

2018 Investor and Analyst Meeting

Barcelona
7th and 8th June

GRIFOLS



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2018 Investor and Analyst Meeting

Thursday, June 7th

<u>Time</u>	<u>Topic</u>	<u>Presenter</u>
8:15	<i>Pick-up from hotels</i>	
9:00 - 9:30	<i>Welcome</i>	
9:30 - 10:00	Introduction	Raimon Grífols Roura
10:00 - 12:00	Commercial Strategies	Lafmin Morgan
	Bioscience	Joel Abelson
	Diagnostic	Carsten Schroeder
	Hospital	Robert Jagt
12:00 - 12:30	Q&A	
12:30 - 1:30	<i>Lunch</i>	

2018 Investor and Analyst Meeting

Thursday, June 7th

<u>Time</u>	<u>Topic</u>	<u>Presenter</u>
1:30 - 2:15	Plasma Procurement Strategy	Peter Allen
2:15 - 3:00	Bioscience Manufacturing Operations	Eduardo Herrero
3:00 - 3:30	Diagnostic Industrial	Oriol Duñach
3:30 - 4:00	<i>Break</i>	
4:00 - 6:00	Innovation	David Bell
	Progenika Alpha-1 Genetic Test and Singulex	Antonio Martínez
	GigaGen	José Terencio
6:00 - 6:30	Q&A	
6:30 - 7:30	<i>Site Tour</i>	
7:30	<i>Dinner</i>	

2018 Investor and Analyst Meeting

Friday, June 8th

<u>Time</u>	<u>Topic</u>	<u>Presenter</u>
8:00	<i>Pick-up from hotels</i>	
8:30 - 8:45	<i>Welcome</i>	
8:45 - 9:45	Innovation Research Studies on Albumin	David Bell Dr. Arroyo / Montserrat Costa
9:45 - 11:15	Product Showroom	Carlos Roura / Daniel Fleta
11:15 - 12:00	Financials	Alfredo Arroyo
12:00 - 12:15	Closing	Víctor Grífols Deu
12:15 - 12:45	Q&A	
12:45 - 1:30	<i>Lunch</i>	

Introduction

Driving Value Through Strategic Acquisitions

Raimon Grífols Roura
Co-CEO

GRIFOLS



Driving Value Through Strategic Acquisitions

Access Biologicals



- January 2017
- 49% stake
- USD 51m
- 70 employees
- Manufacture of biological products for non-therapeutic uses, including plasma reagents to support specific in-vitro diagnostic and R&D activities
- 5-years call option

Driving Value Through Strategic Acquisitions

Share of NAT Technology Unit



- January 2017
- Acquisition of the share of the NAT technology donor screening unit, transforming diagnostic into a vertically integrated high-margin business
- USD 1,850m
- 175 employees
- Vertical integration of the NAT business with the acquisition of R&D, assay and instrument manufacturing activities based on NAT technology

Driving Value Through Strategic Acquisitions

6 plasma donation centers (Kedplasma)



- February 2017
- 100%
- USD 47m
- 234 employees
- 6 plasma donation centers in the U.S.
- 300,000 liters

Driving Value Through Strategic Acquisitions

GigaGen



- July 2017
- 44% stake
- USD 35m
- 17 employees
- Biopharmaceutical company based in the U.S. specialized in the development of novel innovative monoclonal and polyclonal antibody therapies

Driving Value Through Strategic Acquisitions

Kiro Grifols



- July 2017
- Stake increase from 50% to 90%
- Euro 12.8m
- 54 employees
- Technology-based company based in Mondragón (Gipuzkoa, Spain), specialized in the development of instrumentation to automate and control hospital pharmacy processes

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Driving Value Through Strategic Acquisitions

MedKeeper



- January 2018
- 51% stake
- USD 98m
- 50 employees
- Technology firm based in the U.S. that develops mobile and web-based solutions to enhance hospital pharmacy operations

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Driving Value Through Strategic Acquisitions

Haema



Haema.
Blutspendedienst

- March 2018
- 100%
- EUR 220m
- 1,100 employees
- With 35 centers, it operates the largest independent network of plasma donation centers in Germany and offers a wide range of transfusion medicine services
- 800,000 liters

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Driving Value Through Strategic Acquisitions

Agreement with Boya Bio-Pharmaceutical



- May 2018
- EUR 25m
- Agreement to build and manage plasma collection centers in China, meeting the criteria established by health authorities in the United States, the European Union and China

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Commercial Strategies

Delivering Consistent Growth

Lafmin Morgan
Chief Commercial Officer

GRIFOLS



Commercial Strategies to Deliver Consistent Growth

Agenda

- Introductions and Opening Comments
- Division Overview:
 - Bioscience
 - Diagnostic
 - Hospital
- Panel Discussion
- Closing Comments

Commercial Leadership Team

Experienced Leadership



Joel Abelson

President
Bioscience
Commercial Division



Carsten Schroeder

President
Diagnostic
Commercial Division



Rob Jagt

President
Hospital
Commercial Division

Grifols Is a Leader in Key Markets

Leading Market Shares in Major Segments

Leadership

Grifols leads its market segments

- Global leader in plasma proteins
- Global leader in NAT technology
- A global leader in transfusion medicine
- Safety and quality continues to be a differentiating factor for Grifols products

Growth Momentum Continues

Commercial Portfolio Is Strengthened With New Growth Drivers

Growth

Underlying demand continues to support growth

- Grifols has made investments to support growth
- Grifols is transforming the Hospital Division
- Grifols' growth accelerated significantly in 2017
- Sales volume in 2017 grew in all regions where Grifols operates

Growth Momentum Continues

Commercial Portfolio Is Strengthened With New Growth Drivers

Opportunity

Grifols is positioned for continued growth

- Dedicated teams seeking to achieve the company's mission
- Focus on diagnosis, treatment and geographic expansion continues to successfully deliver market growth
- **ONE GRIFOLS:** Cross divisional collaboration and new products are increasingly a source of differentiation
- Technology application is generating new avenues of growth

Bioscience Division

Delivering Consistent Growth

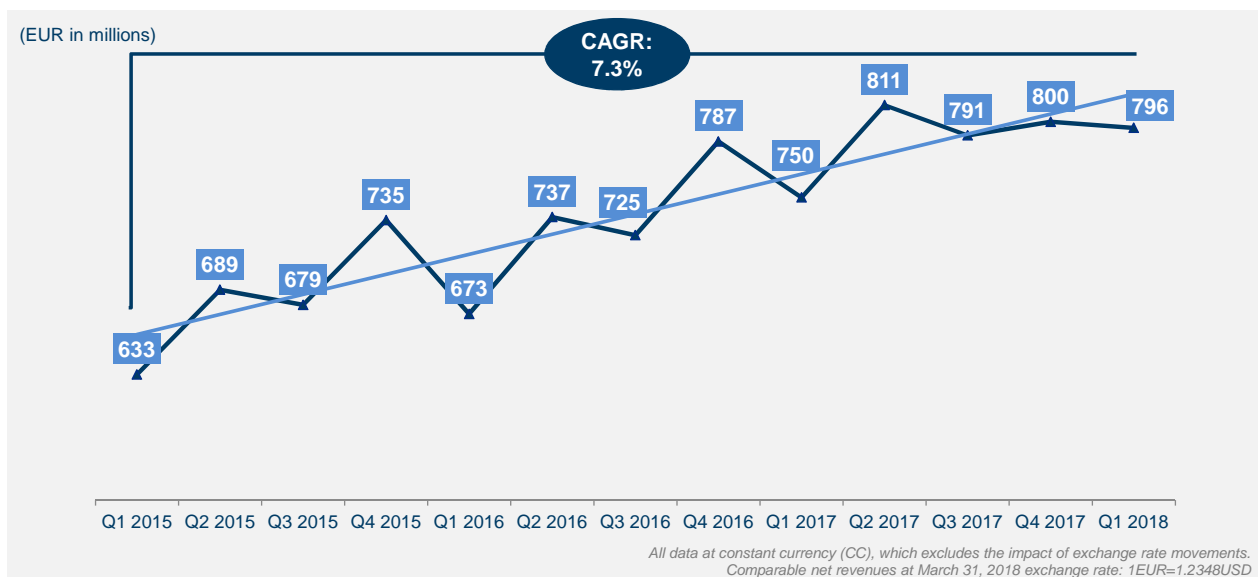
Joel Abelson
President, Bioscience Commercial Division

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Continued Sales Growth

Grifols Bioscience Revenue Grew More than 7% CAGR Since 2015



Bioscience Growth Fundamentals Remain Strong

Leading Position Within Its Core Business of Plasma-Derived Therapies

	Global Market Share ¹	Grifols Global Position	U.S. Market Share ¹	Grifols U.S. Position
Immunoglobulin	23%	#1	32%	#1
Alpha-1	67%	#1	65%	#1
pdFVIII	20%	#1	55%	#1
Albumin	17%	#2	20%	#2

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

1.- Market shares in revenues
Source: Grifols internal provisional data, 2017

Bioscience Growth Fundamentals Remain Strong

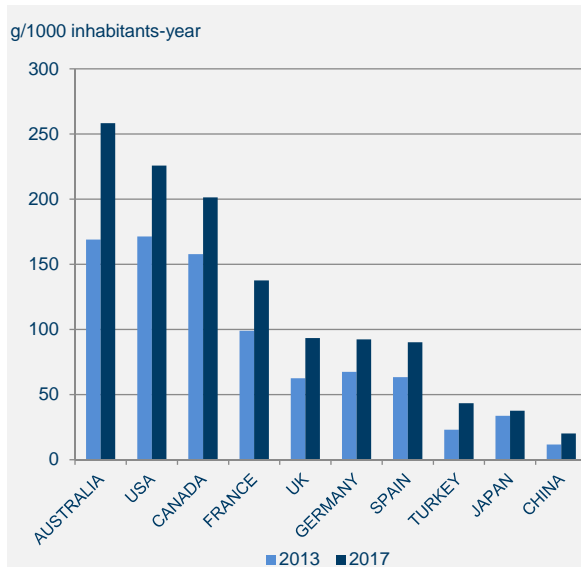
Product Strategies Will Deliver Continued Growth

Immuno-globulin	<ul style="list-style-type: none"> Grifols has a leading share in the U.S. IVIG market and top position in the expanding U.S. CIDP segment Preparing to launch its 20% SCIG offering in 2019
Albumin	<ul style="list-style-type: none"> Grifols leads the industry in clinical investments - results forthcoming in 2018 (AMBAR & ANSWER) Grifols is preparing to launch albumin in bags in the U.S. in 2019
Alpha-1	<ul style="list-style-type: none"> Grifols continues to invest in appropriate testing, diagnosis and treatment FDA approval of Prolastin®-C Liquid builds upon Grifols' position as the market leader of alpha-1 augmentation therapies
pdFVIII	<ul style="list-style-type: none"> Hemophilia A treatment paradigm is evolving, with use focused on certain patients and clinical situations like PUPs¹, prevention & eradication of inhibitors and VWD² Volume growth continues in emerging markets driven by higher rates of diagnosis

Grifols Immunoglobulin

Momentum in IVIG per Capita Utilization Continues

Top 10 Countries in Per Capita Utilization of IVIG in 2017 vs. 2013

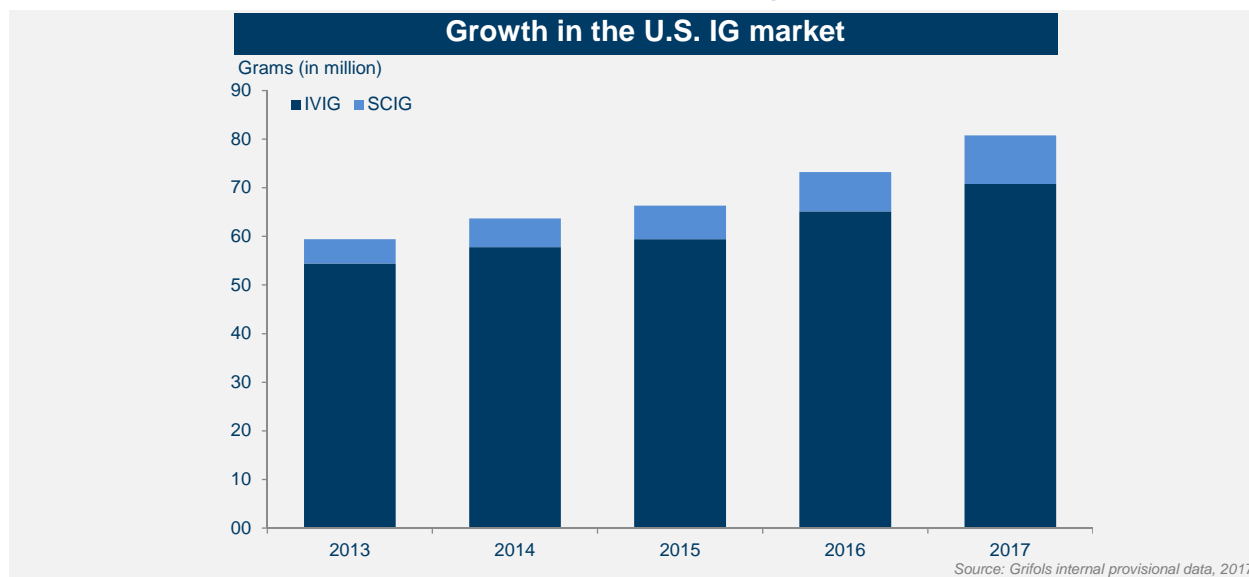


- Top markets in per capita utilization are growing at high rates
- Aging demographics fuel IG growth
- Growth continues in 2017:
 - U.S.: +13%
 - Germany: +7%
 - Spain: +15%
- Full global demand for Grifols products in 2017 could not be met due to tight plasma supply. Grifols is now positioning to fully leverage this opportunity

Source: Grifols internal provisional data, 2017

IVIG Remains the Backbone of the U.S. IG market

Over the past 4 years, approx. 80% of U.S. volume growth was in IVIG vs. SCIG

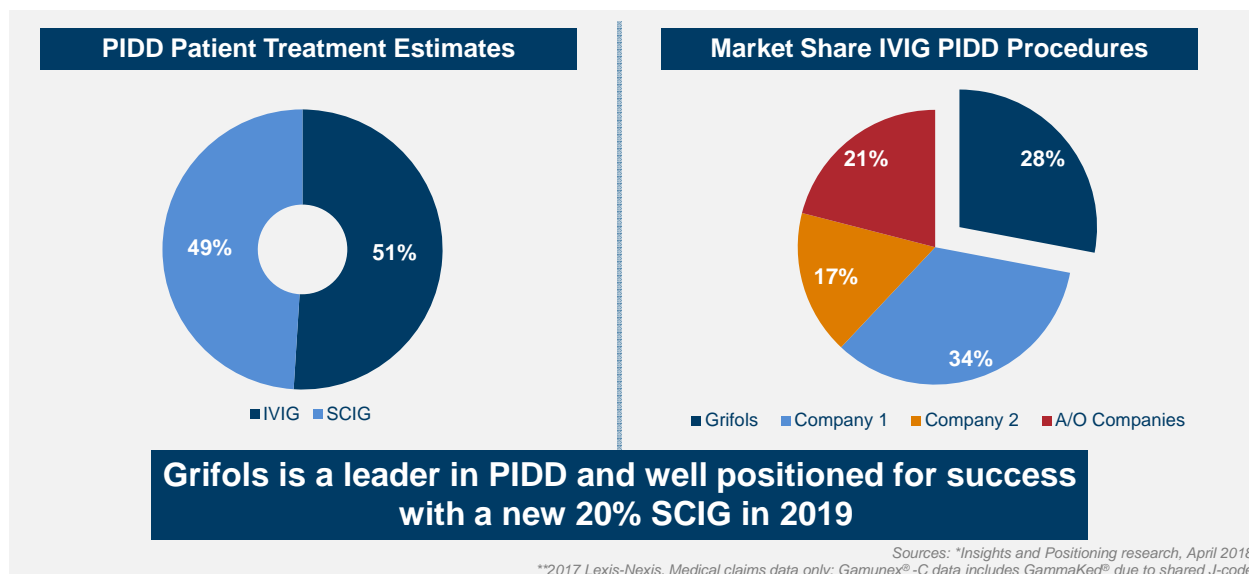


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Leading in PIDD

Despite 7+ Years of SCIG, IVIG Remains Important for PIDD Patients



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Leading in CIDP

Gamunex®-C Is Recognized as the Leading IG Treatment for CIDP

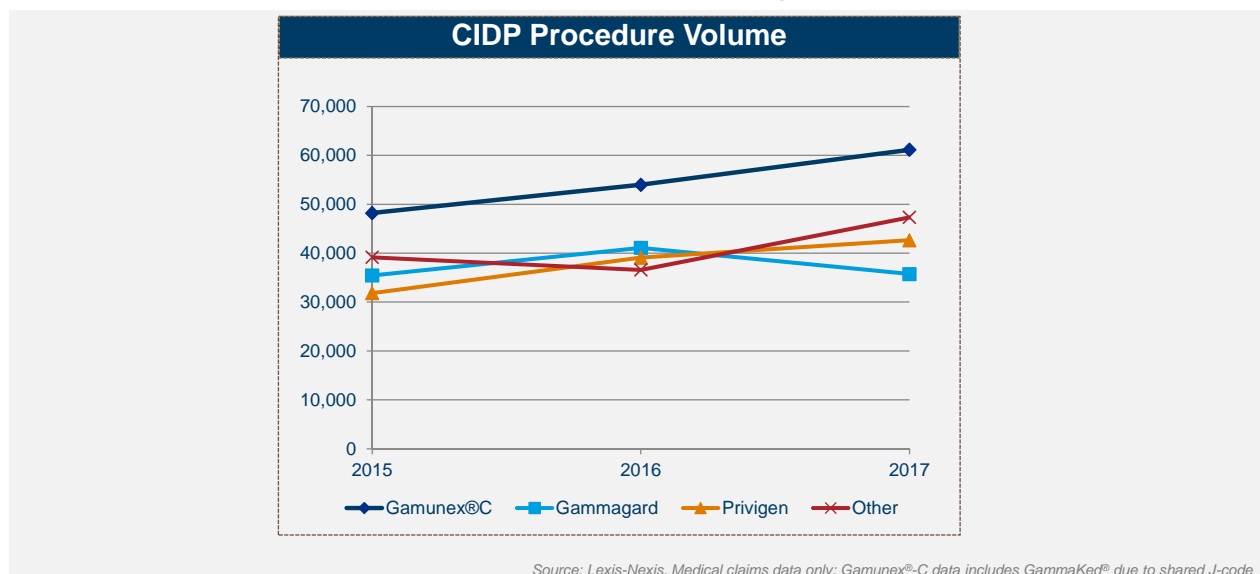
Uncover the Difference

- #1 PRESCRIBED IG FOR CIDP* AND A PROVEN FORMULATION FOR A WIDE RANGE OF PATIENT TYPES
- More than 87% of patients were relapse-free at 48 weeks²
- No dropouts in the extension phase of the ICE¹ study with sustained remission²
- IV administration by a healthcare professional in the home, hospital, or infusion center³

It's the #1 prescribed IG for CIDP¹

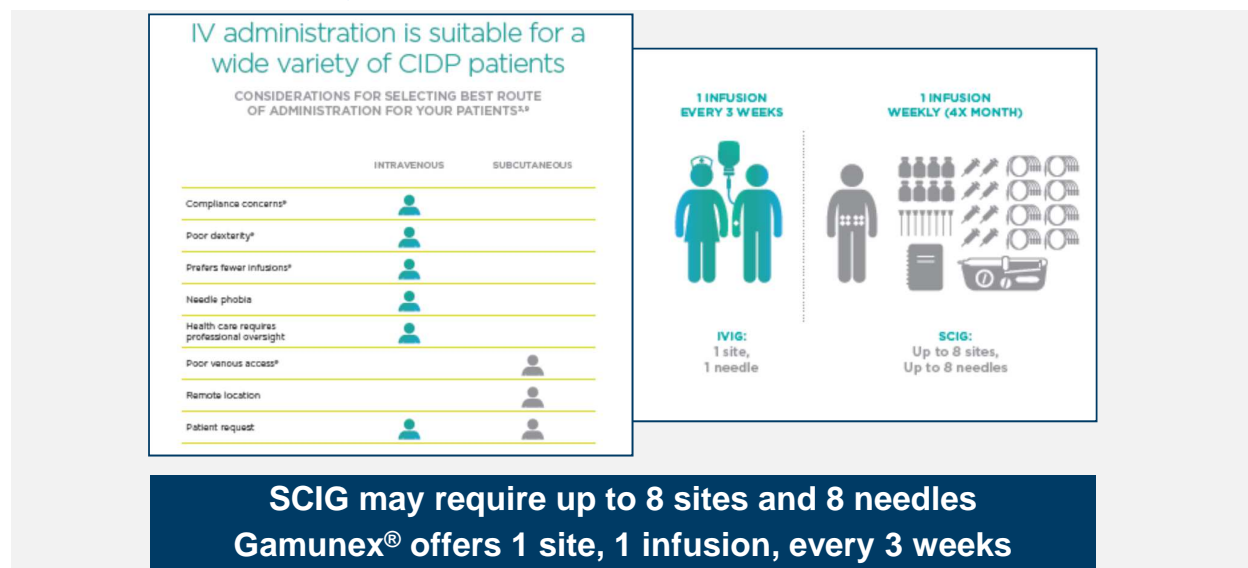
Leading in CIDP

Gamunex®-C Continues to Drive Growth in CIDP Segment



Leading in CIDP

With SCIG in CIDP, Physicians Appear Cautious: Patient Profile Is Different



Grifols Maintains a Leadership Position in IVIG Globally and in the U.S., the World's Single Largest Market

- Growth fundamentals remain strong: continued per capita utilization growth across key countries, U.S. CIDP segment
- IVIG remains the backbone of overall IG market
- Investments in plasma collection and robust plasma growth: Grifols is poised to capture global IG demand opportunities
- Grifols will launch a 20% SCIG product in 2019 and take an active role in this expanding segment in PIDD

Grifols IG HyperRAB® (300 IU/mL)

The First Advancement in Rabies IG Administration in More than 40 Years

NEW Rabies 300 IU/ML provides patients with ½ the Volume & 2X the Antibodies Delivered at the Wound Site

Grifols HyperRAB® is the #1 prescribed rabies immune globulin in the U.S. with more than 90% market share

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**NOW
APPROVED**

Grifols HyperRAB® (rabies immune globulin [human]) 300 IU/mL Receives FDA Approval to Treat Patients Exposed to Rabies Virus Infection

Innovative new formulation delivers higher concentration of anti-rabies virus antibodies per mL at wound site compared to other rabies immune globulin products on the market

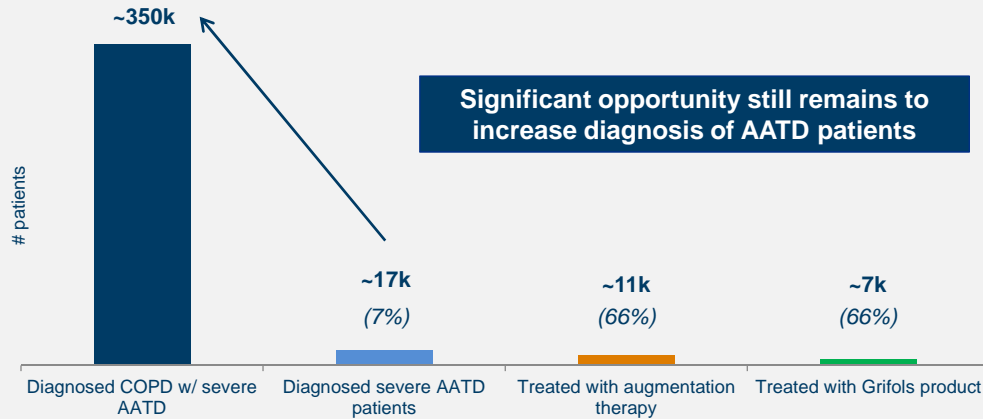
- Reduced volume of medication offers potential for fewer injections for patients
- Higher potency formulation allows for more rabies antibodies per mL to be administered directly into the wound site

Grifols Alpha-1 Antitrypsin

Opportunity Remains Significant

Leading Position in Alpha-1 Deficiency Treatment (AATD)

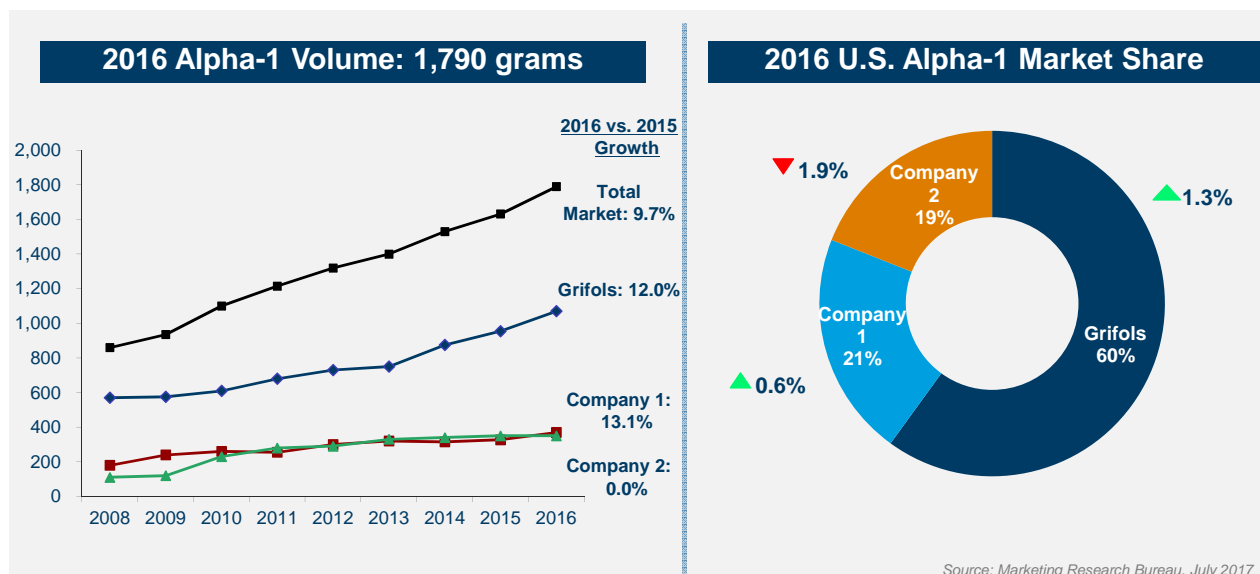
As many as **350k symptomatic COPD** patients worldwide may suffer from severe **AATD** as a result of COPD; however, **fewer than 10%** of them have been identified



Sources and assumptions: Grifols patients based in 1Q 2018 patient counts (last update April 26, 2018). Assume Grifols holds 66% of the total patients based in Grifols BI Database. Assume 2/3 of patients diagnosed receive treatment based in market knowledge and affiliate input

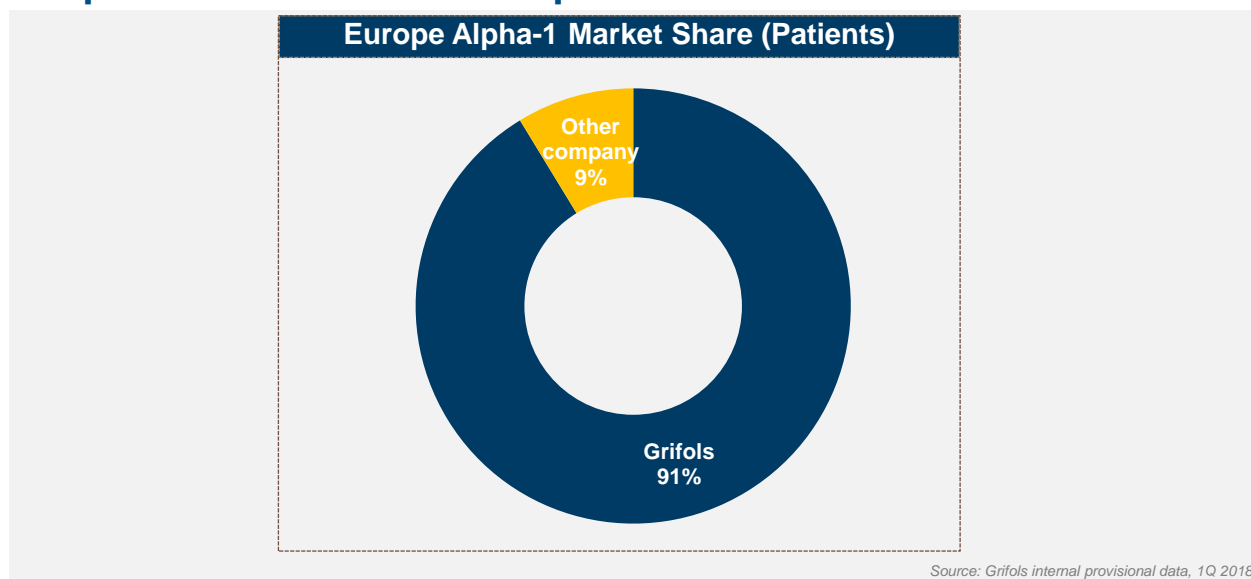
Grifols Is the Global Market Leader in Alpha-1

After 10 Years of Competition, U.S. Prolastin®-C Continues to Lead and Drive Growth



Source: Marketing Research Bureau, July 2017

In Europe, Prolastin® Retains More Than 90% Market Share Despite 2 Years of New Competition



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Leading Position in Alpha-1

- Grifols continues to consolidate its leadership position in the alpha-1 market with 66% global share, which is increasing revenue efficiency per liter
- Significant global opportunity for diagnosis and treatment: fewer than 10% of potential alpha-1 patients identified
- New and underdeveloped markets form a core component of Grifols growth strategy
- Recent FDA approvals reinforce Grifols' position as the market leader of alpha-1:
 - FDA approval obtained for Prolastin®-C Liquid, with launch scheduled in mid-2018
 - FDA approval of a new alpha-1 genetic diagnostic test developed by Diagnostic Division
- Global expansion of U.S. Prolastin Direct® model based on comprehensive and personalized patient support programs

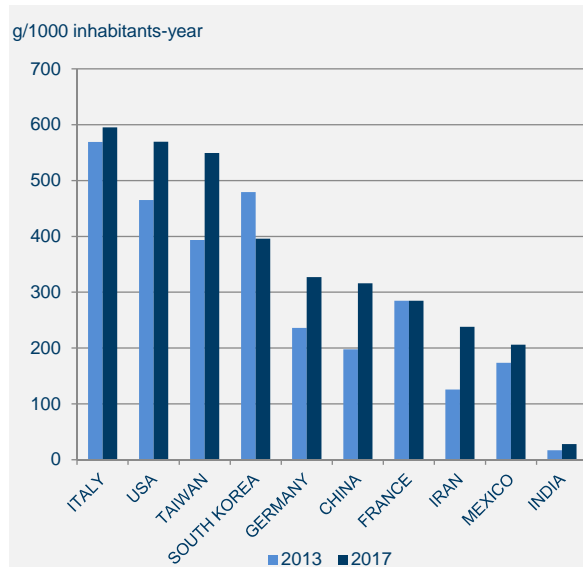
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Grifols Albumin

Momentum in Albumin Per Capita Utilization Continues

Top 10 Countries in Per Capita Utilization of Albumin in 2017 vs. 2013

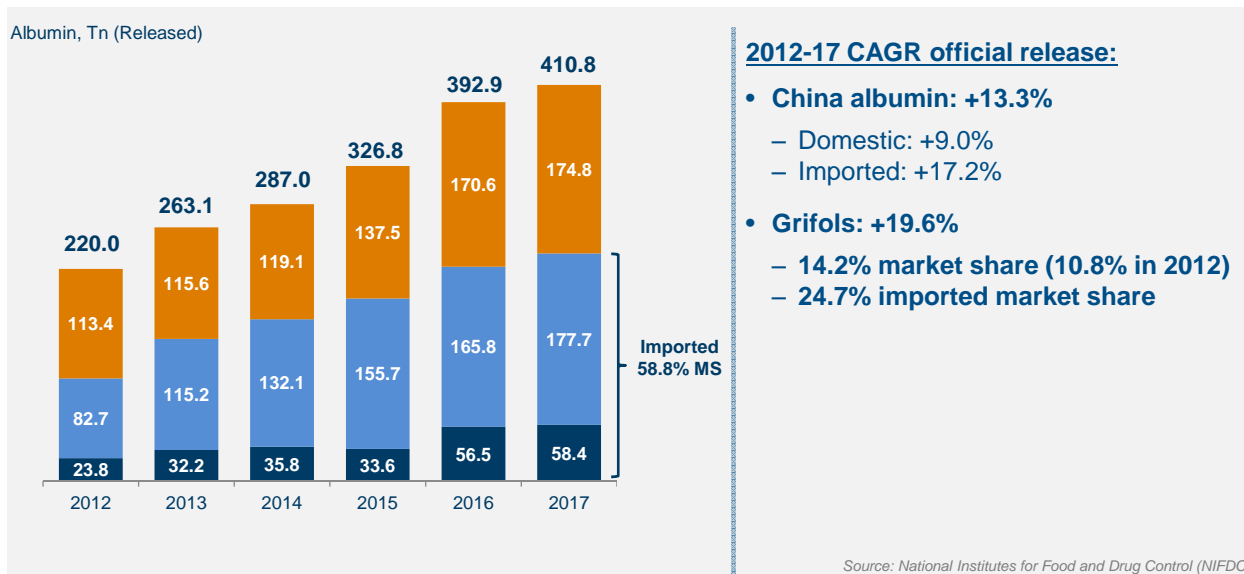


- Albumin use continues to grow in most key countries
- World's largest market (China) has reached top 10 by per capita consumption
- Grifols is a global leader with strong market positions in the U.S. and China
- New clinical data will fuel future growth

Source: Grifols internal provisional data, 2017

Grifols' Growth in China Has Outpaced the Market

The World's Largest Market is Currently in Top 10 by Per Capita Consumption



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Albumin Will Continue to Be a Driver of Bioscience Growth

- Leading position with market demand estimated to grow by 6-8% CAGR
- Growth driven by U.S. and China, where Grifols expects above-the-market growth
- Grifols is investing in a market expansion strategy to extend its reach to Chinese hospitals. The two-invoice system implemented in the country does not affect Grifols since it already complied with these provisions, a circumstance that the company has been able to leverage
- Developing countries are expected to grow at double-digit rates in the coming years
- Investment in albumin innovation:
 - Advancing science: research in Alzheimer's, cirrhosis and other therapeutic areas
 - New packaging: albumin in bags launched in the U.S. in 2019

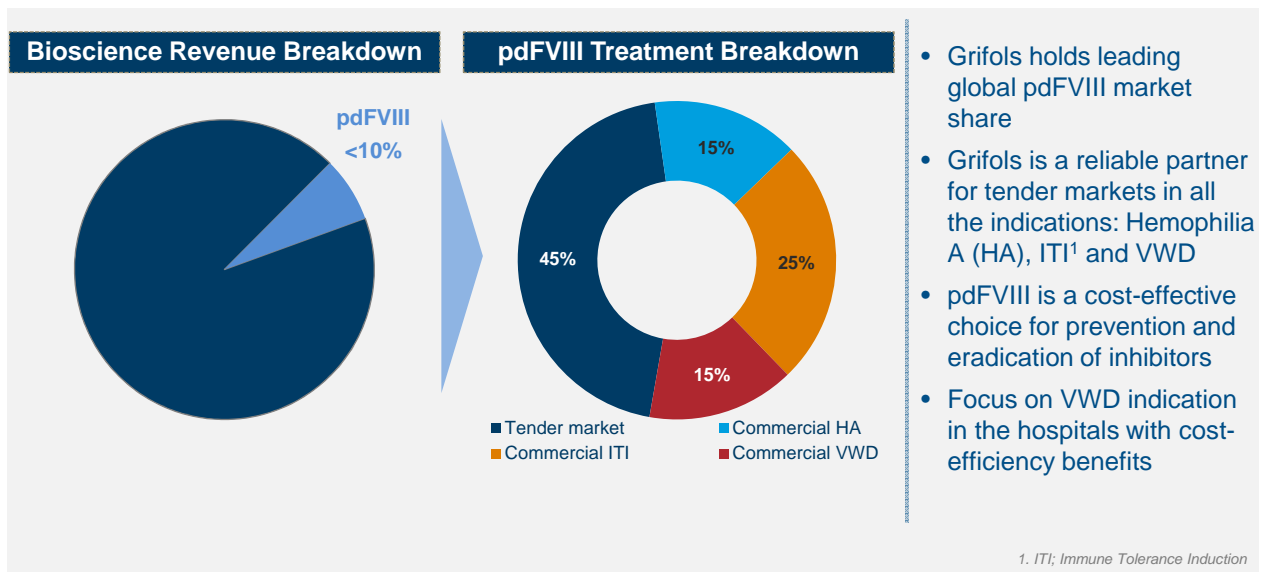
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Grifols pdFVIII

Grifols Holds Leading pdFVIII Position

Opportunities in a Changing Market



Grifols Holds Leading pdFVIII Position

Hemophilia A Paradigm is Changing

- Several new novel therapies are in development that will impact future treatments. Gene therapy is on the horizon
- One new therapy offers benefits but also leaves clinicians with new questions that have implications for Grifols:
 - How to treat breakthrough bleeds in inhibitor and non-inhibitor patients?
 - Should inhibitors be eradicated in the presence of this new therapy?
- Grifols is working to inform and guide safe treatment options amid this changing paradigm

Grifols Holds Leading pdFVIII Position

Continuing Opportunity in pdFVIII Business

- A leader in hemophilia medicines, Grifols focuses on providing safe treatment options in the evolving treatment paradigm
- KoLs agree on the importance of eradicating inhibitors. Their feedback is “every patient deserves at least one ITI, at least one should be tried, or at least offered to patients”
- Significant opportunity for pdFVIII/VWF¹ continues for patients and clinical situations:
 - Prevention and eradication of inhibitors and von Willebrand disease (VWD)
 - Potential role for pdFVIII in combination with new therapies
- Further opportunity for pdFVIII growth in emerging markets, where new patient growth will continue at approx. 5-6% due to increased diagnosis and improved treatment protocols
- Grifols pdFVIII continues to focus on:
 - Market access activities to reinforce the value of pdFVIII/VWF therapies (SIPPET study)
 - Participation in global tenders and new market opportunities (i.e. India)

1. VWF, von Willebrand factor

Key Takeaways

Key Takeaways

Delivering Consistent Growth

Growth	<ul style="list-style-type: none">• Underlying demand for key proteins supports consistent growth• Grifols' positioning for growth following significant plasma supply investments
Opportunity	<ul style="list-style-type: none">• Leading efforts to expand markets through appropriate diagnosis and treatment• Grifols is widening its portfolio: launching Prolastin®-C Liquid; new rabies product; 20% SCIG and albumin in bags in the U.S. in 2019• Research programs will deliver new opportunities in the future
Leadership	<ul style="list-style-type: none">• Grifols holds #1 global share position for IG, alpha-1 and pdFVIII, #2 for albumin• Grifols is the U.S. market leader: IVIG and the CIDP segment• Grifols leads the industry in research for new protein indications and formulations

