock optimization
- Minimize documentation errors and information flow up to 85%
- Enhance efficiencies in production processes
A New Integrated Planning Process Model: A Roadmap for Grifols’ Value Chain

- ONE Business Plan from strategy to execution, enhancing alignment between production and markets needs
- E2E visibility to improve predictability, anticipation and responsiveness
  - New Tender Management Tool
- Optimize inventory thresholds for plasma, intermediates and finished goods
- Supply chain KPIs
  - Plant attainment
  - Vials filled, packed and sold
Global Sourcing
Manufacturing Operations Cost Containment and Risk Mitigation

- Globalization of vendor management is key to ensure both economic efficiency and manufacturing flexibility
- Rationalizing the vendor base allows grouping procurement volumes, leading to better economic outcomes
- Standardizing raw material specifications across manufacturing sites improves flexibility in the supply chain
- Global sourcing mitigates supply chain risks by ensuring double sourcing for critical raw materials
- Nearly 70% of contracts are under global procurement supply and price negotiation instead of local activity by plant, leading to price reductions
## Main Achievements

### Manufacturing and Product Approvals - Progress on Track

<table>
<thead>
<tr>
<th>2018 to Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fr. IV-1/IV-4 co-precipitation in NFF</td>
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<tr>
<td>• Prolastin® from Spanish plasma toll fractionation</td>
</tr>
<tr>
<td>• Filling line 3 (Alpha-1 Liquid)</td>
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<tr>
<td>• Approval of Gamunex® 2nd train in LA</td>
</tr>
<tr>
<td>• Alternative Plasma storage and packaging in Dublin (FDA)</td>
</tr>
<tr>
<td>• Ebola plant and product (CDC and IFER)</td>
</tr>
<tr>
<td>• Albumin in bags 25% (FDA)</td>
</tr>
<tr>
<td>• Rabies-C and GamaSTAN®-C (FDA)</td>
</tr>
<tr>
<td>• IGIV-C (Gamunex®-C) - Fraction II+III Paste Weight Increase</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ongoing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• License submission of Fraction IV₁ from Clayton for Prolastin®-C in BCN</td>
</tr>
<tr>
<td>• Submission of 20% SCIG</td>
</tr>
<tr>
<td>• Alphanate® new method in Clayton</td>
</tr>
<tr>
<td>• Albumin in bags 5% and 20%</td>
</tr>
<tr>
<td>• Prolastin®-C Liquid 0,5g and 4g</td>
</tr>
<tr>
<td>• New packaging lines in Dublin</td>
</tr>
<tr>
<td>• Koate® Room Temperature</td>
</tr>
<tr>
<td>• Modular Thrombin for Ethicon (U.S.)</td>
</tr>
<tr>
<td>• 900 IU HyperRAB® vial</td>
</tr>
</tbody>
</table>
Bioscience Industrial Business Model
Long-Term Manufacturing Sustainability
Prepared to Exploit Market Opportunities

- Total control over the supply chain
- Product availability according to demand
- Ability to react to market opportunities

- Plasma collection in donor centers
- Plasma warehousing
- Plasma samples testing
- Plasma shipment to manufacturing plants
- Plasma fractionation
- Protein purification
- Protein filling
- Vial packaging
- Finished good distribution

FULL VERTICAL INTEGRATION
## Toll Plasma Fractionation

### Our Track Record Endorses Us

#### Business Review

- Promotes countries’ **self-sufficiency** in hemoderivatives
- Allows diverting U.S. plasma procurement and manufacturing supply more efficiently
- Develops technology transfer and enhances awareness

#### Foreign dependency

- Saving for these countries

---

#### Toll Plasma Fractionation Business Review

- Promotes countries’ self-sufficiency in hemoderivatives
- Allows diverting U.S. plasma procurement and manufacturing supply more efficiently
- Develops technology transfer and enhances awareness

---

#### Grifols Know-How

- Operating in 5 countries
- Projects in new 5 countries (EU and ROW)

<table>
<thead>
<tr>
<th>Country</th>
<th>Since</th>
<th>Approx. annual volume (L) (2018)</th>
<th>Grifols facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>1978</td>
<td>375,000</td>
<td>Barcelona</td>
</tr>
<tr>
<td>Canada</td>
<td>1988</td>
<td>140,000</td>
<td>Clayton NC</td>
</tr>
<tr>
<td>Slovak Rep.</td>
<td>2002</td>
<td>40,000</td>
<td>Barcelona</td>
</tr>
</tbody>
</table>

**Reference** in Toll Plasma Fractionation with nearly **10 M** of plasma liters collected since 1978

**Spain**

- 100% Spanish Plasma under toll fractionation contracts
- 17 different agreements (regions)
- Self-sufficiency: Albumin 56%, F-VIII 47%, IGIV 39%
- 2018 savings in Spanish healthcare system > EUR 60M

---

#### Grifols Additional Services

**Communication Tools**

- Web (Plasma Management Services portal)
- PediGri system provides total traceability from donation to the end product
- Contract Fractionation Plasma Manual

**Quality & Professional Training Services**

- Quality program at Academy
- Professional Training in GMP

**Blood Bank Services Portfolio**

- Plasma Transport & Storage
- Contingency plans
- IPTH & Secure Program

---

**Grifols Know-How**

- Operating in 5 countries
- Projects in new 5 countries (EU and ROW)
Manufacturing Flexibility and Versatility (I)
Four Manufacturing Plants, One Aligned Approach

**Pastes**
Multiple combinations in pastes transfer among manufacturing plants creates back-ups and enables maximizing fractionation facilities utilization

**Packaging**
Full packaging movement options among manufacturing plants allows meeting potential demand peaks driven by market volatility
Manufacturing Flexibility and Versatility (II)

Four Manufacturing Plants, One Aligned Approach

Albumin for the Italian market

Possible alternatives:
- Fractionation, purification, filling and packaging in Los Angeles (LA)
- Fractionation (NC), purification and filling (LA) and packaging (LA or Dublin)
- Fractionation, purification, filling (NC) and packaging (NC or Dublin)
- Fractionation, purification, filling (Barcelona) and packaging (Barcelona or Dublin)
## Manufacturing Flexibility and Versatility (III)  
### Alpha-1 Antitrypsin

### Business Model

<table>
<thead>
<tr>
<th>Prolastin®</th>
<th>Today</th>
<th>Upcoming years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>European market</td>
<td>Prolastin®-C</td>
</tr>
<tr>
<td></td>
<td>Lyophilized product</td>
<td>• U.S. market</td>
</tr>
<tr>
<td></td>
<td>Dose = 1g</td>
<td>• Liquid product</td>
</tr>
<tr>
<td></td>
<td>Purification &amp; filling capacity &gt; 3 M eqL</td>
<td>• Dose = 1g</td>
</tr>
<tr>
<td></td>
<td>~70 employees</td>
<td>• Purification &amp; filling capacity &gt; 8 M eqL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ~140 employees</td>
</tr>
</tbody>
</table>

**Prolastin®-C facilities versatility enables covering multiple production requirements:**
- Liquid and Lyophilized Prolastin
- Factor VIII RV
- Lyophilized Thrombin

*Transition from Lyophilized to Liquid Alpha-1 reports 16% manufacturing cost reduction → solvents, freeze driers and HC*

**Transition from Prolastin® (Lyophilized) to Prolastin®-C (Liquid) for European market**
Manufacturing Flexibility and Versatility (IV)

Albumin in Bags

Performance
• Filling throughput up to 4,000 bags/h

Capacity
• Up to 7.5 million of equivalent plasma liters

Manufacturing presentations
• Bag size of 50 ml, 100 ml, 250 ml and 500 ml
• Albumin 5%, 20% and 25%

Facilities
• Pasteurization and quarantine area
• QC laboratory
Biosurgery: A New Opportunity (I)
Leveraging Grifols’ Manufacturing Expertise and Industrial Capacity

Biosurgery Focus

- Partner with the global category leader in the treatment of surgical bleeding and leaks, improving and standardizing patient care

- Merging Grifols’ track-record in the manufacture of hemoderivatives and biological products and Ethicon’s capabilities in medical device design and robust marketing and commercial structure

- This strategic partnership will lead to a comprehensive biosurgery portfolio, enabling standardizing the use of hemostats and sealants by choosing the appropriate product for each type of bleeding and leak site
Biosurgery: A New Opportunity (II)
Leveraging Grifols’ Manufacturing Expertise and Industrial Capacity

**Fibrin Sealant VistaSeal®**
- New generation of Fibrin Sealant PAS Approval obtained in Q2 2019
- Planned submission to EU in August 2019
- Production in June 2019 → + 300,000 kits by 2020
- Capacity to expand to more than 3M eqL

**Finished Product**

**Fibrin Sealant (Packaging & Warehouse)**
Biosurgery: A New Opportunity (III)
Leveraging on Grifols’ Manufacturing Expertise and Industrial Capacity

LyoThrombin Evithrom

- FDA submission completed and expected approval in Q3 of current year
- Planned submission in EU in Q2 of current year
- Initial production capacity of 3.8M eqL to be expanded to more than 7M eqL
- Ongoing routine production → +1,000,000 vials in 2020
Key Takeaways
Key Takeaways
Manufacturing Expansion Plans to Promote Sustainable Growth

Manufacturing Capacities
- Global fractionation capacity expansion to be accomplished by 2021, reaching **19 million liters**
- Execution of key purification, filling and packaging capacities well balanced as planned
- Addition of facilities for storage, packaging operations and QC laboratories improves supply chain efficiencies in product and inventory management

Manufacturing Efficiencies
- Continuous **improvements in manufacturing performance** ensures better manufacturing cost per liter
- Digitalization projects provide overall business optimization in manufacturing and supply chain
- Flexibility in intermediates, purification and packaging operations as **alternate manufacturers**
- Excellent quality and safety track record

Business Model
- Vertical supply-chain integration to promote Grifols’ reputation as a reliable and sustainable player in dynamic environments
- Company expertise to expand contract plasma fractionation opportunities
- Partnership in new therapeutics areas using industrial capabilities to promote further growth
Industrial Capacity
Strengthening Competitive Advantage

Daniel Fleta
Chief Industrial Officer
Capital Investments Plan for 2019 – Investing for Growth
Anticipating Future Market Needs

By Division
- Bioscience: 59%
- Plasma: 17%
- Corporate: 11%
- Diagnostic: 10%
- Hospital: 3%

By Region
- USA: 53%
- EU: 46%
- SPA: 26%
- IRE: 16%
- ROW: 1%

Growth & Maintenance
- Growth: 58%
- Maintenance: 42%
Capital Allocation 2018-2022

Aimed to Meet Growing Demand

- Plasma: 16%
- Commercial & Corporate*: 17%
- Diagnostic: 11%
- Hospital: 5%
- Bioscience: 51%

1,400 MM

*Includes land and common infrastructures
Capital Investment Program
Planning for Growth and Leveraging Internal Strengths

<table>
<thead>
<tr>
<th>ONE GRIFOLS Projects</th>
<th>Business Growth Projects</th>
</tr>
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GRIFOLS
Manufacturing Expansion - San Diego, CA
Consolidation of NAT Reagents Manufacturing Operations

• New facility is located in a nearby 7,000 m² standalone building

• This new facility completes the manufacturing operations spin-off from Hologic achieving a higher manufacturing efficiency and improving the product quality

• The new building paves the way for future DX (NAT, IH) growth on the site in further execution phases
CMF Consolidates and Streamlines Immunoassay Manufacturing Operations

- CMF consolidates all EMV manufacturing operations in a single building, allowing to exit leased properties and reducing site running costs.
- The new facility provides enough resources to double the current production capacity for future growth.
- New production platform based on mammalian cells culture to develop new antigens and offer specialized GMP CDMO services to third parties.
Parets North and Lliçà (Barcelona), Spain

Current and Future Expansion
• Acquisition of a new land plot of 49,716m² in Lliçà, close to the main manufacturing site to expand Diagnostic and Bioscience industrial divisions

• New instruments manufacturing plant will vacate spaces in P4, enabling expansion of reagent-manufacturing capacities. First phase will double the current manufacturing capacity for both reagents and instruments.

*Includes land and common infrastructures
Plastic Injection Revamping in Murcia, Spain

Ensuring the Supply of Key Consumables for All Divisions

- Cross-divisional project to ensure supply consistency for the business
- Additional manufacturing and assembly capacities for:
  - Bioscience: albumin in bags, Fibrinsealant holders, anticoagulant
  - DX: Q Coagulometer cells and racks, BCS
  - Hospital: Fleboflex Luer, Kiro Fill and Oncology disposables
Anticoagulant and Saline EB3 Line BCN, Spain
Vertical Integration With Plasma Procurement and Hospital

- New fully automated FFS line will provide additional capacity for U.S. IV solutions, as well as production capabilities for new product releases:
  - anticoagulant solutions
  - saline with Luer lock for pharmacy compounding
Bioscience Bag Forming Expansion - Murcia, Spain

Hospital and Bioscience

- Fully automated robotic forming line for biological bags with multiple port/connector configurations
- This line will further expand Grifols’ capacity to produce Albumin in bags and IVIG in the future
- 2,500 BPH capacity (15MMB/year)
- Bag formats: 50, 100, 250 and 500 mL
Global Plasma Testing Labs Expansion: Capacities
Ensuring Access to High-Quality Plasma
New Fractionation Building – Clayton, NC
Expanding Our Fractionation Capacity to 19 million liters

- **Bioscience**
  - **2017**
  - **2018**
  - **2019**
  - **2020**
  - **2021**
  - **2022**
  - **2023**

- **Construction**
- **Interiors**
- **Start-up & Validation**
- **Lots & Approval**

- **6 MML**
- **3,825 m³**

- **120 MM**
- **1,900 Tn**

- **2 Trains**
- **80,000 m³**

Investor and Analyst Meeting 2019 | North Carolina | 200
Purification and Filling Facility (PFF)- Clayton, NC
The World’s First Sterile Filling Facility for IgGs in Bags

Bioscience

<table>
<thead>
<tr>
<th>Year</th>
<th>Preparation</th>
<th>Construction</th>
<th>Interiors</th>
<th>Start-up</th>
<th>Validation</th>
<th>Lots &amp; Approval</th>
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<td>2017</td>
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</table>

- 6 MML
- 5,400 m³
- 140 MM
- 2,165 Tn
- 5 Lines
- 107,000 m³

GRIFOLS

Investor and Analyst Meeting 2019 | North Carolina
### Albumin in Bags Purification and Filling Plant - Dublin

**Increasing the Production Capacity of Albumin in Bags**

<table>
<thead>
<tr>
<th>Year</th>
<th>Construction</th>
<th>Interiors</th>
<th>Start-up</th>
<th>Validation</th>
<th>Lots &amp; Approval</th>
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<td>2023</td>
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</table>

- **Bioscience**
- **6 MML**
- **8,300 m³**
- **110 MM**
- **2,828 Tn**
- **4 Lines**
- **111,420 m³**
Fibrin Sealant Plant- Paretas, Spain
Balancing the Liter of Plasma

- Phase 1 includes the production of fibrin sealant
- Second phase will include topical thrombin and other projects including fibrin sealant from whole-blood plasma and pediatric fibrin sealant
- 3,600 m²
New Aseptic Filling Facility · Paret, Spain

Immediate Response to Market Needs

- Leveraging available production areas and infrastructures
- New aseptic filling and freeze-drying areas for new FVIII HC and Lyo Thrombin
- Proprietary GSF® technology for aseptic filling
- 1,200 m²
Key Takeaways
Key Takeaways
Strengthening Competitive Advantage

• **Strategic advantage**
  Having our own engineering company allows us to build cutting-edge facilities leveraging the market’s most competitive investment costs and in the shortest time to market.

• **Technology leadership**
  Grifols’ know-how and experience in developing industrial solutions and facilities positions Grifols as a global technological reference in the sector.

• **One Grifols**
  Grifols’ divisional portfolio has been strategically designed and streamlined to leverage capabilities, resources and expertise and vertically integrate critical supplies and operations.