Diagnostic Division

Delivering Consistent Growth

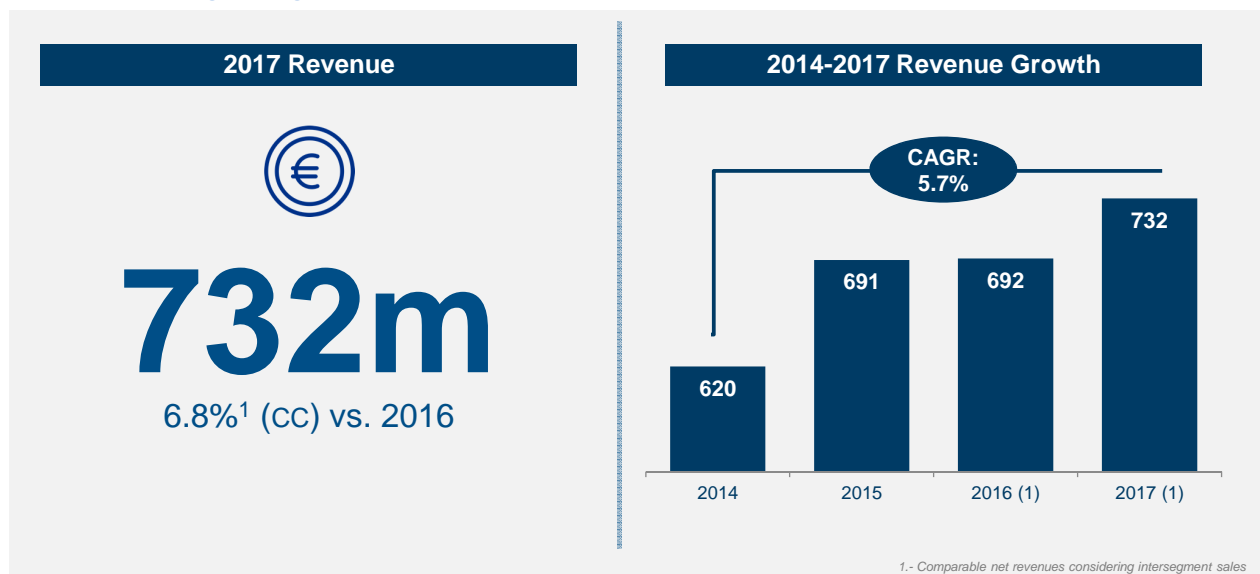
Carsten Schroeder
President, Diagnostic Commercial Division

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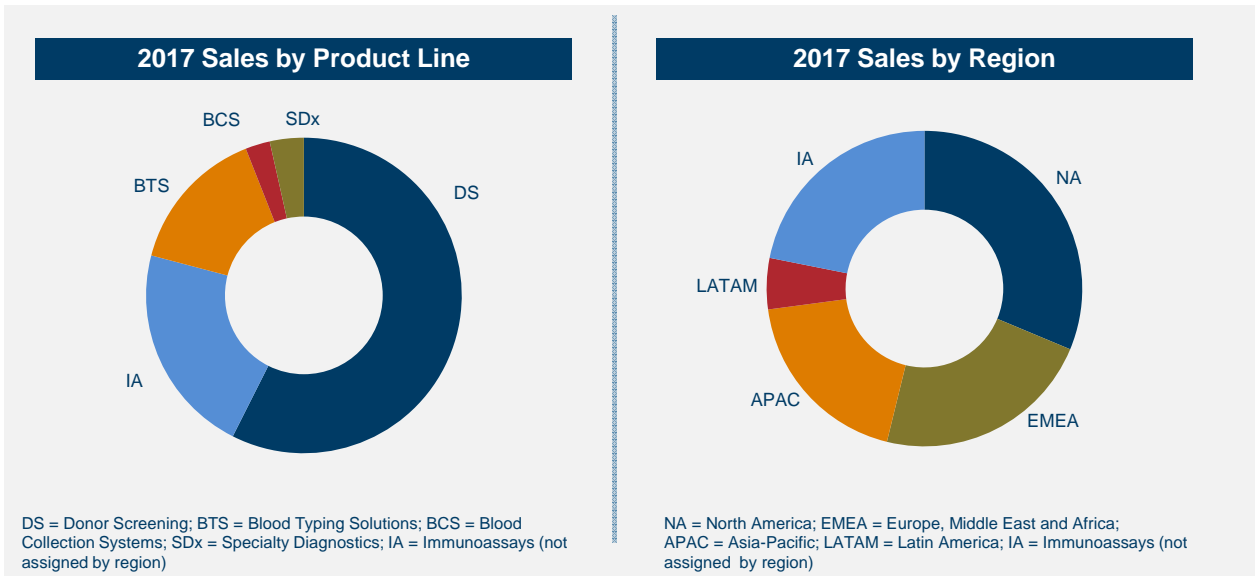
Driving Profitable Growth

Solid Mid-Single Digit Growth Over the Last Four Years








Transfusion Medicine Comprises ~95% of the Business

Donor Screening, Immunoassays & Immunochemistry Are Grifols Core Businesses



Global Leader in Transfusion Medicine

Building a Specialty Diagnostics Portfolio

Transfusion Medicine				Specialty Diagnostics	
					
Donor screening	Immunoassays	Blood typing	Blood collection	Hemostasis	Clinical diagnostics
Global leader in NAT technology donor screening	New manufacturing in Emeryville for immunoanalysis	Complete portfolio of instruments, gel cards and reagents	Manufacturing in Spain and Brazil	Global distribution agreement with Beckman Coulter	Aesku Promonitor®

Vertical Integration of NAT Blood Donor Screening Unit

Assay Development and Manufacturing Aligned to Respond to Customers Needs

PRE-ACQUISITION

Revenue share agreement



• Assay development
• Assay manufacturing
• Instrument development



• Distribution
• Sales & Marketing
• Service

VERTICAL INTEGRATION

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- Assay development
- Assay manufacturing
- Distribution
- Sales & Marketing
- Service
- Instrument co-development



Grifols assay development and manufacturing facilities
Willow Court, California

Grifols has the capability to develop and manufacture tests tailored to specific customers needs

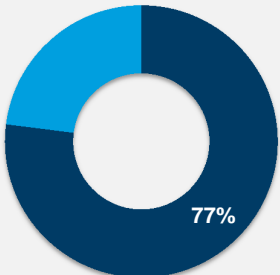
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Global Leader in NAT Donor Screening

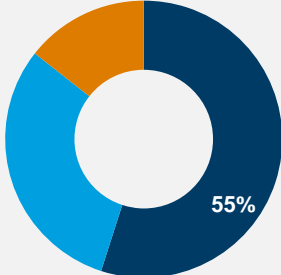
NAT Adoption Increased by 1 Million Donations in 2017

**Global Market Split
(~94 million donations*)**




■ Adopted ■ Unadopted

**Global Share of Adopted
(~75.5 million donations)**




■ Grifols ■ Roche ■ Others



70+

donations tested every minute with a Procleix assay*



200+

people impacted every minute*

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

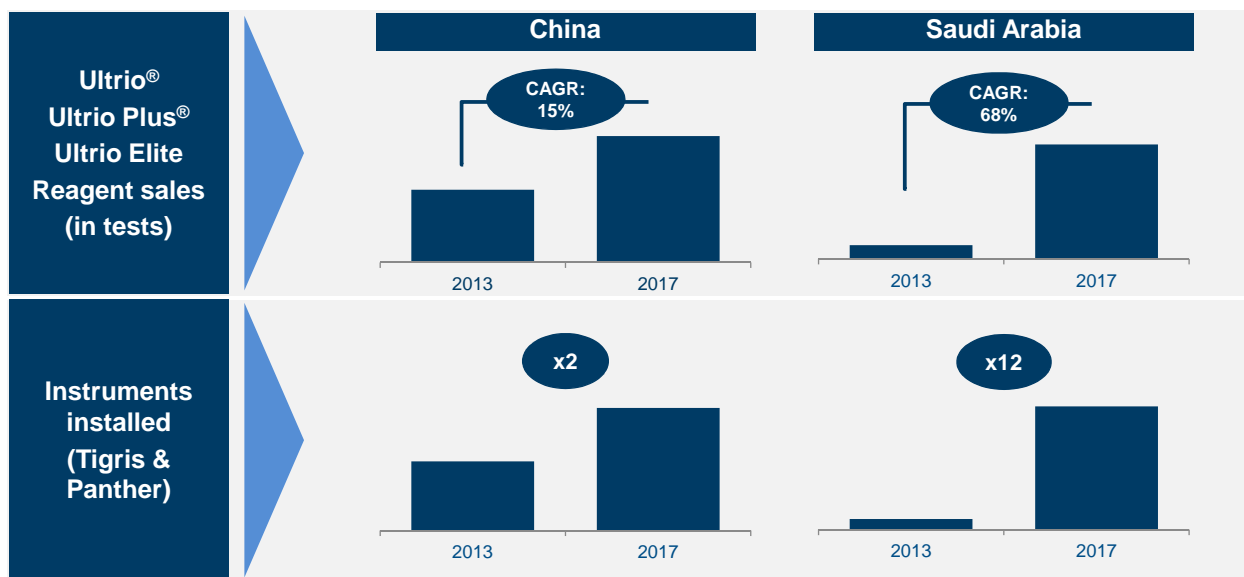
Source: Internal data
*Does not include plasma collection

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NAT Continued Focus on Geographic Expansion

APAC and Middle East Have Fueled Growth

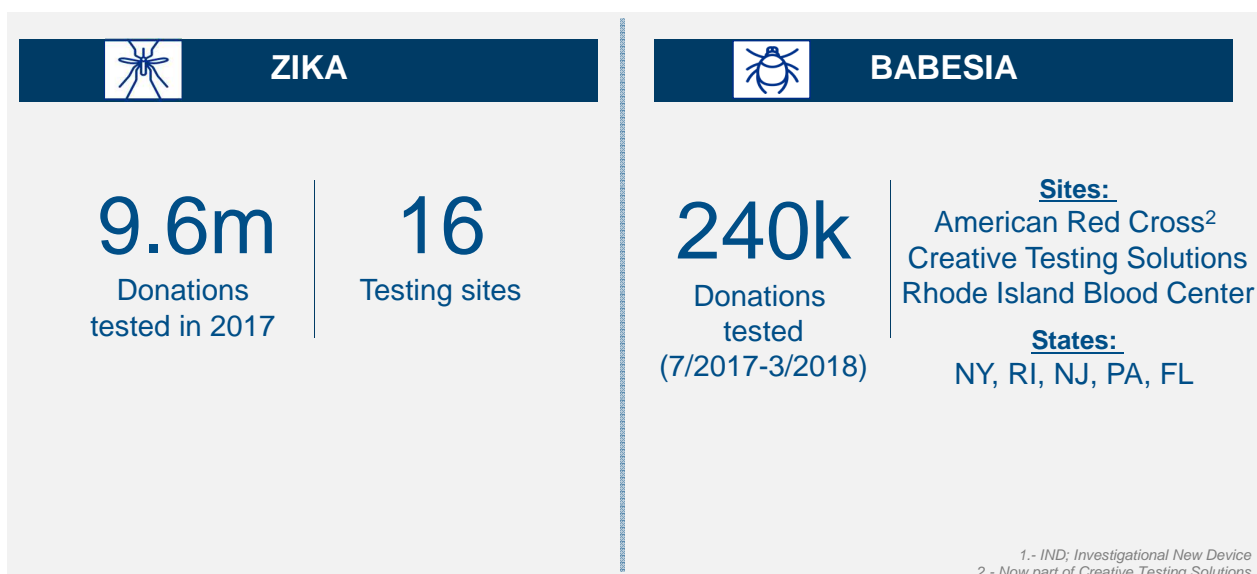


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Committed to Ensuring Safety of the Blood Supply

Procleix Zika and Babesia NAT Tests Used Under IND¹ in the U.S.



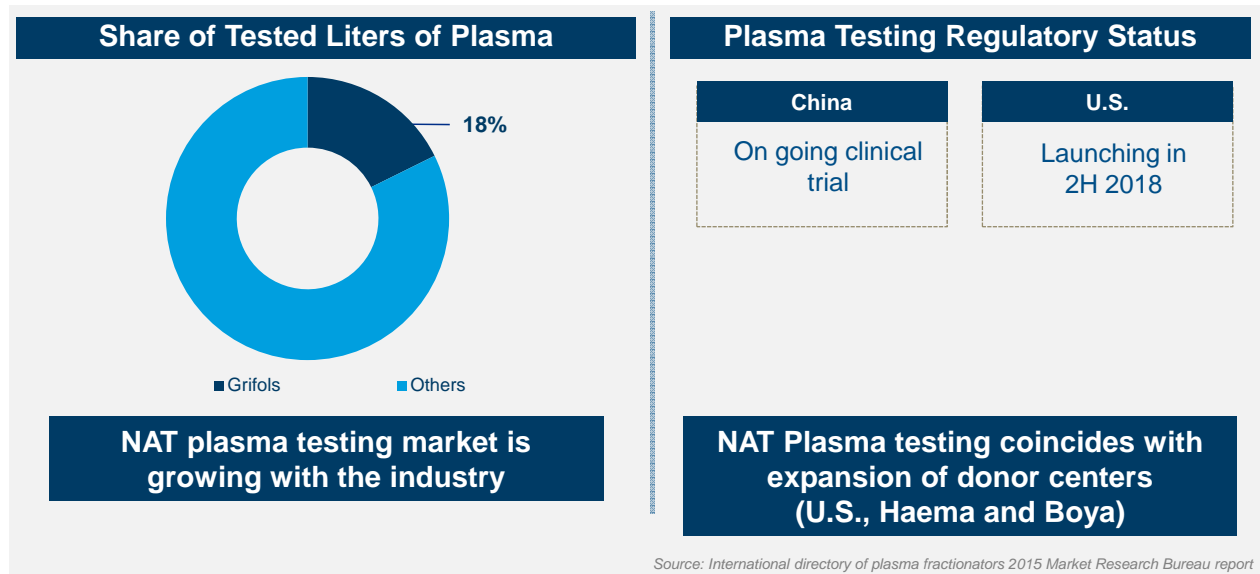
1.- IND; Investigational New Device
2.- Now part of Creative Testing Solutions

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NAT Plasma Donor Screening Represents a Growth Opportunity

Grifols Has Developed a Dedicated Team

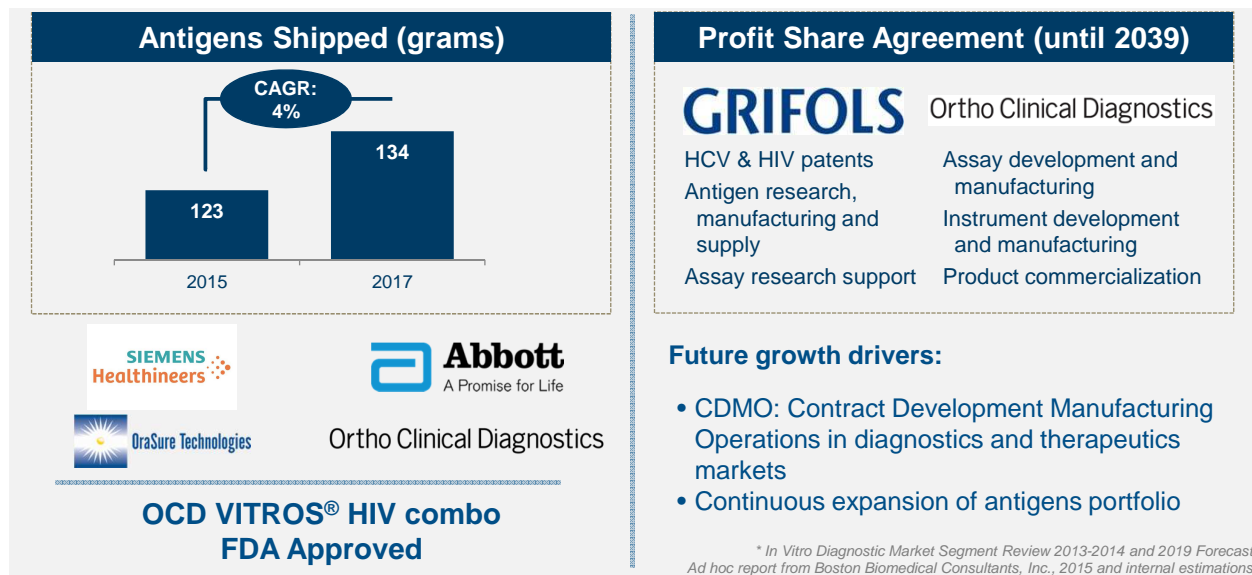


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Leader in Antigen Supply for Immunoassays

Worldwide Market Leader in Hep/Retro Immunoassay Antigens*



Future growth drivers:

- CDMO: Contract Development Manufacturing Operations in diagnostics and therapeutics markets
- Continuous expansion of antigens portfolio

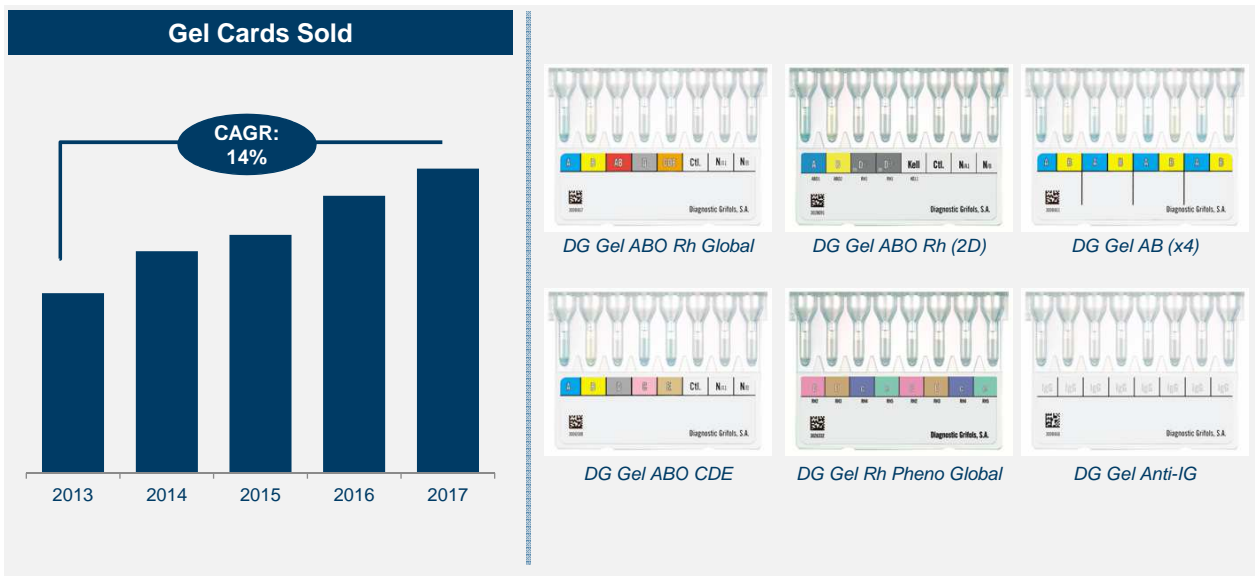
* In Vitro Diagnostic Market Segment Review 2013-2014 and 2019 Forecast
Ad hoc report from Boston Biomedical Consultants, Inc., 2015 and internal estimations

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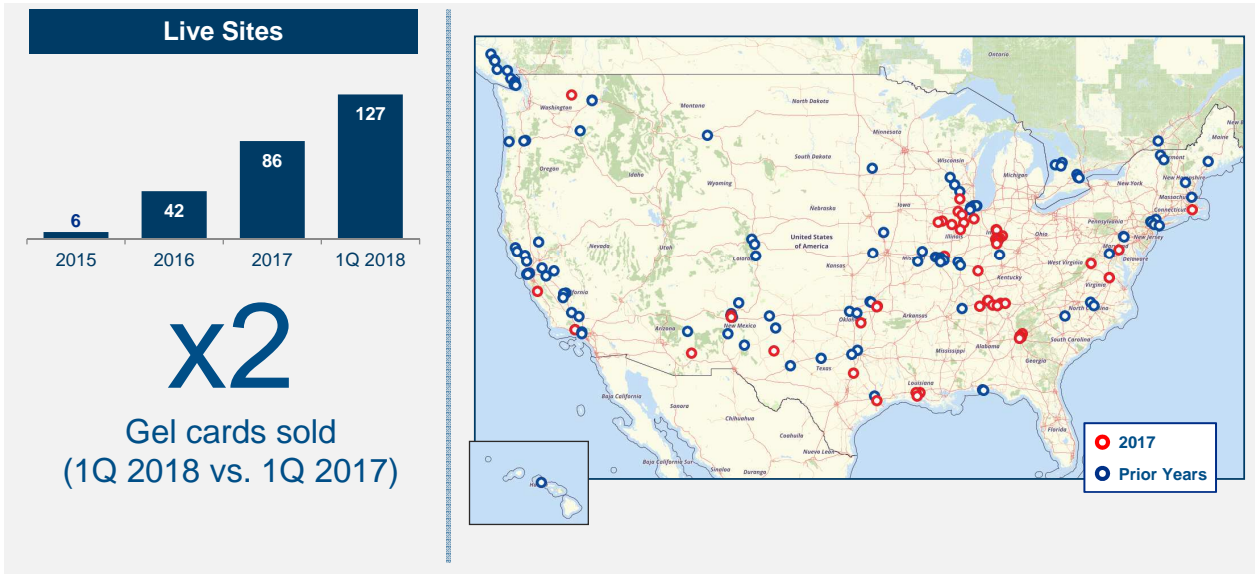
Immunohematology (IH) Continues as a Key Growth Driver

Grifols Sold a Record Number of Gel Cards in 2017



U.S. Immunohematology: 160+ Customer Sites Under Contract

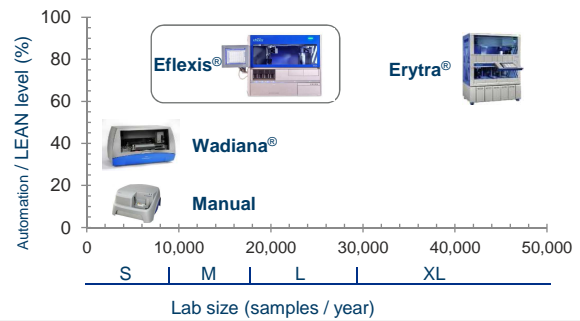
Investments in Sales, Marketing and Service Are Paying Off



Immunohematology Innovation: Eflexis®

Fully Automated, Flexible, Mid-sized Analyzer

The **Eflexis®** performs pre-transfusion compatibility testing using DG Gel® technology with a smart and compact design offering intuitive operations



A fully automated, medium-sized analyzer for performing pre-transfusion compatibility tests. Eflexis® is the natural evolution in Grifols scalable blood typing solutions

Immunohematology Innovation: Eflexis®

Well-received: 90+ Customer Placements in Europe¹ One Year After Launch

90+

Instruments sold



60%

Competitive conversions



19

Countries*

Upcoming portfolio updates:

- New version of Erytra® software with improved features
- New middleware solutions worldwide
- New reagent blood cells and antisera to support U.S. expansion



1.- U.S. clinical trial ongoing

Immunohematology Competitive Advantage: Lab and IH Center

An Industry Reference That Supports Grifols Immunohematology Strategy and...



Grifols clinical laboratory and IH center, San Marcos, Texas



4,000
samples

x4 times
vs. 2016

Services

- Immunohematology testing services for blood banks, hospitals and physicians
- Reference lab for discrepancies and complex cases

Test Menu

- Molecular and serological panels
- Novel assays for immunohematology

Immunohematology Competitive Advantage

...The Grifols Academy of Immunohematology a Recognized Center for Education



THE GRIFOLS ACADEMY
IMMUNOHEMATOLOGY

The Grifols Academy of Immunohematology offers courses to transfusion medicine professionals to help them build a stronger workforce and equip them with tools to deliver higher-quality patient care



13
courses



+1,000
attendees

Hemostasis: Beckman Launches Promotional Activities in Key Markets

Grifols Makes Inroads with Product Registrations in Core Markets

- In 2017, Grifols reached an exclusive worldwide distribution agreement with Beckman Coulter for the global distribution of Grifols' hemostasis instruments, reagents and consumables
- Grifols is currently working on the registration of these products in key markets, including the U.S. and China
- In preparation for product launch in Europe, Grifols has delivered technical service and sales training to Beckman. Sales activities have commenced in EU countries



Clinical Diagnostics: Promonitor® a Growth Driver in the Portfolio

Investment in a Dedicated Sales Force Is Paying Off



PROMONITOR® ELISA test offers key information about drug bioavailability and immunogenicity in patients prescribed with biological therapy for the treatment of chronic inflammatory diseases and other indications



Sales growth

15%

(2017 vs. 2016)



Budget impact model



NHS Scotland

**6,000
PATIENTS**

Clinical Diagnostics: New Product Launches Are Key to Growth

Expanding Portfolio to Meet Evolving Customer Needs

Key Product Launches

Antisera in the U.S.



IDCoreXT



Eflexis®



Erytra® 4.1 Software



Helios assays



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Global Leader in Transfusion Medicine

Future Growth Opportunities



NAT expansion

Emerging pathogens

Plasma

Geographic expansion



Immunoematology growth plan

Erytra® and Eflexis®

Manufacturing in the U.S.



Leader in transfusion medicine

Immunoematology

Molecular testing

Serology testing (SMC™ Singulex)

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Hospital Division

Transformation Brings a New Era

Rob Jagt
President, Hospital Commercial Division

GRIFOLS



Strong Position and Reputation in Iberia and LATAM

Strong Legacy Business - Spain

- Broad portfolio:
 - Pharmatech
 - IV therapy base
 - Medical devices
 - Clinical nutrition
- Advanced hospital pharmacies
- Established leaders; learning, trialing
- Manufacturing and engineering advantages



Well Positioned for Sustained Penetration in the U.S. Market

U.S. Market Drivers Align With Grifols' Strengths: Safety, Quality and Engineering

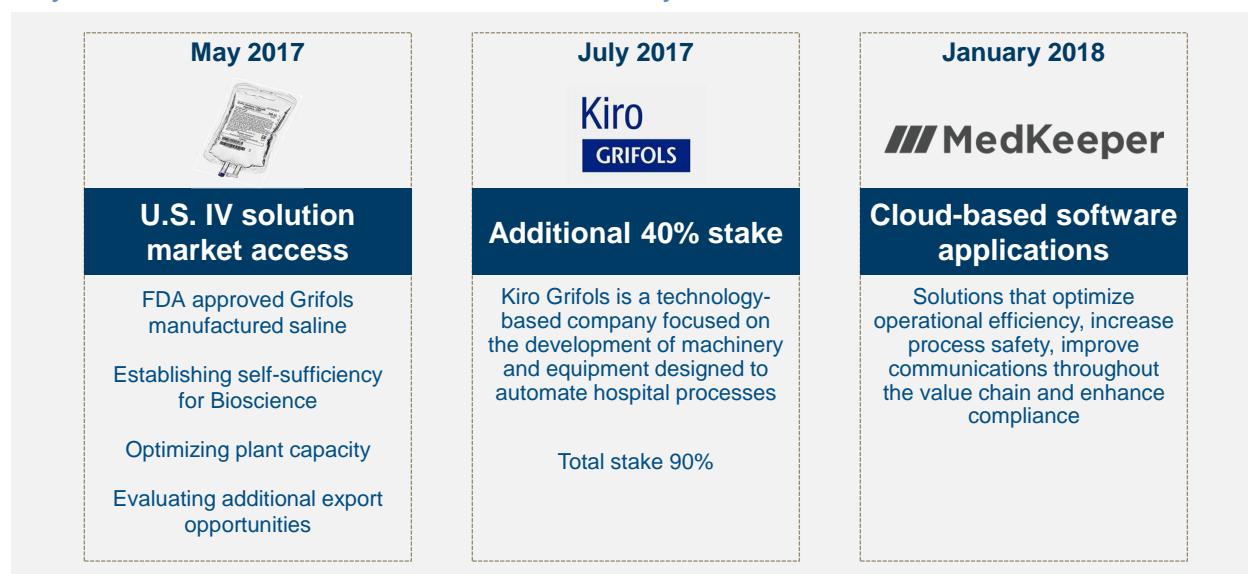
- Novel Pharmatech portfolio meets customer needs - alignment of trends/tailwinds
 - Regulatory **demands increasing**
 - Personalized **medicine growing**
 - Accountability to measure **outcomes**
- System for improving compounding control: quality, safety, efficiency, outcomes

technology; process and compliance



A Clear Path Forward Through a Growing Product Portfolio

Key Events and Milestones of 2017 and Early 2018



MedKeeper: Accelerating Execution of Software Platform and System Strategy

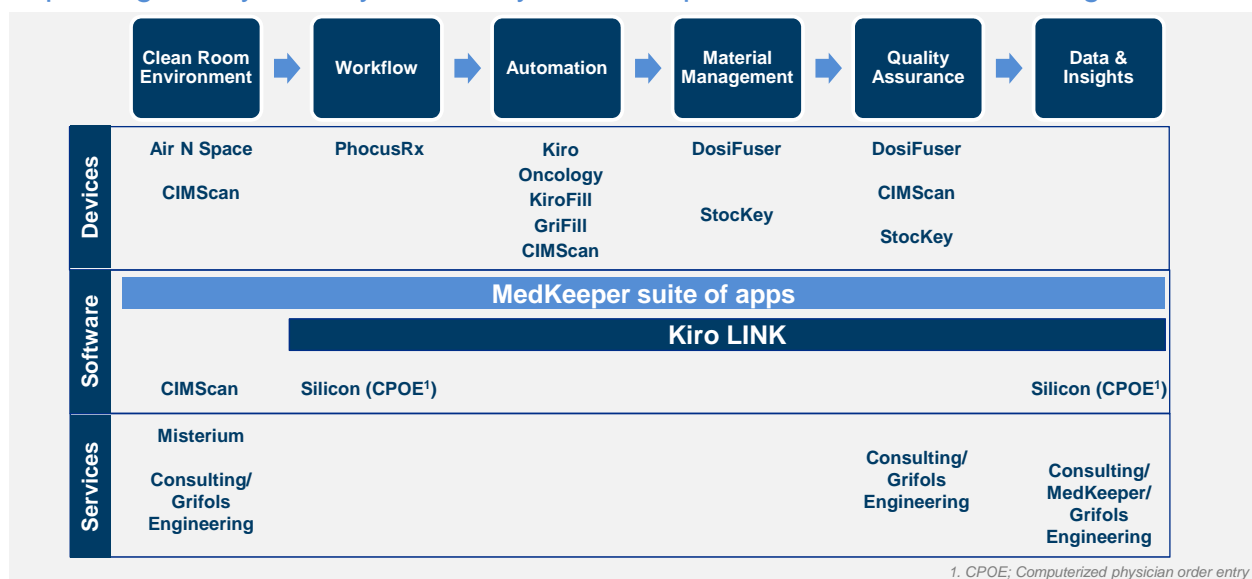


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Complete Solutions to Meet IV Compounding Needs

Improving Safety, Quality, Efficiency, and Compliance With New, Strict Regulations



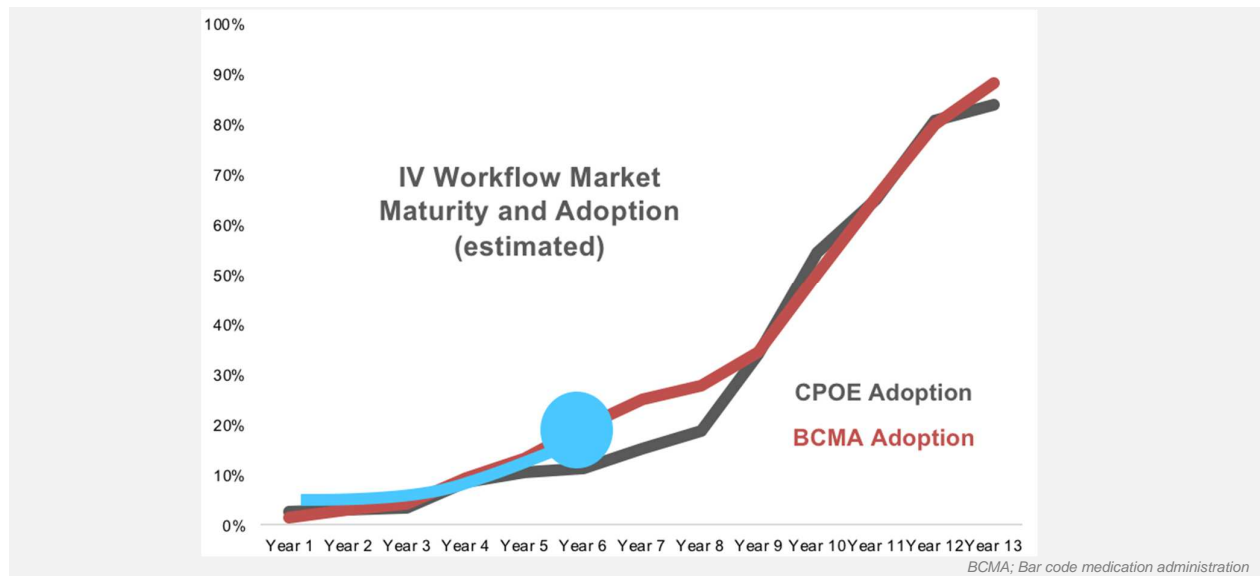
1. CPOE; Computerized physician order entry

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MedKeeper Will Continue to Grow with IVWF Adoption

IV Workflow Management Adoption Is Expected to Accelerate

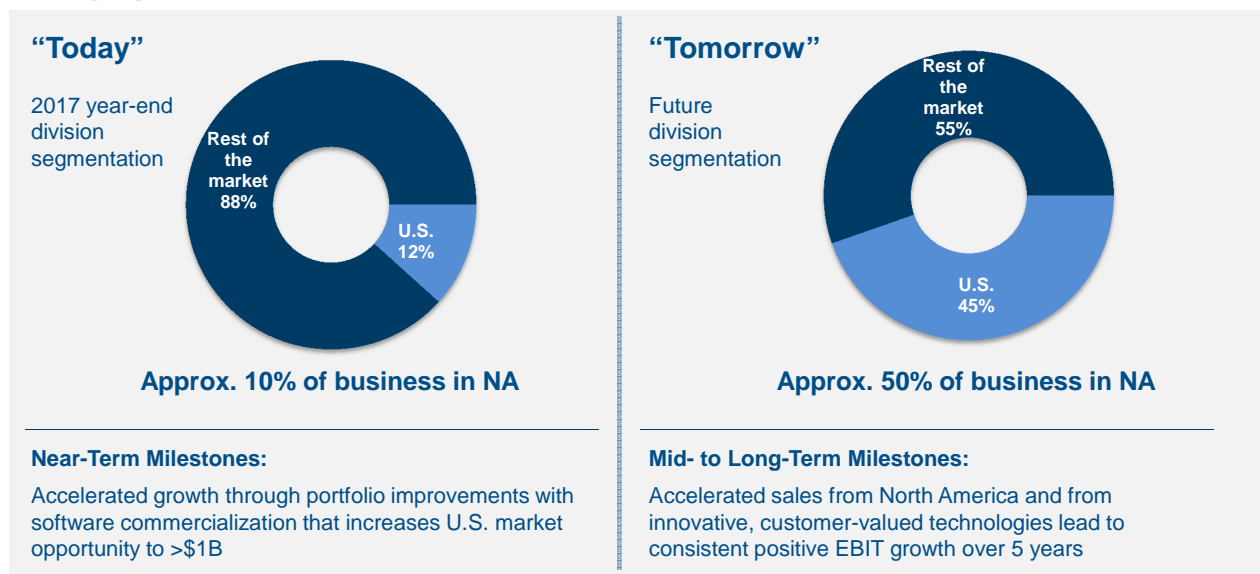


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Division Strategy Accelerates Growth and Strengthens Contribution

Enlarging the Hospital Division

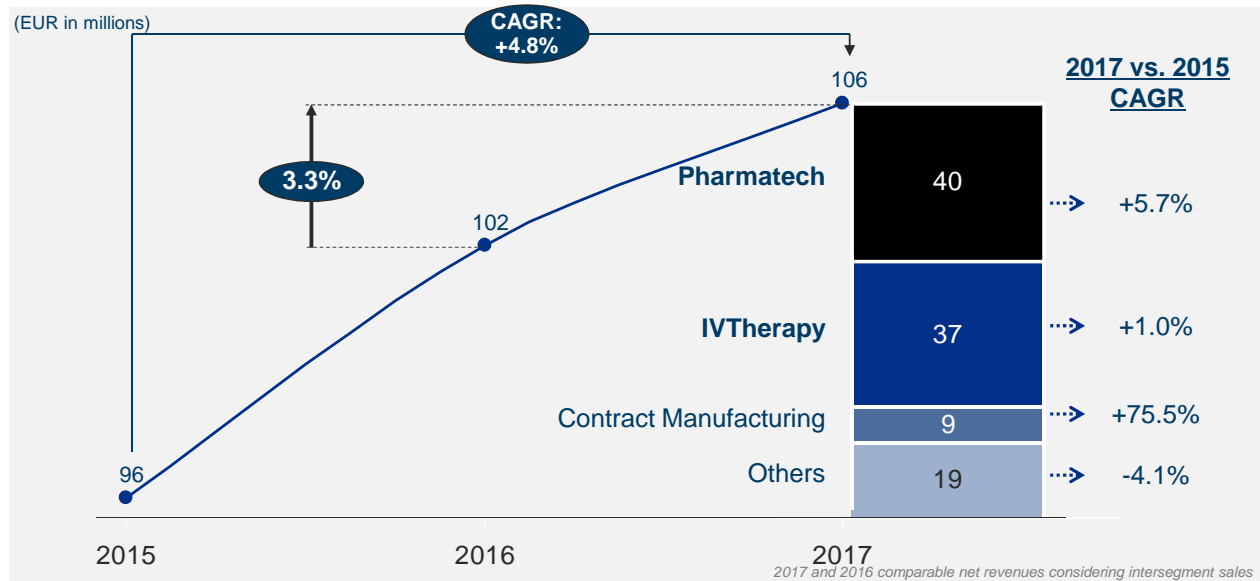


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Pharmatech Business Underpins Growth

Enhancing Hospital Portfolio

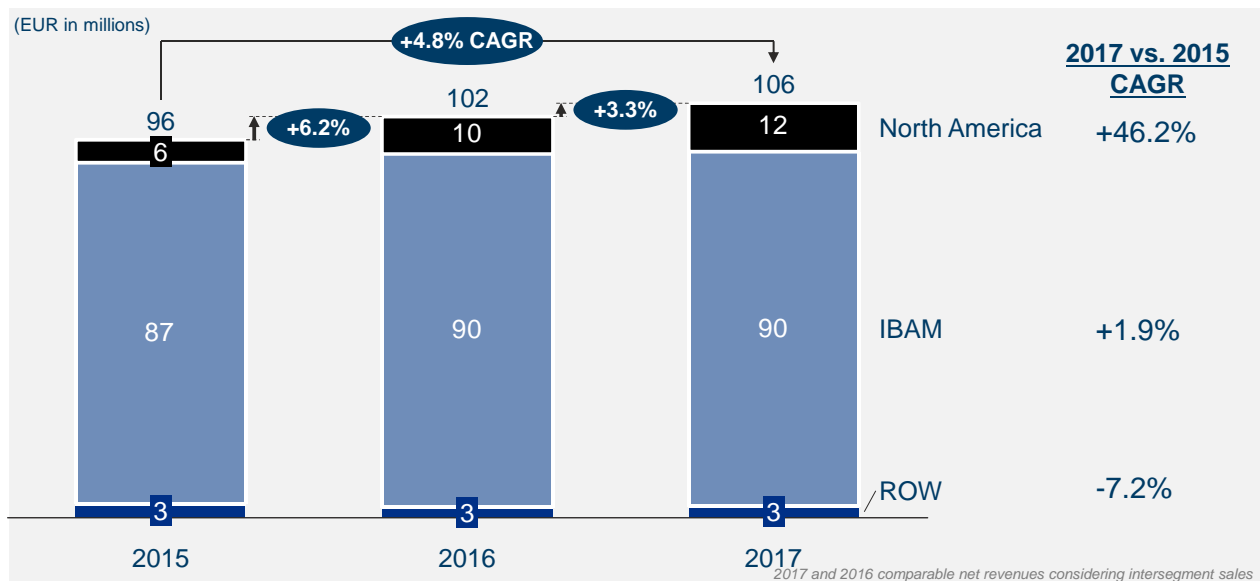


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Consolidating Footprint in the U.S. Market

While Remaining Strong in Spain

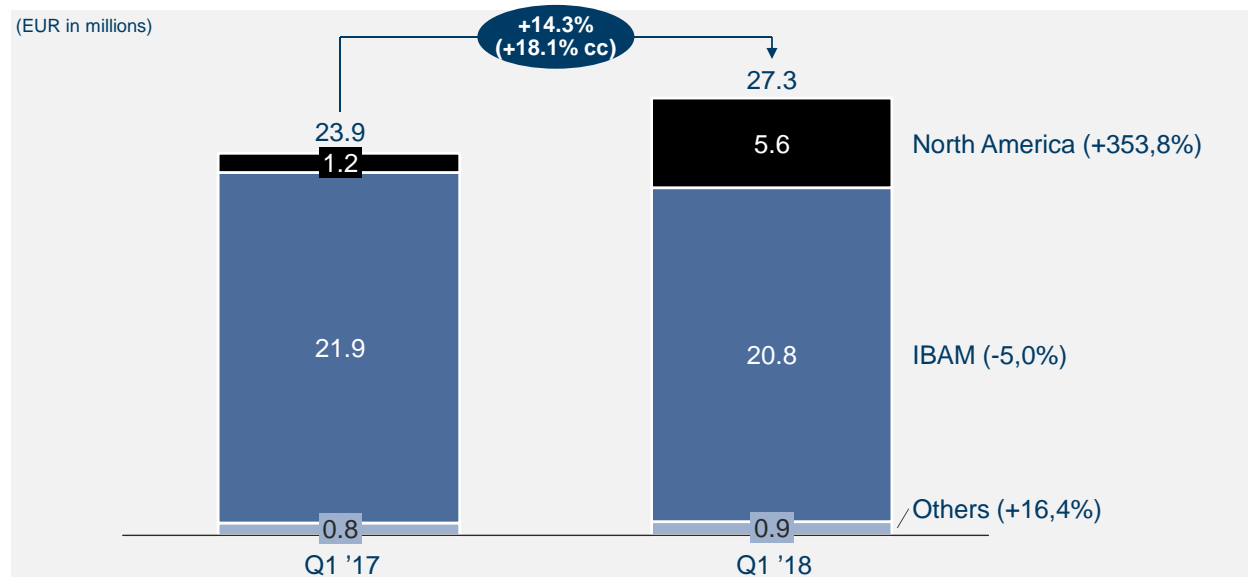


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Successful Strategy Execution

1Q 2018 Revenue Accelerated, Driven by North America



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Key Takeaways

Delivering Results of a Transformation

2017

- Achieved EUR 106 million in sales; CAGR (2015-2017): 4.8%
- Key milestones and events:
 - Gained U.S. IV solution market access: FDA approval; self-sufficiency at Grifols' donor centers and third-party distribution agreement
 - Kiro Grifols stake increased to 90%
 - MedKeeper 51% acquisition, announced in January 2018

2018 and beyond

- 1Q 2018 U.S. sales up c.350%, NA Pharmatech sales doubled and saline launch demonstrates impact
- Sustaining leadership in Iberia / LATAM while U.S. becomes greatest source of growth
- Delivering innovative and customer-valued solutions
- Benefiting from tailwinds in IV compounding control that will support sustained performance over time

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Commercial Strategies Panel Discussion

Bioscience, Diagnostic and Hospital

Commercial Leadership Team

GRIFOLS



Commercial Strategies Panel Discussion

Topics of Focus

One Grifols

- Cross-Divisional Collaboration
- Team Synergies

Commercial Themes

- Customer Centricity
- Leveraging Technology

The following slides have been prepared to support the commercial strategies panel discussion

One Grifols

Cross-Divisional Collaboration

Team Synergies

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One Grifols: Cross-Divisional Collaboration

Normal Saline Launch in U.S.



Biomat USA
GRIFOLS

Talecris Plasma Resources
GRIFOLS

HENRY SCHEIN®

Henry Schein
Largest Distributor of Health Care Products and Services to Office-based Dental, Animal Health, and Medical Practitioners

Over 21,000 Team Schein Members	Over 1 Million Customers
16 Years Fortune World's Most Admired Companies	6 Years Entrepreneur World's Most Ethical Companies
14 Years Fortune 500 #443	10 Years 100
2 Years S&P 500	

Key Company Statistics

15% CAGR Net Sales	15% CAGR Earnings Per Share	19% CAGR Market Cap Growth
\$11.6 Billion in Sales in 2016		
28.1% or \$3.30	25.2% or \$3.30	2.7% or \$423.4M
Dental (48.0%)	Animal Health (28.1%)	Medical (23.7%)
Tech/VAS (3.7%)		

(Henry Schein's company website)

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One Grifols: Cross-Divisional Collaboration

Albumin in Bags

- Ready-to-use, over-wrapped polypropylene bag has advantages for storage and administration in cases where glass vials present issues (crash carts, ambulances)
- Hospital Division shared technology with Bioscience
 - Plastic injection molding and production
 - Bag forming and plastic film overwrap
- Grifols Engineering partnered with Bioscience to implement
 - Machinery design and construction for aseptic filling
 - Process automation and robotization
 - Online radiation sterilization



One Grifols: Cross-Divisional Collaboration

Importance of Diagnosis: Alpha-1 Is the Major Known Genetic Risk Factor for COPD¹

THE LONGER AAT DEFICIENCY REMAINS UNDIAGNOSED, THE GREATER THE RISK FOR IRREPARABLE LUNG DAMAGE^{4,10}

Average interval between onset of pulmonary symptoms and diagnosis was

8.3
years*

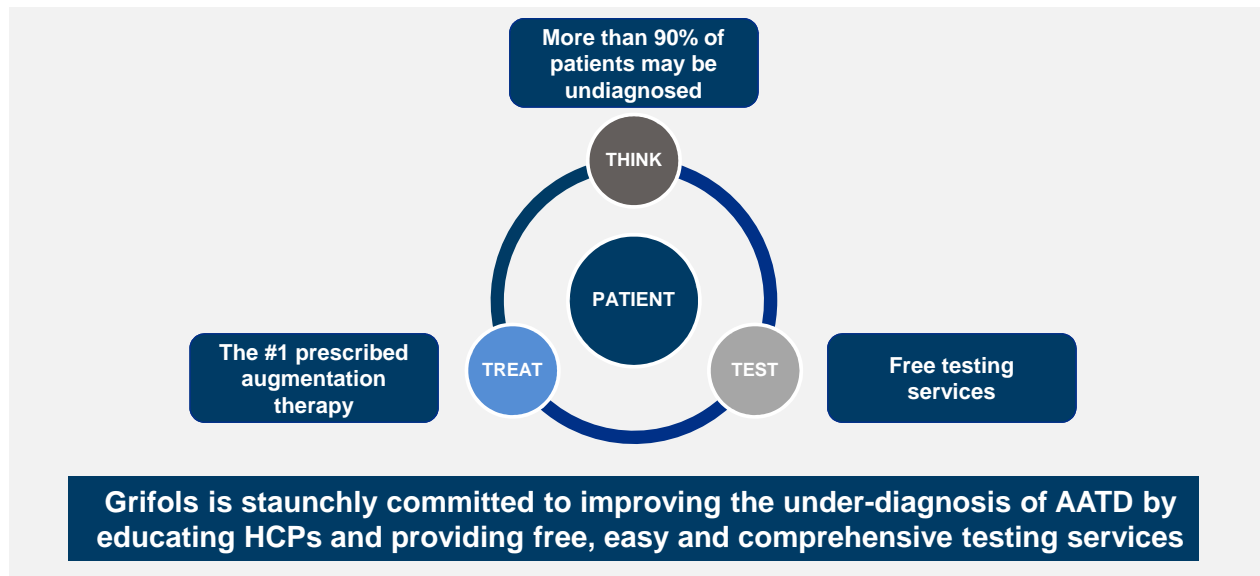
Average number of physicians seen by patients before diagnosis

2.7
physicians*

1. Köhnlein T, Welte T. Alpha -1 antitrypsin deficiency; pathogenesis, clinical presentation, diagnosis, and treatment. Am J. Med. 2008; 121(1) 3-9
4. Campos MA, Wanner A, Zhang G, et al. Trends in the diagnosis of symptomatic patients with alpha1 antitrypsin deficiency between 1968 and 2003. Chest. 2005;128(3):1179-86
10. Vdal R, Blanco I, Casas F, et al. Guidelines for the diagnosis and management of alpha-1 antitrypsin deficiency. Arch. Bronconeumol 2006;42(12): 645-59

One Grifols: Cross-Divisional Collaboration

Alpha-1 Early Diagnosis and Treatment Deliver Multiple Benefits



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One Grifols: Cross-Divisional Collaboration

Progenika Provides the Testing Platform for Alpha-1

Grifols uses the Progenika technology to work with HCPs to increase testing for alpha-1 deficiency



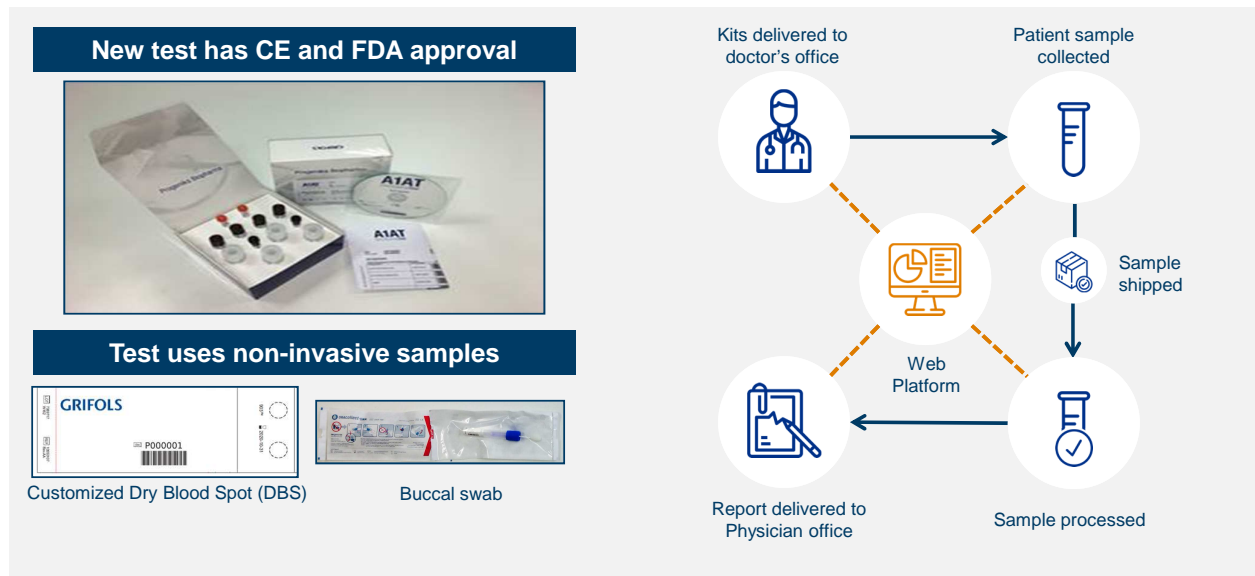
Progenika

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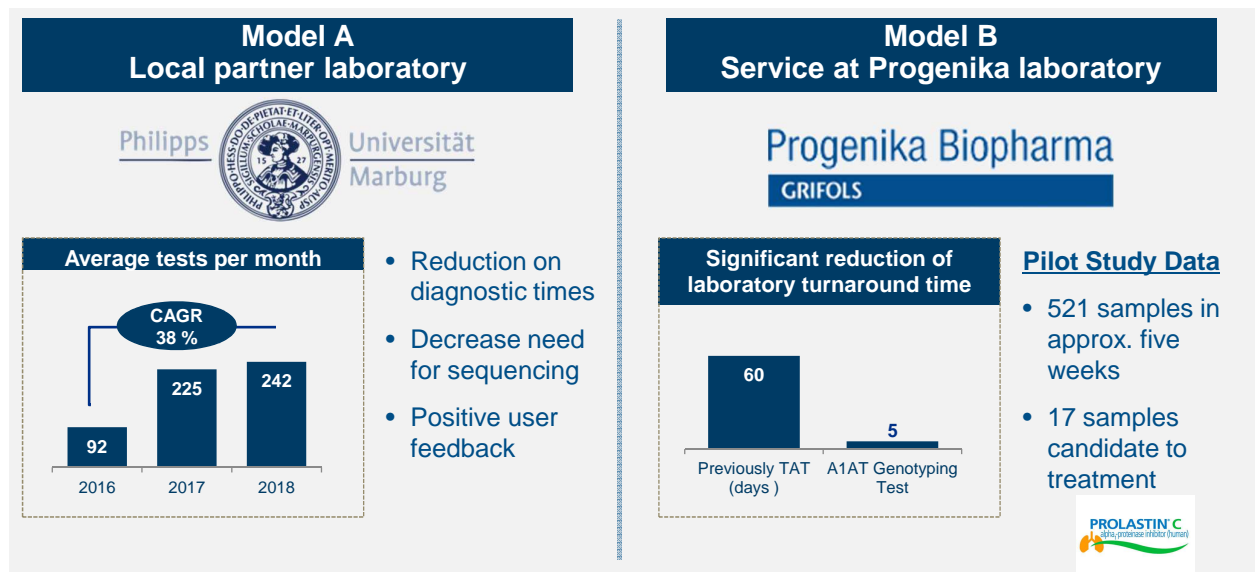
One Grifols: Cross-Divisional Collaboration

Progenika Has Developed an Improved Assay for Alpha-1



One Grifols: Cross-Divisional Collaboration

Improving Alpha-1 Diagnosis: Partner With Local Laboratory and In-House Testing Services



One Grifols: Multiple Collaboration Projects

CLIA Lab in San Marcos, Texas, Provides Multi-Divisional Support

<div> <div>Biomat USA</div> <div>GRIFOLS</div> </div> <div>Grifols plasma special program</div> <div> Identification of donors with Rho D Antibody to produce Rho(D) Immune Globulin </div>	<div> <div>Araclon Biotech</div> <div>GRIFOLS</div> </div> <div>AB Test validation</div> <div> CLIA validation for the investigation of Alzheimer's disease </div>	<div> <div>Progenika Biopharma</div> <div>GRIFOLS</div> </div> <div>FDA validation studies</div> <div> Validation of ID CORE XT PMA dossier for FDA </div>	<div> <div>ALKAHEST</div> </div> <div>Genetic testing services</div> <div> Clinical study on patients with mild-to-moderate Alzheimer's disease </div>
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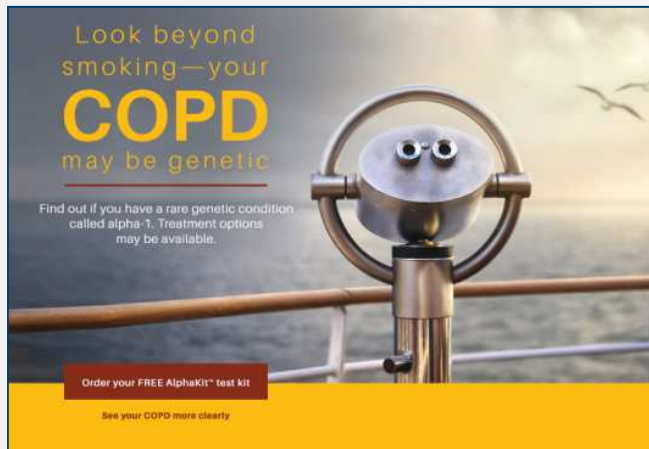
Commercial Themes

Customer Centricity

Leveraging Technology

Customer Centricity: Multi-Channel Marketing

The “Look Into Genetic COPD” Campaign



website/ads

- Reaching targeted COPD patients is the biggest opportunity to accelerate the diagnosis of alpha-1
- Direct to consumer (DTC) multi-channel marketing campaign launched mid-2017
- Key messages motivate COPD patients to take two actions: order the AlphaKit and get tested by their healthcare provider (HCP)

Customer Centricity: Prolastin Direct®

Comprehensive, Personalized Support to U.S. Alpha-1 Patients

DEVOTED ALPHA-1 CARE TEAM¹² Comprehensive, personalized support Dedicated Patient Service Coordinators Manages the streamlined enrollment process	INSURANCE AND REIMBURSEMENT SPECIALISTS¹² Covered by all major insurance providers Manage the preauthorization and verification process Patient assistance program available
SPECIALTY PHARMACY AND INFUSION EXPERTS¹² Dedicated alpha-1 pharmacy 98.4% compliance rate Therapy is scheduled at your patients' convenience	FULLY INTEGRATED DISEASE MANAGEMENT^{10,12} Proven health outcomes¹⁰ Comprehensive disease management with automatic enrollment No extra cost to patients

* AlphaNet: Not-for-profit organization providing health management services for the PROLASTIN DIRECT® program led by alpha-1 experts and patients

Customer Centricity

Comprehensive Support Programs Also Offered ex-U.S.



Spain/Argentina/Chile




Canada




Germany

Technology and Innovation Are at the Core of the Business


Strengthening the NAT portfolio



Automation



Software



New Assays

Automation Project Is Approaching Market Launch in 2019

Scalable Solutions Designed With Built-in System Redundancies for Variable Workflows

Panther AR

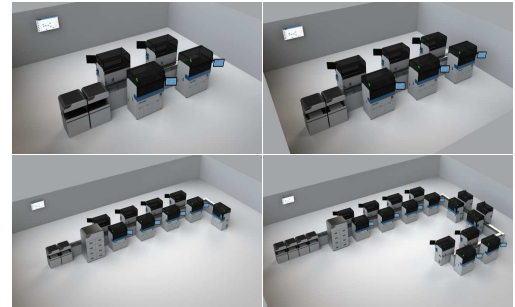


A modified Panther designed to:

- ✓ Connect to a network of Panthers
- ✓ Connect to track transport system
- ✓ Includes waste drain, MTU capacity, other software & hardware modifications

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

Panther AR Workcell



- ✓ Track-based sample transport
- ✓ Working prototypes set up in San Diego
- ✓ Up to 16 Panthers




New Software Solutions to Simplify Customer Workflow

The Panther Dashboard Will Allow Tracking and Monitoring of Crucial Activities



Committed to the Safety of Blood and Plasma Supply

Working Continuously to Respond to Emerging Pathogen Threats

		
Emerging pathogens	Arboplex testing	In-house capabilities
Demonstrated leadership responding to Zika and Babesia	This assay is designed to simultaneously detect: Chikungunya, Zika and Dengue	Willow Court facilities (San Diego, CA) New assay development Assay manufacturing

Impact of Technology on Hospital Pharmacy Operations

Management of Solids and Liquids Require Different Solutions

Oral Solids	Compounded IV Preparations
<ul style="list-style-type: none">• Computerized prescription order entry• Automated dispensing• Inventory management systems software• Bar-coded medication administration	<ul style="list-style-type: none">• Highly manual (85-90%)• Paper-based documentation• Unacceptable error rate• High-risk preparations (intravenous)

Delivering Value Through Technology, Automation & Connectivity

New Gri-fill® 4.0 Delivers on Expectations of Technology Advancement

- Gri-fill® remains the only semi-automated compounder that maintains and documents sterility of compounded preparations
- Improved speed with additional, second peristaltic pump
- Newly redesigned with technology enhancements:
 - IoT / Connectivity with wifi and bluetooth
 - Integrates with hospital IT and EMRs
 - Enhanced touch screen and improved user interface



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Advances in Fully Automated Compounding Devices

KIRO® Oncology



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Impact of Technology on Hospital Pharmacy Operations

MedKeeper



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Closing Comments

Delivering Consistent Growth

Lafmin Morgan
Chief Commercial Officer

GRIFOLS



Key Takeaways

Delivering Consistent Growth

Leadership

Grifols leads its market segments

- Global leader in plasma proteins
- Global leader in NAT technology
- A global leader in transfusion medicine
- Safety and quality continues to be a differentiating factor for Grifols products

Key Takeaways

Delivering Consistent Growth

Growth

Underlying demand continues to support growth

- Grifols has made investments to support growth
- Grifols is transforming the Hospital Division
- Grifols' growth accelerated significantly in 2017
- Sales volume in 2017 grew in all regions where Grifols operates

Key Takeaways

Delivering Consistent Growth

Opportunity

Grifols is positioned for continued growth

- Dedicated teams seeking to achieve the company's mission
- Focus on diagnosis, treatment and geographic expansion continues to successfully deliver market growth
- **ONE GRIFOLS**: Cross divisional collaboration and new products are increasingly a source of differentiation
- Technology application is generating new avenues of growth

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Barcelona
7th and 8th June

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Plasma Procurement Strategy

Capacity Leadership in Plasma to Optimize Growth

Peter Allen
President and CEO, Grifols Plasma Operations

GRIFOLS



Capacity Leadership in Plasma to Optimize Growth

Agenda

- Strong Performance and Business Improvements
- Market Analysis
- Plasma Procurement Strategy and Future Growth
- Business Development: Connections and Innovation
- Leveraging Technology to Drive Efficiencies
- Key Takeaways

Progress to Date

Main Achievements Lead to Strong Market Position

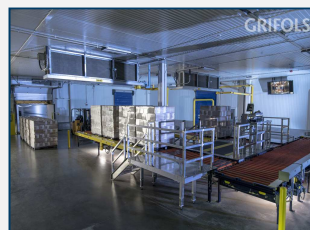
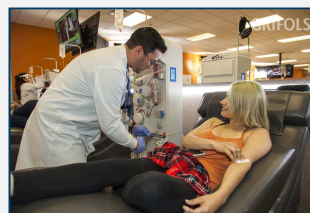
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Grifols Plasma Procurement Is Strong and Well Positioned

Capacity Leadership Drives Growth Opportunities

- 40 additional centers since 2015
- Network of 190 centers expands to approximately 325 by 2023
- Strategically expanded collections to EU
- Enabled for strong self-sufficiency position
- Continuous improvement on collection fundamentals
- Excellence in logistics and lab testing; accuracy and throughput
- Improving efficiencies through technology and programs



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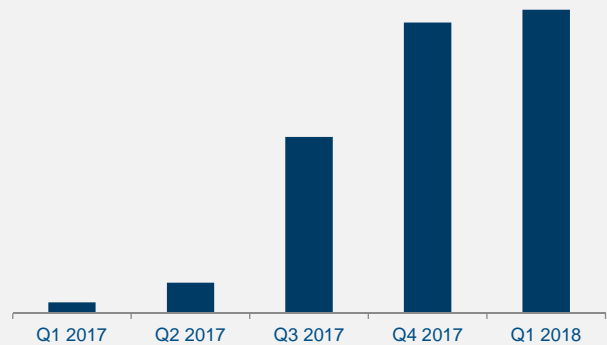
Double-Digit Collections Growth With Strong Performance

Capacity Leadership Drives Growth Opportunities

- U.S. collections have increased significantly driven by the operational efficiencies
- By promoting a fully integrated and balanced plasma procurement organization, Grifols is showing a sustainable growth in plasma collection
- Operational efficiency improvements include continuous upgrades of plasma centers and customer service to increase donor recruitment and loyalty
- Continued focus on quality performance

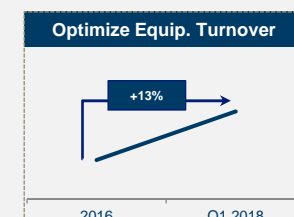
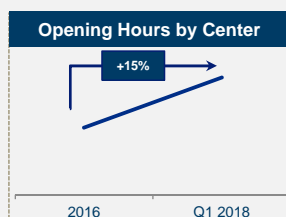
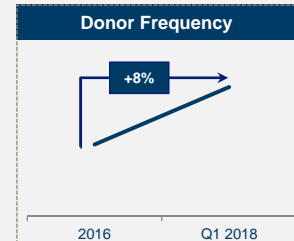
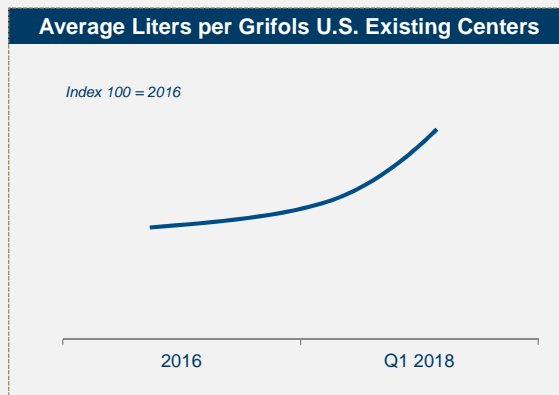
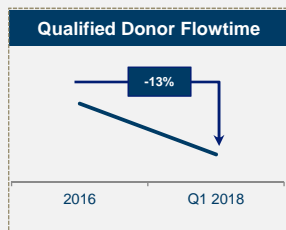
U.S. Grifols Plasma Collection Performance in Liters

Growth Quarter over PY quarter



Focus on Growth Over the Last 3 Years Is Generating Results

Improving Collection Fundamentals

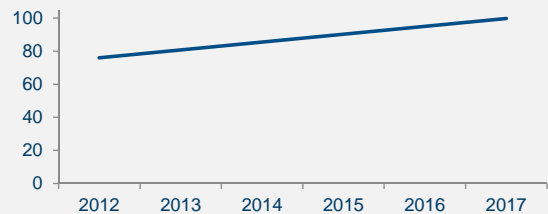


Regulatory Inspections in 2017

Grifols' High Standards Ensure Operational Efficiency and Sustainable Growth

Agency	Inspection Days	Admin Actions ⁽²⁾
FDA ⁽¹⁾	265	0
EU	222	0
COLA/CLIA	108	0
PPTA	60	0
Other ⁽³⁾	48	0
TOTAL	703	0

Close to 100% of FDA inspections with "0" observations⁽⁴⁾



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

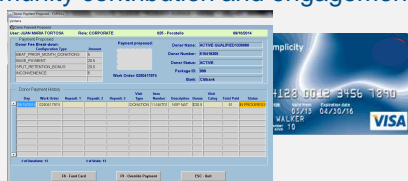
1. More than 90% of FDA inspections resulted in 0 observations
 2. Suspension, revocation or loss of any license or certification; warning letter; imposed suspension of any regulated activity, etc.
 3. State environmental agencies, OSHA, ex-US/EU Agencies
 4. Number of FDA inspections with "0" issues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

Systems Deployment Completed

In Place in 100% Centers

Grifols' Donor Payment and Fundraising System

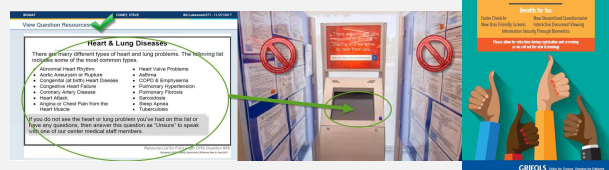
- Eliminates manual cash management at centers
- Near real-time financial transactions
- Improves financial controls
- Multi-cash card system reduces risk and dependency on a single banking solution provider
- Incorporates fundraising capability for donors community contribution and engagement



1. FTE= Full time equivalent employee

Biometrics Donor Health History Solution with Next Gen

- Eliminates donor manual wristbands efficiency saving of 1 FTE¹ per center
- Biometric donor fingerprint capture for enhanced donor experience and safety
- Implements PPTA questionnaire Plasma Protein Therapeutics Association standard
- Electronic display of guidance image resources to donors



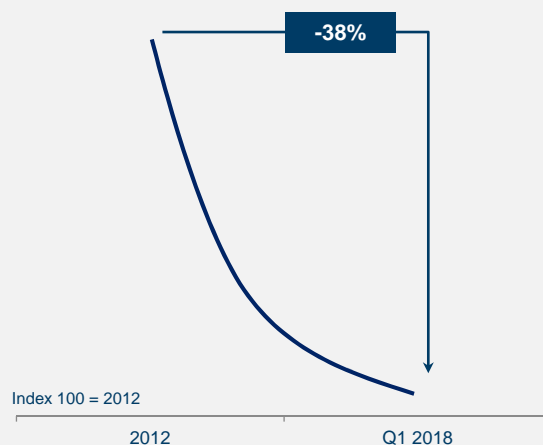
Increase in Collected Plasma Available

Organizational Efficiency Drives Significant Productivity Gains

Plasma rejected and downgraded¹

- Decrease of c.-38% of unsuitable plasma post collection by reducing testing turnaround time to less than 72 hours **through Grifols NAT platform** and investments in equipment and facilities
- Focus on process improvement, training and education of staff and donors
- Continuous improvements by monitoring of KPIs
- Quality program in place to attain further reductions in 2018-2019

Evolution of Rejected Plasma

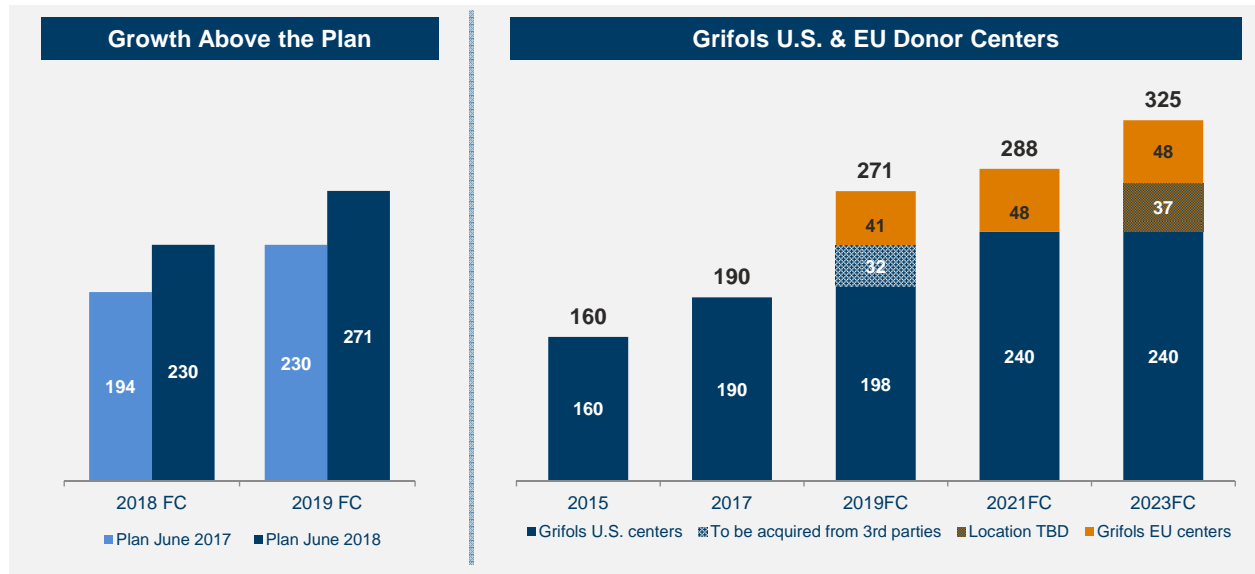


1. Plasma available for further fractionation but with some markets restrictions

Plasma Procurement Strategy Expansion, Diversification and Key Improvements for Upcoming Years

Plasma Procurement Strategy: Expansion and Diversification

Capacity Leadership in Plasma to Optimize Growth Opportunities



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Plasma Procurement Strategy: Expansion and Diversification

EU Plasma Collection Growth



- HAEMA is a German company acquired by Grifols in 2018 with +1,000 employees
- HAEMA currently operates 35 donor centers in 9 different German states and a laboratory for testing plasma and blood control. 3 donor centers under construction



- In 2017, Grifols established PLASMAVITA GmbH, a joint venture between Grifols (50%) and two European partners (50%)
- Grifols plans to open 10 new centers in Europe

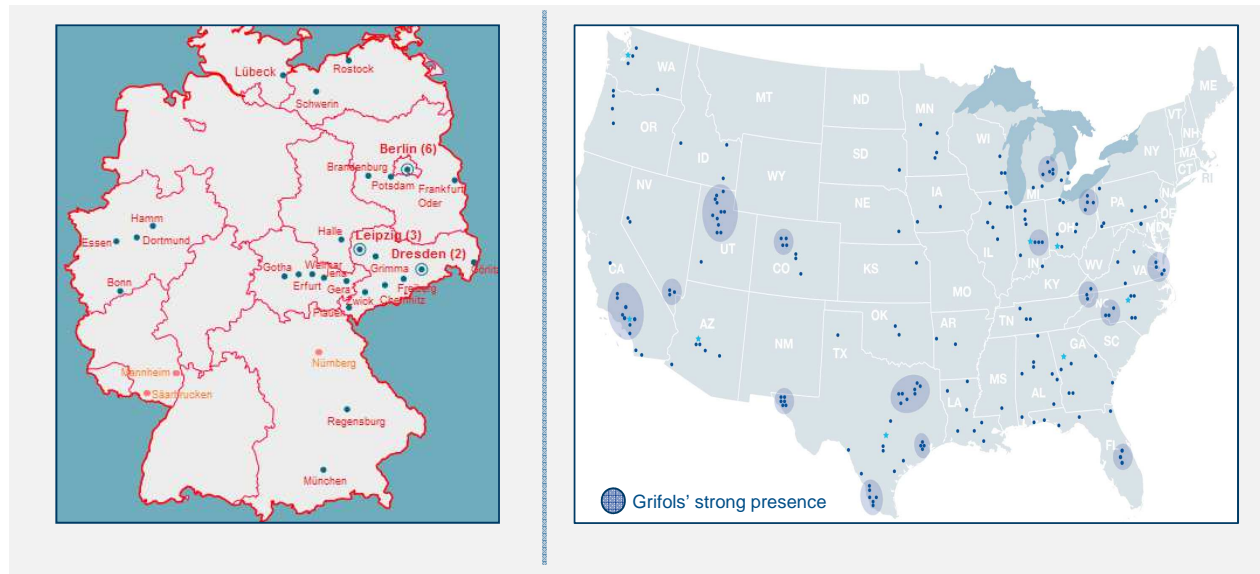


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Plasma Procurement Strategy: Expansion and Diversification

Grifols Plasma Donor Centers: Presence and Opportunities Ahead



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Plasma Procurement Strategy

Focus on Grifols' Competitive Advantage

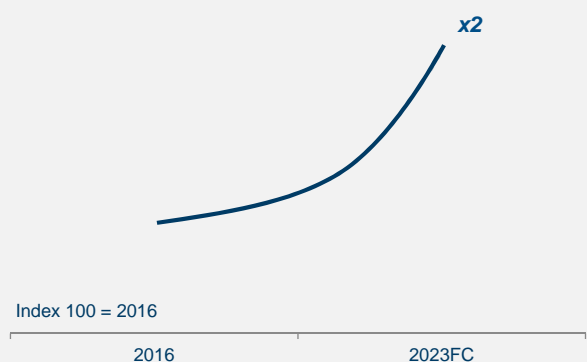
Growth

- Acceleration in growth of plasma centers
- ↑ Number of donor centers
- ↑ EU plasma supply; diversifying supply
- Expand business development capabilities

Operational efficiencies

- Standardizing processes
- Continuous quality assurance best practices
- Leverage current and new technologies

Grifols Plasma Collections

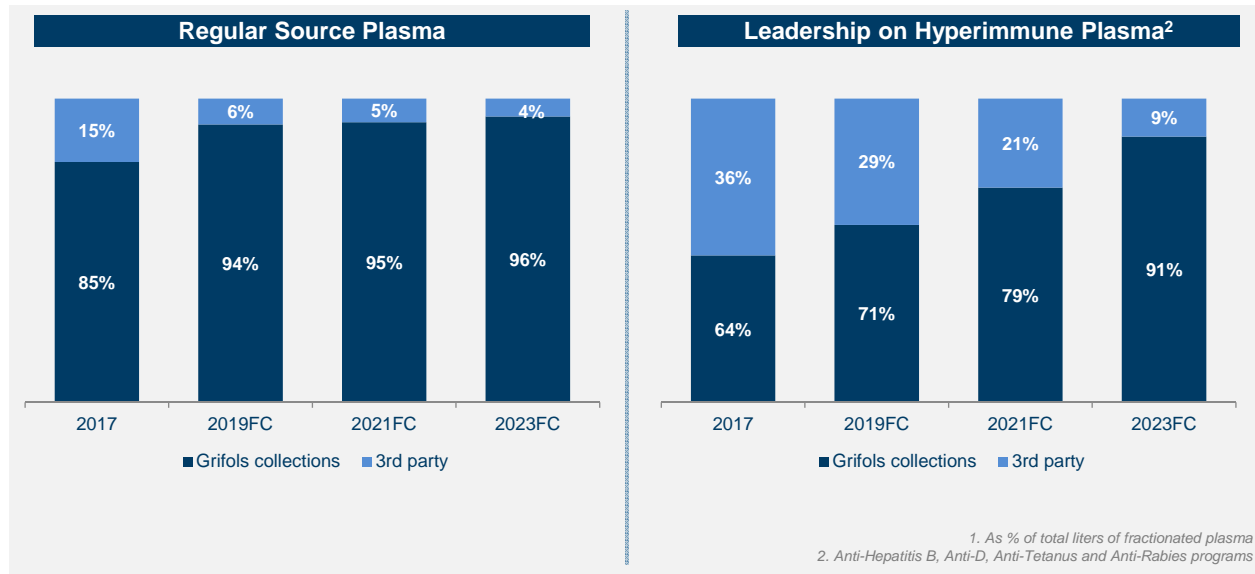


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Plasma Procurement Strategy

Expanding Plasma Capacity While Working Toward Self-Sufficiency¹



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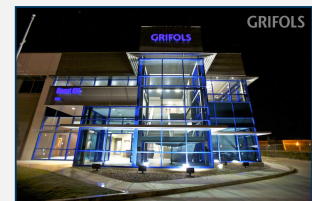
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Plasma Testing Laboratories: Capabilities and Efficiency

Focus on Optimizing Costs While Maintaining High Operational Integrity

Laboratory processes are designed for controlled high-volume testing

- Combined testing capacity in the future with planned expansions and IBBI acquisition:
 - Up to 20 million annual donations
 - More than 168 million reported test results
- Excellent testing turnaround time to fewer than 72 hours



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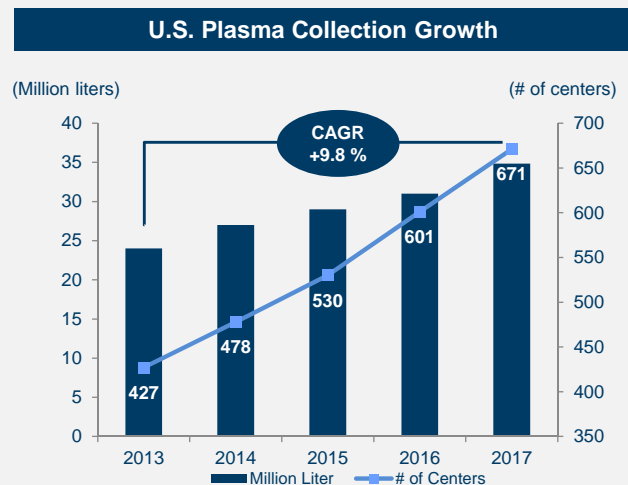
Market Analysis, Challenges & Opportunities