• **Consistent execution**
  Long-range production plan is progressing as expected. Protein-purification and fill-and-finish investments are moving forward, keeping up with the growth in fractionation capacities and in alignment with marketing and commercial demands.
Development of Protein Therapies
Bioscience Research and Development Pipeline

Todd Willis, PhD
VP, Discovery Research
R&D Bioscience Industrial Group
Bioscience R&D Organization

R&D Departments Located in Barcelona, Los Angeles and North Carolina

QUALITY R&D

- Product Development
- Discovery Research
- Global Product Safety
- Plasma Protein Replacement Therapies
Bioscience R&D Organization
Product Development Core Expertise

Product Development

Process Development and Technology
- Process development and formulation
- Process scale-up and transfer to Manufacturing
- Clinical manufacturing (cGMP)

Bioanalytics
- Process / product characterization
- Assay development, validation, and transfer to QC
- Clinical assay support (immunogenicity)
- Extractable and leachable (E&L) studies

Development Stability
- Intermediate and product stability
Plasma Protein Replacement Therapies

- Focus on treatment of complex, multifactorial disorders with combination therapies consisting of plasmapheresis and plasma protein replacement
- Collaboration of internal expertise in plasmapheresis and plasma protein therapeutics with key opinion leaders in targeted therapeutic areas
- Movement from treatment of rare disease to management of prevalent diseases
Global Product Safety Core Expertise

**Toxicology**
- Board-certified toxicologists
- Design and execute GLP compliant IND-enabling toxicology studies
- Safety evaluation of data from E&L studies

**Pathogen Safety**
- Assess and validate virus/prion clearance capacity of purification processes
- Optimization of pathogen safety steps during process development
- Development of methods to measure viral infectivity, neutralization, antibody content and binding
- BSL 3 containment lab in North Carolina
Deep knowledge of protein biochemistry and purification sufficient to generate innovated project ideas, new IP, and guidance and oversight of external collaborations

*In vivo* Pharmacology
- In-house animal model development
- External CRO oversight of animal studies
- Expertise in PK and PD of plasma and recombinant proteins

*In vitro* Pharmacology
- Molecular analysis of gene expression
- Cell-based assay formats
- Cellular expression of proteins
## Bioscience R&D
### Recent Licenses 2014 - 2018

<table>
<thead>
<tr>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamunex®-C Phase IV (KIDS)</td>
<td>Gamunex® Nanofiltration EU</td>
<td>Gamunex® Nanofiltration U.S.</td>
<td>Prolastin®-C Liquid®</td>
<td>GamaSTAN® PK Study (Phase IV)</td>
</tr>
<tr>
<td>Alphanate® 2000 IU Vial</td>
<td>Prolastin® EU (inclusion of fractionation at IG)</td>
<td>Flebogamma® DIF 10% - ITP</td>
<td>Fibrin Sealant U.S.</td>
<td>HyperRAB® &amp; GamaSTAN® New Process</td>
</tr>
<tr>
<td>Gamunex® 40g Vial</td>
<td></td>
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<td></td>
<td>Plastem®</td>
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<tr>
<td>Prolastin® EU (transfer to BCN)</td>
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</tr>
<tr>
<td>Fractionation NFF - GT</td>
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<tr>
<td>Fractionation IV – double scale IG</td>
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</table>
Bioscience R&D
Key 2H 2018 R&D Highlights

- Immune globulin subcutaneous 20% - U.S. submitted
- 25% Albumin in Flexible container – U.S. submitted
- AMBAR presentation of results
- VISTASEAL® - Ethicon (Fibrin Sealant new container) – U.S. submitted
## Bioscience R&D Development Pipeline – June 2019

<table>
<thead>
<tr>
<th>Protein</th>
<th>Preclinical</th>
<th>Clinical Non-pivotal</th>
<th>Clinical Pivotal</th>
<th>Life Cycle Management</th>
<th>Regulatory Review</th>
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<tbody>
<tr>
<td><strong>Albumin</strong></td>
<td>New Formulations</td>
<td></td>
<td>Alzheimer’s Disease <em>(AMBAR)</em></td>
<td>Albumin in Bags</td>
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<tr>
<td></td>
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<td>Albumin in Liver Failure <em>(APACHE)</em></td>
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<td>Albumin in Cirrhosis <em>(PRECIOSA)</em></td>
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<tr>
<td><strong>Ig</strong></td>
<td>Anti-Infective</td>
<td>Myasthenia Gravis (MG) Maintenance</td>
<td>MG Exacerbations</td>
<td>900 IU HyperRAB®</td>
<td>20% IGSC US</td>
</tr>
<tr>
<td></td>
<td>Gamunex® New Process</td>
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<td>20% IGSC EU</td>
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<td></td>
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<td></td>
<td>20% IGSC Flex Dose &amp; Daily Push</td>
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<tr>
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<td>Flebogamma PPS</td>
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<tr>
<td><strong>Alpha-1</strong></td>
<td>Prolastin®-C Concentrated</td>
<td></td>
<td></td>
<td>Prolastin®-C Liquid New Vials</td>
<td>Project Japan (in preparation)</td>
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<td><strong>Factor VIII</strong></td>
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<td>FVIII/VWF Reduced Volume</td>
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<td><strong>PPF</strong></td>
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<td>Plasmanate® MP</td>
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<td>Plasmanate® in Bags</td>
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<tr>
<td><strong>Fibrinogen</strong></td>
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<td>Fibrin Sealant Pediatric Study</td>
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<td>IV Fibrinogen</td>
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</table>
Discovery Research
General R&D Product Development Funnel


Discovery Research
How we Operate

• **Proof-of-concept** studies to demonstrate feasibility (does it work?)

• **Mechanism-of-action** studies conducted at a molecular level (how does it work?)

• To optimized capabilities, research studies support multiple phases - **early research, clinical trials, and post approval**
Discovery Research

General Strategy

Key Drivers
- First in Class
- BioBetters
- Expansion
- Balancing the Liter

Accelerate
- Capitalize on internal research expertise across the organization
- Leverage external research partners / advisors
- Integrate artificial intelligence (IBM Watson Drug Discovery)

Execute
- Proof-of-concept studies
- Mechanism-of-action studies
- Quick kills & concentrate resources on “wins”

As long as a medical need exists, no protein therapeutic (recombinant or plasma-derived) or therapeutic indication is off limits
Goals Achieved Through Internal and External Partners

Sample of Partners

External Experts
- EF Clif
- Fundació ACE

Outsourced Analysis
- eurofins
- KYMOS
- COS Centre for Omic Sciences
- Echevarne

External Collaborations
- Wake Forest University
- Ramot Tel Aviv University
- Banc de Sang i Teixits
- Fundació cim
- UNT Health Science Center

One Grifols
- R&D
- Clinical
- Marketing
- Medical Affairs
- Diagnostics
- Biomat
- Hospital
Key Strategic Research Partners

- Discovery of rare, **high-affinity antibody** candidates diverse human repertoire
- Identify most **efficacious antibodies** through massively parallel bioassays that screen millions of antibodies at a time
- **Decoding the plasma proteome during healthy aging** and contrasting it to disease states
- Identifying **plasma protein fractions** to treat complex diseases with multiple mechanism of actions

**GIGANT INNOVATION**

- **Plasma proteins for treatment of age-related disorders** – “Healthy Aging”
- **Recombinant polyclonal platform** for diseases that can be treated with neutralizing antibodies
- **Plasma proteins to prevent and/or stop bleeding during surgical procedures**

**GigaGen**

**Ethicon**

**Alkahest**
**Four Primary Drivers**

**First in Class**
- Innovative protein entities
  - Capitalize on unique plasma protein properties, their modifications, and protein combinations
  - Utilize latest scientific technologies to reveal connections and relationships between plasma proteins and disease
  - Exploit utilization of process waste streams

**BioBetter**
- Best in class therapies
  - Improve product attributes to enhance safety, efficacy, stability, half-life, convenience, and bioavailability
  - Investigate new routes of product administration
    - subcutaneous
    - intradermal
    - aerosol

**Expansion**
- New indications and improve position of current products
  - Capitalize on emerging technologies (AI) and scientific advancements
  - Conduct PoC studies in relevant therapeutic areas
  - Partner with key opinion leaders in target therapeutic areas

**Balancing the Liter**
- Opportunities to develop commercial plasma-derived proteins outside of current portfolio
  - Create innovative approaches to
    - reduce development time line and manufacturing cost
    - Identify new potential indications
Building the Research Pipeline

First in Class

Key Areas of Research

• Anti-infective with broad microbial recognition and synergistic efficacy with standard of care treatments
  • First anti-infective protein to enter IND-enabling toxicology studies
  • Proof-of-concept studies underway for second microbial target

• Novel neuroprotective protein(s) for treatment of cognitive disorders (Alzheimer’s Disease, Parkinson’s Disease)
  • Research conducted with internal R&D and in-conjunction with external partners
Building the Research Pipeline

BioBetters

Key Areas of Research

• Modulation of autoimmunity
  • Proof-of-concept studies with potentially high efficacy antibodies and comparison to licensed IgG products

• New product formulations
  • Proprietary formulations to maintain desired product attributes and improve clinical outcome in treatment of Alzheimer’s Disease and liver disease (cirrhosis)

• Alternative routes of delivery (subcutaneous and intradermal)

• New product formulation with an alternative route of delivery to enter IND-enabling toxicology studies
Building the Research Pipeline

Expansion

Key Areas of Research

- FVIII
  - Concomitant use of Alphanate® / Koate® with Emicizumab (Hemlibra®), supporting concomitant use of these products
  - Protective effect of VWF towards inhibitor reactivity of FVIII products
  - Fibrin Sealant (Fibrinogen and Thrombin) in tissue engineering and surgery
- Albumin as an active protein therapeutic in the treatment of Alzheimer’s Disease and liver disease
Albumin Treatment for Alzheimer’s Disease

Investigate Plasma Exchange + Albumin MoA

OMICS

Albumin as active ingredient

Inflammation Neurodegeneration

Albumin functional characterization

Confirm

New
Albumin Treatment for Cirrhosis

Albumin characterized from patients
New Methods
MoA of Albumin in patients
New formulations of Albumin
PoC studies (in vivo, ex vivo)

Albumin as active ingredient
Building the Research Pipeline
Balancing the Liter

Key Area of Research

• Identify key commercial plasma-derived proteins and indications outside of current Grifols product portfolio to Balance the Liter of plasma

• Create new opportunities
  • Introduce new technologies to reduce development and production costs
  • Collaborate with internal partners (Regulatory and Clinical) to optimize regulatory path for product licensure
  • Collaborate with strategic external partners (Alkahest, Ethicon, …) to identify new potential indications
Summary of Research Pipeline by Therapeutic Area

Therapeutic Area

<table>
<thead>
<tr>
<th>Coagulation / Hemostasis</th>
<th>Liver Failure</th>
<th>Tissue Engineering</th>
<th>BioSurgery</th>
<th>Infection</th>
<th>Immunology</th>
<th>Cognitive Disorders</th>
<th>Pulmonology</th>
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</thead>
<tbody>
<tr>
<td>pdFVIII + Hemlibra</td>
<td>New Formulations</td>
<td>BioInk</td>
<td>Transplantation</td>
<td>Emerging Pathogens</td>
<td>Autoimmunity</td>
<td>Alzheimer’s Disease</td>
<td>New Formulations</td>
</tr>
<tr>
<td>New Plasma Protein Opportunities</td>
<td>Cirrhosis</td>
<td>Sealent</td>
<td></td>
<td></td>
<td></td>
<td>Parkinson’s Disease</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>New Formulations</td>
<td></td>
</tr>
</tbody>
</table>
AMBAR: Grifols Alzheimer trial
Up-to-Date Clinical and Biomarker Results

Antonio Paez, MD
Alzheimer’s Research Group. Medical & Technical Director
Background

- 15 years ago we learned that most amyloid-beta (Aβ) circulating in plasma was bound to Albumin.

- A clinical program of Plasma Exchange (PE, Plasmapheresis with Albumin replacement) was initiated in mild-to-moderate AD.

- Pilot and phase II studies with PE showed a decrease in plasma Aβ and an increase in CSF Aβ *

- Signals of clinical and functional neuroimaging benefit *

- Post-hoc basic research analyses on Albumin have shown an increase of oxidized and glycated forms in plasma and markedly in CSF in AD patients **

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Boada M et al. J Alzheimers Dis. 2017; 56(1):129-143

Costa et al. submitted to JPAD
### AMBAR Eligibility Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
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<tbody>
<tr>
<td>Age</td>
<td>55-85 years</td>
</tr>
<tr>
<td>Probable AD</td>
<td>(NINCDS-ADRDA criteria)</td>
</tr>
<tr>
<td>MMSE score</td>
<td>18-26</td>
</tr>
<tr>
<td>Stable treatment (3 months)</td>
<td>AChEIs and/or memantine</td>
</tr>
<tr>
<td>CAT or MRI (12 months)</td>
<td></td>
</tr>
<tr>
<td>Stable caregiver</td>
<td></td>
</tr>
</tbody>
</table>

- **Mild:** 22-26
- **Moderate:** 18-21
AMBAR Treatments

- **Conventional Therapeutic Plasma Exchange (TPE)**
  - 1 plasma volume processed
  - Albumin replacement (Albutein®): 125-150g

- **Low Volume Plasma Exchange (LVPE)**
  - New modality of PE developed by Grifols for this trial as maintenance therapy
  - Plasma volume processed similar to that of a plasma donation
  - Albumin (Albutein®) replacement (less volume infused): 20-40g. IVIG (Flebogamma DIF®) / 4 months: 10-20g

- **Placebo**
  - Simulated procedure (sham) for both TPE and LVPE. Blind for patient, caregiver and rater
  - Devices working in a close circuit manner with colored fluids mimicking plasma and patients falsely connected to devices
AMBAR Schematic

1 LVPE/month

High + IVIG
A20%: 40g
IG: 20g

Low + IVIG
A20%: 20g
IG: 10g

Low, no IVIG
A20%: 20g

Placebo group
Sham treatment

TPE: Total Plasma Exchange
LVPE: Low Volume Plasma Exchange
A: Albutein 5%-20% (Albumin)

Months:
1 2 3 4 5 6 7 8 9 10 11 12 13 14

AMBAR

Investor and Analyst Meeting 2019 | North Carolina | 237
Outcomes

• Co-Primary outcomes
  • ADAS-Cog: Change from baseline to 14 months
  • ADCS-ADL: Change from baseline to 14 months

Presented at CTAD’18

• Secondary endpoints
  • MMSE, NPS, NPI, CDR-SB, ADCS-CGIC, CSDD, C-SSRS, QoL-AD, RUD-Lite®
  • Changes in $A\beta_{40}$ and $A\beta_{42}$ in plasma and CSF
  • Changes in Tau and P-Tau in CSF
  • Changes in brain volume by MRI
  • Changes in brain activity by FDG-PET

AD/PD’19 update

• Safety endpoints
  • AEs and SAEs associated with plasma exchange

Presented at CTAD’18
+ AD/PD’19 update
Primary Efficacy Analysis

• Main population
  • mITT: patients undergoing at least 1 TPE

• Pre-specified primary analyses (MMRM)
  • mITT: 3 treatment arms vs. placebo
  • mITT: all patients vs. placebo (all patients share the same plasma removal component of the treatment)
  • “Mild AD” (baseline MMSE 22-26) and “Moderate AD” (baseline MMSE 18-21) vs. placebo
Featured Article

Plasma exchange for Alzheimer’s disease Management by Albumin Replacement (AMBAR) trial: Study design and progress

Mercè Boada\textsuperscript{a,b}, Oscar López\textsuperscript{c}, Laura Núñez\textsuperscript{d}, Zbigniew M. Szczepiorkowski\textsuperscript{e}, Mireia Torres\textsuperscript{d}, Carlota Grifols\textsuperscript{d}, Antonio Páez\textsuperscript{d,∗}