Plasma Supply Tightness

U.S. Plasma Market

Plasma Collection Growth¹

- Plasma collection has continued to be a large, growing industry year-on-year
- In 2017, the U.S. plasma market has collected c.35 million liters
- The number of donor centers reached 671 by the end of 2017
- Increasing collections and recruiting qualified staff are main challenges

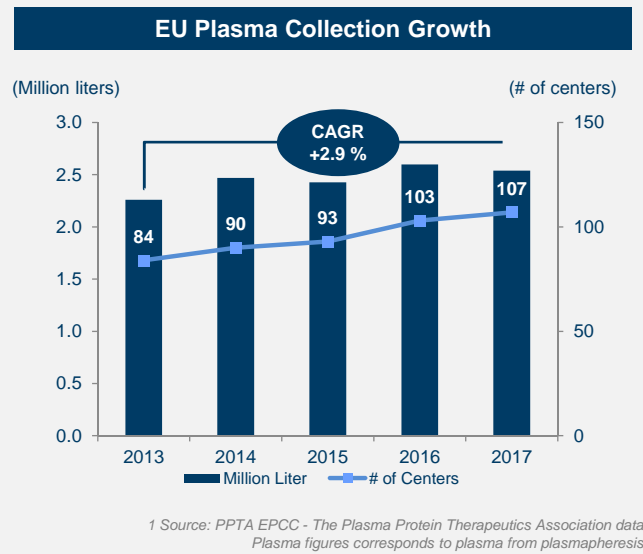


¹ Source: PPTA - The Plasma Protein Therapeutics Association data
Plasma figures corresponds to plasma from plasmapheresis

EU Plasma Market

Plasma Collection Growth¹

- In 2017, the EU plasma market has collected c.2.5 million liters (Germany 1.7, Austria 0.5 and Czech Rep & Hungary 0.3 million liters)
- The number of donor centers reached 107 by the end of 2017
- Increasing collections and recruiting qualified staff are main challenges
- Main players, Haema, Octapharma, CSL, Biotest, TMD and KedPlasma

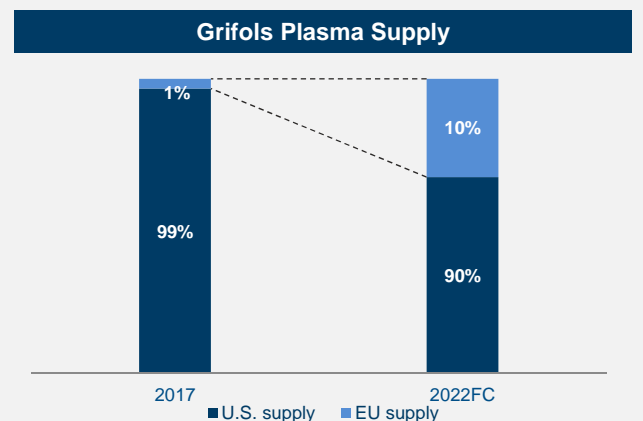


Plasma Procurement Strategy

Expanding Plasma Capacity

Opportunities for improved efficiencies

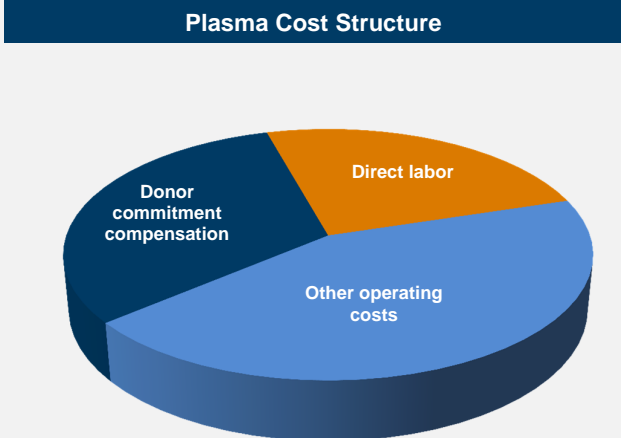
- Improvement in operating efficiencies in U.S.
- Diversification to EU plasma supply provides efficiencies and optimization of cost per liter due to better operational cost and savings on ocean freights



Plasma Cost Management

Continuous Improvement of the Entire Value Chain to Promote Cost Containment

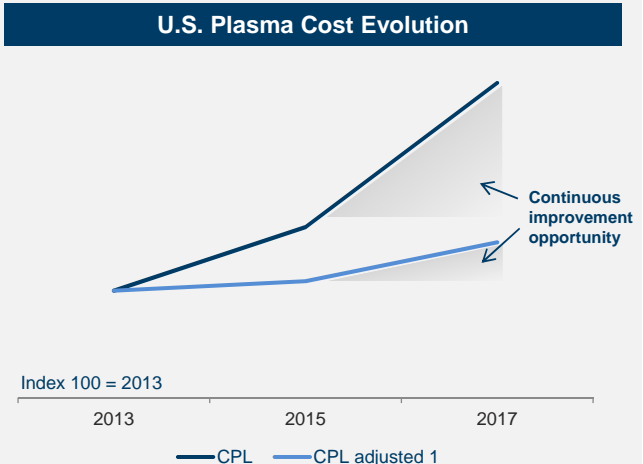
- Planned volume growth drives fixed cost leverage
- Maintain donor commitment compensation consistent with market
- Management of U.S. labor market consistent with the industry
- Process improvements and automations to further promote cost savings



Plasma Cost Management

Continuous Improvement of the Entire Value Chain to Promote Cost Containment

- During 2015-2017 period, almost 40 new centers opened and integrated in the ramp-up process
- Focus on opening centers and volume growth
- Impact of new donor centers, donor commitment compensation and direct labor were the main drivers for the CPL increase over this period
- Demand growth lead to tightness in plasma supply



1. CPL Adjusted is not considering Donor Commitment Compensation, Direct Labor and New Donor Centers Impact

Business Development: Connections

New Donor Recruitment and Customer Service Strategies

Donor-Centric Strategy

Enhance Donor Experience to Increase Productivity

Commitment	<ul style="list-style-type: none"> • All donors are heroes Donors come to Grifols with a purpose: to fulfill a financial need; help others; or take part in something greater than themselves. We celebrate all donors! 	
Compensation	<ul style="list-style-type: none"> • All donations are created equal Grifols compensates all donors for their substantial commitment of personal time. Competitors base their compensation on weight 	
Loyalty	<ul style="list-style-type: none"> • Personalized experience drives loyalty Innovative appointments program. Cadenced messages through CRM technology enhance connection; donor focus in center fosters family atmosphere 	

Loyalty

Appointment Technology Differentiates Grifols' Donor Experience

Launch of First-of-Its-Kind Plasma Donor Appointment Program

- Customized web and mobile-enabled
- Launched in select centers nationwide
- Schedule algorithm tailored for each center
- Donor choice balances workload
- Reduce processing times - donor loyalty
- Team scheduling predictability

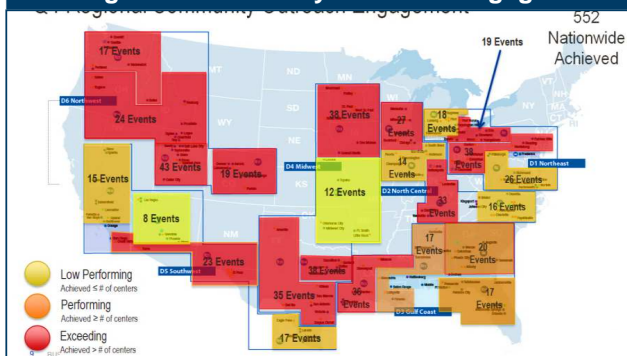
Improvement of Automated Customer Relationship Management (CRM) Tool

- Direct to donors
- Robust content builds iteratively
- Real time messaging
- Personalized messages - call-to-action; Donation frequency increased.
- Analytics illuminate opportunity areas

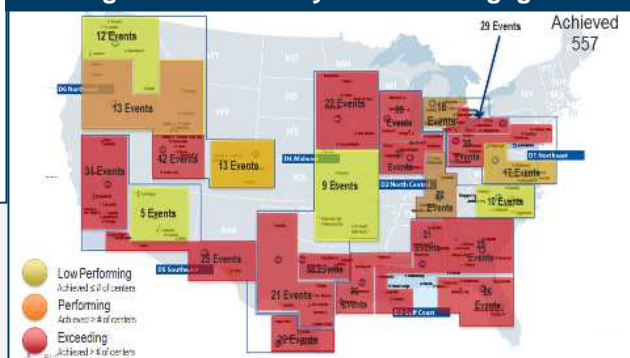
Engagement with the Community

Expanded Community Outreach With More Than 1,000 Events

Q4 Regional Community Outreach Engagement



Q1 Regional Community Outreach Engagement



Build Learning Culture for Process Efficiency & Customer Service

Building Competitive Advantage Through Highly Skilled, Motivated and Engaged Staff

Center Leadership Development Program

- 6-month skills enhancement and development
- Shared learning and instruction experience
- Focus on donor and employee engagement

Accreditation

- Submitted; Institute for Credentialing Excellence (ICE)
- Program is substantially robust
- Aligned with global initiatives



THE GRIFOLS
ACADEMY
PLASMAPHERESIS



Institute for
Credentialing
Excellence®



The value of the education program lead industry players to participate in these education activities

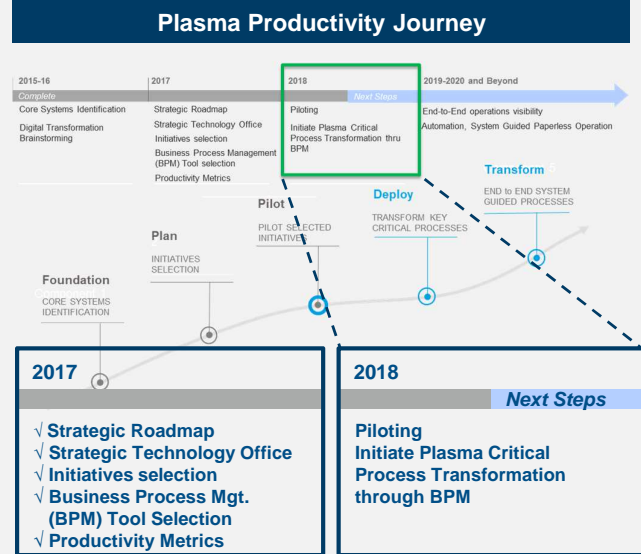
Business Development: Innovation Process and Technology Improvements

Plasma Productivity Journey

Journey Status - ON TRACK

Journey achievements

- Core Systems identification and big picture comparison completed
- Plasma technology plan defined in alignment with 4 goals
- Strategic technology office established
- Business Process Management (BPM) tool selected:
- Piloting: Two BPM solutions created
 - Donor Flow Tracking
 - Change Control Management



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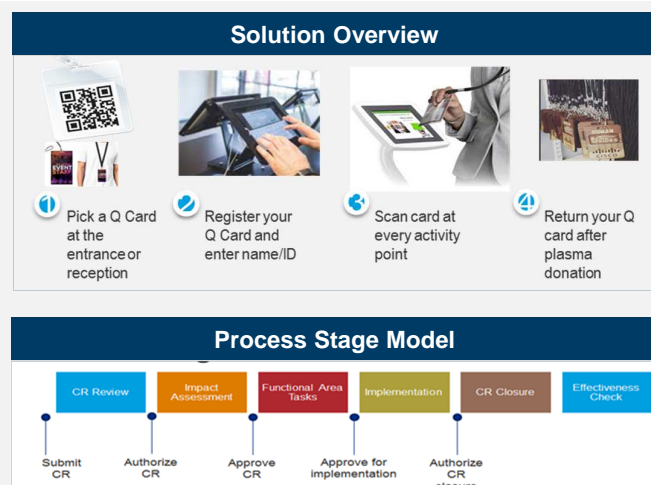
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Enabling Plasma Data Flow Management in Real Time

Trial of BPM Enables Actionable Data and Empowers Staff

Objective: BPM tool to manage process flows in real time. Enable actionable intelligent data for staff to take immediate action and accelerate results for high productivity

- Data management improvement
- Operations Intelligence improvement
- Optimize business rules and decision management
- Workforce mobility
- Donor and staff engagement. Routine manual workflow automation



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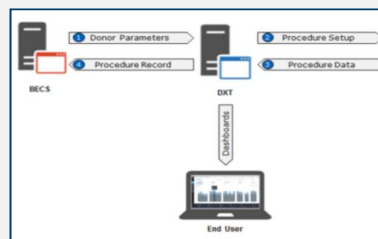
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Collection Devices Upgrade

Improved Donation and Quality Performance

Replace current Plasmapheresis Devices to newer technologies available from Fresenius Kabi and Haemonetics

- The NexSys PCS¹ and Aurora Xi have improved quality and compliance with automated procedure when connected to BECS² system
- Faster procedure time and paperless donations
- Intelligent reporting and process optimization when using connected to BECS
- Improved donor comfort and safety
- Reduced machine downtime, improved usability, configurability, reliability and serviceability



1. PCS; Plasma Collection System, a Haemonetics apheresis device
2. BECS; Blood Establishment Computer Software

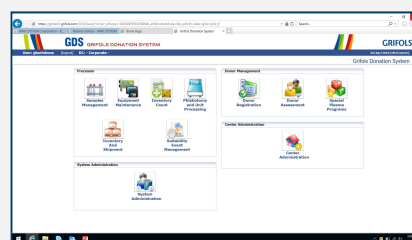
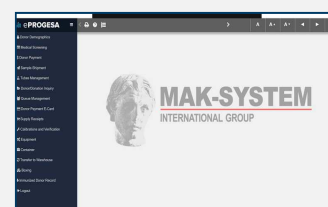
Core BECS Systems Rationalization

Drive Towards One Core System

Define and implement BECS Standard

- Defined as the Core BECS system that provides higher contribution and alignment with long-term plasma strategic goals and performance
- Drive down cost per collection by rationalizing and focusing in one Core BECS System
- Ensure quality management and compliance
- Rationalize support, maintenance and integration efforts
- Reduce complexity and promote seamless staffing flows among centers

Grifols / Haemonetics / MAK-System



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 acceleration plan to reach approximately 325 by 2023
- U.S. collections increasing by double digits, driven by enhanced operational efficiencies
- EU plasma collections access key to diversify plasma supply
- Competitive advantage: building long-term inventory for business opportunities

FOCUS ON EFFICIENCIES

- U.S. plasma procurement continuous improvement combined with EU plasma synergies will drive efficiencies
- 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
- Delivery of high-impact educational and professional opportunities for employees

Bioscience Manufacturing Operations

Capacity Leadership in Manufacturing to Optimize Growth

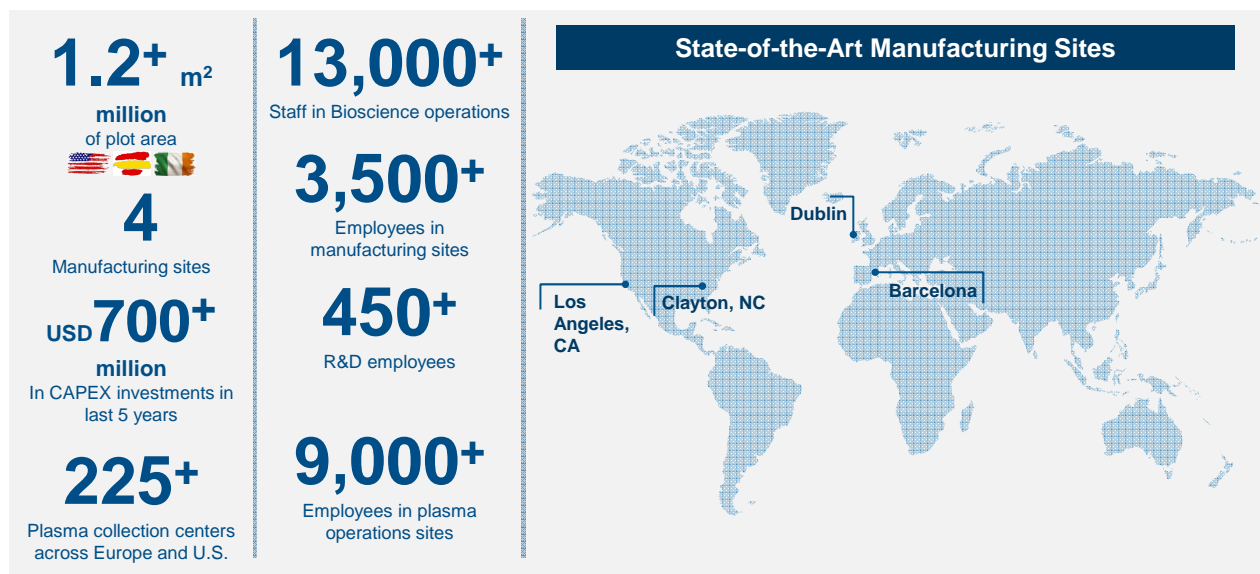
Eduardo Herrero
President, Bioscience Industrial Group

GRIFOLS



Bioscience Manufacturing Operations

Global Footprint



Bioscience Manufacturing Operations

Key Priorities

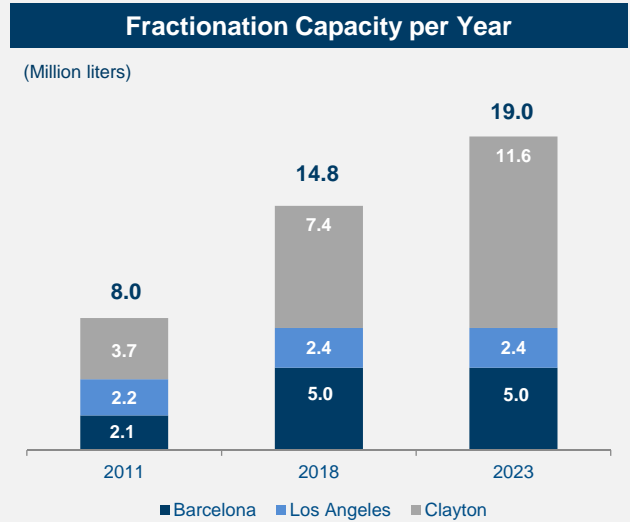
Capacities	Efficiencies
<ul style="list-style-type: none">• Fractionation capacity• Key purification capacities• Fibrin sealant capacity• Investing in growth	<ul style="list-style-type: none">• Process improvements evolution• Manufacturing cost per liter• Quality and safety driven• Main achievements

Bioscience Manufacturing Capacities

Fractionation Capacity

Capacity Leadership in Manufacturing to Optimize Growth Opportunities

- Given the long time to execute, validate and obtain approvals, it is key taking the right decision in advance of where, when, and for how much capacity a facility is built
- Target fractionation capacity is plan to be achieved in 2022

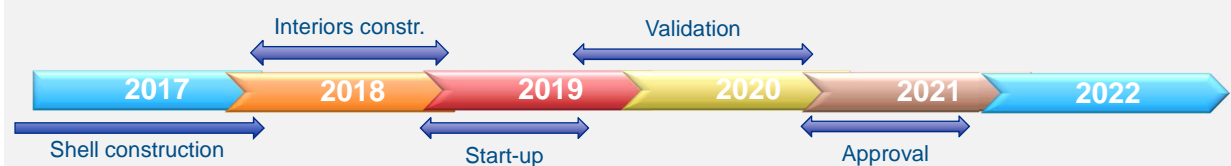


New Fractionation Building (NFB) Project at Clayton (NC)

Engineered for Maximum Efficiency and Flexibility



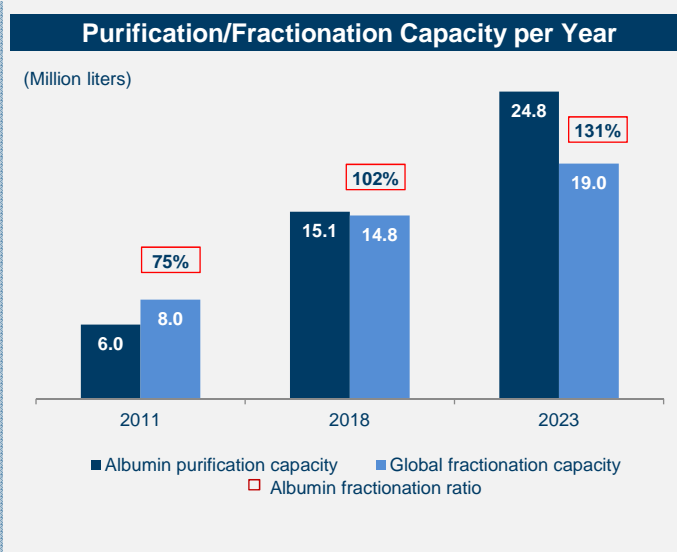
- Fractionation capacity: **6m eq/L plasma/year**
- **Two parallel** plasma pooling and fractionation lines
- CAPEX: USD 90M



Albumin Purification Capacity

Supporting Demand Growth

- Protein purification capacity decisions aligned to fractionation capacity
- Los Angeles and Dublin facilities, along with manufacturing process improvements, are growth drivers of albumin purification capacity
- Product differentiation ensures up to 7 million liters in flexible containers
- Albumin fractionation ratio to increase over 100%

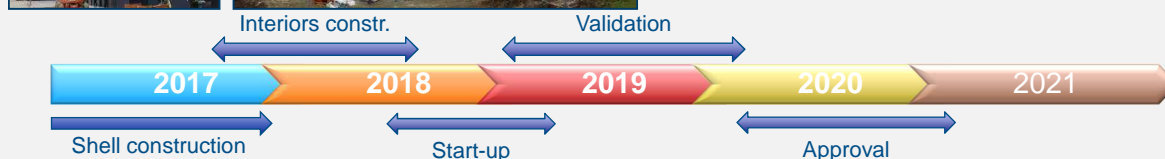


New Albumin Purification and Filling Facility in Dublin

Albumin in Flexible Containers: State-of-the-Art Facility for Global Supply



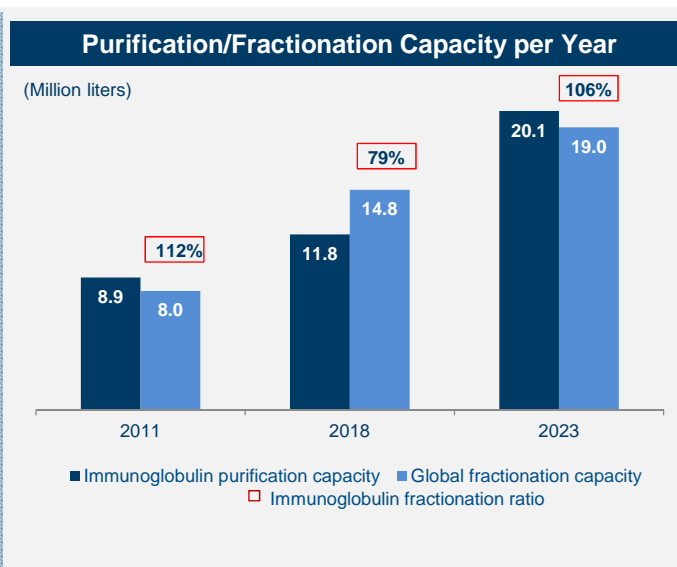
- Purification and filling plant for **6m eqLplasma/year of albumin**
- CAPEX: USD 85m
- 4 sterile filling lines for albumin in bags
- Implementation of **continuous online process**, from bag forming to pasteurization and sterilization, to **enhance production efficiency**



Immunoglobulin Purification Capacity

Supporting Demand Growth

- Protein purification capacity decisions are aligned with fractionation capacity
- Los Angeles and Clayton plants and continuous improvement serve as growth drivers of immunoglobulin purification capacity
- Immunoglobulin fractionation ratio to increase over 100%



New IG Purification and Filling Facility at Clayton

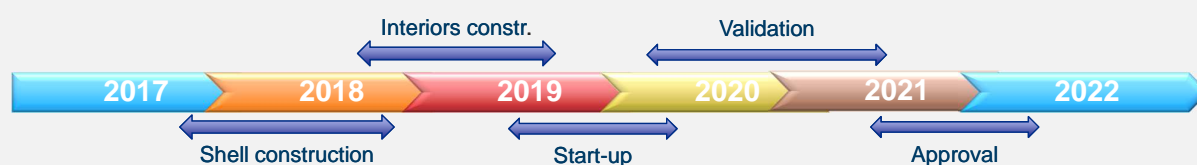
First-in-Class Facility for the Next Generation of IGs



- **World's first facility for IGs in flexible containers**
- Purification and Filling Plant for **6m eq.L plasma/year IG**



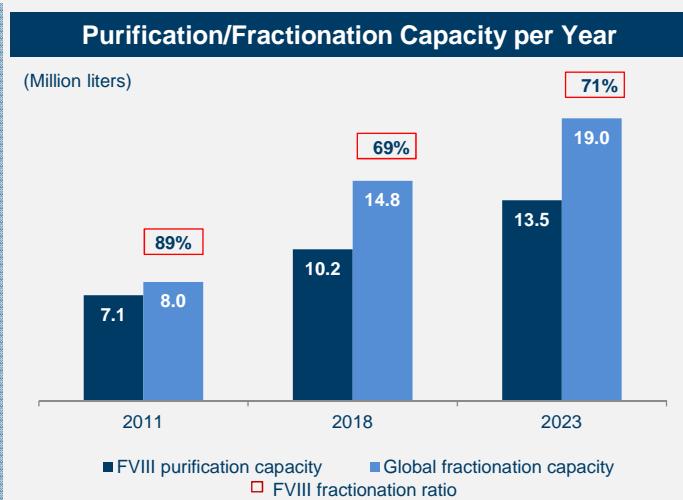
- Subcutaneous
- Intravenous
- Intramuscular
- CAPEX: USD 120m



Factor VIII Purification Capacity

Supporting Demand Growth

- Protein purification capacity decisions aligned with fractionation capacity
- Clayton plant not significant investments in room upgrades together with Barcelona and Los Angeles process improvements are the drivers of the Factor VIII purification capacity growth



Factor VIII Purification Facilities in Clayton

Upgraded Processing Rooms and Repurposed Flows and Equipment



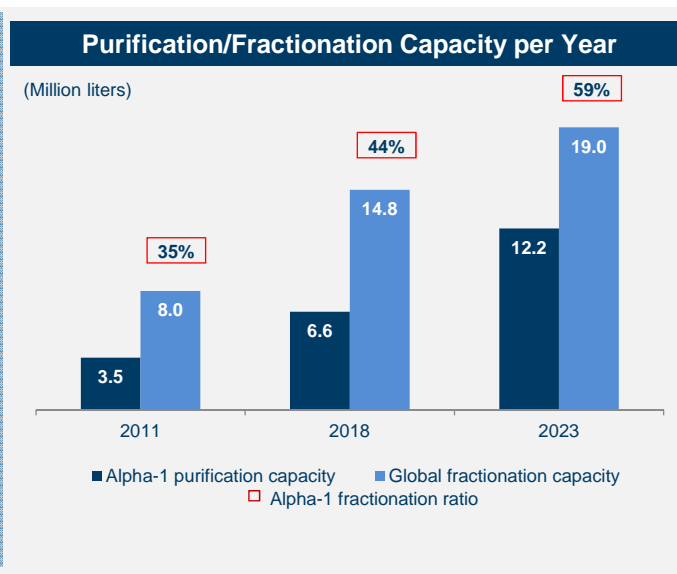
Non-VC (Zone 1) Area for Alphanate® in B300, Rooms 3012 & 3013

VC (Zone 2) Area for Alphanate® in B300, Room 3922

Alpha-1 Purification Capacity

Aligned With Fractionation Capacity

- Protein purification capacity decisions aligned with fractionation capacity
- Barcelona plant is the main growth driver of alpha-1 purification capacity

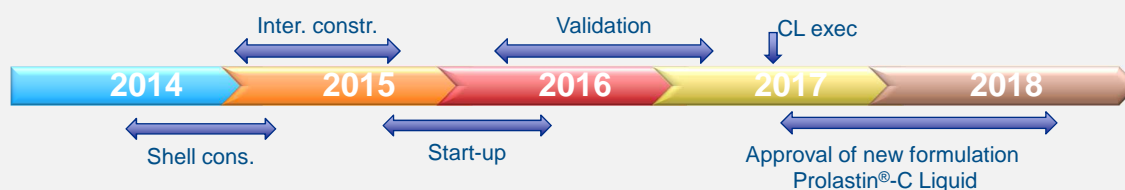


Alpha-1 Purification and Filling Facility in Barcelona

New Plant Provides Capacities for Alpha-1 Growth



- Purification and filling plant for **4.3m eqLplasma/year of Prolastin®-C**
- New formulation for **Prolastin®-C Liquid**
- GSF® proprietary technology for aseptic filling operations
- CAPEX: USD 65m
- 80,000 square feet on 3 levels

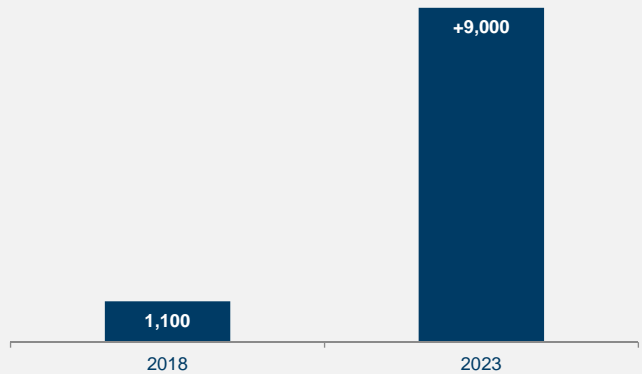


Fibrin Sealant Manufacturing Capacity

Supporting Demand Growth

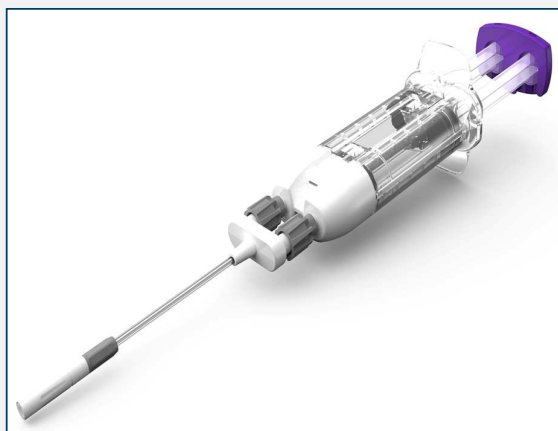
- Fibrin sealant manufacturing capacity fully covered by fractionation capacity
- Barcelona plant as the driver of the fibrin sealant manufacturing process

Manufacturing Capacity of Thousands of Kits Over Next 5 Years



Fibrinogen/Thrombin Purification and Filling Facility in Barcelona

Complete Upgrade to Increase Fibrin Sealant Presentations



- Capacity 1.7MM units per year
- Syringes of 2, 4, 6 and 10 ml formats
- New final product sterilization, packaging and warehousing areas
- Automated warehouse -30°C for 700 pallets
- CAPEX: EUR 27m



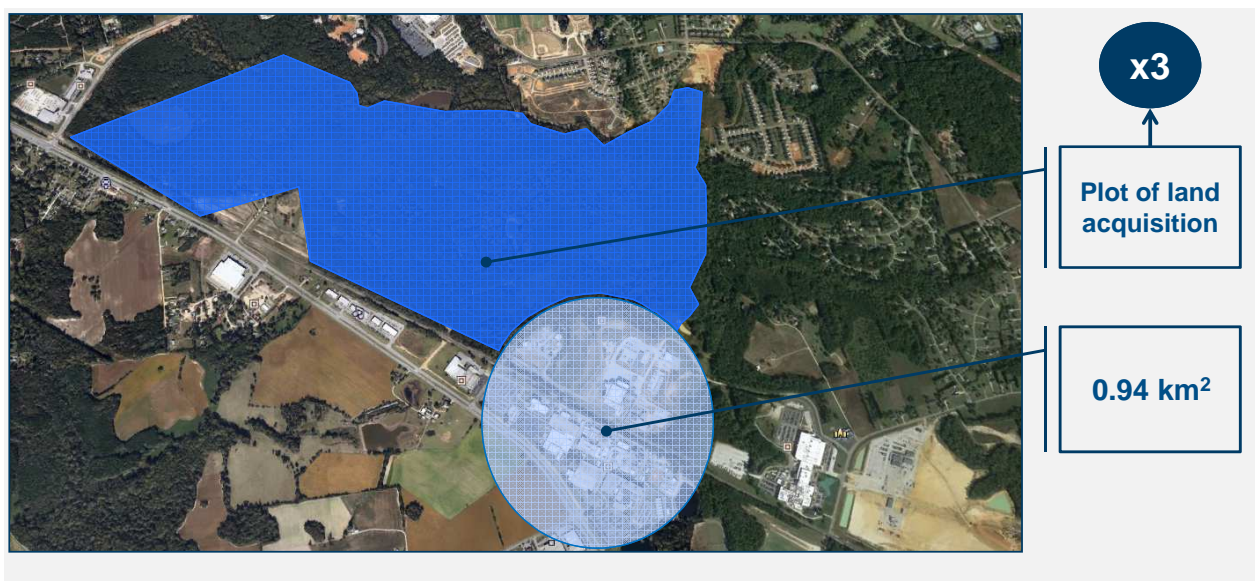
Investing in Growth

Barcelona, + 49,000m², +109% of Land Expansion



Investing in Growth

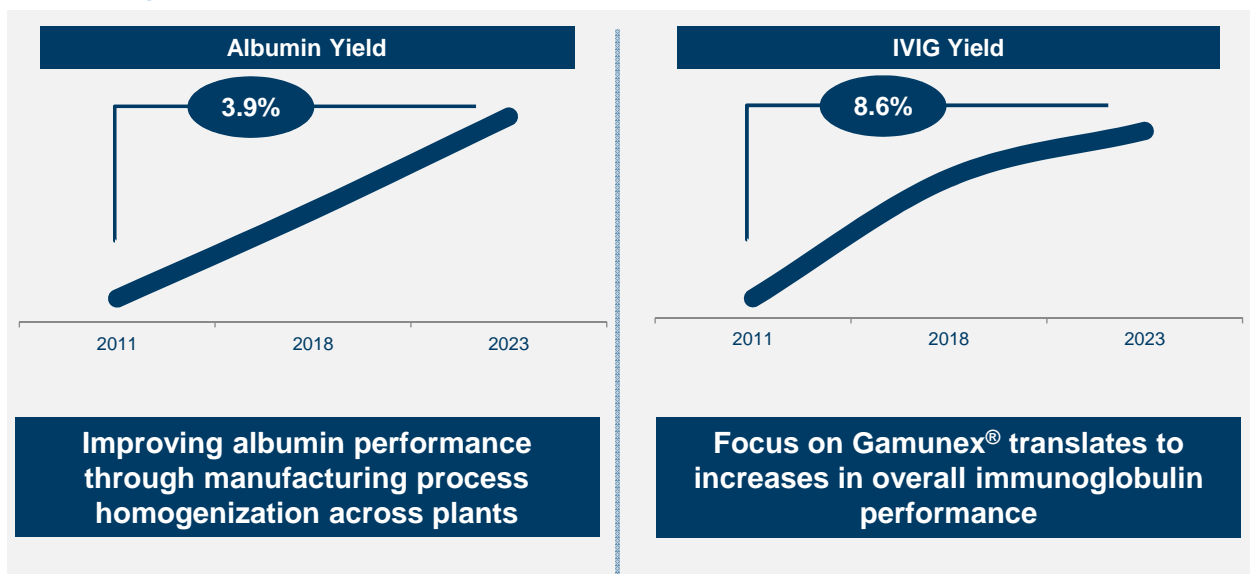
North Carolina, + 1.9 km², 200% of Land Expansion



Bioscience Manufacturing Efficiencies

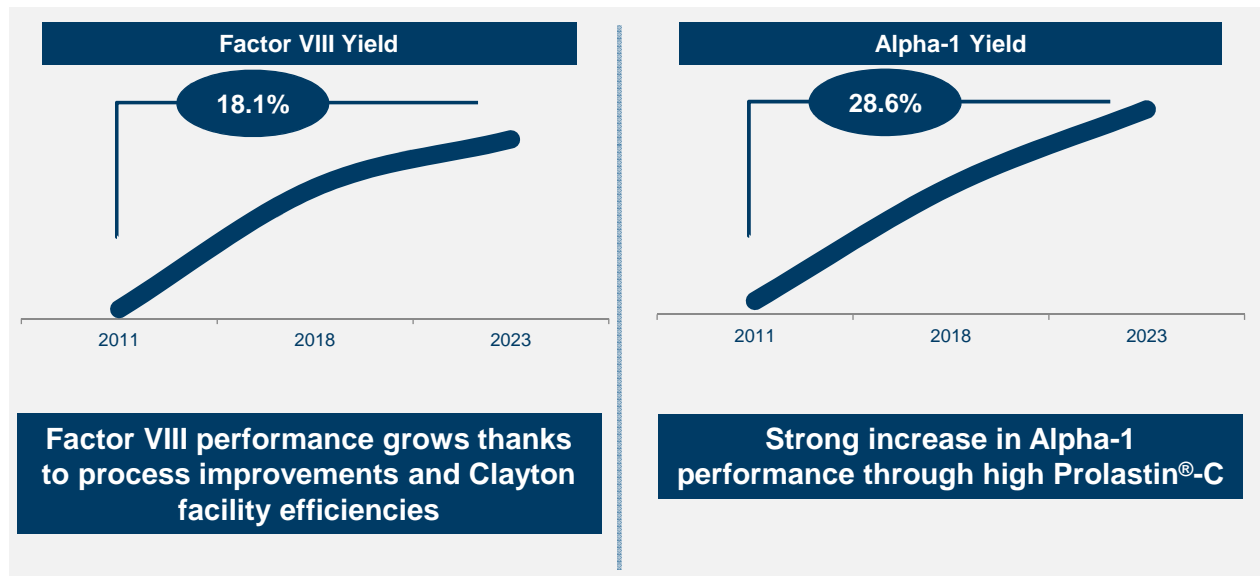
Continuous Process Improvements Evolution (I)

Increasing Performance in Key Proteins



Continuous Process Improvements Evolution (II)

Increasing Performance in Key Proteins



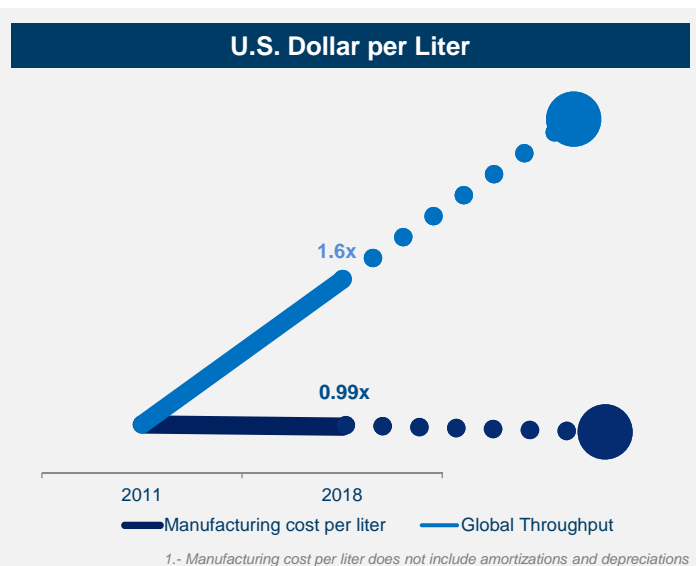
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Manufacturing Cost per Liter

Leveraging Capacity Expansion

- Manufacturing cost per liter¹ benefits from efficiencies over time and is able to absorb the annual cost of living
- Impact of new plants is leveraged by automation and process improvements