\textsuperscript{a}Research Center and Memory Clinic, Fundació ACE, Institució Catalana de Neurociències Aplicades, Barcelona, Spain
\textsuperscript{b}Facultat de Medicina i Ciències de la Salut, Universitat Internacional de Catalunya, Barcelona, Spain
\textsuperscript{c}Departments of Neurology and Psychiatry, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA
\textsuperscript{d}Bioscience Research Group. Grifols S.A., Barcelona, Spain
\textsuperscript{e}Department of Pathology and Laboratory Medicine, Dartmouth Hitchcock Medical Center, Lebanon, NH, USA
Patient and Site Disposition

**Sites:** 41
**Spain:** 19 (n=232)
**USA:** 22 (n=264)

496 Screened

149 (30%) Screening failures

347 (70%) Randomized

25 (7%) No therapy

**Placebo**
- **Completed:** 64 (80%)
  - Low dose Alb (no IVIG) 61 (78%)

**Low dose Alb (no IVIG)**
- **Completed:** 78
  - Low dose Alb+IVIG 56 (65%)

**Low dose Alb+IVIG**
- **Completed:** 86
  - High dose Alb+IVIG 51 (65%)

**High dose Alb+IVIG**
- **Completed:** 78

322 Evaluable:
- **Withdrawal:**
  - 31 (9.6%) AE
  - 37 (11.5%) ICF
  - 5 (1.6%) PV
  - 5 (1.6%) LoFU
  - 12 (3.7%) Other
- **Completed:** 232 (72%)
Demographics: All Patients

<table>
<thead>
<tr>
<th>Age (yrs.)</th>
<th>Placebo (N=80)</th>
<th>Low albumin, no IVIG (N=78)</th>
<th>Low albumin + IVIG (N=86)</th>
<th>High albumin + IVIG (N=78)</th>
<th>Total (N=322)</th>
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</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>68.44 (8.38)</td>
<td>68.47 (7.48)</td>
<td>69.47 (6.92)</td>
<td>69.54 (7.90)</td>
<td>68.99 (7.66)</td>
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<td>Age Group (n, %)</td>
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<tr>
<td>&lt;65</td>
<td>29 (36.3)</td>
<td>26 (33.3)</td>
<td>17 (19.8)</td>
<td>22 (28.2)</td>
<td>94 (29.2)</td>
</tr>
<tr>
<td>65-75</td>
<td>33 (41.3)</td>
<td>37 (47.4)</td>
<td>52 (60.5)</td>
<td>35 (44.9)</td>
<td>157 (48.8)</td>
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<tr>
<td>&gt;75</td>
<td>18 (22.5)</td>
<td>15 (19.2)</td>
<td>17 (19.8)</td>
<td>21 (26.9)</td>
<td>71 (22.0)</td>
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<tr>
<td>Sex (n, %)</td>
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<td>Female</td>
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<tr>
<td></td>
<td>44 (55.0)</td>
<td>35 (44.9)</td>
<td>38 (44.2)</td>
<td>31 (39.7)</td>
<td>148 (46.0)</td>
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<tr>
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<td>36 (45.0)</td>
<td>43 (55.1)</td>
<td>48 (55.8)</td>
<td>47 (60.3)</td>
<td>174 (54.0)</td>
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## Demographics: Mild (MMSE 22-26)

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<th>Placebo (N=44)</th>
<th>Low albumin, no IVIG (N=32)</th>
<th>Low albumin + IVIG (N=49)</th>
<th>High albumin + IVIG (N=36)</th>
<th>Total (N=161)</th>
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</thead>
<tbody>
<tr>
<td><strong>Age (yrs.)</strong></td>
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</tr>
<tr>
<td>Mean (SD)</td>
<td>68.11 (7.89)</td>
<td>69.97 (6.36)</td>
<td>70.16 (6.39)</td>
<td>68.76 (7.91)</td>
<td>69.27 (7.16)</td>
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<tr>
<td><strong>Age Group (n, %)</strong></td>
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</tr>
<tr>
<td>&lt;65</td>
<td>15 (34.1)</td>
<td>8 (25.0)</td>
<td>8 (16.3)</td>
<td>11 (30.6)</td>
<td>42 (26.1)</td>
</tr>
<tr>
<td>65-75</td>
<td>19 (43.2)</td>
<td>17 (53.1)</td>
<td>31 (63.3)</td>
<td>17 (47.2)</td>
<td>84 (52.2)</td>
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<tr>
<td>&gt;75</td>
<td>10 (22.7)</td>
<td>7 (21.9)</td>
<td>10 (20.4)</td>
<td>8 (22.2)</td>
<td>35 (21.7)</td>
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<tr>
<td><strong>Sex (n, %)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24 (54.5)</td>
<td>16 (50.0)</td>
<td>24 (49.0)</td>
<td>20 (55.6)</td>
<td>84 (52.2)</td>
</tr>
<tr>
<td>Female</td>
<td>20 (45.5)</td>
<td>16 (50.0)</td>
<td>25 (51.0)</td>
<td>16 (44.4)</td>
<td>77 (47.8)</td>
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### Demographics: Moderate (MMSE 18-21)

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<th></th>
<th>Placebo (N=35)</th>
<th>Low Dose, no IVIG (N=46)</th>
<th>Low Dose + IVIG (N=37)</th>
<th>High Dose + IVIG (N=42)</th>
<th>Total (N=160)</th>
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<tr>
<td><strong>Age (yrs.)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>69.1 (1.52)</td>
<td>67.43 (1.19)</td>
<td>68.54 (1.25)</td>
<td>70.12 (1.22)</td>
<td>68.76 (0.64)</td>
</tr>
<tr>
<td><strong>Age Group (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;65</td>
<td>13 (37.1)</td>
<td>18 (39.1)</td>
<td>9 (24.3)</td>
<td>11 (26.2)</td>
<td>51 (31.9)</td>
</tr>
<tr>
<td>65-75</td>
<td>14 (40.0)</td>
<td>20 (43.5)</td>
<td>21 (56.8)</td>
<td>18 (42.9)</td>
<td>73 (45.6)</td>
</tr>
<tr>
<td>&gt;75</td>
<td>8 (22.9)</td>
<td>8 (17.4)</td>
<td>7 (18.9)</td>
<td>13 (31.0)</td>
<td>36 (22.5)</td>
</tr>
<tr>
<td><strong>Sex (n, %)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>19 (54.3)</td>
<td>19 (41.3)</td>
<td>14 (37.8)</td>
<td>11 (26.2)</td>
<td>63 (39.4)</td>
</tr>
<tr>
<td>Female</td>
<td>16 (45.7)</td>
<td>27 (58.7)</td>
<td>23 (62.2)</td>
<td>31 (73.8)</td>
<td>97 (60.6)</td>
</tr>
</tbody>
</table>
Primary Results: Global Cognition and Function
Global Cognition (ADAS-Cog): All patients

Compared to baseline, the combined arm showed a decrease in ADAS-Cog scores, with the treatment arm showing a statistically significant decrease (p=0.06) compared to the placebo arm.

**Treatment arms**

The treatment arms were divided into three groups: Low alb, no IVIG, Low alb + IVIG, High alb + IVIG, and Placebo. The change in ADAS-Cog scores from baseline are as follows:

- **Low alb, no IVIG**: Change from baseline = 1.5
- **Low alb + IVIG**: Change from baseline = 0.8
- **High alb + IVIG**: Change from baseline = 0.8
- **Placebo**: Change from baseline = 3.2

The p-values for the treatment vs. placebo comparison were:

- **Diff. vs. Placebo**: Low alb, no IVIG = -1.6, Low alb + IVIG = -2.4, High alb + IVIG = -2.4, Placebo = -

For further analysis, the p-value of the interaction term was 0.247, with post-hoc testing showing:

- **Less decline**: Placebo = 50%, Low alb = 75%, Low alb + IVIG = 75%, High alb + IVIG = -

*Notes:*
- PE treated vs. Placebo:
  - Change from baseline = 1.0 vs. 3.2
  - Diff. vs. Placebo = -2.1 vs. -
  - p-value = <0.06 vs. -
  - Less decline = 66% vs. -
Global Cognition (ADAS-Cog): Mild Combined arm

ADAS-Cog change from baseline (MMSE 22-26)

Treatment arms

ADAS-Cog change from baseline (MMSE 22-26)
Global Cognition (ADAS-Cog): Moderate

**Combined arm**

ADAS-Cog change from baseline (MMSE 18-21)

Months

<table>
<thead>
<tr>
<th></th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS Mean Change from baseline</td>
<td>2.6</td>
<td>6.4</td>
</tr>
<tr>
<td>Diff. vs. Baseline</td>
<td>-3.9</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>61%</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 161

**Treatment arms**

ADAS-Cog change from baseline (MMSE 18-21)

Months

<table>
<thead>
<tr>
<th></th>
<th>Low, no IVIG</th>
<th>Low+IVIG</th>
<th>High+IVIG</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS Mean Change from baseline</td>
<td>3.3</td>
<td>1.9</td>
<td>2.4</td>
<td>6.4</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>-3.1</td>
<td>-4.5</td>
<td>-4.0</td>
<td>-</td>
</tr>
<tr>
<td>p-value (adj. mult. testing)</td>
<td>0.177</td>
<td>0.177</td>
<td>0.177</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>48%</td>
<td>70%</td>
<td>63%</td>
<td>-</td>
</tr>
</tbody>
</table>
Global Function (ADCS-ADL): All Patients

Combined arm

ADCS-ADL change from baseline

![Graph showing LS Mean Change from baseline over months for PE treated and Placebo groups.]

- PE treated group shows a significant decline (p = 0.030).
- Placebo group shows a less pronounced decline.

<table>
<thead>
<tr>
<th></th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-3.2</td>
<td>-6.7</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>3.5</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>* 0.030</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>52 %</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 322

Treatment arms

ADCS-ADL change from baseline

![Graph showing LS Mean Change from baseline over months for different treatment arms.]

- Low alb, no IVIG
- Low alb + IVIG
- High alb + IVIG
- Placebo

<table>
<thead>
<tr>
<th></th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-3.9</td>
<td>-2.0</td>
<td>-3.5</td>
<td>-8.7</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>2.8</td>
<td>4.7</td>
<td>3.1</td>
<td>-</td>
</tr>
<tr>
<td>p-value (adj. mult. testing)</td>
<td>0.163</td>
<td>0.056</td>
<td>0.163</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>42 %</td>
<td>70 %</td>
<td>46 %</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 322
Global Function (ADCS-ADL): Mild

Combined arm

ADCS-ADL change from baseline (MMSE 22-26)

Months

<table>
<thead>
<tr>
<th></th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-0.6</td>
<td>-1.3</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>0.7</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.664</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 161

Treatment arms

ADCS-ADL change from baseline (MMSE 22-26)

Months

<table>
<thead>
<tr>
<th></th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-0.9</td>
<td>0.8</td>
<td>-2.4</td>
<td>-1.3</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>0.3</td>
<td>2.1</td>
<td>-1.1</td>
<td>-</td>
</tr>
<tr>
<td>p-value (adj. mult. testing)</td>
<td>0.869</td>
<td>0.792</td>
<td>0.869</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 161
Global Function (ADCS-ADL): Moderate

Combined arm

ADCS-ADL change from baseline (MMSE 18-21)

<table>
<thead>
<tr>
<th>Months</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-5.5</td>
<td>-14.1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worsening

N = 161

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-5.5</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>8.6</td>
</tr>
<tr>
<td>p-value</td>
<td>** 0.002</td>
</tr>
<tr>
<td>Less decline</td>
<td>61%</td>
</tr>
</tbody>
</table>

Treatment arms

ADCS-ADL change from baseline (MMSE 18-21)

<table>
<thead>
<tr>
<th>Months</th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-6.0</td>
<td>-5.7</td>
<td>-4.5</td>
<td>-14.1</td>
</tr>
<tr>
<td>3</td>
<td>8.0</td>
<td>8.3</td>
<td>9.5</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worsening

N = 161

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-6.0</td>
<td>-5.7</td>
<td>-4.5</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>8.0</td>
<td>8.3</td>
<td>9.5</td>
</tr>
<tr>
<td>p-value (adj. mult. testing)</td>
<td>*0.02</td>
<td>*0.02</td>
<td>*0.01</td>
</tr>
<tr>
<td>Less decline</td>
<td>57%</td>
<td>59%</td>
<td>67%</td>
</tr>
</tbody>
</table>
Secondary Clinical Endpoints
Memory (Verbal learning): All patients

Combined arm

RAVLT score 1: immediate recall

TPE | LVPE
PE treated | Placebo

<table>
<thead>
<tr>
<th>Change from baseline</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>-1.9</td>
<td>-4.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diff. vs. Placebo</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.1</td>
<td>2.2</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>p-value</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.073</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Less decline</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RAVLT score 1: immediate recall

TPE | LVPE
PE treated | Placebo

<table>
<thead>
<tr>
<th>Change from baseline</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>-3.9</td>
<td>-1.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diff. vs. Placebo</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.2</td>
<td>4.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>p-value</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.915</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improv.</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 X</td>
<td>0.6 X</td>
<td>1.1 X</td>
</tr>
</tbody>
</table>

N = 322
Memory (Verbal learning): Mild Combined arm

**RAVLT score 1: immediate recall**  
(MMSE: 22-26)  

**Treatment arms**

**RAVLT score 1: immediate recall**  
(MMSE: 22-26)  

**N = 161**  

**PE treated**  
**Placebo**

<table>
<thead>
<tr>
<th>Change from baseline</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diff. vs. Placebo</td>
<td>0.9</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.600</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>45 %</td>
<td>-</td>
</tr>
</tbody>
</table>

**Low alb, no IVIG**  
**Low alb + IVIG**  
**High alb + IVIG**  
**Placebo**

<table>
<thead>
<tr>
<th>Change from baseline</th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diff. vs. Placebo</td>
<td>-1.2</td>
<td>0.9</td>
<td>3.0</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.596</td>
<td>0.663</td>
<td>0.194</td>
<td>-</td>
</tr>
<tr>
<td>Improv.</td>
<td>-</td>
<td>0.5 X</td>
<td>1.5 X</td>
<td>-</td>
</tr>
</tbody>
</table>
Memory (Verbal learning): Moderate

Combined arm

RAVLT score 1: immediate recall (MMSE: 18-21)

<table>
<thead>
<tr>
<th>Months</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td>6</td>
<td>-5</td>
<td>-4</td>
</tr>
<tr>
<td>9</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>12</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

PE: Placebo

<table>
<thead>
<tr>
<th>LS Mean Change from baseline (±SEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE treated</td>
</tr>
<tr>
<td>TPE</td>
</tr>
<tr>
<td>3.9</td>
</tr>
<tr>
<td>0.024</td>
</tr>
<tr>
<td>59 %</td>
</tr>
</tbody>
</table>

N = 161

Treatment arms

RAVLT score 1: immediate recall (MMSE: 18-21)

<table>
<thead>
<tr>
<th>Months</th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-5.0</td>
<td>-2.1</td>
<td>-0.4</td>
<td>-6.6</td>
</tr>
<tr>
<td>3</td>
<td>1.7</td>
<td>4.6</td>
<td>6.2</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>0.384</td>
<td>0.041</td>
<td>0.003</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>26 %</td>
<td>70 %</td>
<td>94 %</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 161
Language (Verbal fluency): All patients

Combined arm

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>0.9</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>2.8</td>
</tr>
<tr>
<td>p-value</td>
<td>0.007</td>
</tr>
<tr>
<td>Improv.</td>
<td>1.5 X</td>
</tr>
</tbody>
</table>

Treatment arms

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>0.2</td>
<td>1.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>2.0</td>
<td>3.0</td>
<td>3.5</td>
</tr>
<tr>
<td>p-value</td>
<td>0.106</td>
<td>0.022</td>
<td>0.008</td>
</tr>
<tr>
<td>Improv.</td>
<td>1.1 X</td>
<td>1.6 X</td>
<td>1.8 X</td>
</tr>
</tbody>
</table>
Language (Verbal Fluency): Mild

Combined arm

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>2.6</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>3.8</td>
</tr>
<tr>
<td>p-value</td>
<td>0.013</td>
</tr>
<tr>
<td>Improv.</td>
<td>3X</td>
</tr>
</tbody>
</table>

N = 161

Treatment arms

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>1.7</td>
<td>2.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>3.0</td>
<td>3.9</td>
<td>4.7</td>
</tr>
<tr>
<td>p-value</td>
<td>0.141</td>
<td>0.036</td>
<td>0.025</td>
</tr>
<tr>
<td>Improv.</td>
<td>2.3 X</td>
<td>3 X</td>
<td>3.8 X</td>
</tr>
</tbody>
</table>
Language (Verbal Fluency): Moderate

Combined arm

Treatment arms

PVF (MMSE: 18-21)

Months

LS Mean Change from baseline (± SEM)

PE treated
Placebo

P<0.05
P<0.1

N = 161

PE treated
Placebo

Change from baseline

Diff. vs. Placebo

p-value

Less decline

N = 161

<table>
<thead>
<tr>
<th>Treatment arms</th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-1.4</td>
<td>-0.3</td>
<td>-0.5</td>
<td>-2.6</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>1.2</td>
<td>2.2</td>
<td>2.1</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.441</td>
<td>0.213</td>
<td>0.200</td>
<td>-</td>
</tr>
<tr>
<td>Less decline</td>
<td>46%</td>
<td>85%</td>
<td>81%</td>
<td>-</td>
</tr>
</tbody>
</table>
Executive Function (Processing Speed): All Patients

Combined arm

<table>
<thead>
<tr>
<th></th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>1.3</td>
<td>-1.1</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>2.4</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.054</td>
<td>-</td>
</tr>
<tr>
<td>Improv.</td>
<td>2.2 X</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 322

Treatment arms

<table>
<thead>
<tr>
<th></th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>0.4</td>
<td>1.3</td>
<td>2.4</td>
<td>-1.1</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>1.5</td>
<td>2.4</td>
<td>3.5</td>
<td>-</td>
</tr>
<tr>
<td>p-value</td>
<td>0.313</td>
<td>0.119</td>
<td>0.030</td>
<td>-</td>
</tr>
<tr>
<td>Improv.</td>
<td>1.4 X</td>
<td>2.2 X</td>
<td>3.2 X</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 322
Executive Function (Processing Speed): Mild

Combined arm

Treatment arms

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>2.9</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>3.6</td>
</tr>
<tr>
<td>p-value</td>
<td>0.055</td>
</tr>
<tr>
<td>Improv.</td>
<td>5.1 X</td>
</tr>
</tbody>
</table>

N = 160

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>2.1</td>
<td>2.3</td>
<td>4.5</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>2.9</td>
<td>3.0</td>
<td>5.2</td>
</tr>
<tr>
<td>p-value</td>
<td>0.244</td>
<td>0.173</td>
<td>0.039</td>
</tr>
<tr>
<td>Improv.</td>
<td>4.1 X</td>
<td>4.3 X</td>
<td>7.4 X</td>
</tr>
</tbody>
</table>
Executive Function (Processing Speed): Moderate

**Combined arm**

**Treatment arms**

<table>
<thead>
<tr>
<th>SDMT (MMSE: 18-21)</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE treated</td>
<td>Placebo</td>
</tr>
<tr>
<td>LS Mean Change from baseline (-SEM)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-0.8</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>-0.1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.931</td>
</tr>
</tbody>
</table>

N = 151

<table>
<thead>
<tr>
<th>SDMT (MMSE: 18-21)</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low alb, no IVIG</td>
<td>Placebo</td>
</tr>
<tr>
<td>Low alb + IVIG</td>
<td>Placebo</td>
</tr>
<tr>
<td>High alb + IVIG</td>
<td>Placebo</td>
</tr>
<tr>
<td>LS Mean Change from baseline (-SEM)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-1.4</td>
<td>-0.1</td>
<td>-0.5</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>-0.7</td>
<td>0.6</td>
<td>0.2</td>
</tr>
<tr>
<td>p-value</td>
<td>0.858</td>
<td>0.757</td>
<td>0.910</td>
</tr>
<tr>
<td>Less decline</td>
<td>-</td>
<td>86%</td>
<td>29%</td>
</tr>
</tbody>
</table>

N = 151
Quality of Life (Caregiver Rating): All Patients

**Combined arm**

**QoL-AD (caregiver rating)**

<table>
<thead>
<tr>
<th>Months</th>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Baseline</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.3</td>
<td>-0.8</td>
</tr>
<tr>
<td>6</td>
<td>1.1</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>1.4X</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>0.07</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**N = 322**

**Treatment arms**

**QoL-AD (caregiver rating)**

<table>
<thead>
<tr>
<th>Months</th>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.8</td>
<td>-0.8</td>
</tr>
<tr>
<td>3</td>
<td>0.8</td>
<td>0.9</td>
<td>1.6</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>0.280</td>
<td>0.288</td>
<td>0.050</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>2 X</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**N = 322**
Quality of Life (Caregiver Rating): Mild

**Combined arm**

QoL-AD (caregiver rating) (MMSE: 22-26)

<table>
<thead>
<tr>
<th>Months</th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS Mean Change from baseline (± SEM)</td>
<td>PE treated</td>
<td>Placebo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>-0.1</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.1</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.2</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.3</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.4</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.5</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 156

**Treatment arms**

QoL-AD (caregiver rating) (MMSE: 22-26)

<table>
<thead>
<tr>
<th>Months</th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS Mean Change from baseline (± SEM)</td>
<td>PE treated</td>
<td>Placebo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.1</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.2</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.3</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.4</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.5</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.6</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 156

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>0.8</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>1.5</td>
</tr>
<tr>
<td>p-value</td>
<td>0.073</td>
</tr>
<tr>
<td>Improv.</td>
<td>2.1 X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>0.7</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>1.4</td>
<td>1.8</td>
<td>1.3</td>
</tr>
<tr>
<td>p-value</td>
<td>0.0204</td>
<td>0.085</td>
<td>0.264</td>
</tr>
<tr>
<td>Improv.</td>
<td>2 X</td>
<td>2.6 X</td>
<td>1.9 X</td>
</tr>
</tbody>
</table>
Quality of Life (Caregiver Rating): Moderate

Combined arm

Quality of Life (QoL-AD) (caregiver rating) (MMSE: 18-21)

- Treatment arms

N = 156

- Combined arm

N = 156

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-0.4</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>0.5</td>
</tr>
<tr>
<td>p-value</td>
<td>0.639</td>
</tr>
<tr>
<td>Less decline</td>
<td>56%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low alb, no IVIG</th>
<th>Low alb + IVIG</th>
<th>High alb + IVIG</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from baseline</td>
<td>-0.7</td>
<td>-1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Diff. vs. Placebo</td>
<td>0.2</td>
<td>-0.6</td>
<td>1.6</td>
</tr>
<tr>
<td>p-value</td>
<td>0.857</td>
<td>0.644</td>
<td>0.181</td>
</tr>
<tr>
<td>Improv.</td>
<td>0.2X</td>
<td>-</td>
<td>1.8X</td>
</tr>
</tbody>
</table>
Other Clinical Endpoints

- **Analyses ongoing:**
  - NAB (NAB Naming Test)
  - CSDD (Cornell Scale for Depression in Dementia)
  - NPI (Neuropsychiatric Inventory)
  - CDR-Sb (Clinical Dementia Rating, Sum of boxes)
  - ADCS-CGIC (Clinical Global Impression of Change)
  - C-SSRS (Columbia Suicide Severity Rating Scale)
  - Neuroimaging analyses (MRI and PET)
CSF Biomarkers
$A\beta_{42}$, Tau and P-Tau
**CSF Aβ42**

<table>
<thead>
<tr>
<th>All treated patients</th>
<th>Mild (MMSE 22-26)</th>
<th>Moderate (MMSE 18-21)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aβ42 CSF</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LS Mean Change from baseline (±SEM)</strong> (pg/mL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of TPE period</td>
<td><strong>p=0.064</strong></td>
<td></td>
</tr>
<tr>
<td>(month 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of LVPE period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(month 14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N = 299</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TPE: Therapeutic Plasma Exchange**

**LVPE: Low Volume Plasma Exchange**
CSF Tau: Moderate (MMSE 18-21)

**Total Tau**

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>P=0.002 (month 2)</td>
<td></td>
</tr>
</tbody>
</table>

**P-Tau**

<table>
<thead>
<tr>
<th>PE treated</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>p=0.040 (month 2)</td>
<td></td>
</tr>
</tbody>
</table>

*PTE: Therapeutic Plasma Exchange*  
*LVPE: Low Volume Plasma Exchange*  
*N = 154*
## Most Frequent AEs Related with PE

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Placebo</th>
<th>Low, no IVIG</th>
<th>Low + IVIG</th>
<th>High + IVIG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TPE</td>
<td>4709</td>
<td>1223</td>
<td>1207</td>
<td>1180</td>
</tr>
<tr>
<td></td>
<td>LVPE</td>
<td>1718</td>
<td>435</td>
<td>430</td>
<td>448</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2991</td>
<td>788</td>
<td>777</td>
<td>732</td>
</tr>
<tr>
<td>PEs with AE, n (%) of PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td>43 (0.9)</td>
<td>2 (0.2)</td>
<td>13 (1.1)</td>
<td>16 (1.4)</td>
<td>12 (1.1)</td>
</tr>
<tr>
<td>Catheter local reactions</td>
<td>119 (2.5)</td>
<td>0</td>
<td>43 (3.6)</td>
<td>31 (2.6)</td>
<td>45 (4.1)</td>
</tr>
<tr>
<td>Catheter / Device infection</td>
<td>15 (0.3)</td>
<td>0</td>
<td>7 (0.6)</td>
<td>5 (0.4)</td>
<td>3 (0.3)</td>
</tr>
<tr>
<td>Muscle spasms</td>
<td>49 (1.0)</td>
<td>0</td>
<td>16 (1.3)</td>
<td>4 (0.3)</td>
<td>29 (2.6)</td>
</tr>
<tr>
<td>Dizziness</td>
<td>30 (0.6)</td>
<td>1 (0.1)</td>
<td>8 (0.7)</td>
<td>13 (1.1)</td>
<td>8 (0.7)</td>
</tr>
<tr>
<td>Headache</td>
<td>11 (0.2)</td>
<td>3 (0.2)</td>
<td>4 (0.3)</td>
<td>2 (0.2)</td>
<td>2 (0.2)</td>
</tr>
<tr>
<td>Paraesthesia</td>
<td>28 (0.6)</td>
<td>0</td>
<td>16 (1.3)</td>
<td>1 (0.1)</td>
<td>11 (1.0)</td>
</tr>
<tr>
<td>Presyncope</td>
<td>28 (0.6)</td>
<td>1 (0.1)</td>
<td>8 (0.7)</td>
<td>14 (1.2)</td>
<td>5 (0.5)</td>
</tr>
<tr>
<td>Syncope</td>
<td>11 (0.2)</td>
<td>0</td>
<td>4 (0.3)</td>
<td>3 (0.3)</td>
<td>4 (0.4)</td>
</tr>
<tr>
<td>Hypotension</td>
<td>102 (2.2)</td>
<td>0</td>
<td>37 (3.1)</td>
<td>37 (3.1)</td>
<td>28 (2.5)</td>
</tr>
</tbody>
</table>
## Infections

<table>
<thead>
<tr>
<th></th>
<th>Total (N=322)</th>
<th>Placebo (N=79)</th>
<th>Low, no IVIG (N=78)</th>
<th>Low + IVIG (N=86)</th>
<th>High + IVIG (N=79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PE</td>
<td>4709</td>
<td>1223</td>
<td>1207</td>
<td>1180</td>
<td>1099</td>
</tr>
<tr>
<td>TPE</td>
<td>1718</td>
<td>435</td>
<td>430</td>
<td>448</td>
<td>405</td>
</tr>
<tr>
<td>LVPE</td>
<td>2991</td>
<td>788</td>
<td>777</td>
<td>732</td>
<td>694</td>
</tr>
<tr>
<td>Total of Infections</td>
<td>159</td>
<td>38</td>
<td>52</td>
<td>37</td>
<td>32</td>
</tr>
<tr>
<td>Patients with infections</td>
<td>147</td>
<td>33</td>
<td>49</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>% of patients with infections</td>
<td>N/A</td>
<td>41.8</td>
<td>62.8</td>
<td>39.5</td>
<td>39.2</td>
</tr>
<tr>
<td>Infections per 100 patients</td>
<td>N/A</td>
<td>48.1</td>
<td>66.7</td>
<td>43.0</td>
<td>40.5</td>
</tr>
</tbody>
</table>
Distribution of AEs
(Treatments vs. Control)

- # of AEs (Placebo)
- # of AEs (Low, No IVIG)
- # of AEs (Low+IVIG)
- # of AEs (High+IVIG)

TPE: Therapeutic Plasma Exchange
LVPE: Low Volume Plasma Exchange

AEs: “Manhattan” Chart
Recent BACE and Mab Programs Discontinued due to Lack of Efficacy vs. AMBAR: ADAS-Cog

A Change in Alzheimer's Disease Assessment Scale-Cognitive Subscale Score

![Graph showing change in ADAS-Cog scores over weeks for Placebo and Solanezumab.](image)

<table>
<thead>
<tr>
<th>No. at Risk</th>
<th>Placebo</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>1057</th>
<th>893</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solanezumab</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>1053</td>
<td>968</td>
</tr>
</tbody>
</table>

No. of Patients

<table>
<thead>
<tr>
<th>Group</th>
<th>Week 14</th>
<th>Week 26</th>
<th>Week 52</th>
<th>Week 78</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mg group</td>
<td>821</td>
<td>816</td>
<td>816</td>
<td>816</td>
</tr>
<tr>
<td>45 mg group</td>
<td>822</td>
<td>816</td>
<td>816</td>
<td>816</td>
</tr>
<tr>
<td>Placebo group</td>
<td>819</td>
<td>814</td>
<td>814</td>
<td>814</td>
</tr>
</tbody>
</table>

A Worsening Score on ADAS-cog

![Graph showing worsening score on ADAS-cog over weeks.](image)

A ADAS-cog11

![Graph showing improvement in ADAS-cog11.](image)

AMBAR

![Graph showing change in Alzheimer's Disease Assessment Scale-Cognitive subscale.](image)
Recent BACE and Mab Programs Discontinued due to Lack of Efficacy vs. AMBAR: ADCS-ADL
Key Messages: Efficacy

• Primary endpoints:
  • Mild AD: No decline, neither active nor placebo
  • Moderate AD: 61% statistically significant less decline in both ADAS-Cog and ADCS-ADL of treated patients as compared with placebo at 14 months
    All three treatment arms statistically different from placebo (ADCS-ADL)

• Secondary endpoints:
  • All-patient analysis: statistically significant improvement in memory, language, processing speed and QoL (caregiver) of High-Albumin+IVIG arm compared with placebo at 14 months
  • Mild AD: statistically significant improvement in language and processing speed and of High-Albumin+IVIG arm
    Borderline significance in QoL (caregiver)
  • Moderate AD: statistically significant improvement in memory and QoL (caregiver) of High-Albumin+IVIG arm
Key Messages: Safety and Feasibility

- Feasible: 4,709 procedures
  - 1,223 sham; 3,486 real
  - 1,718 TPE; 2,991 LVPE

- 72% of patients completed the study

- AE rate seems to depend on volume infused and IVIG dose, as expected

- Low rate of plasma exchange procedures related with AEs

- Safety conclusion: PE, both TPE and LVPE, was safe, well tolerated and feasible in mild-to-moderate AD patients, with a 72% of patients completing the study
Key Messages: Biomarkers and Infections

• **Biomarkers:**
  - **CSF Aβ_{42}:** stabilization in the treated patients and decline in placebo arm particularly for moderate AD
  - **CSF Tau and P-Tau:** less increase in the treated patients compared to placebo particularly for moderate AD

• **Infections:**
  - Patients treated with plasmapheresis without IVIG had more infections than those treated with IVIG and also than those in the placebo arm
  - The rate of infections not related with catheter was lower in patients receiving IVIG
We are Profoundly Grateful to the Patients and Families that Have Kindly Participated in the AMBAR Clinical Trial
Thanks to the Pioneers...
Bioscience R&D & Clayton Facilities Tours

Todd Willis & Daniel Fleta

GRIFOLS
Bioscience R&D Facilities Tour
Bioscience R&D – RTP

Facilities and Organization

30,000 ft² state-of-the art R&D facility

- Open lab concept to maximize space
- Specialized areas for bench-scale and macro-bench processing, filling suite, and cell culture rooms
- BSL-3 facility and containment practices for handling Risk Group 3 pathogens

- 90 scientists and support staff
- Product Development
  - Bioanalytics
  - Process Development
- Product Safety
  - Toxicology
  - Pathogen Safety
- Discovery Research
- Quality R&D
Clayton Facilities Tour
Clayton Facilities Tour

Safety Guidelines

- We will split into 4 groups to facilitate the tour. Please stay with your group.
- When walking on an area with metal grading, please stay on the designated pathway.
- Watch your step, especially on transitions between different surfaces.
- Please do not touch anything as many of the systems are energized.