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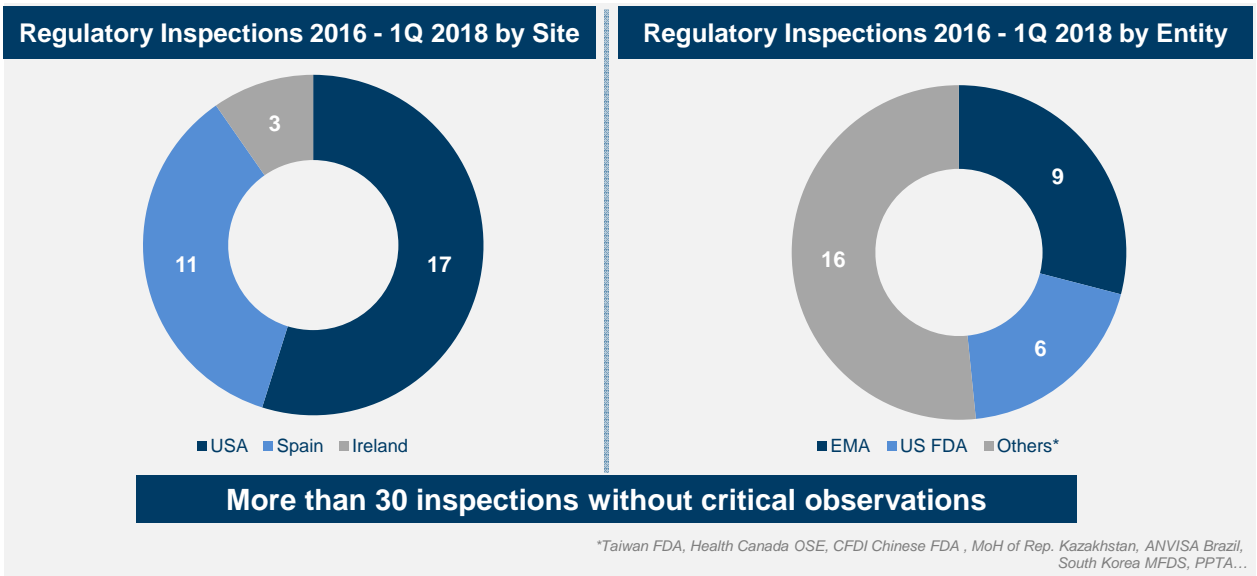
Quality, Safety & Reliable Supply are Key Drivers of Sustainable Growth

A Core Value for Grifols

Vertical integration <p>Ensure safety and quality throughout the process</p>	A strict in-process control framework <p>Continuously monitoring the process, assessing KPIs, as well as GMP compliance status, deviations and CAPA</p>	Robust supplier qualification program <p>Ensure any raw material follows a strict qualification process</p>
External quality certifications <p>PPTA IQPP for Source Plasma and QSEAL for manufacturing plants</p>	Quality management system <p>Effective quality management system through all the organization from plasma collection centers to manufacturing facilities</p>	Regulatory compliance as a top priority <p>None of Grifols sites involved in the plasma supply chain has received a warning letter, license suspension or revocation</p>

Quality, Safety & Reliable Supply are Key Drivers of Sustainable Growth

A Core Value for Grifols



Recent Regulatory Achievements

Progress on Track

2017 to Present	Ongoing
FDA manufacturing approvals <ul style="list-style-type: none">• Filling line 3 (Albumin 20ml)• Filling line 5 (Prolastin®-C)• Approval to produce Gamunex® LA with II+III from Clayton• Approval of Gamunex® 2nd train in LA Product approvals <ul style="list-style-type: none">• Alpha-1 Liquid (FDA)• Fibrin sealant (FDA and EMA)• Rabies-C and GamaSTAN®-C (FDA)	<ul style="list-style-type: none">• License submission of Prolastin® of European plasma for contract fractionation• License submission of Fraction IV₁ paste from Clayton for Prolastin®-C in BCN• 20% SCIG• Alphanate® new method in Clayton• Albumin in bags

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Key Takeaways

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Key Takeaways

Capacity Leadership to Optimize Growth

Manufacturing Capacities

- Global fractionation capacity to grow **up to 19 million liters**
- Key proteins purification and filling capacities growing aligned with global fractionation capacity
- Supporting future expansion by investing in land acquisitions, which will **triple** current surface
- An integrated supply chain that has become a competitive advantage
- Manufacturing reliability: **stable product global supply**

Manufacturing Efficiencies

- Continuous **improvements in manufacturing performance** translates to yields increase and manufacturing cost per liter containment
- Constant **upgrades** ensures **state-of-the-art** manufacturing operations
- U.S. and EU plants are able to work as **alternate manufacturers** among them
- Quality and safety are core values for Grifols to ensure sustainable growth and reliable supply

Diagnostic Industrial

Supporting Sustainable and Profitable Growth

Oriol Duñach
President, Diagnostic Industrial Group

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Investing in Equipment and Facilities

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NAT Business: Capturing the Value of Vertical Integration

Remodeling and New Facilities Investments

San Diego, CA - Willow Court facilities

Area: 41,900 sq ft



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NAT Business: Capturing the Value of Vertical Integration

Remodeling and New Facilities Investments



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NAT Business: Capturing the Value of Vertical Integration

Remodeling and New Facilities Investments

New freezer in building 10808:

- Temperature: -20C°
- 268 pallet positions
- 3 levels
- 1 anteroom of 5C°



New warehouse in building 10808:

- Controlled temperature: 16-30C°
- 300 pallet positions
- 3 levels

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NAT Business: Capturing the Value of Vertical Integration

Remodeling and New Facilities Investments

New building 10804:

- Ground floor: Q.C. and R&D labs (new R&D projects)
- 1st floor: offices



Acquisition of a new building 10895:

- 78,500 sq. ft approx.
- Template positive manufacturing (NAT related)
- Future expansion for IH manufacturing
- Warehouse space

Immunoematology Business: Investing to Support Growth

Key Growth Driver of Diagnostic Division



5th manufacturing line; Barcelona

25% increase in **gel cards** manufacturing capacity to underpin future growth



New fully automated machine for **red cells** manufacturing, with a nominal capacity of 3.5M vials/year to support business growth



Automated red cells filling machine; Barcelona

Hemostasis Business: Investing to Support Growth

Beckman Coulter Partnership to Drive Hemostasis Growth

New freeze-dryer with capacity of 1.5m vials/year



New freeze-dryer; Barcelona



Capacity to manufacture up to 30 different hemostasis reagents



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Blood Bag Business: New Manufacturing Plant in Brazil

Local Manufacturing Presence to Directly Serve the LATAM Market

Curitiba, Brazil

- Total: 5,525 m²
- Lot size: 15,176m²
- Warehouse capacity: 1,270 pallets
- Initial manufacturing capacity: 8m units
- Possibility to duplicate capacity
- ANVISA inspection: 2Q 2018
- First commercial lots: 1Q 2019



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Regulatory Approvals

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Genotyping Business

FDA Regulatory Processes on Track

Grifols Progenika, Bilbao

- The company has obtained FDA approval for the genetic test for Alpha-1 deficiency
- The company successfully passed FDA plant inspection for ID Core XT manufacture, a key product in the blood genotyping IH portfolio



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Antigens for Immunoassays

Ongoing Regulatory Submissions

Emeryville, California

- Already submitted to FDA:
 - HCR43
 - HB Core
- To be submitted in 2018:
 - C100
 - NS5
 - C22
 - C200



2018 Clinical Trials to Support Future Regulatory Submissions

	U.S.	CE	China
Immuno Hematology	<ul style="list-style-type: none"> • Eflexis • 2 New Gel Cards • New Quality Control (2 tubes) 	<ul style="list-style-type: none"> • New Gel Card Reader • XT Quality Control for molecular testing 	<ul style="list-style-type: none"> • Eflexis • 2 New Cards • New Gel Card Reader
Hemostasis	<ul style="list-style-type: none"> • Instruments (Qsmart, JustQ, Qexpert) • All Reagents 	<ul style="list-style-type: none"> • New Reagents: • DG Latex VWF: Ag • DG APTT silica based 	
NAT	<ul style="list-style-type: none"> • Zika Organ and Tissue Transplant • Babesia (Pooling) 		<ul style="list-style-type: none"> • UE (Pool of 96 samples)

Key Takeaways

Supporting Sustainable and Profitable Growth

- Continuous investments in core businesses in order to increase capacity
- Significant facilities investments in acquired NAT manufacturing and research activities in San Diego
- Sustained regulatory effort in genetic tests, new Emeryville antigens factory (Horizon Project), hemostasis products, immunohematology and NAT all support commercial opportunities for Grifols

2018 Investor and Analyst Meeting

Barcelona
7th and 8th June

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Innovation

Driving Sustainable and Profitable Growth Through Strategic Innovation

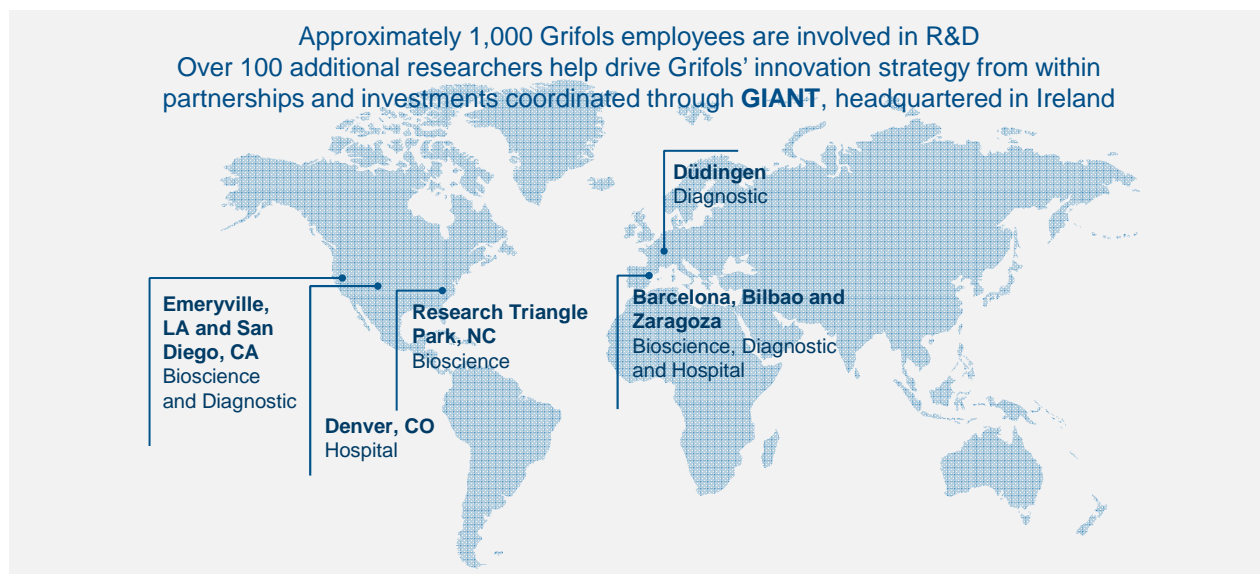
David Bell
Chief Innovation Officer

GRIFOLS

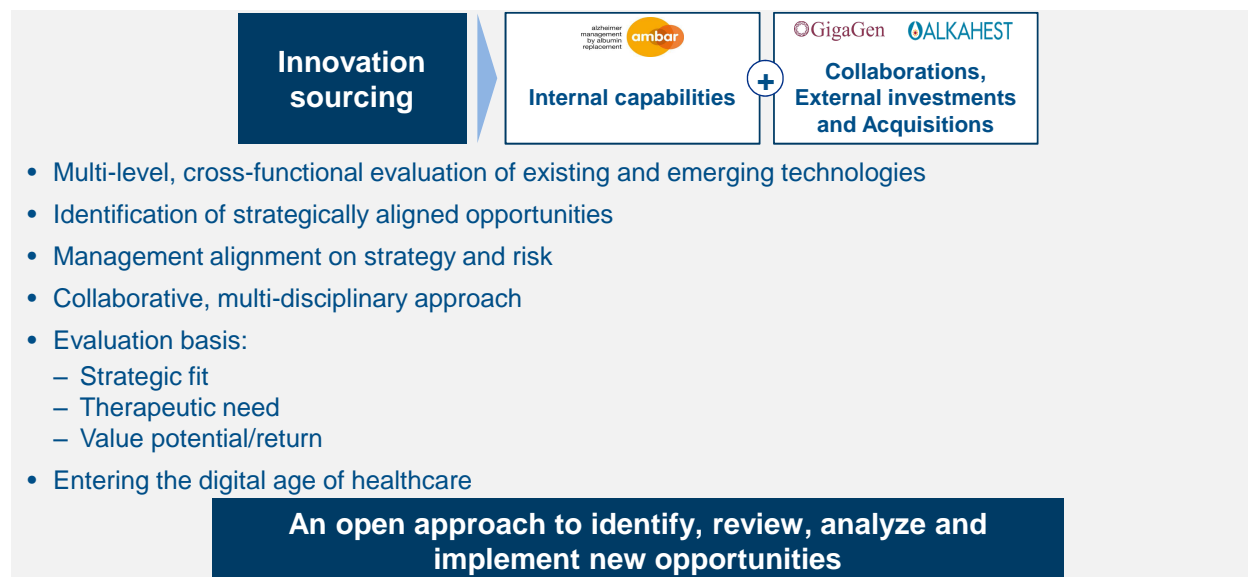


Grifols Innovation Sites

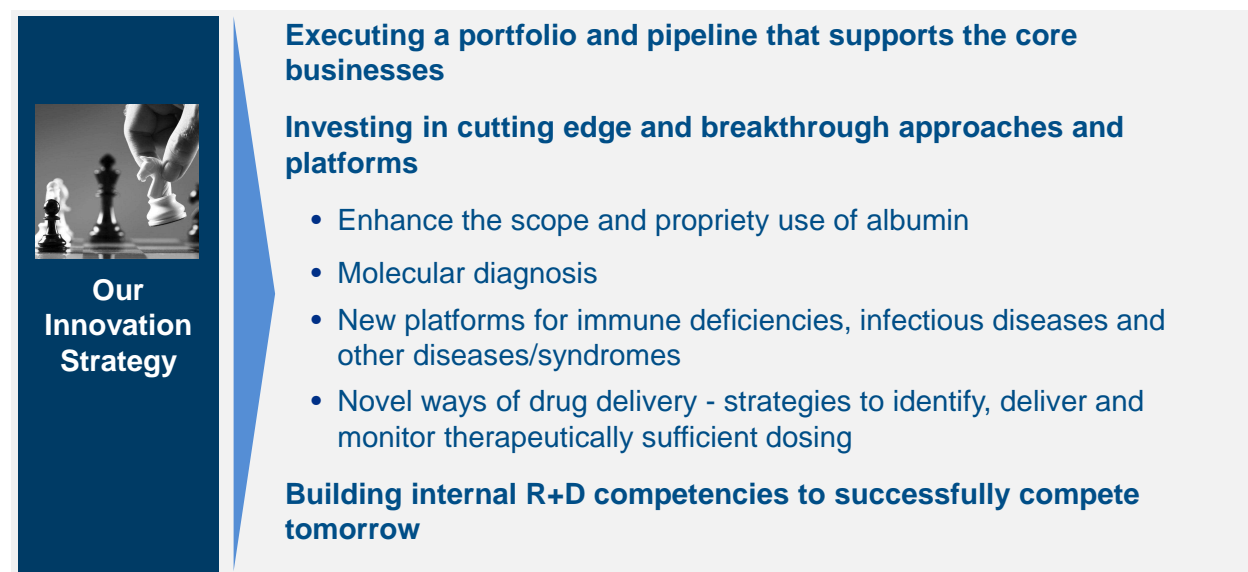
Global Footprint



Sourcing Innovation Through Internal Capabilities, External Investment and Collaborative Ventures

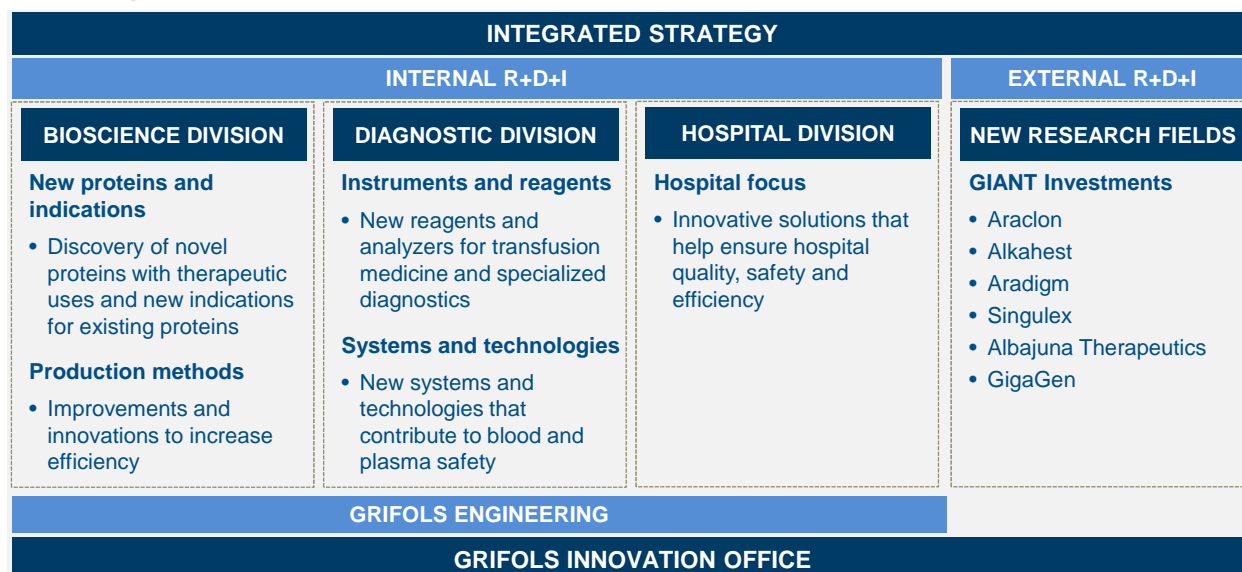


Grifols' Strategic Approach to Growth Is Built on Sustainable Innovation



An Integrated Innovation Approach

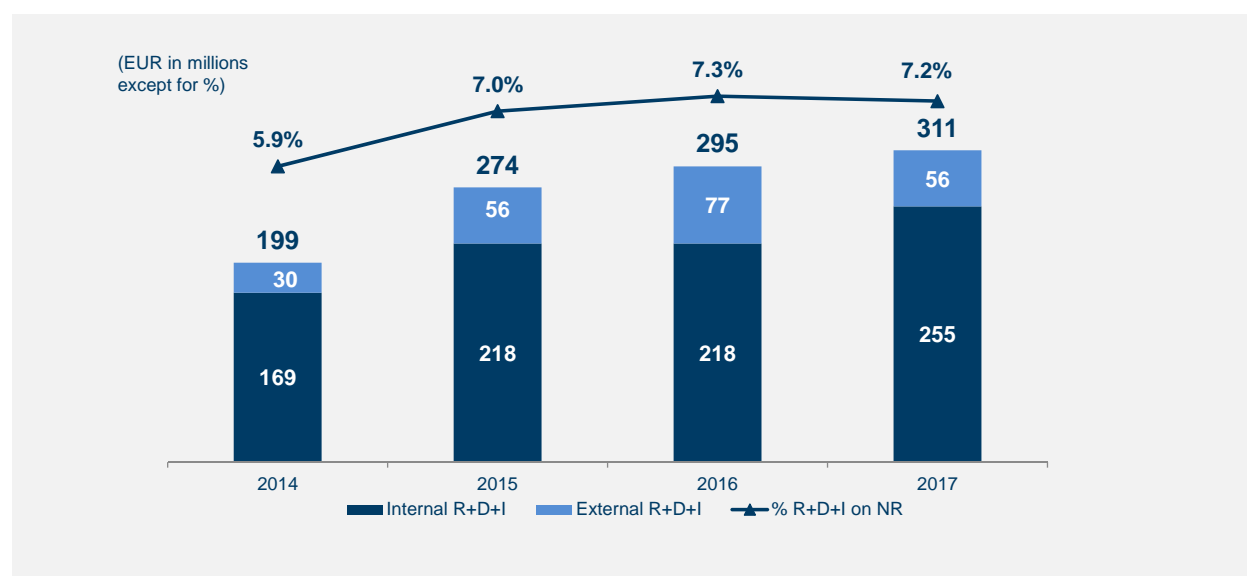
A Strategy That Transcends Internal Resources: Grifols Innovation Office



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A Solid Commitment to an Integrated R+D+I Approach



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Update on Internal R&D Projects

Recent Achievements

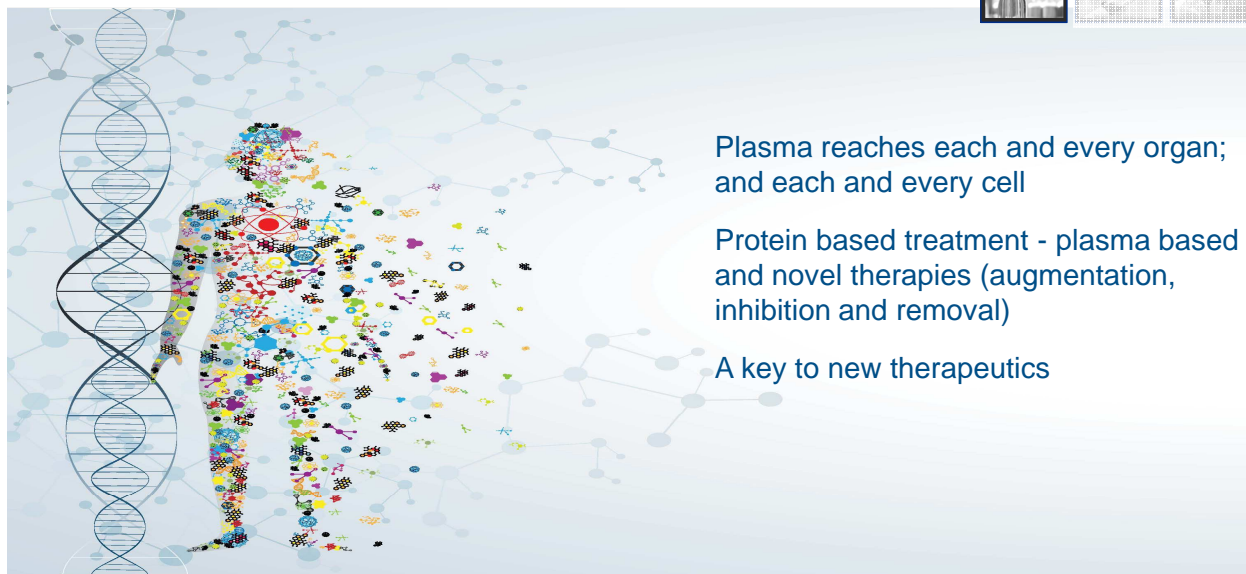
New Licenses Granted	Expected Licenses (Short Term)
<ul style="list-style-type: none"> Liquid Alpha-1 Fibrin Sealant Thrombin Rabies Hyperimmune - new formulation GamaSTAN® - new formulation Saline solution (new U.S. license granted) Alpha-1 genetic diagnostic test Product, automation and clinical testing services (5 new FDA licenses in 2018) 	<ul style="list-style-type: none"> Albumin in bags (expected in 2019) SCIG (expected in 2019) Low volume highly concentrated pdFVIII (expected in 2020) IVIG for Myasthenia Gravis - crisis (expected in 2020) Product, automation and clinical testing services (5 more FDA licenses expected in 2018)

A Solid Commitment to Collaborative Research

 <small>Institut de Recerca de la Sida</small>		 <small>GRIFOLS</small>			
Albajuna Therapeutics	Alkahest	Araclon	Aradigm	GigaGen	Singulex
Development of a new treatment strategy based on antibodies with great potential to neutralize HIV	Research on age-related cognitive deterioration related to plasma proteins	Research, treatment development and diagnostic tests for Alzheimer's disease and other neurodegenerative diseases	Development and marketing of inhaled pharmaceuticals for the treatment and prevention of severe respiratory diseases.	Specialized in the development of novel innovative monoclonal and polyclonal antibody therapies	Development of a novel ultrasensitive technology SMC™ (Simple Molecular Counting) applicable to clinical diagnostic and transfusional fields

The Human Proteome: Plasma Holds the Key to Disease Treatment

Emerging Technologies Based on Proven Platforms



Plasma reaches each and every organ;
and each and every cell

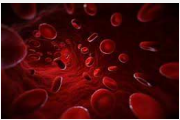



Protein based treatment - plasma based
and novel therapies (augmentation,
inhibition and removal)

A key to new therapeutics

Next Generation Diagnostic Testing Solutions

A Comprehensive Approach to Each Business Line



 <p>TRANSFUSION MEDICINE <i>Retain BDS Market Leadership Grow Immunohematology</i></p> <ul style="list-style-type: none"> • Menu expansion and high multiplexing assays • Lab automation and software solutions • Value-added services for blood donor centers • Immunoassay serology testing • Adjacent synergistic product offerings 	 <p>CLINICAL DIAGNOSTICS <i>Strengthen Hemostasis Explore Specialty Diagnostic</i></p> <ul style="list-style-type: none"> • Hemostasis: menu expansion and instrumentation • Leverage expertise in medical diagnostic, infectious disease and antigen production to explore clinical diagnostic opportunities 	 <p>IMMUNO BUSINESS</p> <ul style="list-style-type: none"> • Expand recombinant protein development and production • Grifols existing business • External partners 	 <p>INVEST IN DISRUPTIVE TECHNOLOGIES</p> <ul style="list-style-type: none"> • Next generation sequencing • Proteomics • Point-of-care or near-patient instrumentation
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The Hospital Pharmacy

Increasing Efficiency & Economics of the Hospital Pharmacy through Quality & Safety



Sterile IV Solutions

- Needle-free bags for improved safety

Pharmatech

- IV workflow software that captures and digitizes data from connected devices on compounded IV preparations for analysis and actionable insights
- Robotics for automation in compounding for enhanced accuracy, safety and efficiency
- Closed System Transfer Devices that are compatible with oncology robots
- Smart pumps as connected devices to improve safety in administration
- Technology for precise identification of contents of IV solutions prior to final administration
- Automated eye tracking that will reduce contamination by enabling touchless data entry

Convergence of Science, Business and Society

Common Sense Solutions to Complex Challenges

TOTAL DISEASE MANAGEMENT

TOWARD A PERSONALIZED MEDICAL EXPERIENCE

- From earlier diagnoses of the onset of disease through new approaches to diagnostic testing and predictive analysis
- To developing therapies with plasma based proteins and their recombinant analogs
 - Delivered in novel ways to ensure bioactivity where it is actually required
- To monitoring the effect of treatment: identifying optimal dosing regimens
- To providing support and education to patients and their caregivers

Combining Grifols' core competencies across divisions to deliver a new level of comprehensive care

Progenika Alpha-1 Genetic Test and Singulex

Driving Sustainable and Profitable Growth Using Core Capabilities in Diagnostic

Antonio Martínez
CEO, Progenika Biopharma

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Progenika: A Grifols Company

An Integrated Innovation Strategy

DESIGN, DEVELOPMENT AND PRODUCTION OF MOLECULAR BIOLOGY TESTS

for blood group genotyping, diagnosis of genetic complex diseases
and monitoring response to biological therapy





- Founded in 2000 by a group of university and biotech-company researchers
- Leader in selected niches as transfusion medicine, cardiovascular and drug monitoring
- Located in Bizkaia (Spain), focused in R&D and manufacturing of IVD products
- Certified by EU, FDA, Health Canada, TGA (Australia), ANVISA (Brazil), SFDA (Saudi Arabia) and KFDA (Korea)
- 74 employees (40% PhDs in molecular biology)



Progenika: A Grifols Company

Capabilities in DNA Genotyping and Multiplexing

BLOODchip^{ID}

Reagents			Software
			
IDCORE^{XT}	IDHPA^{XT}	IDRHD^{XT}	BIDS^{XT} BLOODchip ^{ID} software
Analyzes 29 polymorphisms to determine 37 antigens of RBC groups. Rh CE, Kell, Kidd, Duffy, MNS, Diego, Dombrock, Colton, Cartwright and Lutheran	Analyzes 13 polymorphisms to determine 12 HPA systems	Analyzes 5 polymorphisms to determine D antigen of Rh blood group and 1 polymorphism to determine HPA-1 system	Traceability tools LIS connectivity Database for analysis
Progenika has broad expertise developing assays for the simultaneous detection of several DNA variants			

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Genetic Diagnosis of Alpha-1 Deficiency

Use of Core Capabilities in Diagnostic to Support Bioscience Growth

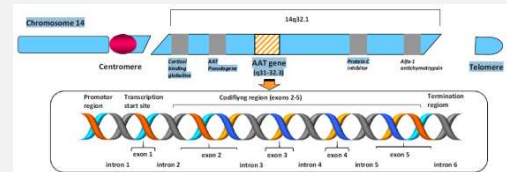
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Alpha-1 Antitrypsin Deficiency

A Largely Undiagnosed Disease

- **Alpha-1 antitrypsin deficiency is a genetic disease** caused by mutations in the SERPINA1 gene
- Although alpha-1 antitrypsin deficiency is not a rare disease (prevalence of **1:2,000 to 1:10,000** in EU and US) it is **underdiagnosed**
- Diagnosis may take **an average of 8 years** following the onset of symptoms¹
- Intravenous alpha-1 antitrypsin deficiency augmentation has been proven to be **safe and effective in COPD patients**
- Diagnosis can be done through several techniques (alpha-1 antitrypsin deficiency levels, phenotyping or molecular biology) but **all have important limitations**



Role of alpha-1 antitrypsin in human health and disease. F. de Serres & I. Blanco. Journal of Internal Medicine, 2014, 276: 311–335.



1.- Greulich, T. et al Respir. Med. 2013

Alpha-1 Antitrypsin Genetic Diagnosis

Grifols Developed a State-of-the-Art Test

- **Universal method** valid for worldwide population independently of geographical origin:
 - A1AT can detect the **14 most prevalent mutations** worldwide
 - Three sites - Lifeshare Blood Center (Louisiana, USA), University of Pavia (Pavia, Italy) and Progenika CLIA lab (San Marcos, U.S.) showed **100% correct calls in validation studies**
- **Validated for non invasive samples:**
Samples can be saliva* or dry blood spot (DBS)
- **First genetic test** for A1AT diagnosis cleared by FDA and CE



Grifols is actively contributing to improve the diagnosis rate of alpha-1 antitrypsin deficiency for an accurate clinical management of these patients

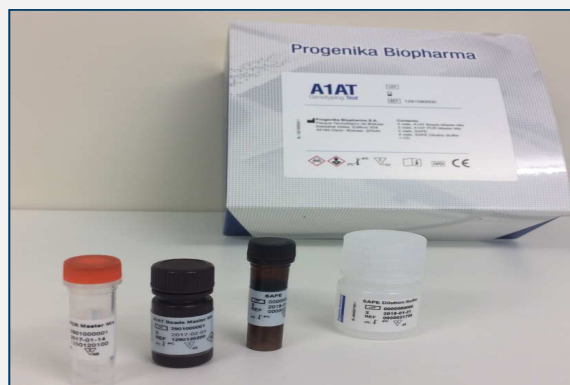
* Only for CE mark

Alpha-1 Antitrypsin Genetic Diagnosis

Development of a Complete Solution: Kit

1. IVD Kits to be Processed in Hospitals or Reference Laboratories

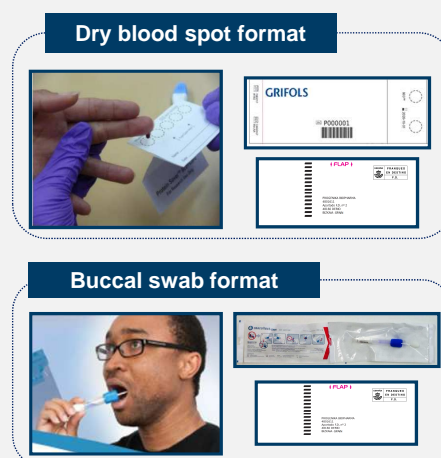
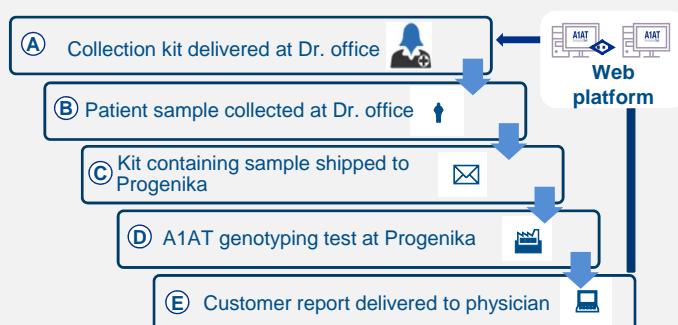
Grifols supplies the kit and the laboratory runs the assay (i.e. Marburg University Hospital)



Alpha-1 Antitrypsin Genetic Diagnosis

Development of a Complete Solution: Service

2. Diagnostic Service through the Clinical Diagnostic Laboratory in Progenika



Key Takeaways

Use of Core Capabilities in Diagnostic to Support Bioscience Growth

- Grifols has developed the first genetic kit for the Alpha-1 antitrypsin deficiency approved by the FDA and CE
- The test is universal and the assay has been validated for non-invasive samples: buccal swabs and DBS
- Grifols is the only company that can offer a complete and worldwide solution for alpha-1 antitrypsin deficiency (kit and service)

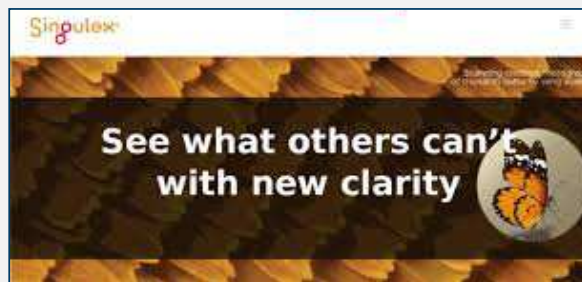
Ultra-Sensitive Immunoassays in Blood Screening

Investing in Next Generation Serologic Testing

Singulex Ultrasensitive SMC™ Technology

Seeing the Invisible

- Company located in Alameda, CA
- Singulex has developed SMC™, Single Molecule Counting, a disruptive technology for protein identification and quantitation
- Grifols owns 20% and an exclusive license to apply the technology in blood and plasma donors

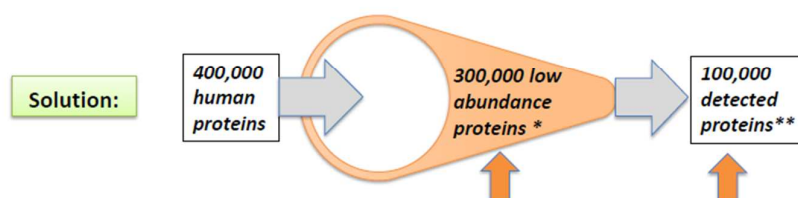


* Only for CE mark

Singulex Ultrasensitive SMC™ Technology

Disease Onset and Progression Detection

- Challenge:**
- 75% of human proteins undetected due to low abundance *
 - Remaining 25% includes proteins only detectable at disease levels

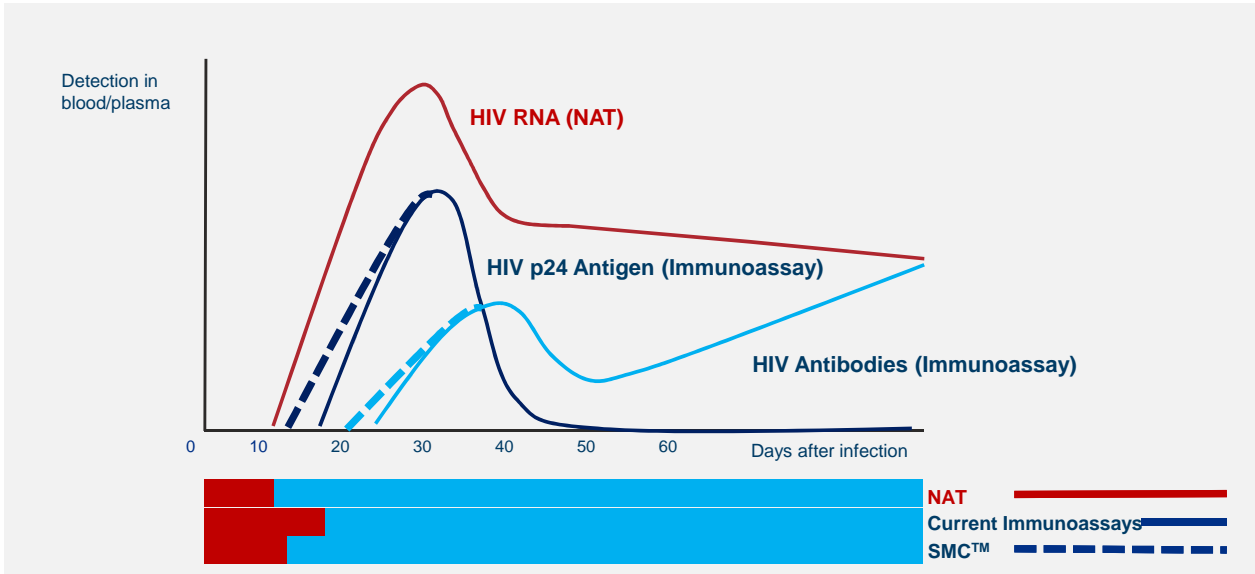


Singulex SMC™ technology makes it possible to measure new proteins and correlate their expression to disease onset/progression

* Source: Visiongain 2013 report; Singulex R&D
 ** Source: PubMed Citation search; Singulex R&D

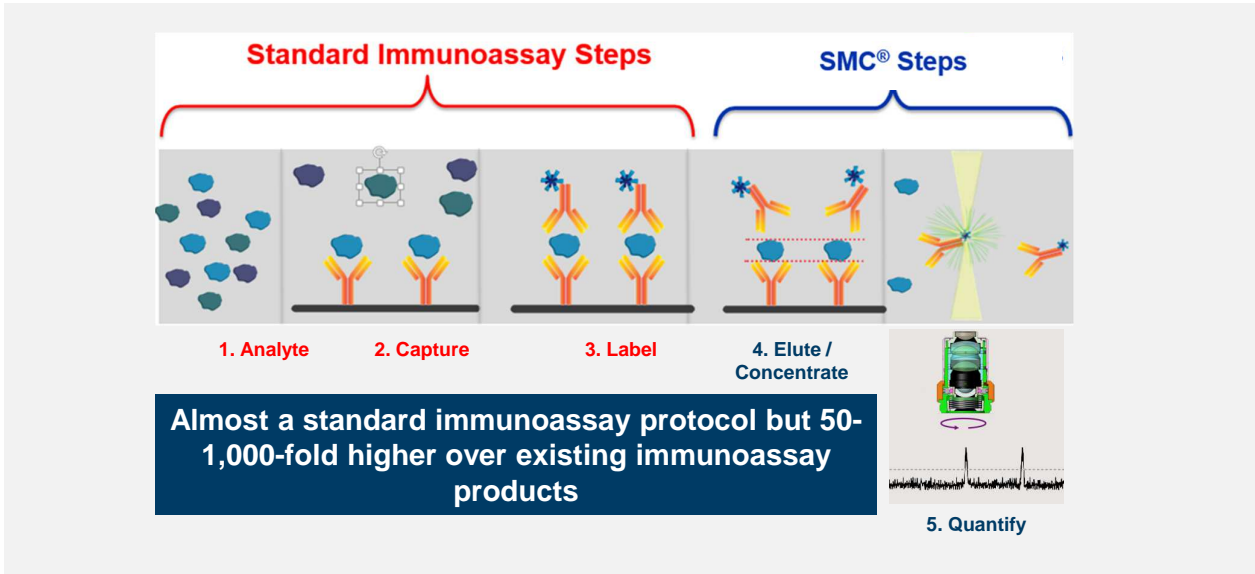
Ultra-Sensitivity in Blood and Plasma Screening