Please feel free to ask questions.
New Fractionation Building:
- 6MM Liter plasma / year capacity
- Construction complete during 1Q 2019, start up in progress
- Features latest version of Automatic Bottle Opener ABO₆

Ebola IGIV facility:
- Totally isolated facility for processing plasma to final container
- Batch size is 75L of plasma
1. Start & end of tour
2. New Fractionation Building
3. Ebola IGIV facility
Clayton Facilities Tour
New Fractionation Building General Information

- **Surface**: 85,000 sq.ft. building area
- **Capacity**: 6MM Liters plasma/ yr capacity
- **Execution**: Two production trains with 16 vessels per train and eight buffer vessels
- **Floors**: Two production floors with an interstitial areas above each floor
Clayton Facilities Tour
New Fractionation Building General Information

- **Most recent version of Grifols Engineering Automatic Bottle Opener**
  - Automated de-palletizing, loading and re-palletizing
  - Includes RFID tracking capability
  - Throughput rate of 1,250 bottles/hour
- **Reactors** integration in the clean room. Grifols patented method for installation of vessels in the clean room
- **Process rooms** with daylight for operators working environment convenience
- **Filter presses** with CIP system built-in
- **Central buffer** preparation area for both trains
Clayton Facilities Tour
Convalescent Plasma Immunoglobulin Facility
Clayton Facilities Tour
Convalescent Plasma Immunoglobulin Facility

- Design and construction of a Plasma Fractionation and IGIV purification facility + filling and conditioning segregated
- Batch Size 75 Liters in bags of approx. 500ml plasma from donors with anti-ebola antibodies
- 300gr Gamunex® will be manufactured by batch
- Production capacity of up to 3 batched per week
- IGIV filling at 10% using Gri-Fill® technology in 100 ml bags (30 bags)
- The facility will also have labelling, packaging and warehouse previous to sending
Clayton Facilities Tour
Convalescent Plasma Immunoglobulin Facility

**Plant**
Total Structure area: 1,300m²
Clean Rooms, QC Lab & Lockers: 427m²
Total Clean Rooms 241m²
52 tons structural steel

**Equipment**
4 Units HVAC + 1 Steam generator
2 Chillers(5°C and -25°C)
1 Plant water treatment & Osmosis
1 Autoclave + 1 Liquid sterilizer HWFI loop/tank

The construction started in January 2015 and finished in October 2015
<table>
<thead>
<tr>
<th>June 5 – Clayton, NC</th>
<th>June 5 – Clayton, NC</th>
<th>June 6 – Raleigh, NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30</td>
<td>2:00-2:45</td>
<td>7:30</td>
</tr>
<tr>
<td>Pick-up from</td>
<td>Novel Plasma</td>
<td>Pick-up from</td>
</tr>
<tr>
<td>recommended hotels</td>
<td>Therapies</td>
<td>recommended hotels</td>
</tr>
<tr>
<td>8:30-9:00</td>
<td>Development</td>
<td>8:30-9:30</td>
</tr>
<tr>
<td>Registration and</td>
<td>T. Willis</td>
<td>R&amp;D Tour</td>
</tr>
<tr>
<td>welcome</td>
<td>AMBAR: Grifols’</td>
<td>9:30-10:15</td>
</tr>
<tr>
<td></td>
<td>Alzheimer Trial</td>
<td>China: Facing the</td>
</tr>
<tr>
<td></td>
<td>A. Paez</td>
<td>Opportunity</td>
</tr>
<tr>
<td>9:00-9:30</td>
<td>2:45-3:30</td>
<td>10:15-10:45</td>
</tr>
<tr>
<td>Introduction</td>
<td>AMBAR</td>
<td>Digital Innovation</td>
</tr>
<tr>
<td>R. Grífols</td>
<td>Grifols’ Alzheimer</td>
<td>X. Sueiras</td>
</tr>
<tr>
<td></td>
<td>Trial</td>
<td></td>
</tr>
<tr>
<td>9:00-11:30</td>
<td>3:30-4:00</td>
<td>11:15-12:00</td>
</tr>
<tr>
<td>Commercial</td>
<td>Break</td>
<td>Financials</td>
</tr>
<tr>
<td>Strategies</td>
<td></td>
<td>A. Arroyo</td>
</tr>
<tr>
<td>L. Morgan/J.</td>
<td></td>
<td>11:15-12:30</td>
</tr>
<tr>
<td>Abelson/C.</td>
<td></td>
<td>Grifols: A Socially</td>
</tr>
<tr>
<td>Schroeder/R. Jagt</td>
<td></td>
<td>Responsible</td>
</tr>
<tr>
<td>4:00-4:30</td>
<td>Q&amp;A</td>
<td>Company</td>
</tr>
<tr>
<td>9:30-11:30</td>
<td>4:30-5:00</td>
<td>12:00-12:30</td>
</tr>
<tr>
<td>Break</td>
<td>Tour Introductions</td>
<td>Closing</td>
</tr>
<tr>
<td>11:30-12:00</td>
<td></td>
<td>V. Grifols Deu</td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td>12:45-1:15</td>
</tr>
<tr>
<td>12:00-1:00</td>
<td>5:00-6:30</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>Industrial Capacity</td>
<td>Site Tour: New</td>
<td>12:45-1:15</td>
</tr>
<tr>
<td>and Plasma Capabilities</td>
<td>Fractionation Building and Ebola plant</td>
<td></td>
</tr>
<tr>
<td>P. Allen/E.</td>
<td></td>
<td>Lunch</td>
</tr>
<tr>
<td>Herrero/D. Fleta</td>
<td></td>
<td>1:15</td>
</tr>
<tr>
<td>1:00-2:00</td>
<td>7:00</td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td>Dinner</td>
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</tr>
<tr>
<td>10:00</td>
<td>Back to recommended hotels</td>
<td></td>
</tr>
<tr>
<td>10:00</td>
<td>12:30-12:45</td>
<td></td>
</tr>
<tr>
<td>10:00</td>
<td>Closing</td>
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<tr>
<td>12:45-1:15</td>
<td>Q&amp;A</td>
<td></td>
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<tr>
<td>1:15</td>
<td>Lunch</td>
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</tr>
</tbody>
</table>
China: Facing the Opportunity
Grifols Next Growth Engine

Amarant Martinez 马敏伟
VP, China Affairs Office 中国事务办公室副总裁
1. China and its Healthcare Market: Key Figures
China is a Strategic Market for Grifols
By 2030, China is Expected to Become #1 Economy in the World

In 2018…

- 1,415 Million people\(^1\)
- 18.5% of World population\(^1\)
- 15.8% of World Economy\(^1\)
- +6.6% GDP growth 2018\(^1\)

In the World…

- 55% of ALBUMIN market\(^2\)
- 10% of IVIG market\(^2\)
- 12.0M of blood donations NAT-tested\(^3\)
- 5% of pdFVIII market\(^2\)
- USD310M IH IVD testing market size\(^4\)

Sources: 1 Fitch Solutions; 2 Global Plasma Industry Database 2017 (values); 3 NIFDC 2018; 4 InterChina survey 2017; 5 HSBC
China’s Healthcare Market Fundamentals are Strong
Long-Term Sustained Growth and Healthcare Demand

- China’s economic development
- Continued expansion of China’s healthcare system and medical insurance: Health China 2030
- Raising urbanization levels: 994M in 2028
- Aging population & chronic disease burden

Source: Fitch Solutions
Clusters: Provinces at Growth Stage Offer Opportunities to Expand into China’s Provincial Healthcare Landscape

Anhui  Beijing  Chongqing  Fujian  Gansu  Guangdong  Guangxi  Guizhou  Hainan  Hebei  Heilongjiang  Henan  Hubei  Hunan  Inner Mongolia  Jiangsu  Jiangxi  Jilin  Liaoning  Ningxia  Qinghai  Shanxi  Shaanxi  Shanghai  Shanxi  Sichuan  Sichuan  Tianjin  Tibet  Tibet  Xinjiang  Yunnan  Zhejiang

Hospitals Level of Activity
- High
- Medium
- Low

Sources: National Health Commission Year Book 2018; Fitch Solutions

1 Patients includes out-patient visits & in-patient admissions; 2 Hospitals Level of Activity = Patients / Population
Global Health Expenditure

China’s Continued Expansion to Reach 16% Global Share by 2028

United States 41%
China 9%
France 4%
UK 3%
Germany 5%
Japan 7%
Brazil 3%
Italy 2%
Canada 2%
RoW 22%
RoW 23%
Canada 2%
S. Korea 2%
Brazil 2%
France 3%
Ind 3%
UK 4%
Germany 5%
Japan 5%

Source: Fitch Solutions

2018:
- RoW 22%
- United States 41%
- China 9%
- France 4%
- UK 3%
- Germany 5%
- Japan 7%
- Brazil 3%
- Italy 2%
- Canada 2%

2028:
- RoW 23%
- United States 35%
- China 16%
- Canada 2%
- S. Korea 2%
- Brazil 2%
- France 3%
- India 3%
- UK 4%
- Germany 5%
- Japan 5%

China’s Continued Expansion to Reach 16% Global Share by 2028
China as a Leader in Healthcare Digital Transformation

Digital Transformation is a Key Pillar of Grifols Strategy

• ~40% physicians have used online consultation
• 20 M active users and >700 k registered physicians on top online consultation platforms
• 1.5 M physicians active on top 3 online platforms
• 63% vs 37%: Innovative channels* have overtaken traditional channels when obtaining professional information

• 3.0 M patients making appointment on top 3 platforms
• 656 k patients buying drugs on top 3 B2C platforms
• 15.6 M patients using largest online consultation platform

Sources: Kantar Health 2018 Digital Life Physician; China Summit McKinsey Report 2018
* Innovative channels: social media, online meeting, VC, APP...
2. Grifols Long-Term Commitment to China
China is Going West and Beyond
The Belt and Road Initiative (BRI) was Launched in 2013

- Foreign Policy
- 60 countries
- 65% world’s population
- 40% Global GDP (2017)
- USD 80 B investment
- USD 6.47 Trillion goods’ trade
- Trade routes
- Infrastructure
Continued Reform of the Healthcare System to Improve Access to Care

• Only from Aug 2013 to Nov 2018, 783 new Grade III Hospitals were opened!

<table>
<thead>
<tr>
<th>Grade</th>
<th>No of Hospitals</th>
<th>% Hospitals</th>
<th>% patients*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1: Small hospitals (&lt;100 beds)</td>
<td>10,050</td>
<td>49%</td>
<td>7%</td>
</tr>
<tr>
<td>Grade 2: Mid-sized hospitals (100-500 beds)</td>
<td>8,422</td>
<td>40%</td>
<td>45%</td>
</tr>
<tr>
<td>Grade 3: Large hospitals (&gt;500 beds)</td>
<td>2,340</td>
<td>11%</td>
<td>48%</td>
</tr>
</tbody>
</table>

N= 20,812

Source: National Health Commission Year Book, 2018
*consolidated figure in-patient and out-patient

Government New Policies

- National Reimbursement Drug List (NRDL)
- National Supplementary Drug List (NSDL)
- Volume Based Procurement (4+7; 31 drugs)
- GPOs (Guangzhou pilot)
- DRGs (Diagnosed Related Groups)
- Tiered Care System
- Rational Drug Use / Medicine Proportion
- Prescription Outflow
- Direct to Patients (DTP) Pharmacies
- Zero mark-up
- Two-Invoice System

Grade 3: Large hospitals (>500 beds)
Grade 2: Mid-sized hospitals (100-500 beds)
Grade 1: Small hospitals (<100 beds)

Investor and Analyst Meeting 2019 | North Carolina
## Major Advancements in the 2017 NRDL vs. 2009

Dynamic RDL Adjustment is Next, from 2020

<table>
<thead>
<tr>
<th>Drug</th>
<th>Class</th>
<th>2009</th>
<th>2017</th>
<th>2009</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin</td>
<td>B</td>
<td>B</td>
<td></td>
<td>Emergency treatment; Industrial insurance</td>
<td>Emergency treatment; Critical care; hypoalbuminemia caused by cirrhosis, cancer or hydrothorax and ascites, albumin level lower than 30g/L</td>
</tr>
<tr>
<td>IVIG</td>
<td>B</td>
<td>B</td>
<td></td>
<td>Children's severe virus infection; Industrial insurance</td>
<td>Primary Immune Globulin Deficiency; Septicemia of Newborn; Severe Primary Immune Thrombocytopenia; Kawasaki Disease; Generalized Myasthenia Gravis; Acute Guillain–Barre Syndrome</td>
</tr>
<tr>
<td>IMIG</td>
<td>B</td>
<td>B</td>
<td></td>
<td>Not indicated</td>
<td>Measles; Preventive treatment of infectious hepatitis</td>
</tr>
<tr>
<td>pdFVIII</td>
<td>A (EDL*)</td>
<td>A (EDL)</td>
<td></td>
<td>Prevention and treatment Hemophilia A</td>
<td>Prevention and treatment Hemophilia A</td>
</tr>
<tr>
<td>rFVIII</td>
<td>B</td>
<td>B</td>
<td></td>
<td>When hemophiliac presents severe bleeding, and pdFVIII is not available</td>
<td>Paediatric haemophilia A; for adult haemophilia A has bleeding</td>
</tr>
<tr>
<td>rFIX</td>
<td>Not included</td>
<td>B</td>
<td></td>
<td>Not indicated</td>
<td>Paediatric haemophilia B; for adult haemophilia B has bleeding</td>
</tr>
<tr>
<td>PTC</td>
<td>B</td>
<td>B</td>
<td></td>
<td>Surgical bleeding; bleeding caused by cirrhosis or liver necrosis</td>
<td>Surgical bleeding; or bleeding caused by liver diseases; Haemophilia B; Haemophilic has FVIII inhibitor</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>B</td>
<td>B</td>
<td></td>
<td>Emergency treatment of hypofibrinogenemia</td>
<td>Active bleeding caused by hypofibrinogenemia</td>
</tr>
<tr>
<td>Rabies IG</td>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus IG</td>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
<td>In 2018, Tetanus IG was included in the Essential Drug List</td>
</tr>
</tbody>
</table>

*EDL: Essential Drug List, fully reimbursed
Development of IG Therapies in China

China Stands as the 2nd Worldwide IG Market but Use per Capita Remains Low

- Access to therapies
- Demographic development and clinical use per capita
- Diagnosis and awareness of treatment options and indications
- Chronic conditions regular treatment

IG consumption per capita (gr/’000 population)