Improves Safety and Diagnosis by Reducing the Window of Time After Infection



Singulex Ultrasensitive SMC™ Technology

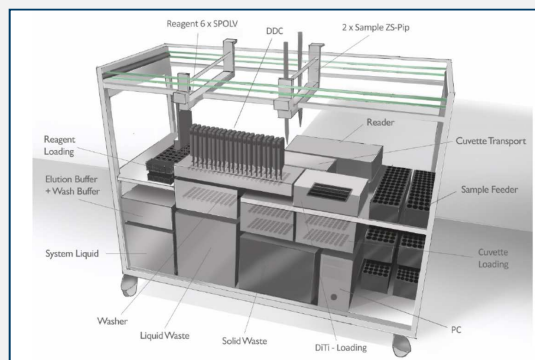
SMC™ Sample Processing



Grifols Ultra-Sensitive Immunoassays

Project and Portfolio

- Assays for blood and plasma screening are currently in development (i.e. HIV, HCV, HBV, HTLV, etc.)
- Project is evolving as scheduled, with more than 90% of needed antigens and antibodies identified, most of them to be sourced from Grifols' Emeryville facility
- Instrumentation for high-throughput screening is under development



Key Takeaways

Investing in Next Generation Serologic Testing

- SMC™ is the next generation of immunoassays as it allows precision measurement of biomarkers with unprecedented ultra sensitivity
- Grifols is developing the next generation of immunoassays and equipment based on SMC™ technology for blood and plasma testing
- Working with NAT and SMC™ is a step forward in Grifols ongoing efforts to improve safety in blood and plasma donors





GigaGen: Novel Polyclonal Antibody Therapeutics

Building the Future for the Treatment of Immune Diseases

Jose Terencio
Vice President, Innovation



GigaGen: Groundbreaking Technology

Capturing Natural Human Antibodies Repertoire

- In July 2017, Grifols acquired a 44% stake in GigaGen, a San Francisco-based biotechnology startup, for USD 35m to support new drug development
- GigaGen's technology copies complete human antibody repertoires as DNA to develop novel polyclonal antibody therapies
- GigaGen's technology has the potential to impact the treatment of certain immune and infectious diseases
- Potential new platform that can change the future of drug manufacture

GigaGen: Groundbreaking Technology

An Innovative Team With a Unique Patented Technology

- GigaGen was founded in 2011 by two Stanford scientists dedicated to combining immunology and genomics to combat diseases resulting from immune dysregulation
- The GigaGen team currently includes 17 people
- GigaGen has a strong IP position, with granted patents that protect both the construction of DNA libraries from donor blood cells as well as the expression of antibodies

David Johnson
Genomics
PhD Stanford



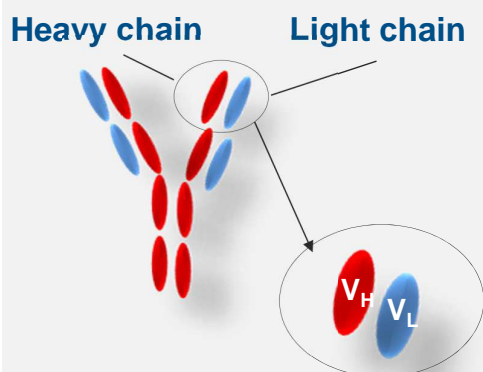
Everett Meyer
Immunology
MD/PhD Stanford
Stanford Professor



**World-leading technology
to understand and
overcome immune
dysregulation**

GigaGen: Groundbreaking Technology

Antibodies: The Key to Immune Function



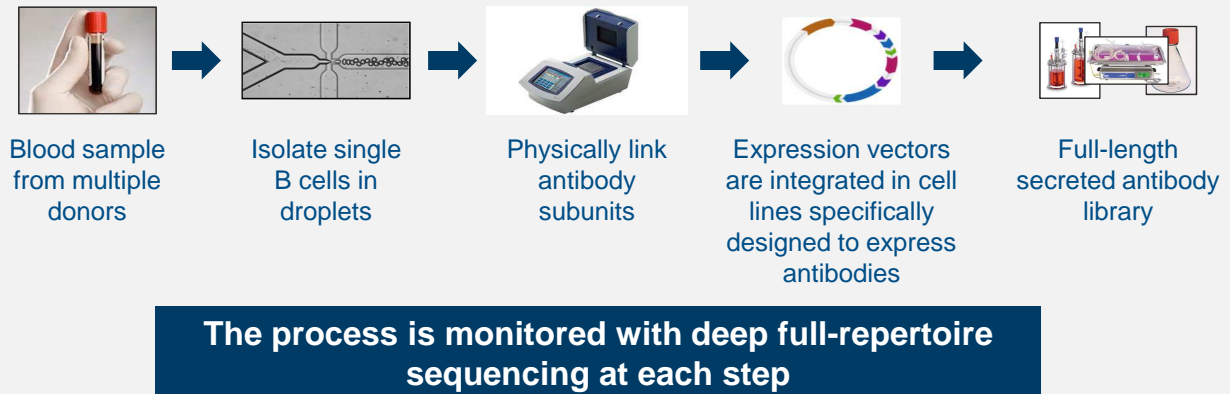
- Human antibodies are critical to proper immune function
- Antibodies are proteins made by B cells¹ that allow healthy people to avoid or overcome disease
- **Each B cell only makes 1 type of antibody**
- Healthy people make millions of antibodies
- Heavy and light chain pairing determines antibody function
- Highly variable protein sequences ("heavy" and "light" chains) attack pathogens
- Heavy and light chains are encoded on separate chromosomes in a B cell, so **capturing the DNA of natural heavy/light chain** pairs entails first isolating a B cell

1.- Type of white blood cell that makes antibodies. B cells are part of the immune system and develop from stem cells in the bone marrow. They are also known as B-lymphocytes

GigaGen: Groundbreaking Technology

Donor Blood Transformed Into a Library of Antibodies

GigaGen's technology combines **microfluidics**, **genomics**, **bioinformatics** and **protein expression** to recreate all the antibodies encoded in the B cells of a donor sample



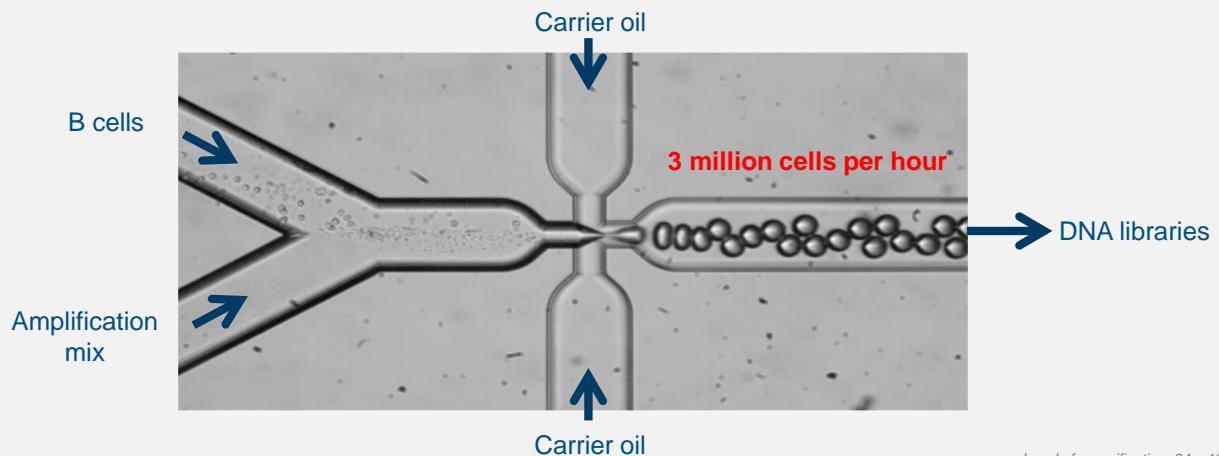
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GigaGen: A High Throughput Platform

Platform Processes 3,000,000 cells/hour

Exceptionally fast speed enables GigaGen to capture the full diversity of a human immune system



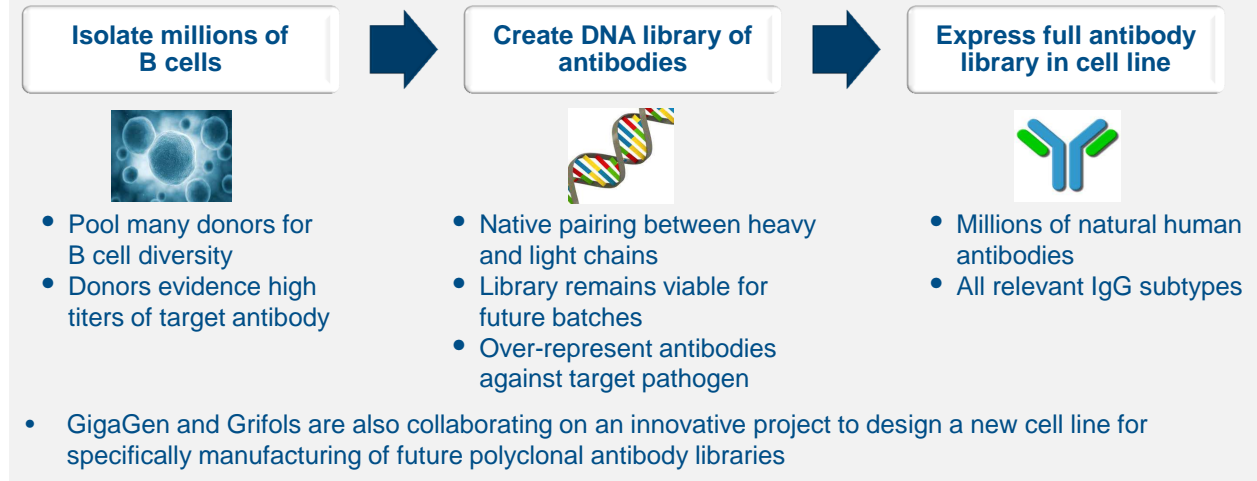
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Development of a True Polyclonal Hyperimmune

Validate Platform Using a Known Hyperimmune With Clear Biomarkers for Efficacy

- Find the best responders to the specific pathogen from the donor pool, clone their immune systems (B cells) and express as high titer recombinant hyperimmune antibodies



Key Takeaways

Building the Future for the Treatment of Immune Diseases

- Grifols anticipates future collaborations on polyclonal therapies as we validate the expression, manufacturing, regulatory and clinical pathway with a unique polyclonal hyperimmune
- Continue to leverage Grifols' experience in donor sample collection, sample processing, manufacturing, regulatory and clinical trial design to accelerate therapeutic development
- Grifols maintains exclusive rights to commercialize projects developed by GigaGen
- Provides a platform for responding to emerging viruses and infectious diseases that can be treated with neutralizing antibodies
- Grifols anticipates future investments in this cutting-edge technology with the aim to strengthen the treatment of infectious and immune diseases



2018 Investor and Analyst Meeting

Barcelona
7th and 8th June



2018 Investor and Analyst Meeting

Friday, June 8th

<u>Time</u>	<u>Topic</u>	<u>Presenter</u>
8:00	<i>Pick-up from hotels</i>	
8:30 - 8:45	<i>Welcome</i>	
8:45 - 9:45	Innovation Research Studies on Albumin	David Bell Dr. Arroyo / Montserrat Costa
9:45 - 11:15	Product Showroom	Carlos Roura / Daniel Fleta
11:15 - 12:00	Financials	Alfredo Arroyo
12:00 - 12:15	Closing	Víctor Grífols Deu
12:15 - 12:45	Q&A	
12:45 - 1:30	<i>Lunch</i>	



Alzheimer's Management By Albumin Replacement

David Bell
Chief Innovation Officer

alzheimer
management
by albumin
replacement



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Alzheimer's Management By Albumin Replacement

Prequel to Results

- AMBAR is a double-blind, placebo-controlled trial with 400+ individual patients with mild to moderate Alzheimer's disease, studied over a year of treatment with a combination of low volume plasma exchange and albumin replacement
- Trial endpoints:
 - Primary: combination of cognition (ADAS-Cog) with activities of daily living (ADCS-ADL) at 14 months of treatment
 - Secondary: combination of cognition (ADAS-Cog) with activities of daily living (ADCS-ADL) at intermediate points, other variables of function and cognition at intermediate points. Amyloid Beta and P-TAU in Plasma and CSF
 - Other endpoint of interest: MMSE (Minimental status examination)

Alzheimer's Management By Albumin Replacement

Prequel to Results

- Data to be analyzed:
 - Test results
 - Laboratory samples
 - Cognitive analysis
- Follow-up analysis, additional clinical trials and possible clinical implementation:
 - Genomic analysis of high responders
 - Other work and analysis as suggested by data
- In partnership with key opinion leaders and clinicians treating Alzheimer's patients
- Data lock: June 2018; Clinical study report (CSR): 1Q 2019; Topline data presentation 4Q 2018

Research Studies on Albumin

Montserrat Costa, PhD
Dr. Arroyo, MD, PhD

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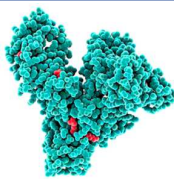
Driving the Discovery and Delivery of Albumin's Untapped Potential

Montserrat Costa, PhD
Senior Manager, Research

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Albumin Molecule



- Highly soluble protein with only one chain of 585 amino acids and lacking added sugars (molecular weight= 66,500 Daltons).



- Synthesized in the liver at the rate of 12 - 25 g/day



- Most abundant protein (more than 50% of the plasma and CSF proteins by mass)



- Distribution within the body:
 - Intravascular: 40% of total albumin
 - Extravascular (intracellular + interstitial): 60% alb

CSF: Cerebrospinal fluid

First modern use took place during WWII as a plasma substitute



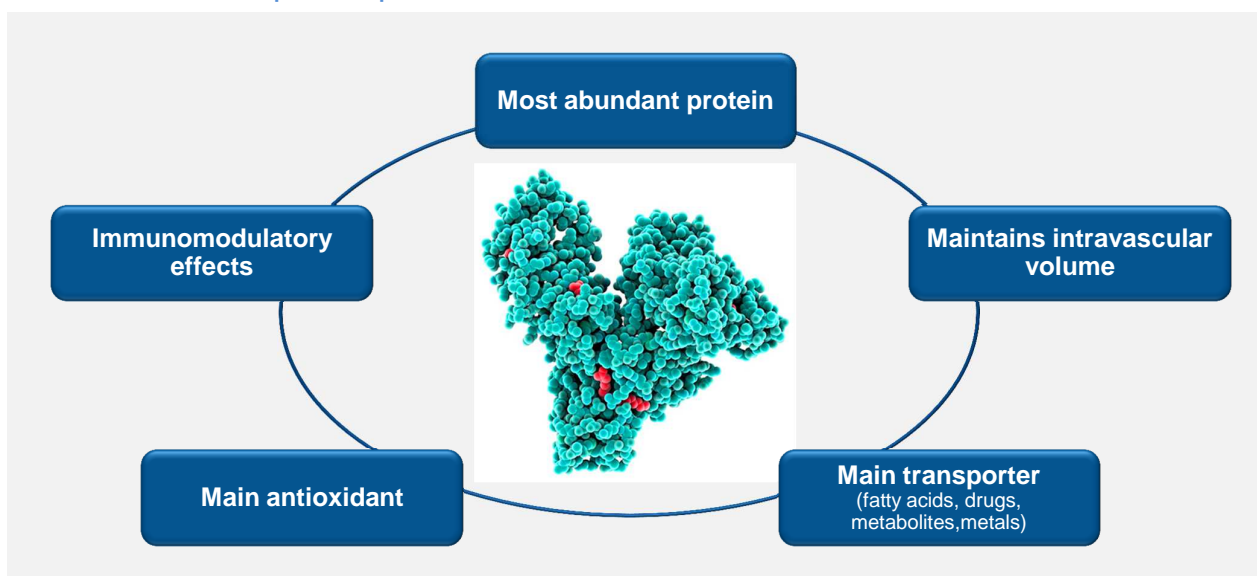
Albumin infusion is a safe and effective fluid replacement for conditions requiring plasma volume expansion



Low blood volume with or without shock, trauma, major surgeries, cardiopulmonary bypass procedures, **Therapeutic Plasma Exchange**

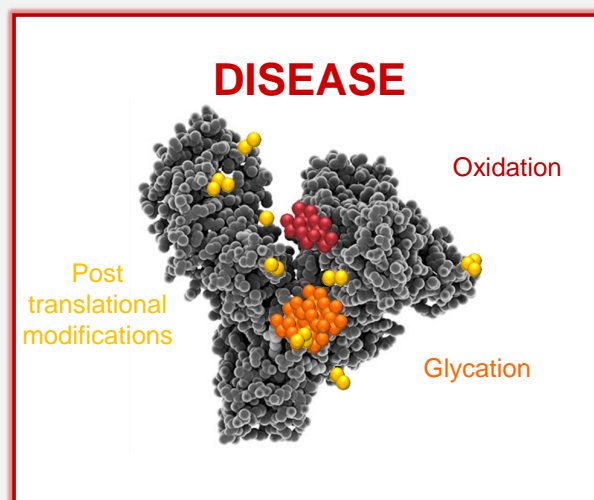
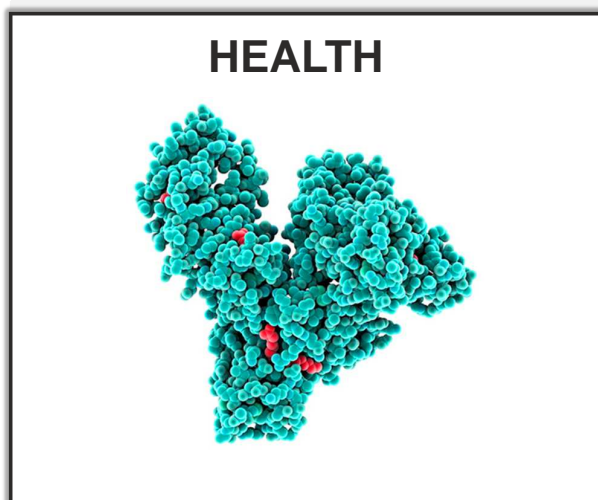
Albumin Molecule

Albumin Has Multiple Properties



Albumin Molecule

Albumin in Health and Disease



Albumin Molecule

Does Albumin Dysfunction Matter?

Association between albumin functional capacity and survival in liver diseases

Alterations in the Functional Capacity of Albumin in Patients with Decompensated Cirrhosis Is Associated with Increased Mortality

Rajiv Jalan,¹ Kerstin Schnurr,² Rajeshwar P. Mookerjee,¹ Sambit Sen,¹ Lisa Cheshire,¹ Stephen Hodges,¹ Vladimir Muravsky,² Roger Williams,¹ Gert Matthes,^{2,3} and Nathan A. Davies¹

HEPATOLOGY, Vol. 50, No. 2, 2009

Oxidative albumin damage in chronic liver failure: Relation to albumin binding capacity, liver dysfunction and survival

Karl Oettl^{1,*}, Ruth Birner-Gruenberger^{2,3}, Walter Spindelboeck⁴, Hans Peter Stueger⁵, Livia Dorn⁶, Vanessa Stadlbauer⁴, Csilla Putz-Bankuti⁴, Peter Krisper⁷, Ivo Graziadei⁶, Wolfgang Vogel⁶, Carolin Lackner³, Rudolf E. Stauber⁴
Journal of Hepatology 2013 vol. 59 | 978–983

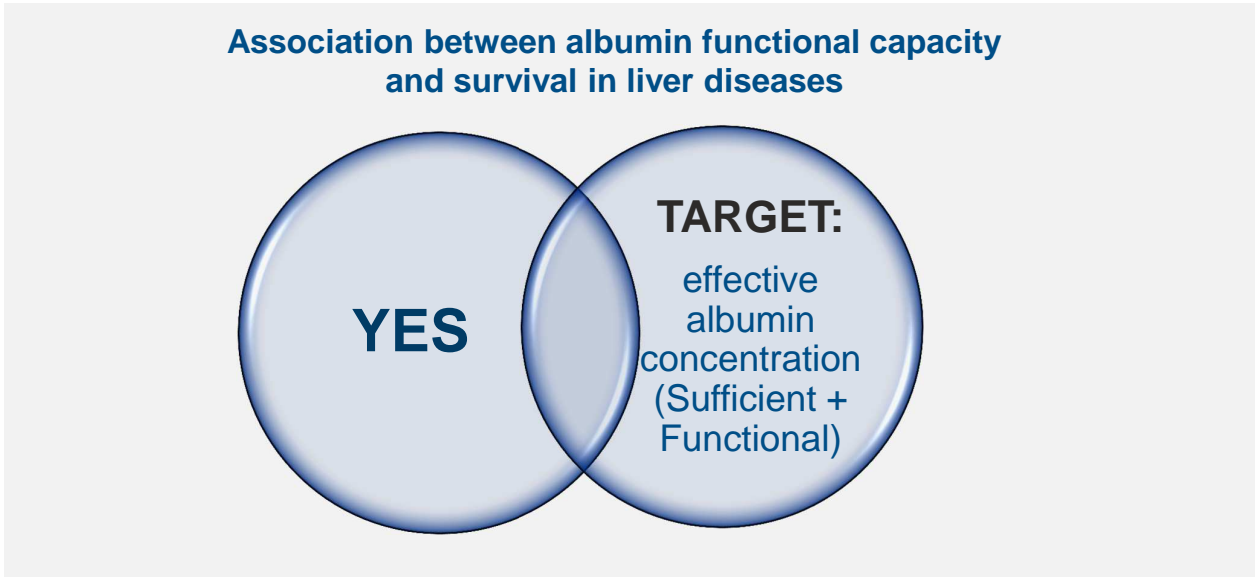
Immunomodulatory and antioxidant function of albumin stabilises the endothelium and improves survival in a rodent model of chronic liver failure

Rita Garcia-Martinez¹, Fausto Andreola¹, Gautam Mehta¹, Katie Poulton², Marc Oria¹, Maria Jover¹, Junpei Soeda³, Jane Macnaughtan¹, Francesco De Chiara¹, Abeba Habtesion¹, Rajeshwar P. Mookerjee¹, Nathan Davies¹, Rajiv Jalan^{1,*}

Journal of Hepatology 2015 vol. 62 | 799–806

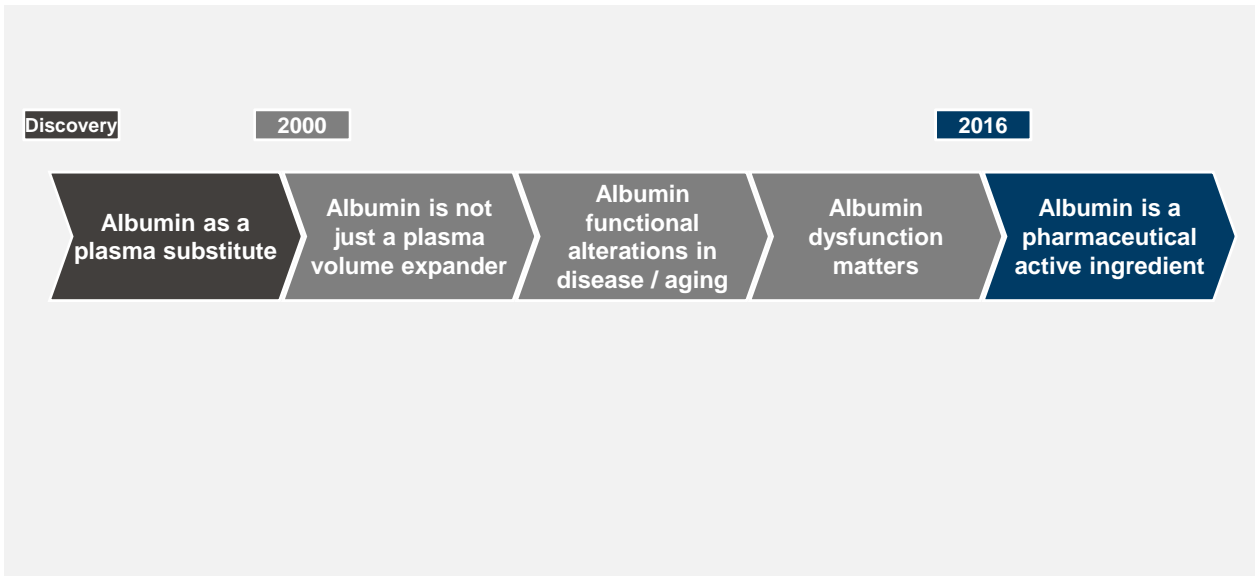
Albumin Molecule

Does Albumin Dysfunction Matter?



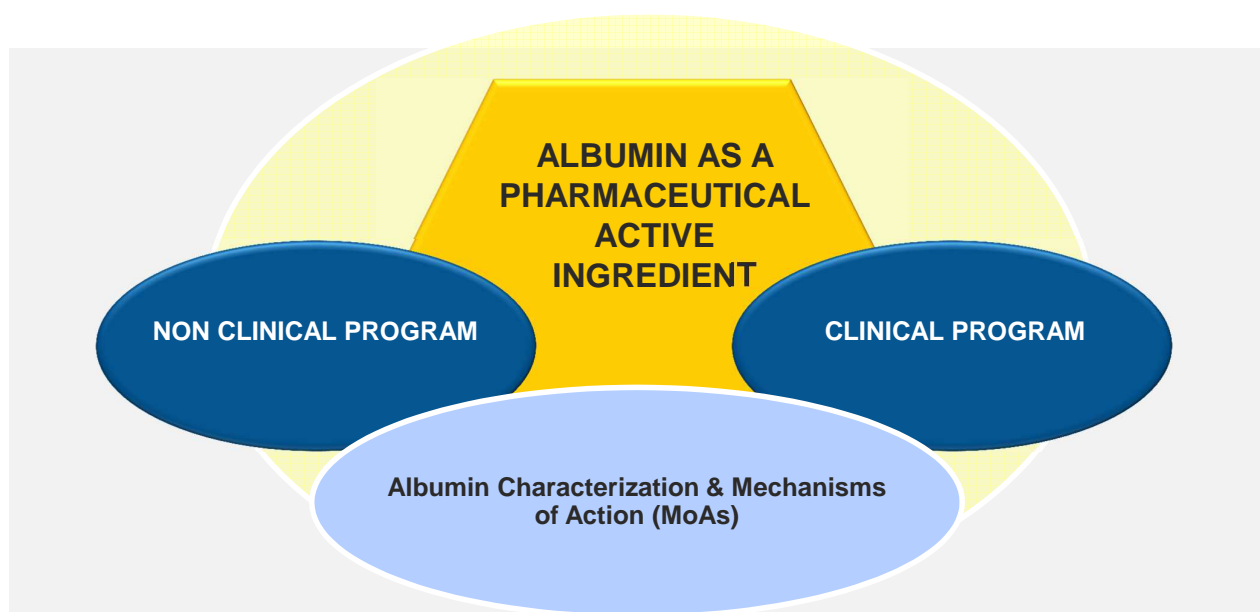
Albumin Use

Rationale



Grifols Albumin Research Approach

Grifols Research on Albumin



Current Albumin Clinical Programs

AMBAR	PRECIOSA	APACHE
Alzheimer's disease	Cirrhosis	Acute-on-chronic liver failure
PE-A5%	Albumin infusion	PE-A5%

&

Non clinical research program for the understanding of albumin effects & MoAs

PE-A5%: Plasma Exchange with 5% Albumin reposition

Alzheimer's Disease

Rationale

Alzheimer's Disease (AD)

- Prevalence ↑
- No treatments approved in 15 years
- Phase III targeting A β fail
- AD is a systemic disease that needs a multi-target approach
- Albumin is more than a plasma volume expander

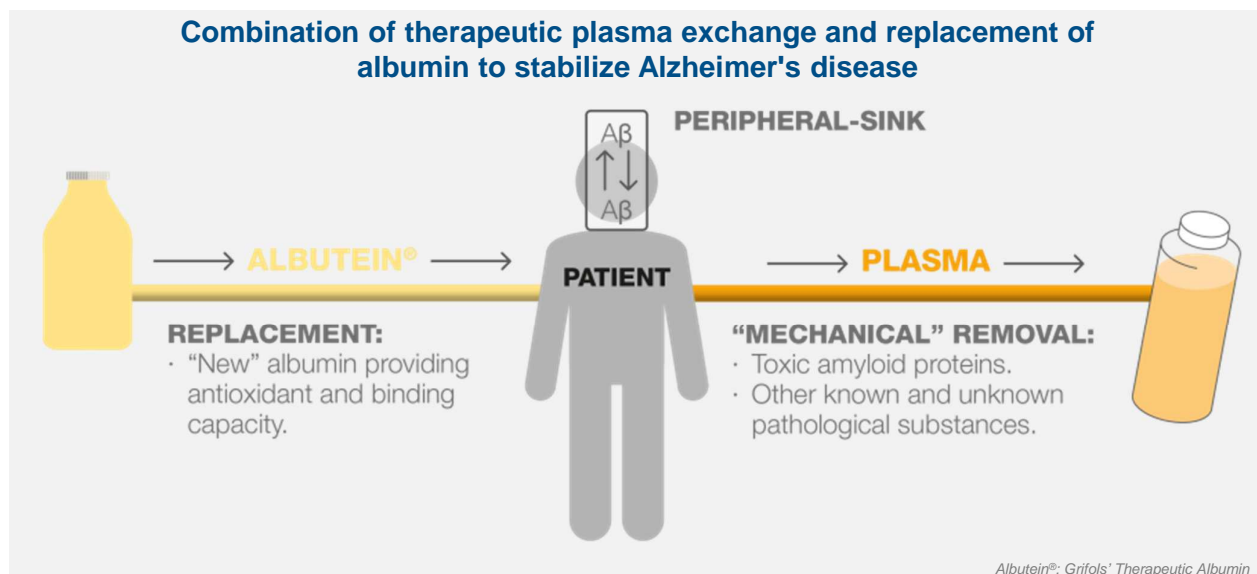
A β : Amyloid-beta peptide

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AMBAR (Alzheimer Management By Albumin Replacement)

Over a Decade of Alzheimer Related Research

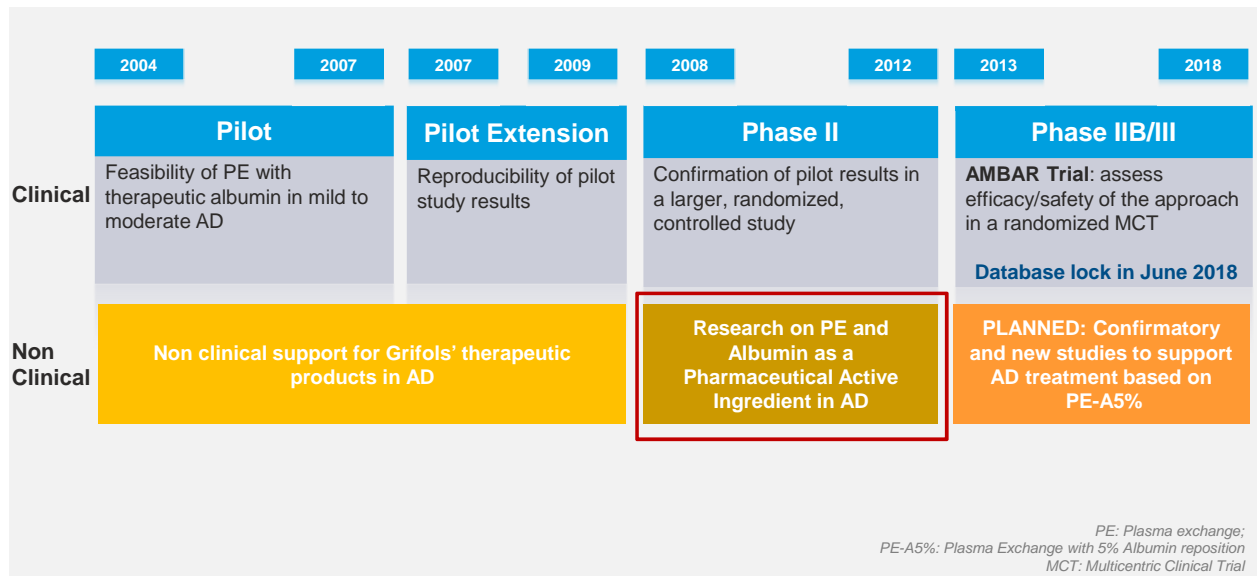


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AMBAR Program

Overview



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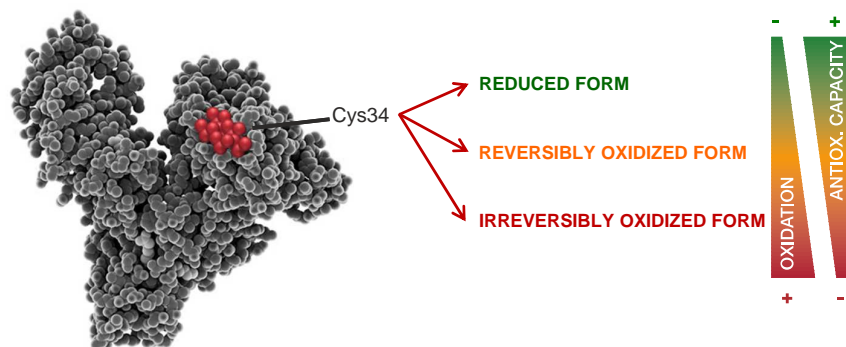


WHAT CAN WE LEARN FROM THE PHASE II TRIAL?



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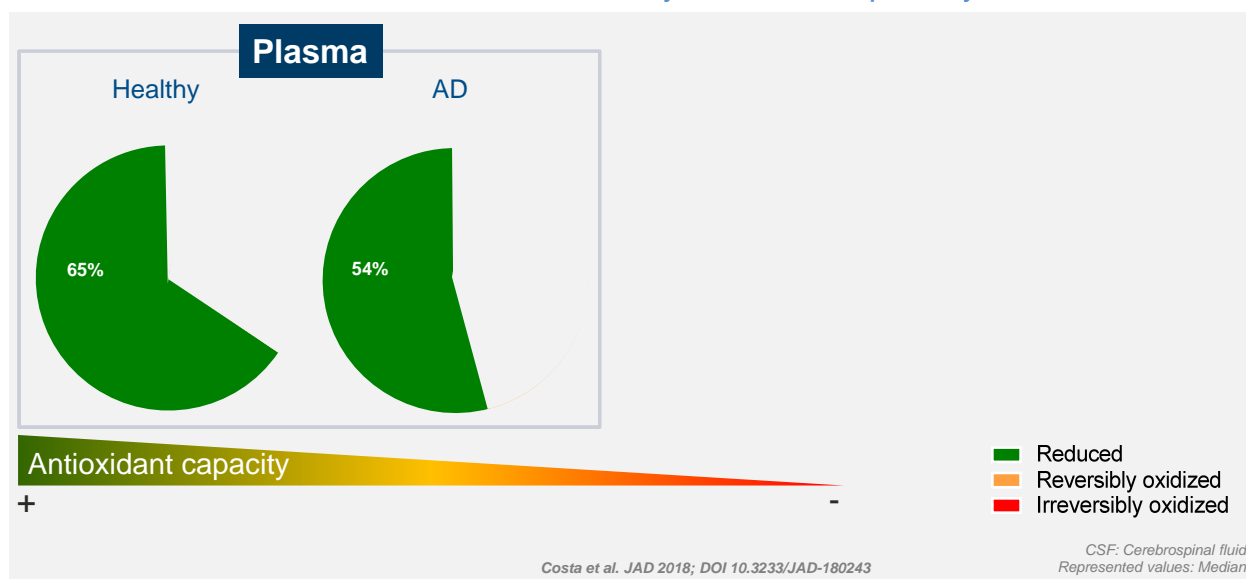
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Albumin Oxidation in Plasma and CSF

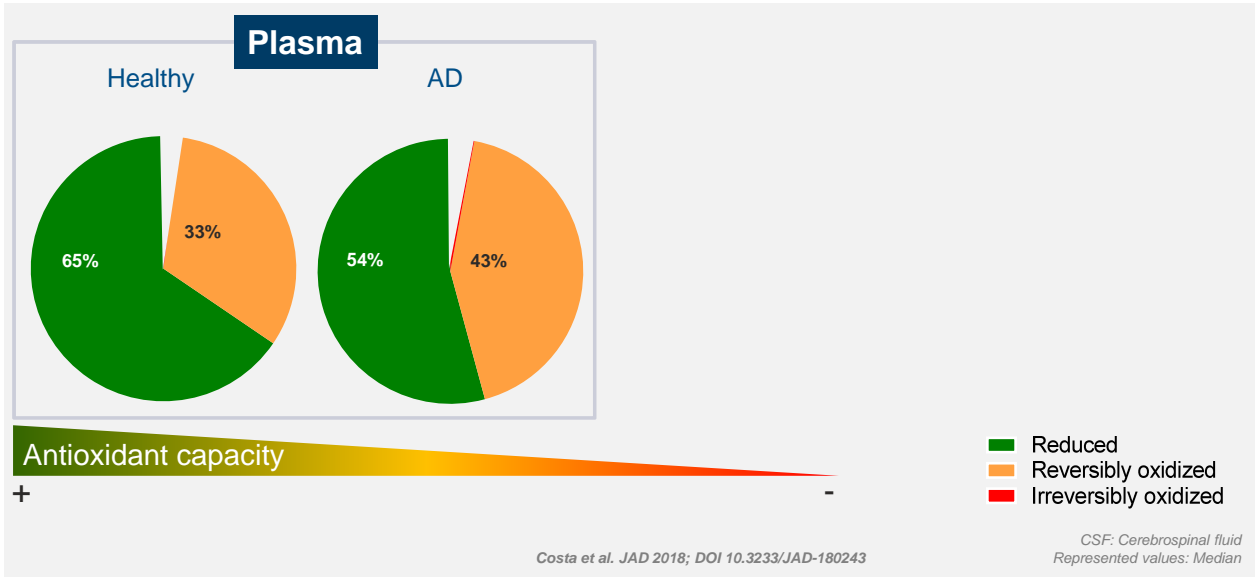
Albumin Oxidation

Albumin Is More Oxidized in AD Than Healthy Controls, Especially in CSF



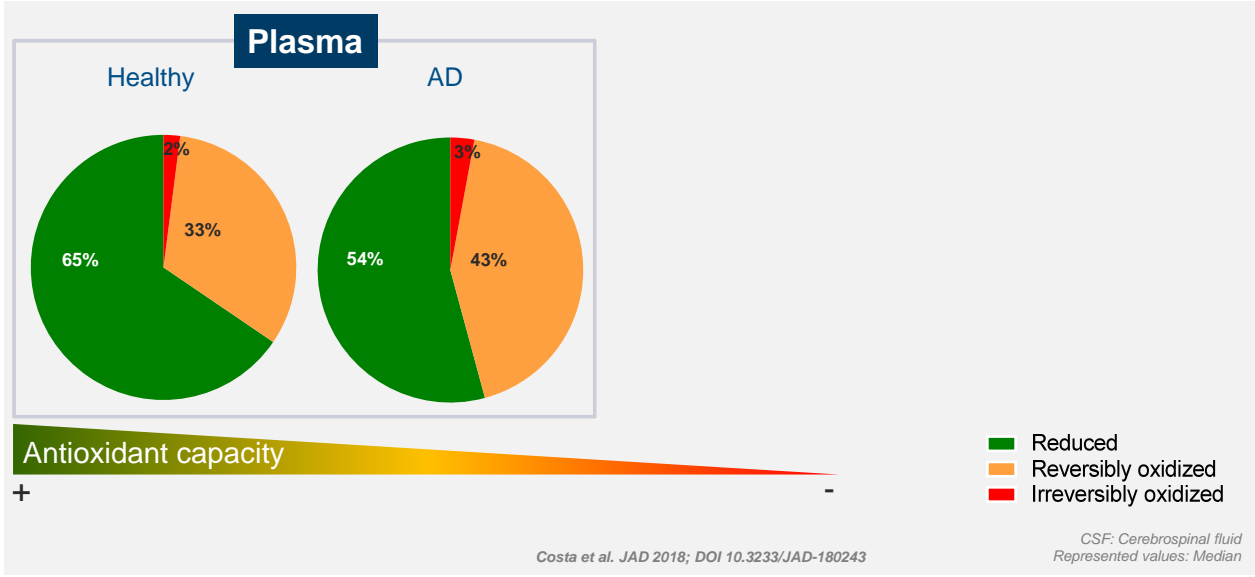
Albumin Oxidation

Albumin Is More Oxidized in AD Than Healthy Controls, Especially in CSF



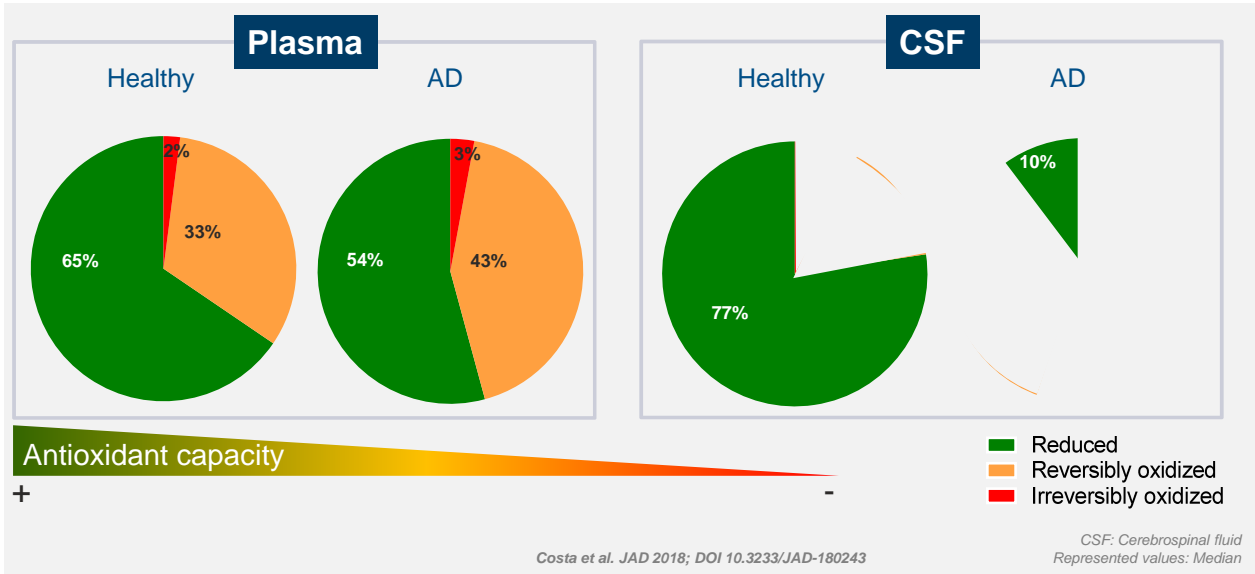
Albumin Oxidation

Albumin Is More Oxidized in AD Than Healthy Controls, Especially in CSF



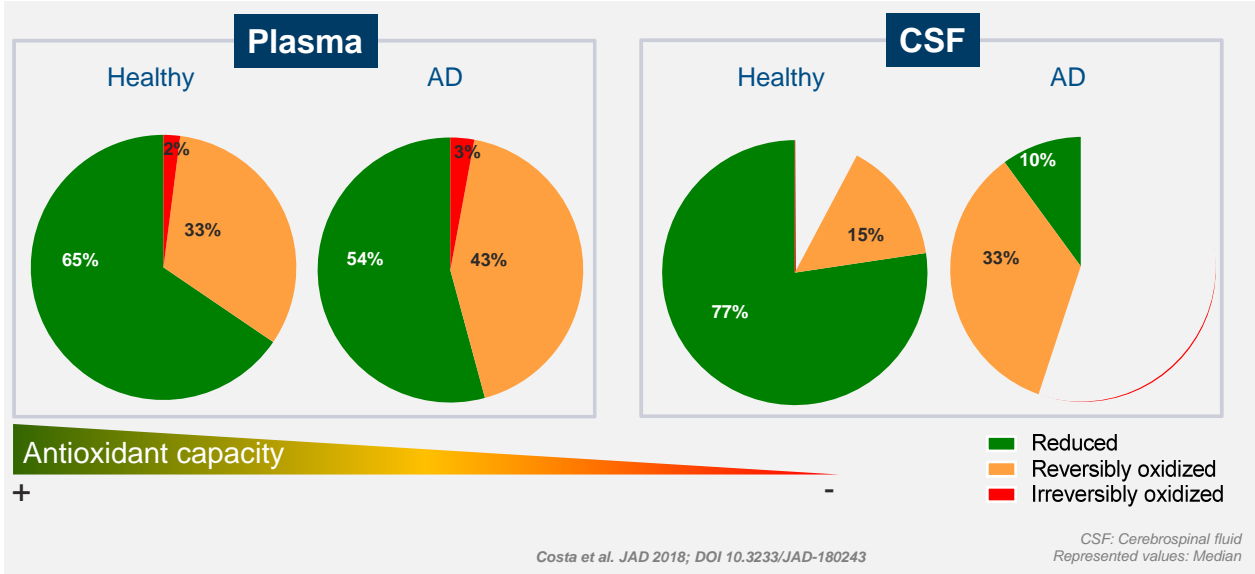
Albumin Oxidation

Albumin Is More Oxidized in AD Than Healthy Controls, Especially in CSF



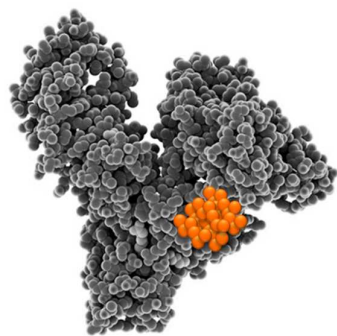
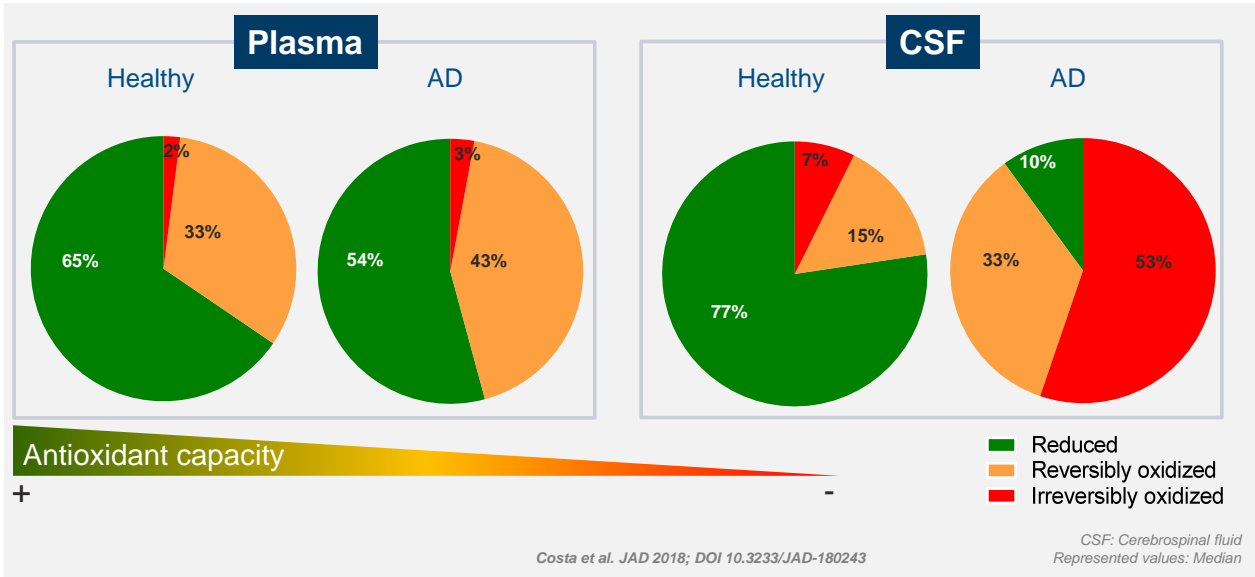
Albumin Oxidation

Albumin Is More Oxidized in AD Than Healthy Controls, Especially in CSF



Albumin Oxidation

Albumin Is More Oxidized in AD Than Healthy Controls, Especially in CSF

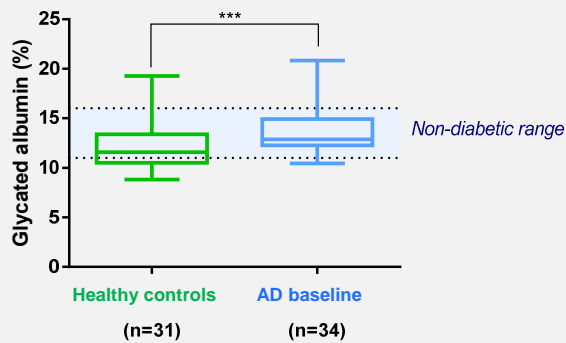


Glycation is an spontaneous age-dependent modification linked to AD

Albumin Glycation in Plasma

Albumin Glycation

Plasma Albumin Is More Glycated in AD Than Healthy Controls



Median \pm Interquartile range (min. to max.)
Mann-Whitney test
*** $P < 0.001$, changes between AD Baseline and Healthy Controls

Albumin in plasma of AD patients is not only more oxidized but more glycated than age-matched healthy controls

Pilot

Pilot Extension

Phase II

Phase IIB/III

Research on PE and Albumin

WHAT CAN WE LEARN FROM THE PHASE II TRIAL?

Is albumin altered in Alzheimer patients?

YES

Which are the effects of the treatment with PE-A5%?

PE-A5%: Plasma Exchange with 5% Albumin reposition



WHAT CAN WE LEARN FROM THE PHASE II TRIAL?

Which are the effects of the treatment with PE-A5%?

CSF: Cerebrospinal fluid
A β : Amyloid-beta peptide
PE-A5%: Plasma Exchange with 5% Albumin reposition

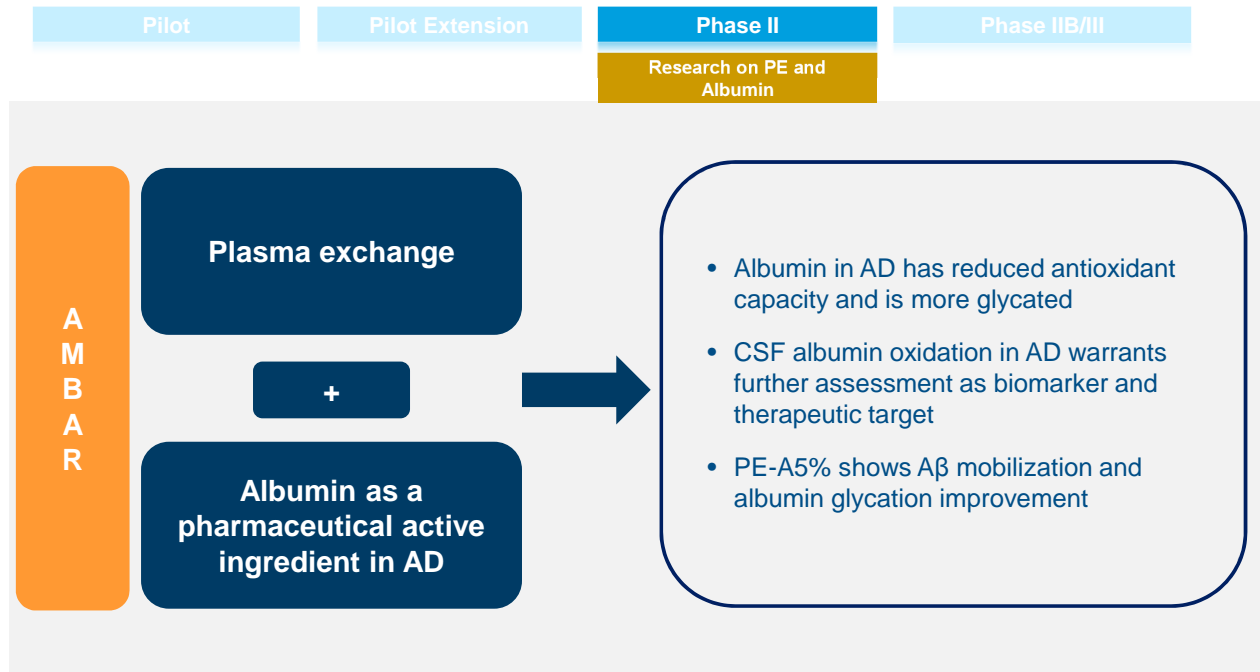


WHAT CAN WE LEARN FROM THE PHASE II TRIAL?

What are the effects of treatment with PE-A5%?

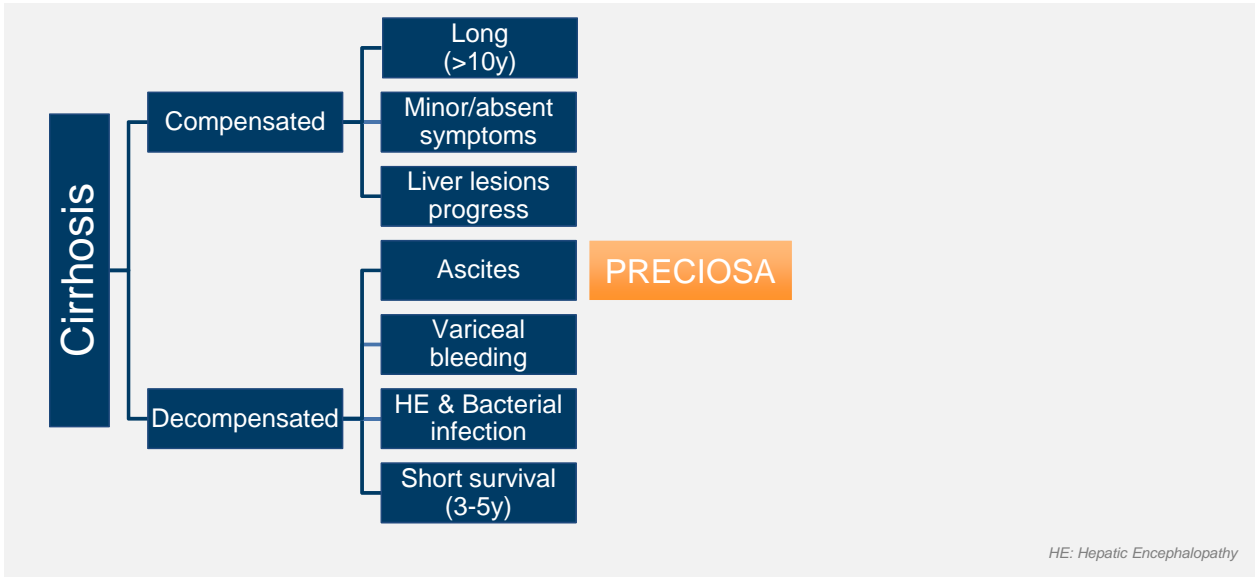
- CSF A β 42 levels improve in treated patients
- CSF albumin antioxidant capacity shows a similar trend of improvement in treated patients
- PE-A5% shows a positive but transient effect in lowering albumin glycation

CSF: Cerebrospinal fluid
A β : Amyloid-beta peptide
PE-A5%: Plasma Exchange with 5% Albumin reposition



Cirrhosis

Cirrhosis

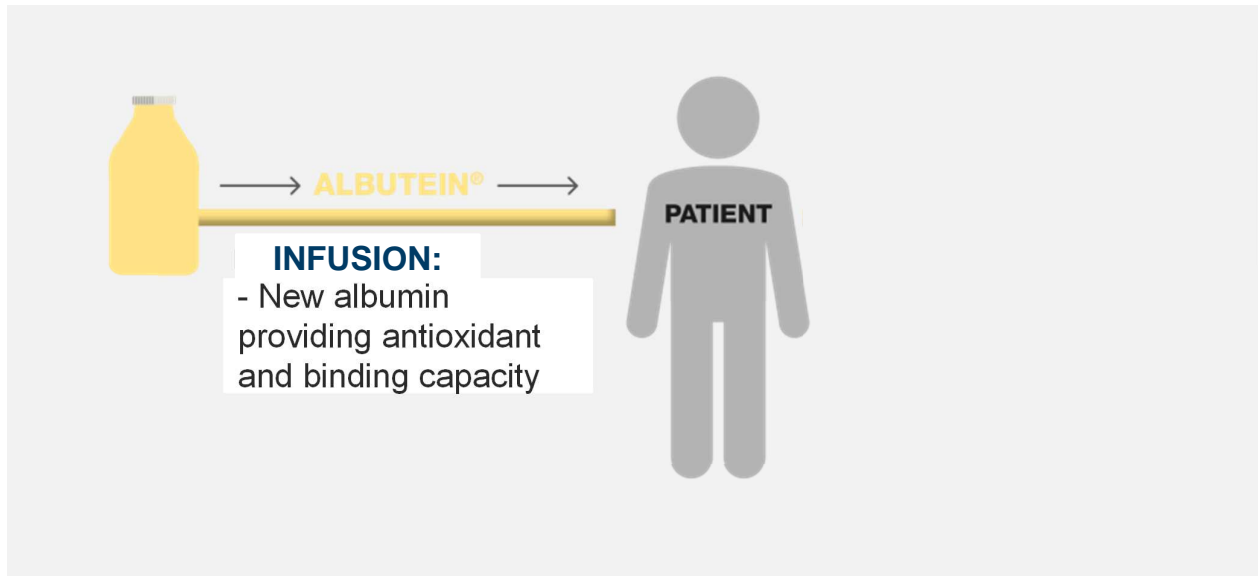


Preciosa - IG 1601

Prevention of mortality with long-term administration of human albumin in subjects with decompensated cirrhosis and ascites

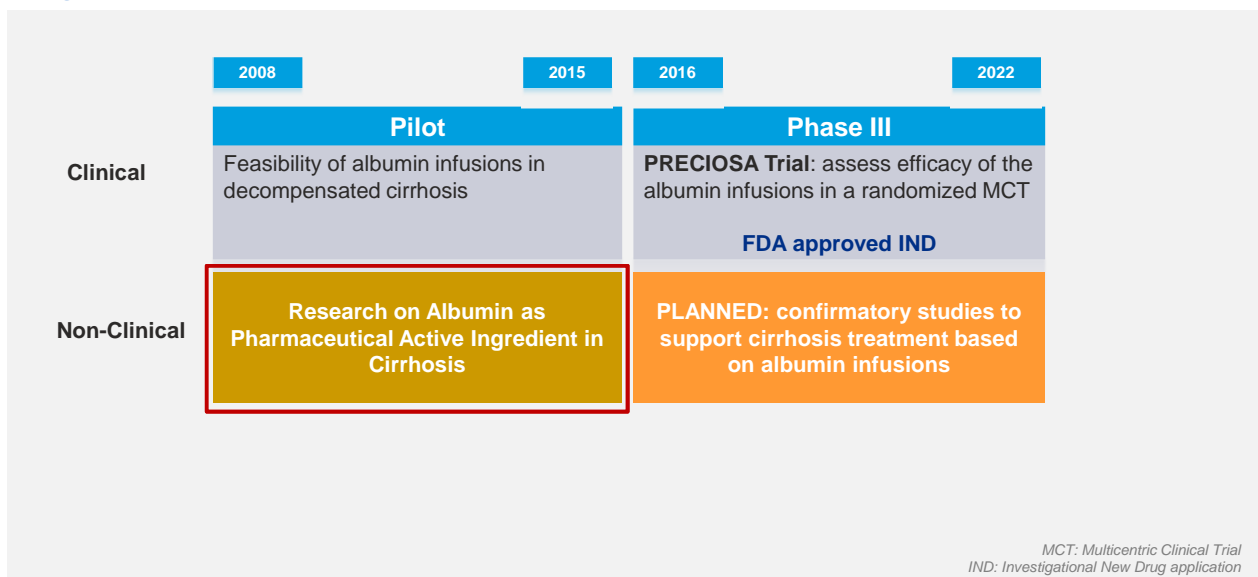
Albumin Infusion

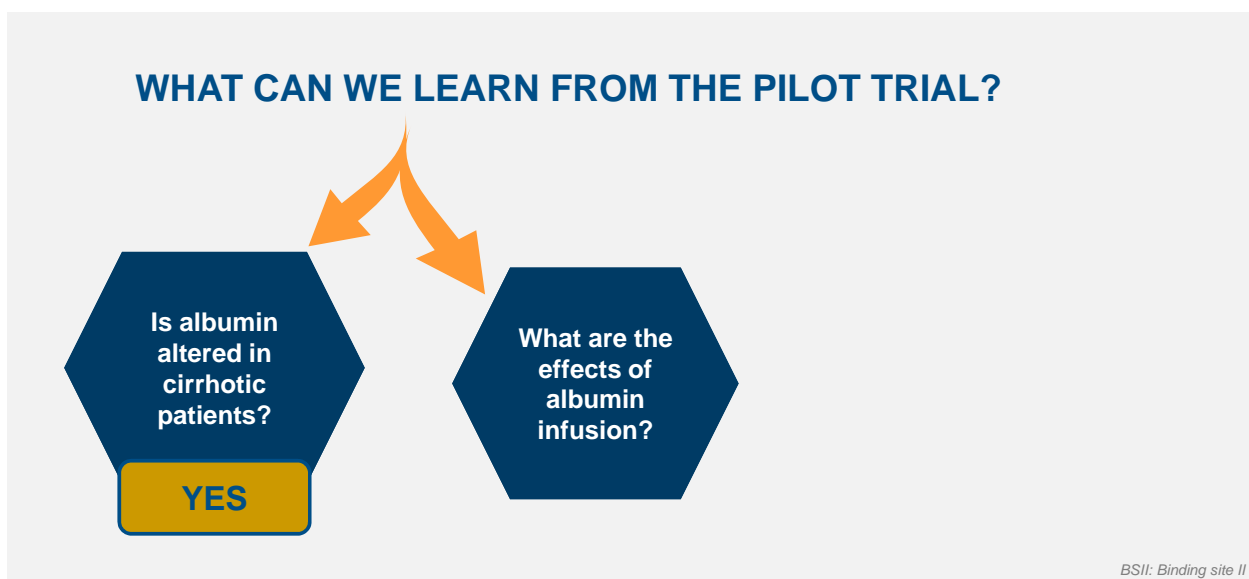
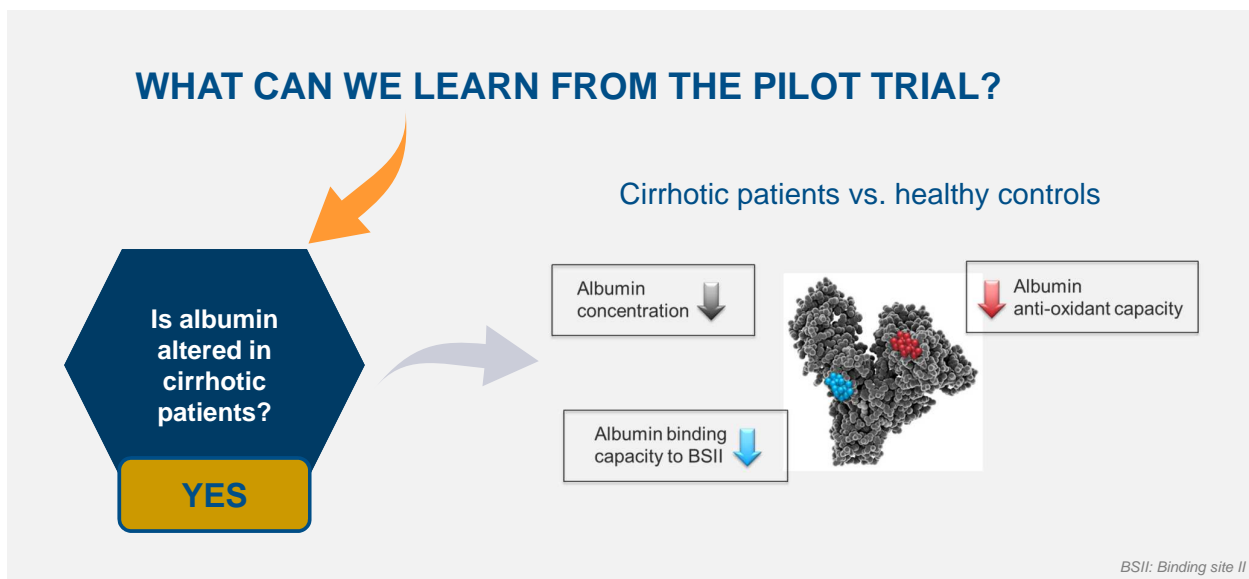
Rationale



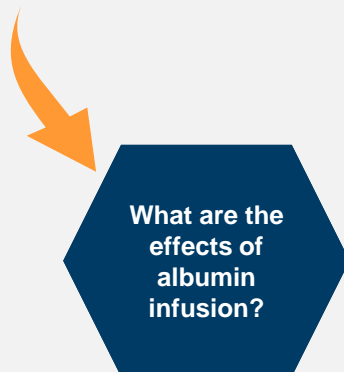
Preciosa

Program Overview



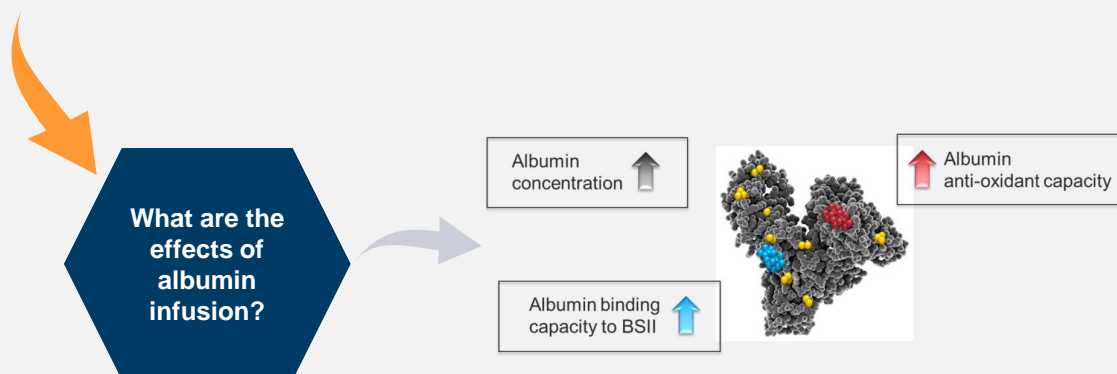


WHAT CAN WE LEARN FROM THE PILOT TRIAL?

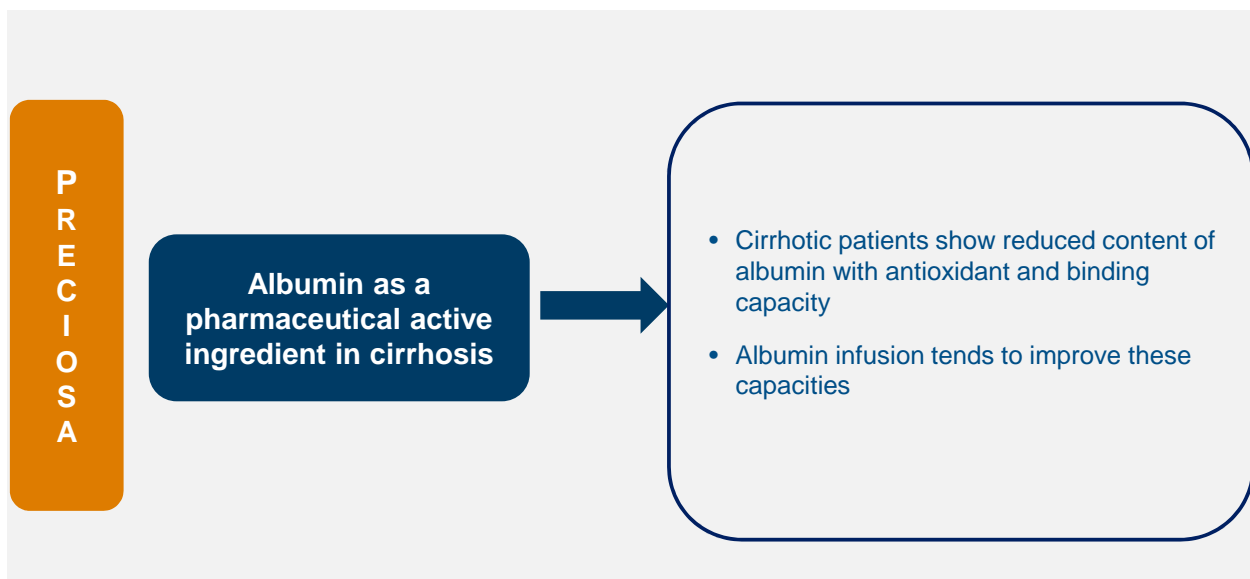


BSII: Binding site II

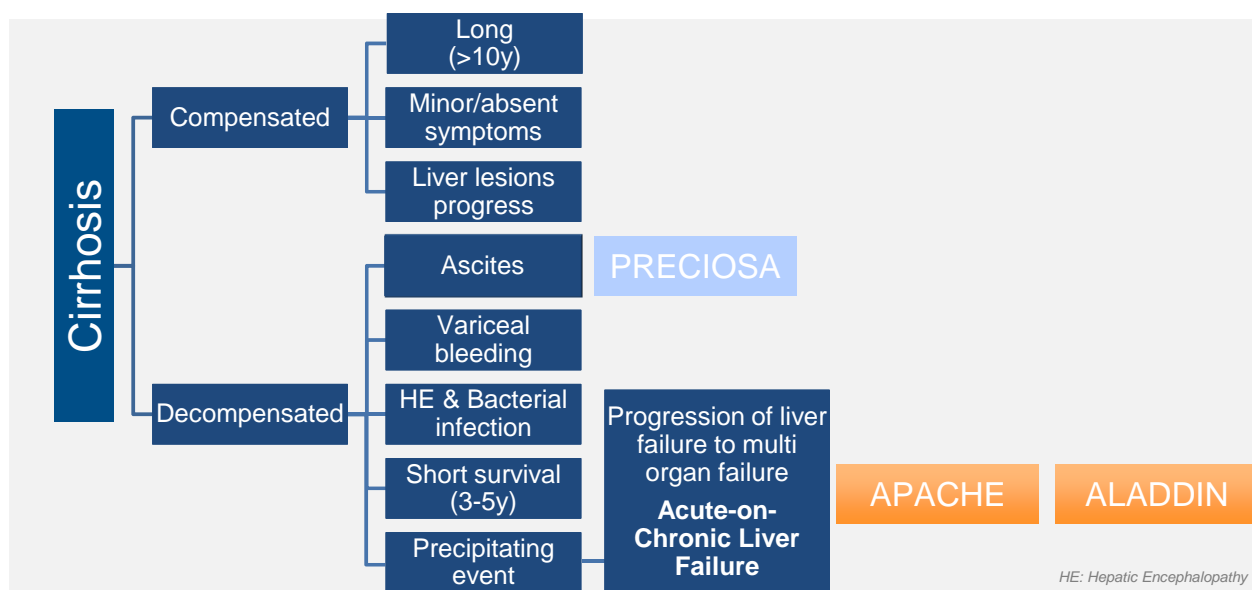
WHAT CAN WE LEARN FROM THE PILOT TRIAL?



BSII: Binding site II



Cirrhosis

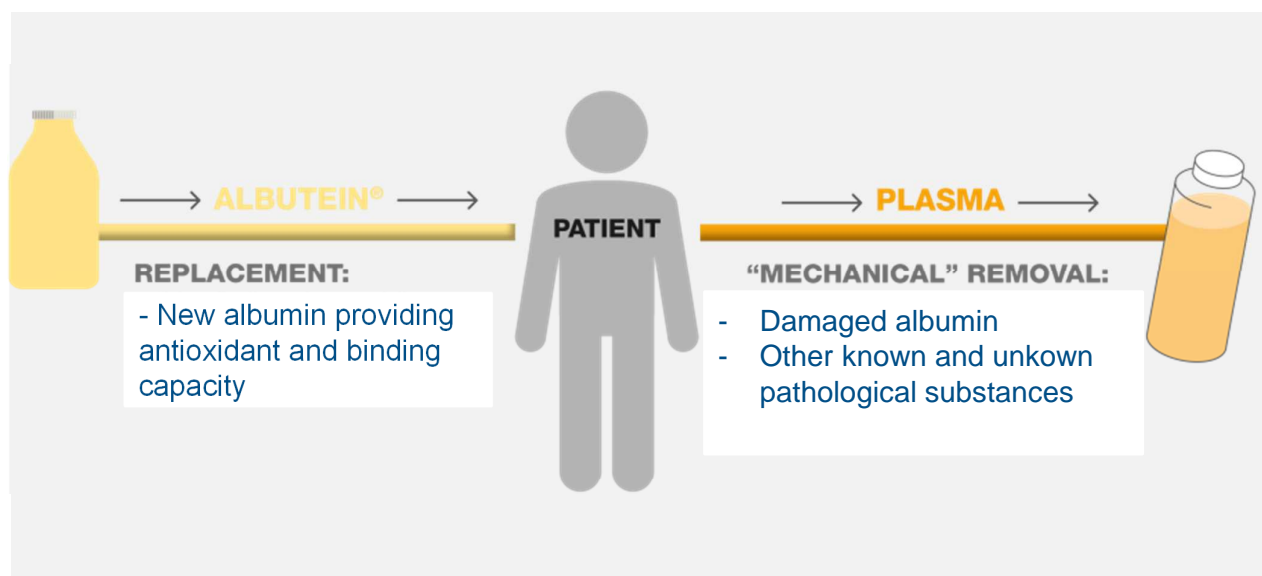


Apache - IG 1407

Effects of plasma exchange with human serum albumin 5% (PE-A5%) on short-term survival in subjects with “Acute-On-Chronic Liver Failure” (ACLF) at high risk of hospital mortality

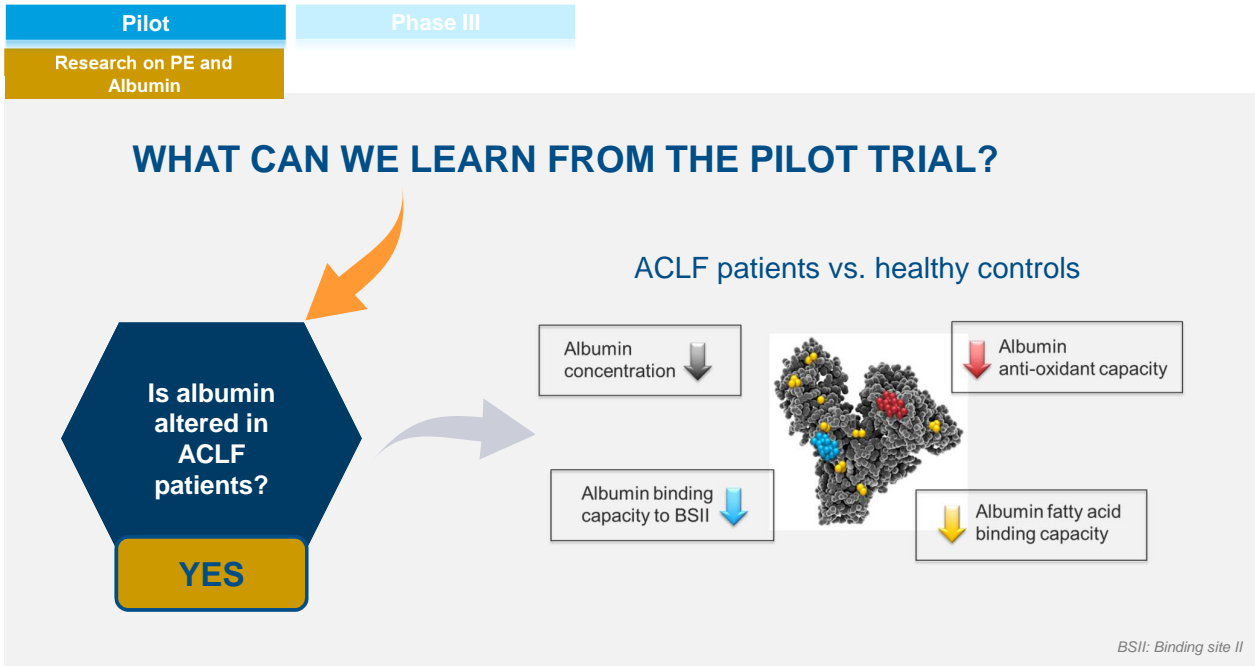
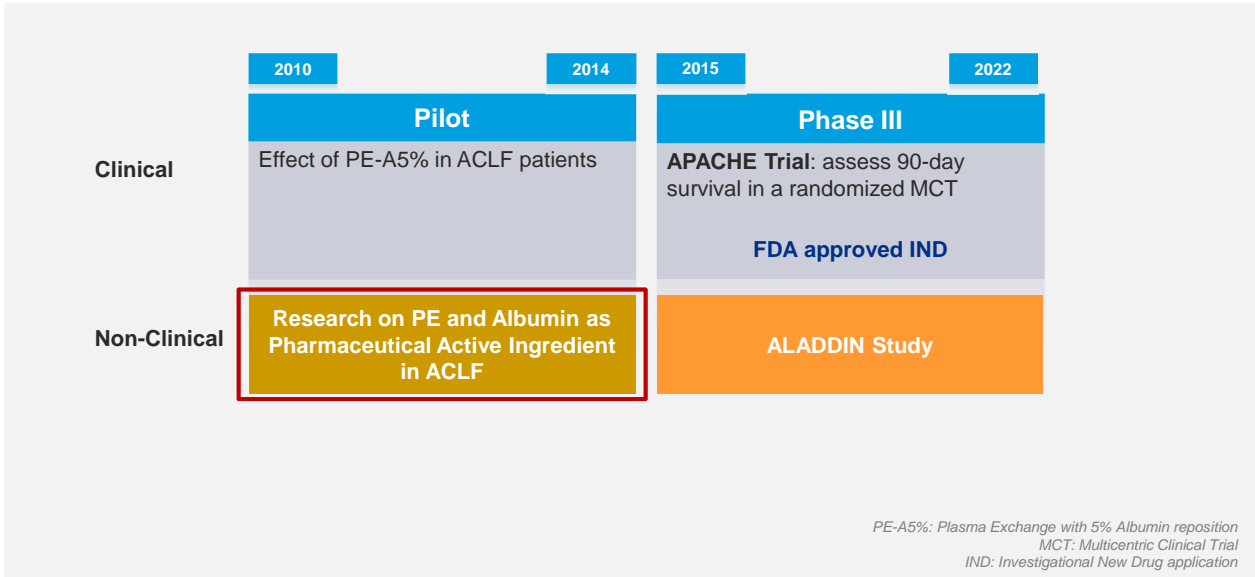
Plasma Exchange + Albumin

Rationale

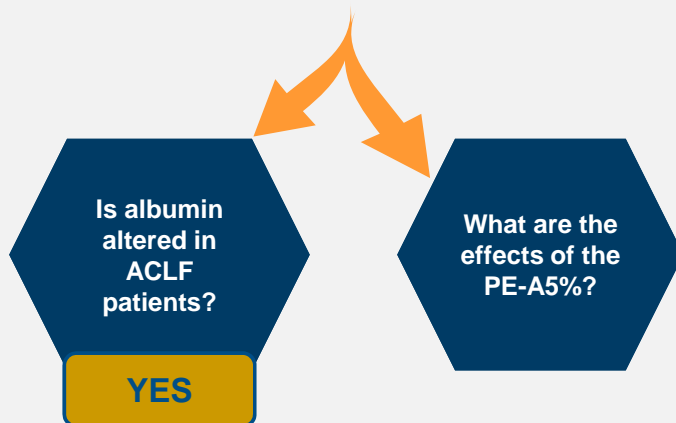


Apache

Program Overview

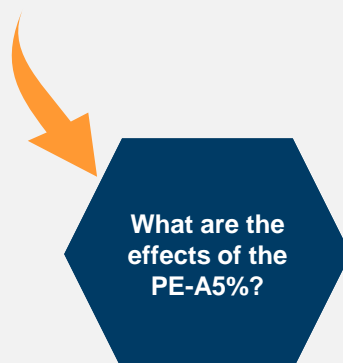


WHAT CAN WE LEARN FROM THE PILOT TRIAL?