<table>
<thead>
<tr>
<th>Country</th>
<th>2017</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUSTRALIA</td>
<td>275.1</td>
<td>247.6</td>
</tr>
<tr>
<td>USA</td>
<td>247.6</td>
<td>232.6</td>
</tr>
<tr>
<td>CANADA</td>
<td>165.4</td>
<td></td>
</tr>
<tr>
<td>FRANCE</td>
<td>113.4</td>
<td>104.5</td>
</tr>
<tr>
<td>UK</td>
<td>104.5</td>
<td>86.8</td>
</tr>
<tr>
<td>GERMANY</td>
<td>84.1</td>
<td>84.1</td>
</tr>
<tr>
<td>SPAIN</td>
<td>43.5</td>
<td>43.4</td>
</tr>
<tr>
<td>ITALY</td>
<td>36.3</td>
<td>36.3</td>
</tr>
<tr>
<td>JAPAN</td>
<td></td>
<td>20.2</td>
</tr>
<tr>
<td>TURKEY</td>
<td></td>
<td>16.3</td>
</tr>
<tr>
<td>S. KOREA</td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>CHINA</td>
<td></td>
<td>20.2</td>
</tr>
<tr>
<td>BRAZIL</td>
<td></td>
<td>16.3</td>
</tr>
<tr>
<td>INDIA</td>
<td></td>
<td>3.1</td>
</tr>
</tbody>
</table>

Source: Grifols Global Plasma Database (Ig includes IV and SC)
China has a Large Hemophilia Population
But With Low Diagnosis Rate (~10%)

Mainly occasional and on-demand treatment (92.9%)

FVIII Hospital consumption expected CAGR 2017-2020: +37%

Sources: WFH 2017 (*China 2016 data); InterChina, China Blood Products Landscape Research. February 2018
**Plasma Procurement Landscape in 2018**

We Expect Plasma Collection in China to Continue Expanding

---

**China**

- No Plasma Center
- ≤ 10 Plasma Centers
- 11 to 20 Plasma Centers
- > 20 Plasma Centers

---

**In China, Top 6 players account for 73.8% of Plasma Collection**

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**Sources:** Annual report released by listed manufacturers; PPTA; National Health Committee (NHC)

---

*Conversion from 8,622 Tons; **Conversion from 51.7 Million Donations
3. A Unique Opportunity for Grifols Across Bioscience and Diagnostic
Unparalleled Opportunity In an Untapped Market
2018-2028 China and U.S. at the Forefront with Equal Contribution to Health Spending

Source: Fitch Solutions
Unparalleled Opportunity In an Untapped Market
2018-2028 China and U.S. at the Forefront with Equal Contribution to Health Spending

Health spending, % Y-o-Y

Source: Fitch Solutions
Unparalleled Opportunity In an Untapped Market
2018-2028 China and U.S. at the Forefront with Equal Contribution to Health Spending

Health spending, % Y-o-Y

2018: China 777.0

2028: China 2,347.0

+11.7% eCAGR (+1,570 USD B)

+3.9% eCAGR (+1,635 USD B)

Source: Fitch Solutions
The Plasma Market in 2017, Top 30 Countries
Grifols Currently Can Only Participate in China in the Albumin Business

*USA, China and Germany capped at USD 1.0 B
Source: Grifols Global Plasma Database
China’s Healthcare Market
Double Digit Growth in Both Plasma and IVD (2017-2022)

2017

USA (USD B):
Healthcare Expenditure: 3,420.0
Pharma Sales: 353.5
Plasma Products Market: 10.1
IVD Market: 23.2

China 2017

Healthcare Expenditure: USD 684.9 B
Pharma Sales: USD 120.9 B
Plasma Products Market: USD 3.7 B
IVD Market: USD 2.7 B

China Plasma Space
Grifols to Contribute to the Whole Plasma Value Chain

USD 3.7 B in 2017
eCAGR ’17-22: +14.6%

Plasma Procurement
245 centers
8.4 M Liters

Fractionation
6 Leading players
Total 28 workshops

Commercial GRIFOLS
9.9% market share
blood products

Commercial Partner
Commercial Partner
Commercial Partner

Sources: Internal Data, Grifols Global Plasma Database (2017); China Blood Products Industry Report 2018-2022 ResearchInChina
Commercial Opportunity: Bioscience
High Potential of Coagulation and IVIG Products

- Increased awareness and access to care
- Expanded NRDL implementation
- Hemophilia diagnosis and prophylaxis treatment
- IVIG: Neurology & Rheumatology areas

Blood Products Market 2013-2020E (USD M)

CAGR (‘13–’20)

- Others +1.5%
- Fibrinogen +27.2%
- Factor VIII +36.1%
- IVIG +27.3%
- Albumin +10.9%

Source: InterChina, China Blood Products Landscape Research. February 2018
China IVD Market
China is the Fastest Growing IVD Market and Still with Great Potential

Still significant growth potential comparing to developed countries
Annual Per Capita Spending on IVD products, in USD per capita p. a. (2016)

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>22.1</td>
<td>28.1</td>
</tr>
<tr>
<td>Japan</td>
<td>6.0</td>
<td>8.1</td>
</tr>
<tr>
<td>Germany</td>
<td>4.6</td>
<td>5.8</td>
</tr>
<tr>
<td>Canada</td>
<td>3.2</td>
<td>4.1</td>
</tr>
<tr>
<td>China</td>
<td>2.4</td>
<td>4.1</td>
</tr>
<tr>
<td>France</td>
<td>3.3</td>
<td>4.1</td>
</tr>
</tbody>
</table>

CAGR

- U.S.: 5.0%
- Japan: 6.1%
- Germany: 4.8%
- Canada: 4.8%
- China: 10.9%
- France: 4.4%

Sources: IVD Market Report, Markets and Markets, 2016; Fitch Solutions; Internal analysis
China is the fastest growing region in the plasma industry

Full NAT mandate on plasma donations from 2020 will add +15.5 M plasma donations to be tested

Viral testing (HAV, Parvo B19) and Emerging pathogens (HEV, Zika and Babesia)
4. Shanghai RAAS: The Right Partner
Shanghai RAAS
The Right Partner

- 2nd company in plasma collection volume in China
- 41 plasma centers across 11 provinces
- 1993, Shanghai RAAS becomes licensee of New York Blood center’s S/D virus inactivation technology
- First company in China to adopt NAT testing, since 1995. NAT performed at three different times from the collection to the final product
- Shanghai RAAS and Grifols operations are truly complementary in China
- High potential for value creation

8,622 tons of plasma collected in China in 2018

Source: Company’s Annual Reports; Internal Analysis

8,622 tons of plasma collected in China in 2018

- RAAS 14%
- CBPO 13%
- Hualan 12%
- Yuanda Shuyang 10%
- Others 26%
- CNBG 18%
- Boya 7%
<table>
<thead>
<tr>
<th></th>
<th>RAAS</th>
<th>CBPO</th>
<th>CNBG</th>
<th>Hualan</th>
<th>Shanxi Kangbao</th>
<th>Yuanda Shuyang</th>
<th>Boya</th>
<th>Shuanglin</th>
<th>Weiguang</th>
<th>Nanyue</th>
<th>Da’an &amp; Wellen</th>
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<tbody>
<tr>
<td>Human Albumin</td>
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<tr>
<td>Freeze-dried Human Serum Albumin</td>
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<tr>
<td>Freeze-dried IVIG</td>
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<td>IMIG</td>
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<tr>
<td>Lyophilized Hepatitis B IG</td>
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<tr>
<td>Intravenous Hepatitis B IG</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Freeze-dried Intravenous Hepatitis B IG</td>
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<td>✓</td>
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<td>Rabies IG</td>
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<tr>
<td>Tetanus IG</td>
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<tr>
<td>Histamine IG</td>
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<td>✓</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Fibrin Sealant</td>
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</tr>
<tr>
<td>Human Prothrombin Complex</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
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<td>Lyophilized Thrombin</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

| Total N Products          | 12   | 9    | 14   | 11    | 7    | 8    | 7    | 6    | 9    | 6    | 7   |

*CBPO: China Biologic Products, including Shandong Taibang and Guizhou Taibang, CNBG: China National Biotechnology Group, including Shanghai, Wuhan, Lanzhou, Guizhou (former Guizhou Zhongtai) Institutes and Rongsheng, RAAS: Shanghai RAAS, Tonrol, Zhengzhou RAAS and Zhejiang Haikang.
5. Execution is Key: Creation of China Affairs Office
Grifols in China: 35+ Years of History

1983
- China issues Article 49

1984
- First import of Intramuscular Immunoglobulin
- Start Human Albumin sales in China

1985
- China issues Article 49

1988
- CFDA approval for Human Albumin

1999
- Registration and import of DG Gel® Cards and IH instruments

2002
- Grifols initiates partnership with Liaoning Huiming

2002
- Establishment of Grifols Representative Office in China

2009
- +35 years albumin imports to China: Grifols achieves 15% MS

2013
- Integration of Novartis Diagnostics

2014
- Set up Grifols Pharmaceutical Technology Shanghai Co. Ltd. and Beijing branch (2018)

2016
- Set up Grifols Pharmaceutical Consulting Co. Ltd.

Present
- Dr. Victor Grífols Lucas on a commercial visit to China 1984
Grifols is Ready and Has Its Own Model to Ensure Success

- Creation of the China Affairs Office
- Reporting to the Company’s CEO’s
- Global alignment and execution under ONE Grifols concept
- Collaborative and agile
- The right people with the right experience in China since 1983
- Long-term focus
Grifols in China
With the Right Partner

• Bring innovative therapies to the Chinese patients
• World-class medical education in chronic and rare diseases
• Grifols Engineering expertise in biopharmaceutical engineering and consultancy to develop best-in-class industrial facilities
• Vertical integration with our Grifols NAT systems and broader virus detection platform
• With Grifols’ partner, creation of a leading Industrial and Commercial platform, realizing the full potential of the Alliance and setting the ground for future expansion
Key Takeaways
China: Facing the Opportunity
Key Takeaways
China: Facing the Opportunity

• China as a **driver of the worldwide healthcare expenditure** with equal contribution to growth as the U.S. **Strong healthcare fundamentals** and continuous expansion of **access to care**

• China offers **unparalleled opportunities across Bioscience and Diagnostic** to become the **next growth engine for Grifols**

• Grifols has a **long-term commitment to China**

• Shanghai RAAS: the **right partner**

• **Execution is the Key**: Grifols is ready and has its own model to ensure success and capture the significant opportunity
Digital Innovation
Focus on Optimization and Thoughtful Transformation

Xavier Sueiras
Chief IT Officer
Digital Innovation

Core Pillars

- Digital Innovation is not new for Grifols
- With our new organization, Grifols is moving to the next level
- Digital optimization and transformation to boost business growth
- Our culture will drive our future
Digital Innovation

Solid Foundation

- Strong technology team
- Core skills and business knowledge
- High expertise in develop internal and external/commercial solutions
- Experts on service transformation/organizations integration
- Reliable background on digitalization projects execution
- Powerful partnership ecosystem

Boosting efficient, agile, and innovative services and technology solutions for…
22,000+ users in 30 countries; 290+ donor centers; 13 manufacturing facilities; and more…
March’82
New business line introducing
Computers and Software
**Digital Innovation**

**What Is the Difference Today?**

Multiple technologies that once combined allows exponential change

<table>
<thead>
<tr>
<th>Big Data &amp; Advanced Analytics</th>
<th>Internet of Things</th>
<th>Artificial Intelligence</th>
<th>Robotics &amp; Process Automation – Block Chain, etc.</th>
<th>and... CULTURE</th>
</tr>
</thead>
</table>
**Digital Innovation**

Innovation Models

- **Transformational**: Developing breakthroughs and inventing things for markets that don’t yet exist.
- **Adjacent**: Expanding from existing business into “new to the company” business.
- **Core**: Optimizing existing products for existing customers.

**Where to Play**
- Serve existing markets and customers
- Enter adjacent markets, serve adjacent customers
- Create new markets, target new customer needs

**How to Win**
- Use existing products and assets
- Add incremental products and assets
- Develop new products and assets
Digital Innovation

Digital Business Transformation Approach

Mission
Build digital capabilities to deliver better outcomes, explore new areas to play in and capture new sources of value

Ambition
- Improve customer/patient/donor/employee experience
- Optimize operations efficiency/productivity
- Add value to our products/services changing the go-to-market model
- Unlock new value sources

Roadmap
Transformation
Optimization
Digitalization
Digital Innovation
Digital Board will Orchestrate the Grifols Digital Transformation

Digital Board
- Define Grifols Digital Approach and Goals
- Prioritize digital initiatives based on DTTs input
- Ensure experience sharing and cross-collaboration
- Promote Digital Innovation Culture

Digital Transformation Teams (DTTs)
- Recommend digital proposals within each area
  - Identify short term opportunities and full potential
  - Organize discovery sessions
  - Develop proposal and present to the Digital Board
- Coordinate digital initiatives within their area

- Commercial
- Industrial
- Plasma
- R&D
- Quality
- Corporate
Digital Innovation
Digital Board will Orchestrate the Grifols Digital Transformation

**Digital Transformation Teams (DTTs)**

- **Commercial**: Focus on Customer Centricity and Value Expansion
- **Industrial**: Focus on Supply Chain Optimization and Operations Excellence
- **Plasma**: Focus on Donor Experience and Efficiencies
- **R&D**: Focus on New Value Sources
- **Quality**: Focus on Safety
- **Corporate**: Focus on Process Optimization and Employee Experience
Digital Innovation

Key Initiatives

Currently 40 initiatives on-going
Digital Innovation
Key Initiatives: Improve Customer/Patient/Donor/Employee Experience

Improve Knowledge of Donors Digitalization to Improve Donor Experience
Digital Innovation

Key Initiatives: Improve Customer/Patient/Donor/Employee Experience

Personalized Interactions
Digital Innovation

Key Initiatives: Optimize Operations Efficiency/Productivity

Digitalization of Donor Centre Operations with Grifols Donation System

- Donor Experience
- Operations Efficiencies
- Enterprise Digital Twin
Digital Innovation

Key Initiatives: Optimize Operations Efficiency/Productivity

Data Analytics and Machine Learning

- Supply Chain Optimization
- Manufacturing Process Optimization
- Connected Factory
- Predictive Maintenance

Virtual and Augmented Reality Technology for:

- Technical service remote assistance
- Employee Training
- Engineering Design
Digital Innovation
Key Initiatives: Optimize Operations Efficiency/Productivity

Robotic Process Automation, Smart Workflows, Character Recognition and Natural Language Tools

- Automate routine tasks through existing interfaces (e.g., data extraction and cleaning)
- Integrate groups of tasks performed by humans & machines (e.g., calculating and applying allocations)
- Conversion of analog inputs into digital data (e.g., performing 2/3 way invoice matches)
- Create seamless interactions between humans & machines (e.g., chatbots for customer service)
- Digital Workplace for employees

Blockchain technology discovery initiative with SAP Consortium
Digital Innovation
Key Initiatives: Add Value to our Products/Services Changing the Go-to-Market Model

Robust ecosystem including software, services and devices focused on Hospital needs

- Improving security and quality
- Creating efficiencies (automation and data value)
- Integration and connectivity
Digital Innovation
Key Initiatives: Add Value to our Products/Services Changing the Go-to-Market Model

Middleware Platform for Blood and Plasma Screening in Laboratories

- Optimize Labs Operations
- Increase Quality Processes
  - Increased Traceability
  - Streamlined Results Management
- User Satisfaction (easy to use - easy to train)
Digital Innovation
Key Initiatives: Add Value to our Products/Services Changing the Go-to-Market Model

**Diagnostics Instruments: Connected devices and data analytics**

- Customer satisfaction and reliability
- Reduce ownership cost
- Field crew efficiency
Digital Innovation

Key Initiatives: Add Value to our Products/Services Changing the Go-to-Market Model

Japan Red Cross Analytics Services

• Convert data into knowledge
• Improve testing outcomes and instruments performance
• Add value which help Grifols to differentiate and enhance relationships
R&D drug and treatment discovery

- Identification of new protein entities
- Identification of new indications for our current products

Artificial Intelligence to evaluate both structured (clinical data) and non-structured information (manuscripts, patents, etc.)
Digital Innovation
It is Not Only About Technology

- Grifols Digital Day & Grifols Digital Talks
- Collaboration space
- Innovation space
- Co-innovation programs
Key Takeaways
Digital Innovation
Key Takeaways

- Digital Innovation is not new for Grifols
- With our new organization, Grifols is moving to the next level
- Digital optimization and transformation to boost business growth
- Our culture will drive our future
Financials
Continuous Focus on Long-Term Growth

Alfredo Arroyo
Chief Financial Officer
A Compelling Investment
A Compelling Investment
Positioned to Support Long-Term Growth

- Global presence with a diversified revenue base and solid upward growth
- Demonstrated ability to successfully grow businesses both organically and through acquisitions
- Significant value creation through acquisitions
- Poised to increase its exposure to the fast-growing Chinese market
- Leading player in plasma-derivatives industry
- Vertically integrated business model

Grifols’ revenue evolution

By division (2)

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (EUR in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>2,303</td>
</tr>
<tr>
<td>2012</td>
<td>2,621</td>
</tr>
<tr>
<td>2013</td>
<td>2,742</td>
</tr>
<tr>
<td>2014</td>
<td>3,355</td>
</tr>
<tr>
<td>2015</td>
<td>3,935</td>
</tr>
<tr>
<td>2016</td>
<td>4,050</td>
</tr>
<tr>
<td>2017</td>
<td>4,318</td>
</tr>
<tr>
<td>2018</td>
<td>4,487</td>
</tr>
</tbody>
</table>

CAGR: +9.5%

By region (2)

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>US &amp; Canada</td>
<td>66%</td>
</tr>
<tr>
<td>EU</td>
<td>18%</td>
</tr>
<tr>
<td>RoW</td>
<td>16%</td>
</tr>
</tbody>
</table>

1. 2011 figures are pro forma for Talecris acquisition.
2. Net revenue breakdown based on FY2018 reported figures

1. 2011 figures are pro forma for Talecris acquisition.
2. Net revenue breakdown based on FY2018 reported figures
A Compelling Investment
Positioned to Support Long-Term Growth through Innovation

- Grifols has been firmly committed to innovation since its foundation
- In 2018, Grifols intensified its net R+D+i investments by 15% at cc to EUR 291M\(^1\). This investment represents 6.5% of revenues
- More than EUR 1,350M invested in R+D+i over the last 5 years
- Grifols advocates an integrated R+D+i strategy that comprises both in-house initiatives and external projects in investee companies whose research complements its core business
- Grifols earned the distinction as one of the top 1,000 global firms that dedicate the most resources to R+D in “2018 Global Innovation 1000” by Strategy&, the consulting arm of PwC

1. Taking into account net investments for both internal and external research initiatives
A Compelling Investment
Positioned to Support Long-Term Growth through Global Expansion

• Strategically, Grifols seeks to strengthening its presence in China as a key global market
• Grifols’ first commercial operations in China began back in the 1980’s, and today it represents one of the major markets for Albumin
• The strategic alliance with Shanghai RAAS pursues to boost growth of its plasma-derived products and diagnostic solutions in China
• This agreement is an important step forward in Grifols’ sustainable growth and long-term strategy, generating value for all of its divisions
## Results Performance in 2018

### Financial Highlights

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Sales</td>
<td>EUR 4.5 billion</td>
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<tr>
<td>Operating Growth</td>
<td>+9.2%</td>
</tr>
<tr>
<td>EBITDA</td>
<td>EUR 1.2 billion</td>
</tr>
<tr>
<td>Adjusted Net Profit</td>
<td>EUR 681 million</td>
</tr>
<tr>
<td>Net Operating Cash Flow</td>
<td>EUR 962 million</td>
</tr>
</tbody>
</table>

- Strong operating sales growth driven by robust performance of Bioscience
- Reported growth in all divisions and geographic regions
- Substantial FX headwinds impacting top line (EUR 227 million)
- Margins impacted by higher plasma costs as a result of both organic and inorganic efforts, to fulfill the continued demand for its plasma-derived therapies
- Record-high dividend payout of EUR 279 million
- Leverage management remains among the company’s top priorities
• Robust sales of the main plasma proteins
• Solid demand for immunoglobulins in the U.S. and some EU markets, and alpha-1 antitrypsin sales remain strong in core markets
• Higher sales volume and positive pricing environment
• The renewal processes of certain licenses in China suffered delays in the last quarter of 2018, impacting sales growth and inventory
Higher NAT solutions sales were primarily fueled by an increase in plasma donations and the growing use of the Zika-virus screening test (Procleix® Zika Virus)

- Strong sales for NAT solutions in Latin America, Poland and Indonesia, in addition to the U.S.
- Continued efforts in the Middle East
- The blood-typing line notably contributed to the overall performance, particularly in the U.S. and in core markets in Latin America, Europe, and Saudi Arabia
Results Performance in 2018 - Hospital
Double-digit Growth Driven by Strong Performance in the U.S.

• Sales of all business lines grew in 2018, especially the Pharmatech line in the U.S. market. A key strategic area for future growth including MedKeeper and Kiro Oncology products.

• The division also reported higher IV solutions sales, especially the physiological saline solution manufactured in the Murcia (Spain) plant.
Delivering on our ambitions in 2019

- Strong organic growth in all geographic regions
- Bioscience: Robust sales growth; cost per liter of plasma stable driven by higher plasma collections; new product launches; and margins improvements
- Inventory build-up as a key pillar of strategic growth
- Diagnostic: Extended contracts with 6 top accounts. Maintaining market share
- Hospital: Focus on execution leveraging on the U.S. market
- Successful closing of strategic acquisitions, integration well on track
- Substantial progress in implementation of strategic initiatives
- Expected FX tailwind
FX Tailwind
Backed on Natural Hedging

P&L Currency Exposure

Revenues
- US Dollar 75%
- EUR 17%
- Others 8%

Expenses
- US Dollar 80%
- EUR 16%
- Others 4%
Applying IFRS 16: Major Impacts
IFRS 16: Major Impacts on Balance Sheet and P&L

Lessee Accounting

- Single model for lease accounting by lessees

- Recognition a right-of-use asset (ROU) representing its right of use the underlying asset throughout the lease term and a lease liability representing its obligation to make future lease payments

- The ROU is measured at cost less accumulated depreciation

- Impact in P/L due to change in the nature of expenses. Lease cost replaced by: depreciation of right of use assets and interest on lease liabilities

- No impact on net cash flow. Shift form cash flows from operating activities to cash flows from financing activities

- As per the financial covenant, no impact on leverage ratio
### IFRS 16: Major Impacts on Balance Sheet and P&L

#### Lessee Accounting

#### Balance Sheet

<table>
<thead>
<tr>
<th>March 31, 2019</th>
<th>ASSETS (right-of-use)</th>
<th>EUR 690M</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DEBT (lease liability)</td>
<td>EUR 711M</td>
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</tbody>
</table>

#### P&L

<table>
<thead>
<tr>
<th>Estimates for FY2019(^1) (In EUR million)</th>
<th></th>
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<tbody>
<tr>
<td>+ Lease expense</td>
<td>56</td>
</tr>
<tr>
<td>= EBITDA</td>
<td>56</td>
</tr>
<tr>
<td>- Higher Depreciation</td>
<td>-58</td>
</tr>
<tr>
<td>= EBIT</td>
<td>+2</td>
</tr>
<tr>
<td>- Interest Expenses</td>
<td>-30</td>
</tr>
<tr>
<td>Profit Before Taxes</td>
<td>-28</td>
</tr>
</tbody>
</table>

1. FY2019 estimated based on 1Q 2019A. Ex-rate USD-EUR 1.15
Plasma Economics

The Paradigm of Balancing the Liter

<table>
<thead>
<tr>
<th>% of plasma volume</th>
<th>IG</th>
<th>Factor VIII</th>
<th>Albumin</th>
<th>Alpha-1</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
<td>46%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>46%</td>
<td></td>
<td>43%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Revenue per Liter

Gross margin (GM)

Cost of Goods Sold (COGS)

For illustrative purposes
Balancing the liter
Maximizing the Grifols’ Gross Margin and Profit

Revenue per Liter

<table>
<thead>
<tr>
<th>% of plasma volume</th>
<th>IG</th>
<th>Albumin</th>
<th>Factor VIII</th>
<th>Alpha-1</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43%</td>
<td>46%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Strategy

- Broad portfolio and optimizing pricing mix
- Accelerate Alpha-1 growth
- Geographic expansion of pdFVIII
- Accelerate R&D output to support business growth
  - New indications for existing proteins (AMBAR)
  - New plasma proteins
- Business development through collaboration and licensing agreements
- Effective cost management
Capital Allocation
Capital Allocation Supports Growth
Capital Discipline Focused on Creating Value

Sources of Cash

- Cash flow generation
- Capital Structure

Investments + Acquisitions + Dividends
**Strong Cash Flow Generation**

High Conversion of EBITDA Into Cash Flow$^{1,2}$

- Strong net cash flow from operating activities of EUR 962M, up from the average in 2014-2018 period

- Continued focus on cash flow from operating activities expansion driven by working capital management, operating performance and disciplined CAPEX

---

1. Cash flow conversion defined as (EBITDA – Capex – Change in Working Capital) / EBITDA
2. Cash flow defined as EBITDA – Capex – Change in Working Capital
Capital Structure Breakdown

Debt to EV Ratio Enables Balance Sheet Flexibility. Deleveraging remains a priority

(EUR in millions)

Market Cap 1Q 2019: $21,875
70%

Net Debt 1Q 2019: $6,617
<50%

Net debt 1Q 2018: $5,155
-1,232

EBITDA: 118
Investments: 305
Working Capital: 330
CAPEX: 279
Dividends: 231
Interest payments: 720
Others: 711
IFRS16: 6,617
Market Cap 1Q 2019: $15,258

Market cap source: Bloomberg at March 31, 2019
**Evolution of Leverage Ratio**

Strategic Investments Lead Higher Leverage Ratio. Deleveraging Remains a Priority

- **Hologic Acquisition**
- Strategic acquisition on Hospital (MedKeeper) and plasma (Kedrion, Biotest and Haema)
- Biotest & Haema monetization

**Continued focus on strong cash flow generation**

Leverage management remains among the company’s top priorities

Our target leverage ratio is below 4.0

****

- Rigel upfront payment;
- corporate transactions;
- Inventory build up;
- Temporary AR & AP impact
- Reverse advanced payment of $150m (-0.2x)

Leverage Ratio defined as Net Financial Debt to EBITDA excluding any IFRS 16 impact

* 4.6x excludes payment of $150m

---

**GRIFOLS**

Investor and Analyst Meeting 2019  |  North Carolina  |  373
CAPEX Continues to Support Long-Term Growth
Allocating EUR 1,400M over 2018-2022

- Significant investments to support growth initiatives and innovation
- Continued emphasis on execution and capital allocation efficacy and return

TOTAL INVESTMENT: EUR +1bn

<table>
<thead>
<tr>
<th>Year</th>
<th>EUR (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>266</td>
</tr>
<tr>
<td>2016</td>
<td>268</td>
</tr>
<tr>
<td>2017</td>
<td>271</td>
</tr>
<tr>
<td>2018</td>
<td>252</td>
</tr>
</tbody>
</table>

CAPEX

(EUR in millions)
R&D Continues to Support Long-Term Growth

Commitment to an Integrated Approach

• R&D drives long-term growth and profitability

• Includes strategic collaborations: leveraging internal and external expertise

TOTAL INVESTMENT: EUR +1.1bn

<table>
<thead>
<tr>
<th>Year</th>
<th>R&amp;D In-house</th>
<th>R&amp;D External</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>218</td>
<td>56</td>
<td>274</td>
</tr>
<tr>
<td>2016</td>
<td>218</td>
<td>77</td>
<td>295</td>
</tr>
<tr>
<td>2017</td>
<td>255</td>
<td>56</td>
<td>311</td>
</tr>
<tr>
<td>2018</td>
<td>281</td>
<td>10</td>
<td>291</td>
</tr>
</tbody>
</table>

(EUR in millions)
Strategic Investment to Secure Growth

Haema and Biotest Transactions

**Rationale**
- To monetize recent acquisitions since there are still significant 3rd party supply agreements in place
- To strength the financial position while reducing financial leverage

**Key terms**
- Same price, terms and conditions existing at the time of Grifols acquisition (June 8 and August 2018)
- Call option to re-acquire exclusively and irrevocably at any time and at original acquisition price
- Current plasma agreements remain in place, extended to 30 years
Strategic Investment to Secure Growth
Haema and Biotest Transactions

Accounting treatment
- Transaction that results in change of ownership interest while retaining control
- Call Option >> potential voting rights >> control >> consolidation
- Full consolidation (P&L and BS) reversed in minorities

Business Management Agreement
- Covers all the existing key management services provided by Group companies
- Term in line with Plasma Supply Agreement at 30 years
Grifols Next Growth Engine
Strategic Alliance with Shanghai RAAS (SRAAS) in China

Key Transaction Terms

- Grifols will contribute 45% economic rights in Grifols Diagnostic Solutions (GDS) Group into SRAAS and 40% voting rights in GDS
- In exchange, Grifols will acquire 26.2% stake in SRAAS (voting and economic rights);
- **Grifols’ protections as shareholder include:**
  - Grifols will have the right to appoint 2 non-independent directors, out of 6 non-independent directors and 3 independent directors existing in SRAAS in total at the board of directors;
  - SRAAS articles of association will include 75% reinforced quorum to issue shares, disposal of material assets, mergers and modify the articles of associations (Grifols having veto on all these);
  - Grifols will have a right of first refusal upon sale of shares of Creat and pre-emption rights on issuance of new shares in SRAAS, to avoid dilution

*Transaction completion subject to regulatory approvals from China and U.S. authorities. The transaction is not expected to close before 4Q 2019.*
• Grifols and SRAAS will enter into an **exclusive Strategic Alliance Agreement** whereby:
  - Grifols and SRAAS shall enter into a Quality Agreement to set up high International quality standards;
  - To appoint a quality person and manufacturing person to follow compliance with such agreed quality agreement;
  - SRAAS become the exclusive distributor of Grifols in China;
  - In exchange of royalties to be agreed upon, Grifols shall provide technology owned or controlled by Grifols to SRAAS for use in China;
  - Grifols shall provide engineering services to SRAAS in exchange of fees to be agreed upon; and
  - SRAAS commits to use GDS NAT technology in its plasma collection business

* Transaction completion subject to regulatory approvals from China and U.S. authorities The transaction is not expected to close before 4Q 2019
Grifols Next Growth Engine
Strategic Alliance with Shanghai RAAS (SRAAS) in China

**Key Transaction(*) Terms**

- Shanghai RAAS will have the right to appoint 1 director at GDS and will have similar antidilution protections as Grifols in SRAAS;
- Creat will be prevented from selling its stake in SRAAS to a competitor of Grifols and Grifols will be prevented from selling its stake in GDS to any Chinese entity

**Accounting treatment**

- **Grifols will fully consolidate GDS Group**, adjusting the 45% of GDS as a minority;
- **Grifols will include the 26.2% of SRAAS net profit at EBITDA level**

---

* Transaction completion subject to regulatory approvals from China and U.S. authorities. The transaction is not expected to close before 4Q 2019.
Return to Shareholders
Sharing success with shareholders

- Strong earnings profile
- Accumulated annual dividend up by 6.3% over the last 5 years
- More than EUR 1,000M returned to shareholders over the last 5 years
- Pay-out ratio 40% of reported consolidated profits

(DPS relates to non-recurring items)

<table>
<thead>
<tr>
<th>Year</th>
<th>DPS (EUR per share)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.27</td>
</tr>
<tr>
<td>2015</td>
<td>0.31</td>
</tr>
<tr>
<td>2016</td>
<td>0.32</td>
</tr>
<tr>
<td>2017</td>
<td>0.34</td>
</tr>
<tr>
<td>2018</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Key Takeaways
Key Takeaways
Continuous Focus on Long-Term Growth

• Continued support to fund **long-term growth**

• Steady focus on **business fundamentals** and **global expansion**

• **Capital allocation** efficient and focused on strategic opportunities, industrial and plasma capacity needs and R&D initiatives

• Working capital management to optimize growth while **maximizing cash flow generation**

• Expected gradual **reduction of leverage ratio** to c.4.5x by 2019; while target is set to below 4.0x. Company is very mindful of its leverage – **remains a key priority**

• **Shanghai RAAS**: the right partner and agreement into the fastest-growing market to create long-term value

• **Constant shareholders reward** through 40% pay-out
Grifols: a Socially Responsible Company
Within Grifols’ DNA Since Our Origins

Teresa Rioné
VP, Corporate Communications
“The right to live in society entails the duty to work to improve it.”

Josep Antoni Grífols i Roig, 1976
Grifols: A Socially Responsible Company
“At Grifols, we believe in responsible management to generate social, economic and environmental value.”

Raimon Grífols Roura
Víctor Grífols Deu
2018
Grifols: A Socially Responsible Company

**MISSION**
Our mission is to improve the health and well-being of patients around the world

**VISION**
We strive to be a global leader in our markets and a constant industry reference for innovation, quality and safety
Corporate Social Responsibility is part of the Grifols’ Business Model
Corporate Social Responsibility

Key Areas

Governance  Employees  Environment  Social
Corporate Social Responsibility

Governance  Employees  Environment  Social
Corporate Social Responsibility

Key Principles

- Ethical Code and Best Practices
- Grifols Ethics Helpline

High Governance Standards
- Board Composition
- Board Independence

Ethics & Integrity

Transparency
- Annual Corporate Governance Report
- Annual Report on Remuneration
- Interactions with healthcare professionals and organizations
Diverse and well-balanced Board:

- Even distribution by **number of years** on Board (31% 1-3 years, 38% 4-10 years, 31% +10 years)
- 31% of Board members are **women**
- Board members represented in all **age groups** (39% aged <55, 46% aged 55-65, 15% aged >65)
- Diverse **professional experience** and career paths (financial, healthcare, research, law)
Corporate Governance

High Governance Standards: Independence

<table>
<thead>
<tr>
<th>Boards of Directors</th>
<th>Board of Directors’ Committees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differentiated roles of President and CEOs</td>
<td>Independent President</td>
</tr>
<tr>
<td>Lead Independent Director</td>
<td>Non-Executive only</td>
</tr>
<tr>
<td>85% Non-Executive</td>
<td>≥2 out of 3 Independent</td>
</tr>
<tr>
<td>&gt;50% Independent</td>
<td></td>
</tr>
</tbody>
</table>
Corporate Governance

Transparency: Our Commitments Beyond Compliance

Interactions with Healthcare Professionals and Organizations

The United States

- Sunshine Act

2019 Plans:

- New Transparency Training Program (Employees)
- Quarterly sub-certification process

EU countries

- All relevant country-specific transparency standards
- Practices voluntarily adopted
  - EFPIA Disclosure Code
  - MedTech Europe - Code of Business Practice
  - Grifols Global Compliance Program
Corporate Governance
Ethics & Integrity: Robust Corporate Policies

- Code of Ethics
- Code of Conduct
- Anti-Corruption
- Crime Prevention

- Privacy & Data Protection
- Tax Compliance
- Directors’ Remuneration
- Communication with Financial Markets
- Risk Control & Management
- Diversity & Equality

Ethics & Integrity: Robust Corporate Policies
## Corporate Governance

### Ethics & Integrity: Our Commitments Beyond Legal Compliance

<table>
<thead>
<tr>
<th>Compliance Function</th>
<th>Employee Training and Helpline</th>
<th>Third Party Anticorruption Management Practices</th>
</tr>
</thead>
</table>
| • Ensures Grifols complies with all applicable anticorruption laws, rules and regulations | • Employees are trained in anticorruption practices  
• Grifols Ethics Helpline to confidentially raise concerns of non-compliance or misconduct | • Exhaustive screening  
• Due Diligence  
• Ethical standards and monitoring |
| • Applies best practices within the organization | | |
| • Strict and immediate response to possible violations | | |
Corporate Social Responsibility

Governance  Employees  Environment  Social
**Employees**

Diversity, Inclusion, Equal Opportunities and Non-Discrimination

---

**TALENT & DIVERSITY**

<table>
<thead>
<tr>
<th></th>
<th>TOTAL TALENT POOL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>21,230 +16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>WOMEN</th>
<th>MEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59%</td>
<td>41%</td>
</tr>
</tbody>
</table>

| PERMANENT CONTRACTS | 98.3% |
| AGE 30-50 YEARS    | 51.7% |
| WORK FULL TIME     | 93.8% |

**EQUAL OPPORTUNITY**

Grifols makes no distinction between men and women.

| WOMEN/PERM. CONTRACTS | 98.7% |
| WOMEN/FULL TIME       | 92.4% |
| WOMEN/PROFESSIONALS   | 1,379 +37% |
| WOMEN/MANAGEMENT      | 590 +25% |
| WOMEN/TOP MANAGEMENT  | 172 +24% |

---

Grifols has reduced the gender pay gap, which is below international benchmarks in all professional categories.
Employees
Talent Attraction and Retention

Strong Corporate Values
- Pride
- Effort
- Safety
- Teamwork
- Commitment
- Innovation & Improvement

Competitive Remuneration package

Continuous Training and Development

Career Development Opportunities

Annual and Systematic Performance review
Employees
Talent Development

Continuous Training and Development

- Leadership Development
  - Executive Education Programs (ESADE, Georgetown)
- Ongoing Professional Development
  - Grifols Academy Programs
- Onboarding Programs

2.5 million hours
Total training in 2018

138 hours
Training per employee in 2018
**Employees**

**Talent Development**

---

**The Grifols Academy Professional Development**
- Training and professional development for Grifols employees.
- Aimed at strengthening specific competencies and fostering Grifols’ corporate culture.
- Programs fall into three core areas: scientific-technical knowledge, skills development and leadership competencies.

---

**The Grifols Academy Plasmapheresis**
- Offers advanced training on all plasmapheresis procedures; collection, analysis and control of plasma; manufacture of plasma-derived medicines and other ethical and quality issues framed within the area of human health.
- Allows the company to transmit its knowledge, standardize procedures and increase employee engagement, while fostering its corporate culture in Grifols’ U.S.-based facilities.

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**The Grifols Academy Transfusion Medicine**
- Offers educational programs on transfusion medicine to global professionals.
- Designed to enhance patient care by contributing to the advancement of knowledge in this field.
Corporate Social Responsibility

Governance

Employees

Environment

Social
Environment
Recognized for our Sustainability Initiatives

Carbon Disclosure Project
Businesses leading on Managing Climate Change (level B)

FTSE4Good Index
Companies that meet globally recognized Corporate Responsibility Standards

ISO 14001 Certified
International Standards for Effective Environmental Management

LEED
Clayton Plant recognition for its sustainable design in two new buildings
Environment
Environmental Management

18 million euros allocated to environmental initiatives in 2018
Environment

Our Commitments – Key Achievements in 2019

2019 “ZERO WASTE TO LANDFILL” GOLD CERTIFICATION

• Zero Waste Policy in place
• Over 99% waste recovery
• Only 5% of incineration with energy recovery
On the promotion of the use of energy from renewable sources

2030 target: ≥ 32% of energy sources must be renewable in the EU

We are already investing in renewable energy sources:

- A new onsite photovoltaic generation plant in Murcia (Spain)
- Establishing PPAs (Power Purchase Agreement) in order to gradually shift towards green energy.

Grifols is committed to continue investing in environmental sustainability beyond the international regulatory requirements.
Corporate Social Responsibility

Governance  Employees  Environment  Social
Social Transparency

- Patient Organizations
- Local Communities Plasma Donor Centers
- Research
- Foundations
- Special Projects

33.3 million euros allocated to social initiatives in 2018
# Social
## Our Commitments with Patients

<table>
<thead>
<tr>
<th>Educational Programs</th>
<th>Support and Patient Care</th>
<th>Access to Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>For patients and their families</td>
<td><strong>ALFACARE</strong>, a patient-assistance program for patients with alpha-1 antitrypsin deficiency in Spain</td>
<td></td>
</tr>
<tr>
<td>• <strong>U.S.</strong> Patient Community Open Houses</td>
<td>• Personalized Support (emotional, psychological)</td>
<td><strong>U.S. PatientCare Program</strong> for Patients with Hemophilia or Primary Immunodeficiency (since 2006)</td>
</tr>
<tr>
<td>• <strong>ES</strong> Alpha-1 antitripsin deficiency <strong>Organization awareness</strong> trekking experience</td>
<td>• Complements Standard Care</td>
<td>25 million International Units of <strong>Clotting factor</strong> donated to <strong>WFH Humanitarian Aid Program</strong> in 2018</td>
</tr>
<tr>
<td></td>
<td><strong>Similar programs have been rolled out in other countries (US, DE, CA)</strong></td>
<td>• Treatment for <strong>6,000 patients</strong> per year until 2021</td>
</tr>
</tbody>
</table>
Social
Our Commitments with Plasma Donors and Local Communities

Plasma Donors - Recognition

- Compensation for Donors’ time and commitment
- Same Remuneration for All Donors (no age, weight or gender distinction)
- Complete Health Screening
- Plasma Possibilities Program (waiving fee for Charity Organizations) – since 2017

Local Communities - Activities

Focus Areas

Feeding our communities
- Food Drives
- Volunteer hours
- Feed the troops

Raising awareness
- Races
- Supporting neighbor organizations
- Plasma education

Supporting our schools
- School supplies drives
- Sponsorships
- Career days

Fundraising
- Plasma Possibilities donor fundraising program
- Support of Direct Relief

3,000 community activities in 2018

Facts & Figures

9,000
KILOS OF FOOD COLLECTED

330
THOUSAND OF $ DONATED TO 70+ U.S. ORGANIZATIONS

16
THOUSAND OF $ IN SCHOOL SUPPLIES, OUTFITTING 150 STUDENTS
Grifols has a long-standing commitment to the scientific community and promotes awards in research related to our core business areas.

**Martín Villar Haemostasis Awards**

- SPIN, Scientific Progress **Immunoglobulins In Neurology Award**
- ALTA, **Alpha-1-antitrypsin** Laurell’s Training Award
- Albus, **Albumin** Awards Program
- GATRA*, Grifols **Antithrombin** Research Awards

* There were no GATRA granted in 2018

Grifols supports education and access to treatment in developing countries:

- Outreach diagnosis
- Improve education
- Facilitate access to treatment
The Foundation pays tribute to the memory of Dr. José Antonio Grifols Lucas, who developed the plasmapheresis technique, and recognizes the indispensable value of the donors.

José Antonio Grifols Lucas Foundation contributes to the communities where Grifols operates its plasma donation centers through health, wellbeing and educational programs.
The Víctor Gríols i Lucas Foundation was established in 1998 to spark cross-disciplinary debate on bioethics.

The Foundation seeks to foster ethical attitudes and create new ideas and insights in organizations, companies and professionals in the field of human health.

Main activities include conferences, seminars and courses as forums to exchange different perspectives.
Fundación Probitas was created in 2008 to leverage Grifols’ expertise in the healthcare field and contribute to enhancing medical care in areas with limited resources.

Probitas combines in-house programs and external collaborations with NGOs in the humanitarian sector (Spanish Red Cross, Save the Children, World Food Program).

0.7% of Grifols corporate profits go to support this private foundation.
Collaborative effort among Grifols, Probitas, and Liberian scientists at the National Public Health Institute of Liberia to obtain plasma from Ebola survivors to produce anti-Ebola immunoglobulin.

Grifols built a first-of-its-kind modular plasma donation center in Monrovia, Liberia.
## Corporate Social Responsibility

Within Grifols’ DNA since our origins

<table>
<thead>
<tr>
<th>Years</th>
<th>Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Grifols Museum</td>
</tr>
<tr>
<td>21</td>
<td>Víctor Grifols I Lucas Foundation</td>
</tr>
<tr>
<td>10</td>
<td>José Antonio Grifols I Lucas Foundation</td>
</tr>
<tr>
<td>10</td>
<td>Probitas Foundation</td>
</tr>
</tbody>
</table>

*Heritage*  
*Ethics*  
*Donors*  
*Social*
Executing a New Chapter of Continued Growth and Success

Víctor Grífols Deu
Co-CEO
OVER THE PAST TWO YEARS, EVERY DECISION HAS BEEN A BUILDING BLOCK THAT HAS PAVED OUR WAY INTO THE FUTURE...  

...WE BELIEVE EVERYTHING IS NOW IN PLACE, NOW IS A MATTER OF RIGHT EXECUTION...  

...TO ENSURE OUR CONTINUED GROWTH & SUCCESS  

Key priorities moving forward  

Corporate Focus areas
Business Evolution – Bioscience \((LTM, \text{ at CC})^1\)

**Current actions with future impact**

- **Sourcing**
  - Double down in plasma: volume expansion and geo. diversification
  - Cost and efficiency improvements
  - Vertical integration (IV)

- **Business (revenue)**
  - Production capacity increase: +19M L by 2022 (fractionation and purification)

- **Engineering and manufacturing**
  - CAGR 7.6%

- **EBITDA**
  - 1,118M€ (30.5%) of revenue

- **Innovation**
  - New products (e.g. Liquid Alpha-1, fibrin, thrombin, alpha-1 test)

- **Commercialization**
  - Geographic expansion (India,…)
  - Complementary products (e.g. Rigel)

- **CAGR** 3.7%

**PPR Therapies: AMBAR, Liver,…**

- New indications and proteins (e.g. GigaGen, Alkahest)

- Continuous liter optimization

- Broaden portfolio of complementary products

- Continuous capacity increase: Plasma volume/Production

---

1. Reported figures. Excluding plasma sales to 3rd parties
Business Evolution – Diagnostic (LTM, at CC)¹

**EBITDA**
- Engineering and manufacturing
  - NAT Vertical integration
  - New facilities Emeryville, San Diego & Brazil
  - BTS production Expansion (US)

**CAGR**
- 34.8%
- 248M€ (34.9%) Of sales

**Current actions with future impact**
- **NAT**: grow plasma business
- China and rest of Asia
- Blood typing geo. expansion
- Operational optimization (e.g. technical service)
- Innovation (e.g. Singulex)

**Business (revenues)**
- 201
- 106
- 100

**Dec. 16**
- Nat Vertical integration
- New facilities Emeryville, San Diego & Brazil
- BTS production Expansion (US)

**Dec. 17**
- NAT reagents/ instruments automation
- Eflexis®

**Dec. 18**
- Blood typing US/Europe (Eflexis®)
- Hemostasis

**Mar. 19**
- NAT Vertical integration
- Eflexis®

**Dec. 2019**
- Dec. 16: 248M€
- Dec. 17: 710M€
- Dec. 18: 2.7%
- Mar. 19: 34.8%

1. Reported figures
Business Evolution – Hospital (LTM, at CC)

- Increase vertical integration: AC
- Focus in Compounding Rx in U.S.
- Build products and solutions alongside with customer (e.g., IV compounding)
- Best-in class: Rapid product testing & prototyping

Key Actions:
- Spain & LATAM consolidation
- US growth
- Kiro Robotics
- MedKeeper
- InclusIV

Current actions with future impact

2019
- Increase vertical integration: 123M€
- Spain & LATAM consolidation: -2M€ (-1.9%)
- US growth: 4.7%

Innovation
- Engineering and manufacturing
- Capacity optimization: US/Spain Balance

Commercialization
- Spain & LATAM consolidation
- US growth

EBITDA

Dec. 16 Dec. 17 Dec. 18 Mar. 19

CAGR 9.3% 4.7%

1. Reported figures
Business Evolution – Group (LTM, at CC)\(^1\)

**Bioscience**
- Double down in plasma: volume expansion and geo. diversification
- Capacity expansion

**Hospital**
- Focus in Compounding Rx
- Vertical integration

**Diagnostic**
- Vertical integration
- Blood typing: U.S. + Eflexis\(^\circledR\)

**Bio Supplies**
- New line of growth

**Transversal**
- Talent
- One Grifols
- Business optimization (e.g. Supply chain, procurement)

**Current actions with future impact**

- Continuous capacity leadership
- Leading in innovation (PPR Therapies)
- China
- Digitalization

---

1. Reported figures. Excluding plasma sales to 3rd parties