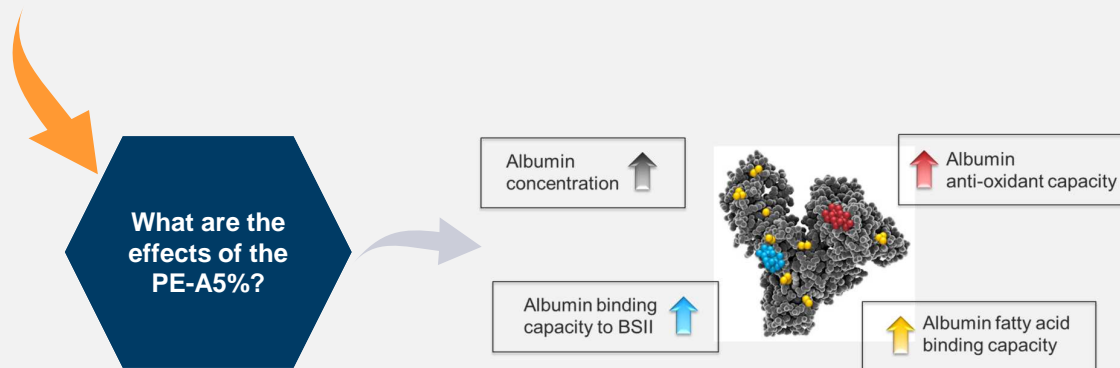
PE-A5%: Plasma Exchange with 5% Albumin reposition

WHAT CAN WE LEARN FROM THE PILOT TRIAL?

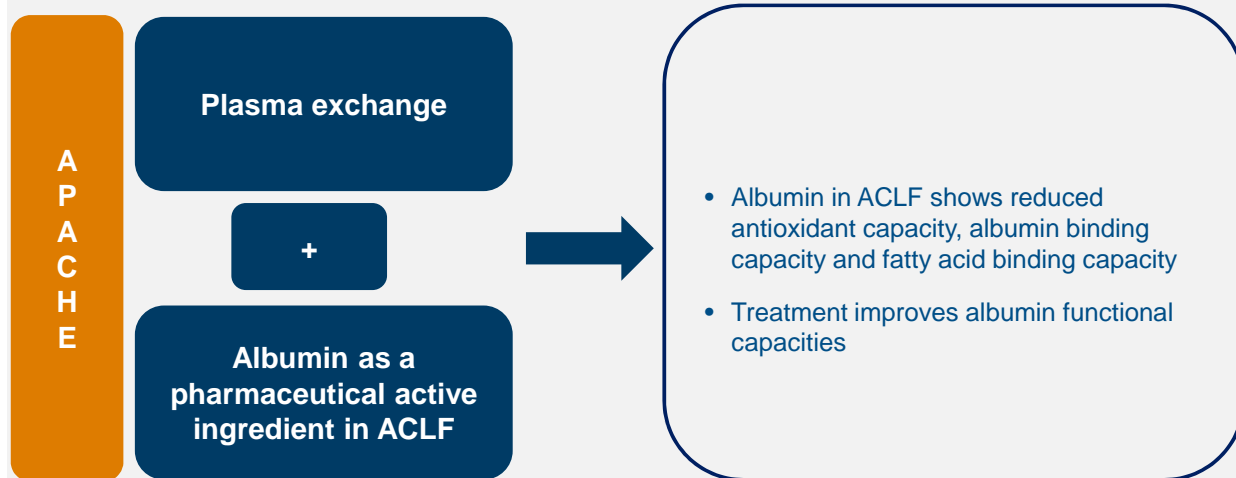


PE-A5%: Plasma Exchange with 5% Albumin reposition
BSII: Binding site II

WHAT CAN WE LEARN FROM THE PILOT TRIAL?



PE-A5%: Plasma Exchange with 5% Albumin reposition
BSII: Binding site II

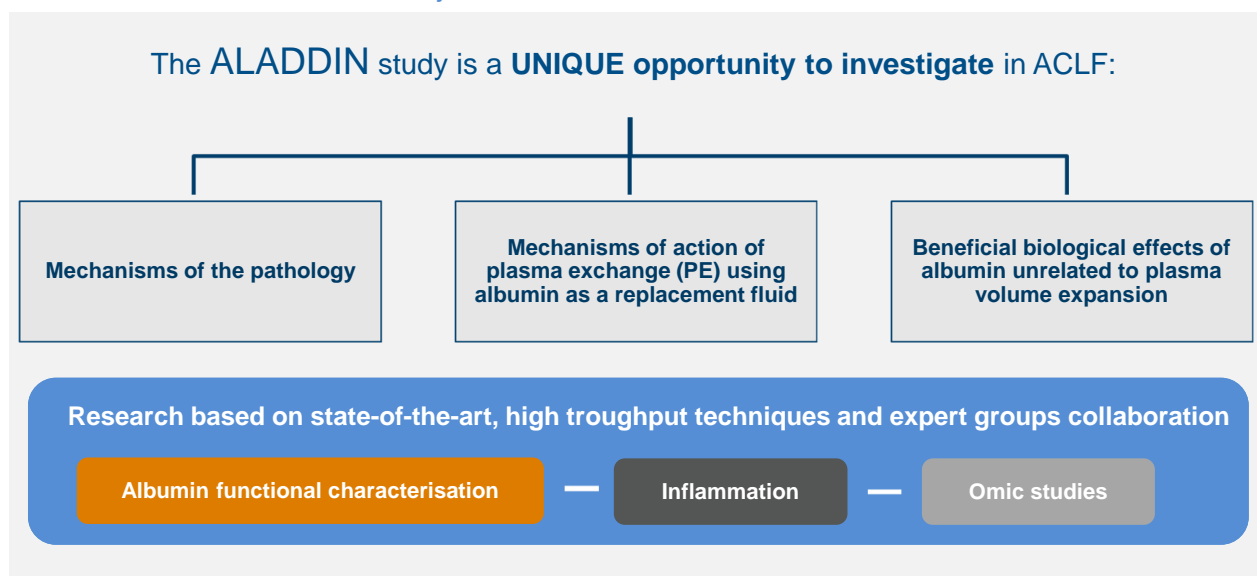


Aladdin - IG 1605

Pathogenesis of Acute-on-Chronic Liver Failure (ACLF) and mechanisms of action of plasma exchange with human serum albumin 5% (PE-A5%) in decompensated cirrhotic subjects with systemic inflammation and ACLF

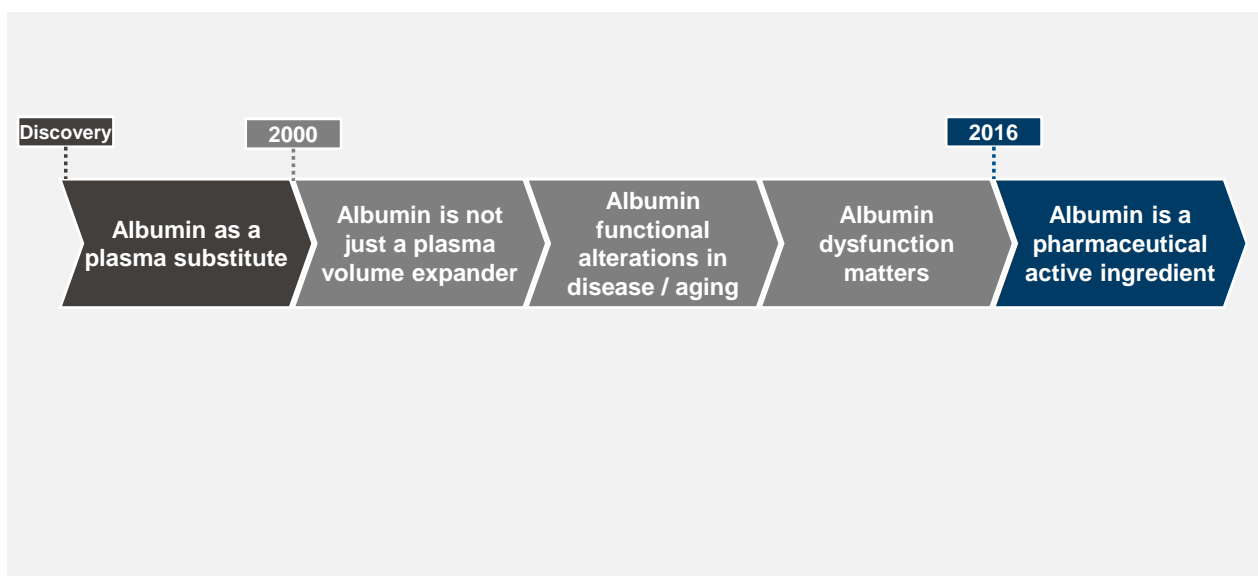
The Aladdin Study

A Translational Research Project

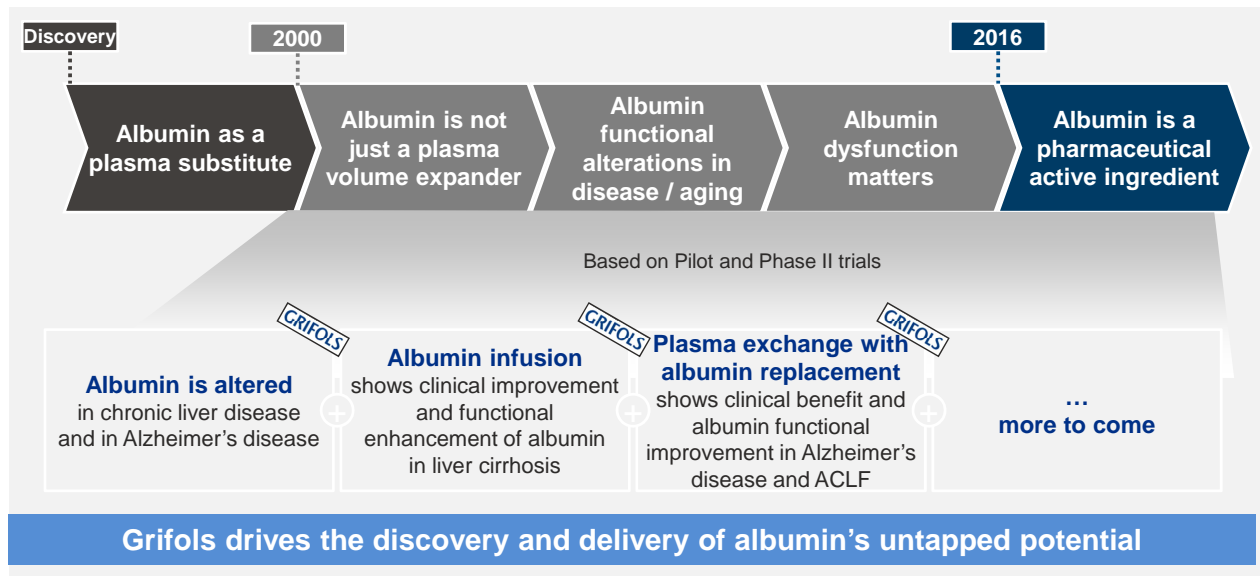


Key Takeaways

Key Takeaways



Key Takeaways



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GRIFOLS

Albumin as a Drug

Dr. Arroyo, MD, PhD

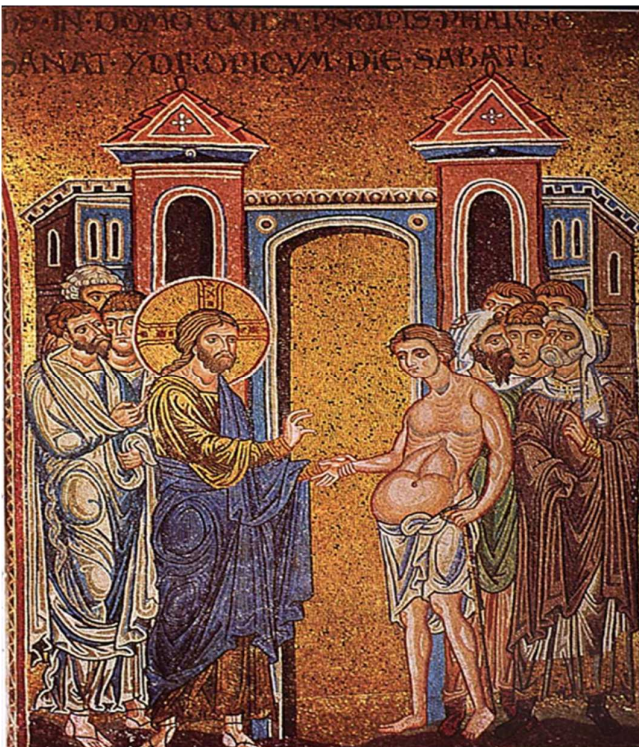
President of the European Foundation for the Study of Chronic Liver Failure

GRIFOLS



Past, present and future of the relationship between a relevant human disease, hepatic cirrhosis, and an octogenarian pharmacologic molecule, human serum albumin (1940-2018 and beyond).

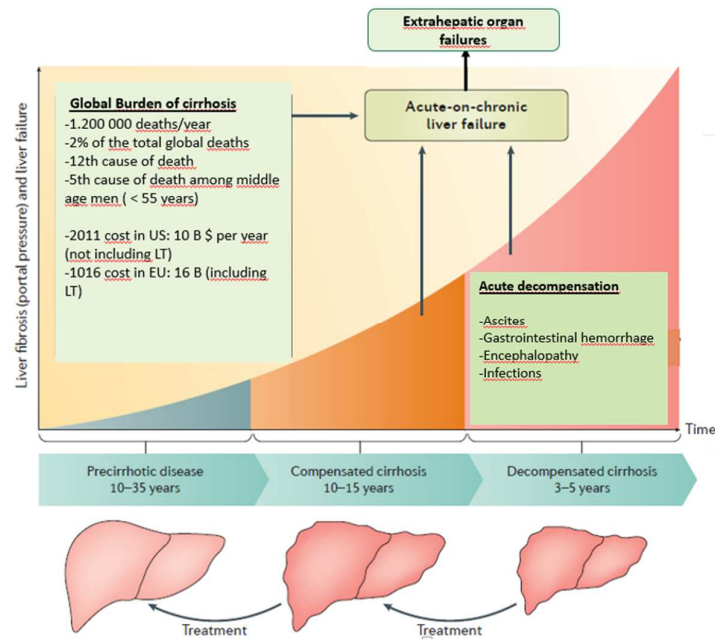
THE PAST



Jesus Christ only cured three sick men: a blind man, a leper and a cirrhotic patient with ascites.

Mosaic 12th-13th Century
Cathedral of the Assumption
Monreale, Sicily

NATURAL HISTORY OF CIRRHOSIS



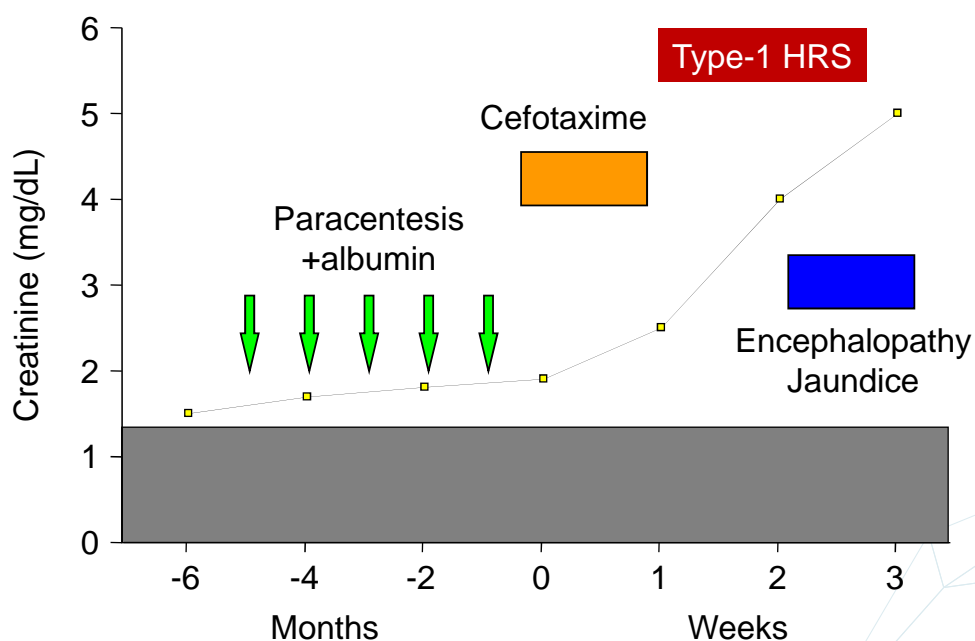
Paracentesis was the only effective treatment of ascites since the time of Galeno (123 A.C) until the 1950s, when modern diuretics and diuretic therapies were introduced



Five consecutive randomized controlled trials (1987-1993) showed paracentesis to be a rapid, effective and safe therapy of ascites in cirrhosis if performed with small trochars, under sterile conditions and using i.v. albumin (8 g/L of ascitic fluid removed, 80 g per treatment)



Hepatorenal Syndrome



Treatment of Spontaneous Bacterial Peritonitis with Albumin
 (1.5 g/kg at diagnosis and 1g/kg at the 3rd day, 150 g per treatment)
The second indication of albumin in cirrhosis

	Cefotaxime (n=63)	Cefotaxime + Albumin (n=63)
Resolution of infection	57 (93%)	59 (98%)
HR	20 (32%)	6 (10%)*
Hospital mortality	17 (27%)	6 (10%)*

HRS: Hepatorenal syndrome; *p<0.001

Sort et al, New Engl J Med 1999

First study on the treatment of Hepatorenal Syndrome (HRS) with
Terlipressin and Albumin (20-40 gr day, 300 g per treatment)
The third indication of albumin in cirrhosis

TREATMENT OF TYPE-1 HRS WITH
TERLIPRESSIN PLUS I.V. ALBUMIN
vs TERLIPRESSIN

	Terlipressin + albumin (n=13)	Terlipressin (n=8)
Complete response	10	2
Survival >1 month	12	2
OLT	5	0

OLT: Orthotopic liver transplantation

Ortega et al., Hepatology 2002



EF Clif

EUROPEAN
FOUNDATION
FOR THE STUDY
OF CHRONIC
LIVER FAILURE

THE PRESENT

It is framed by two important facts:

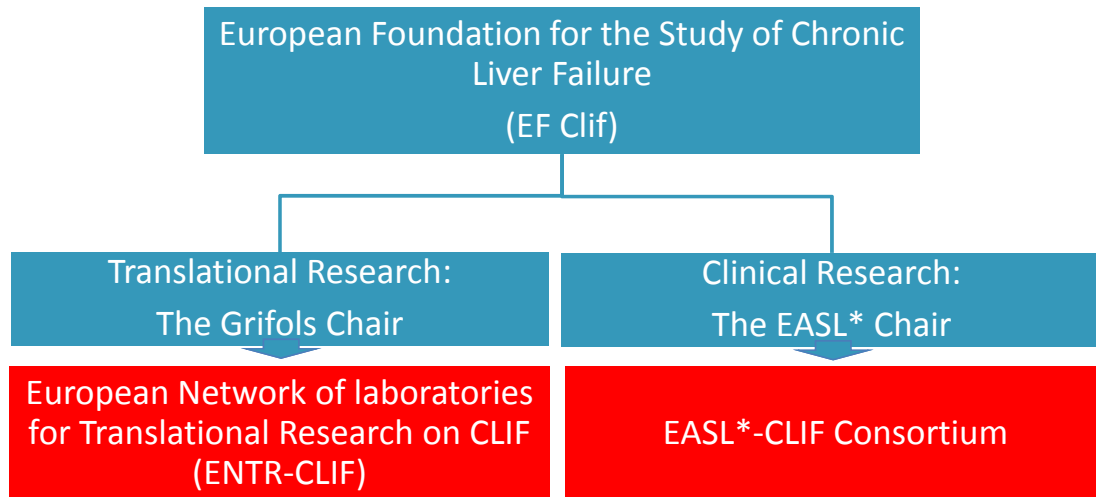
1. The identification and characterization of a new syndrome, Acute on Chronic Liver Failure (ACLF), in cirrhosis (2002-2013)
2. Grifols' decision to promote an ambitious long-term research program on the mechanism of ACLF, albumin's potential role in preventing and treating this syndrome and new mechanisms of action of albumin in cirrhosis.

A patient with ACLF.

Major characteristics of the syndrome

52 year old man with cirrhosis. Previous history of ascites. On treatment with diuretics. Actively working as civil engineer. Admitted to hospital with pneumonia and rapid deterioration of his clinical condition. On admission ascites, deep jaundice, grade III hepatic encephalopathy and renal failure [[Acute Decompensation of cirrhosis associated with Organ Failure\(s\)](#)]. The patient was admitted to the ICU but died 4 days later with progressive impairment of liver, renal, and cerebral function ([High risk of Short-Term Mortality](#))

The European Foundation for the Study of Chronic Liver Failure (EF Clif). A joint venture between European investigators, Grifols and the EASL



*EASL: European Association for the Study of the Liver

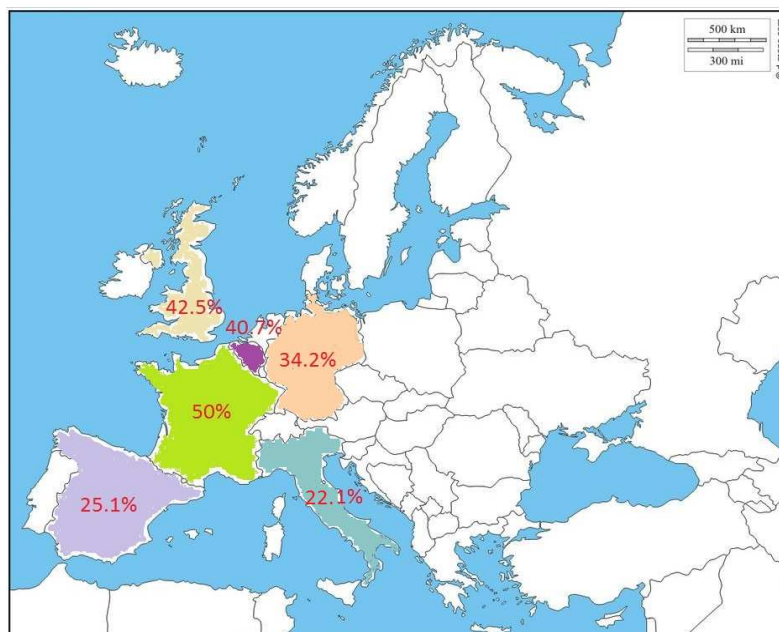
100 European University Hospitals Associated With the EASL-CLIF Consortium in 2017



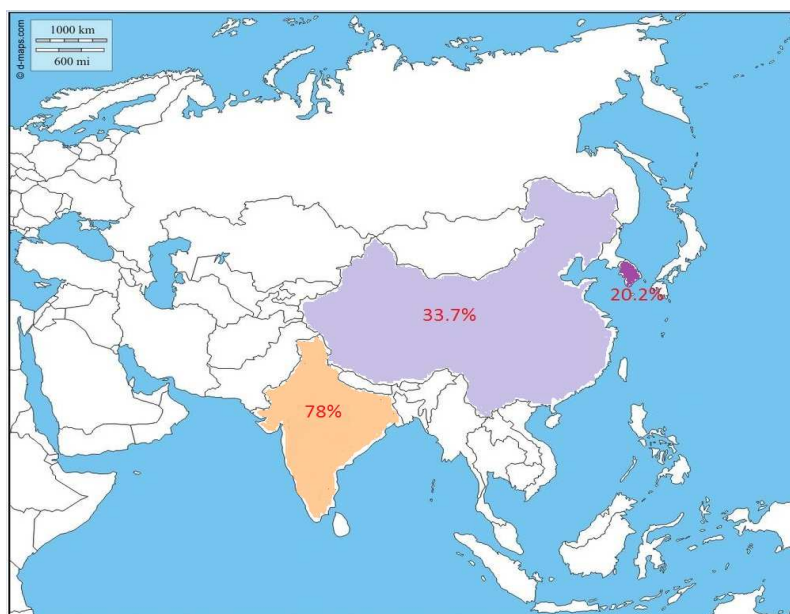
Main results of the CANONIC study, the first EF Clif investigation aimed at characterizing the ACLF syndrome

1. **Prevalence of ACLF: 415/1343: (32%)**
 2. **Grade of severity (prevalence):** ACLF-1: 51%; ACLF-2: 35%; ACLF-3: 14%.
 3. **Age:** 56 years
 4. **Etiology of cirrhosis:** alcoholic 56%, hepatitis C 15%, alcohol + hepatitis C 9%.
 5. **Time from first decompensation:** no prior decompensation 26.5%; <3 months 15.5%.
 6. **Precipitating events:** bacterial infections 31%, acute alcoholic liver injury 23%, no identifiable precipitating event (45.6%).
 7. **Main cause of death. 40% of patients with cirrhosis die as a consequence of ACLF.**
-

Prevalence of ACLF in Europe (CANONIC Study)



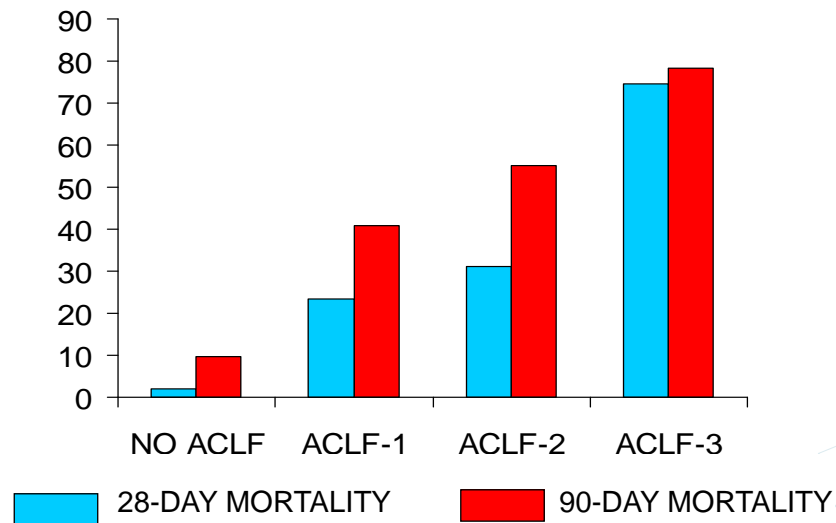
Prevalence of ACLF in Asia



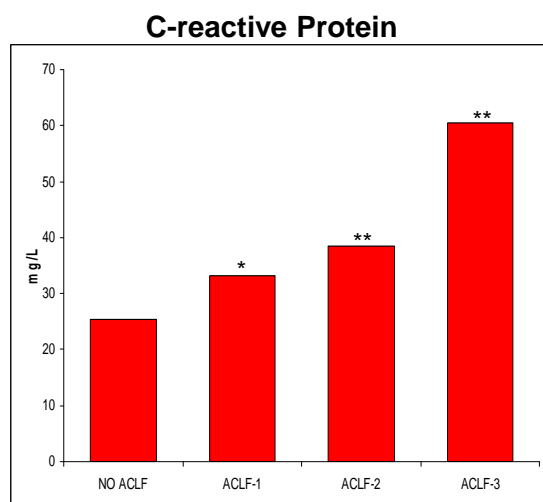
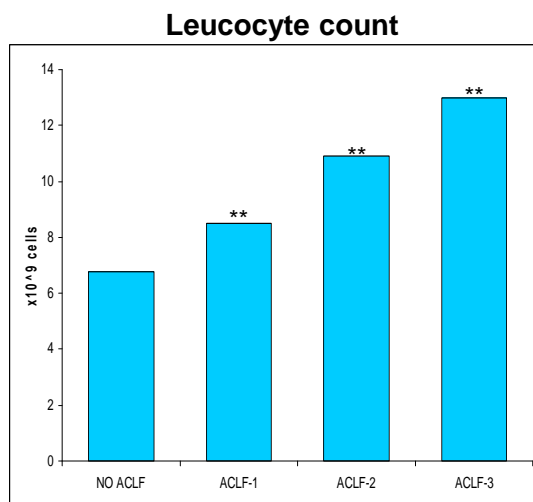
Prevalence of ACLF in the U.S.



ACLF Mortality Rate Is Strongly Related with the Number of Organ Failures (CANONIC Study)



Inflammatory Markers and ACLF ACLF Occurs in the Setting of a Severe Systemic Inflammation (Canonic Study)



* p<0.05 with respect to No ACLF

** p<0.001 with respect to No ACLF



EF Clif

EUROPEAN
FOUNDATION
FOR THE STUDY
OF CHRONIC
LIVER FAILURE

THE FUTURE

It will be largely influenced by research programs led by Grifols and EF Clif.

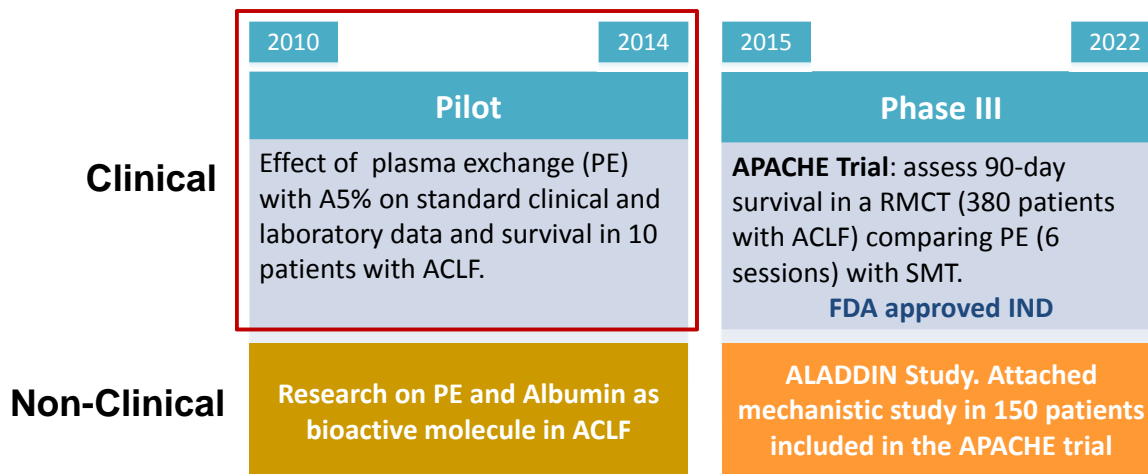
Research Programs to Improve the Management of Cirrhosis Patients

Grifols' research program aims to discover new therapies with albumin to prevent and treat ACLF (2015)

The APACHE and the PRECIOSA studies

EF Clif's translational research program **"Albumin as a Drug"** to identify new mechanisms of action of albumin (2016)

APACHE Program Overview



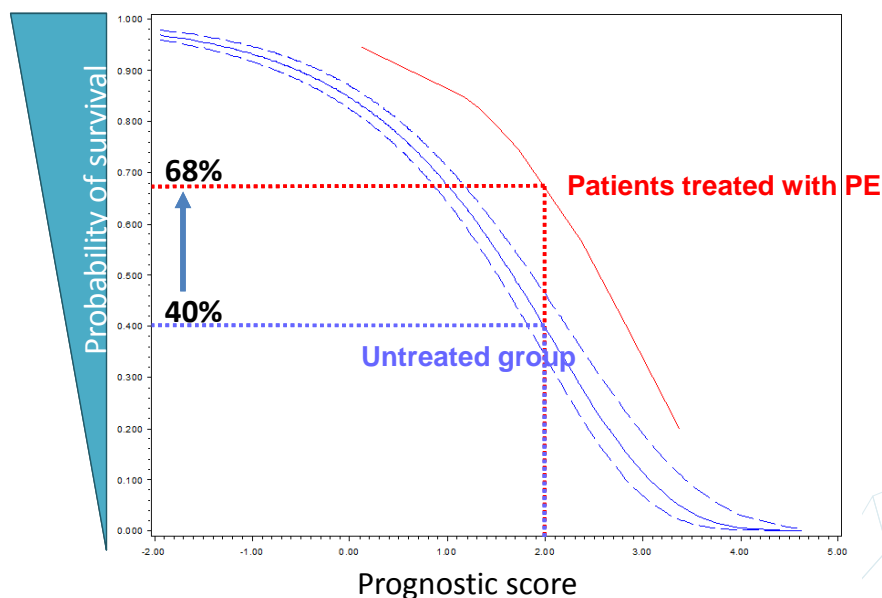
PE-A5%: Plasma Exchange with 5% Albumin reposition (600 g per treatment)

RMCT: Randomized Multicentric Clinical Trial

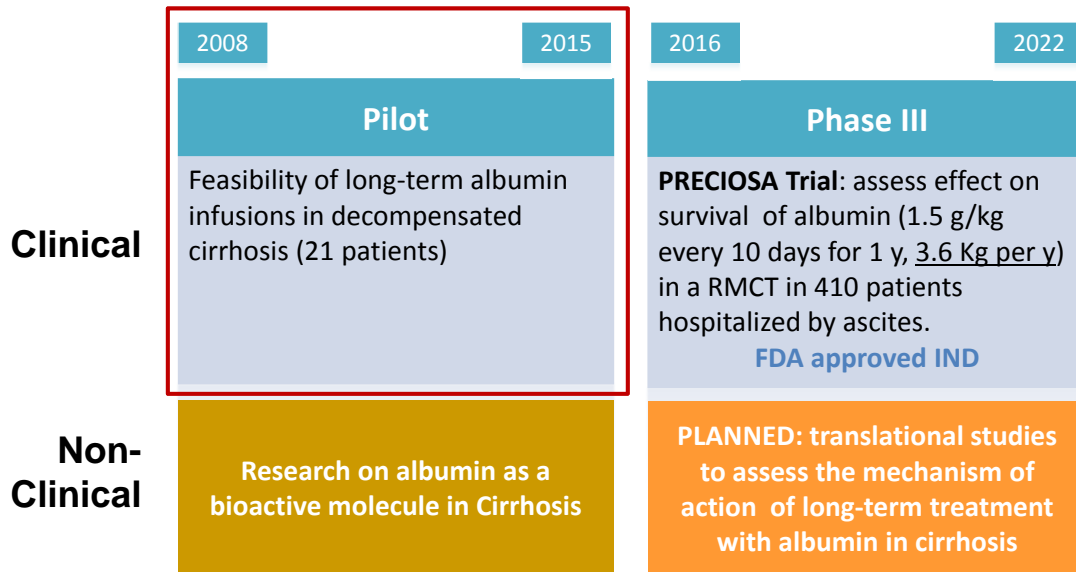
SMT: Standard Medical Therapy

IND: Investigational New Drug application

Plasma Exchange (PE) May Improve Survival in Patients With ACLF (The APACHE Pilot Study)

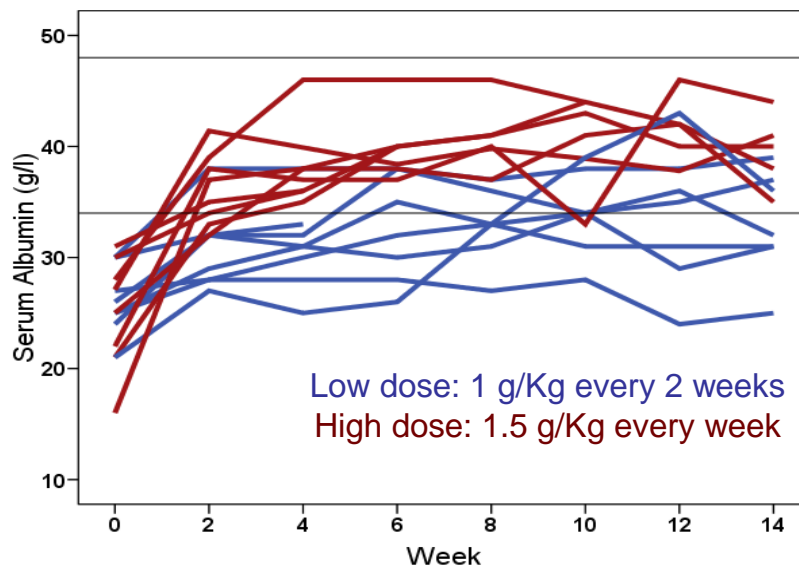


PRECIOSA Program Overview



RMCT: Randomized Multicentric Clinical Trial
IND: Investigational New Drug application

Initial Data: Albumin Dosage Is Important for Therapeutic Response (The PRECIOSA Pilot Study)



Long-Term Albumin in Cirrhosis: Is It the ANSWER?

Long-term albumin administration in decompensated cirrhosis (ANSWER): an open-label randomised trial



Paolo Caraceni, Oliviero Riggio, Paolo Angelì, Carlo Alessandria, Sergio Neri, Francesco G Foschi, Fabio Levantesi, Aldo Airolidi, Sergio Boccia, Gianluca Sveglia-Baroni, Stefano Fagioli, Roberto G Romanelli, Raffaele Cazzolongo, Vito Di Marco, Vincenzo Sangiovanni, Filomena Marisco, Pierluigi Tonivitto, Annalisa Tortora, Rosanna De Marco, Mario Angelico, Irene Cacciola, Gianfranco Elia, Alessandro Federico, Sara Massironi, Riccardo Guarisco, Alessandra Galioto, Giorgio Ballardini, Maria Rendina, Silvia Nardelli, Salvatore Piano, Chiara Elia, Loredana Prestianni, Federica Mirici Cappa, Lucia Cesarini, Loredana Simone, Chiara Pasquale, Marta Cavallin, Alida Andreoli, Federica Filone, Matteo Ruggeri, Andrea Roncadori, Maurizio Baldassarre, Manuel Tufoni, Giacomo Zacherini, Mauro Bernardi, for the ANSWER Study Investigators*

Summary

Background Evidence is scarce on the efficacy of long-term human albumin (HA) administration in patients with decompensated cirrhosis. The human Albumin for the treatment of ascites in patients With hEpatic cIRrhosis (ANSWER) study was designed to clarify this issue.

Methods We did an investigator-initiated multicentre randomised, parallel, open-label, pragmatic trial in 33 academic and non-academic Italian hospitals. We randomly assigned patients with cirrhosis and uncomplicated ascites who were treated with anti-aldosterone drugs (≥ 200 mg/day) and furosemide (≥ 25 mg/day) to receive either standard medical treatment (SMT) or SMT plus HA (40 g twice weekly for 2 weeks, and then 40 g weekly) for up to 18 months. The primary endpoint was 18-month mortality, evaluated as difference of events and analysis of survival time in patients included in the modified intention-to-treat and per-protocol populations. This study is registered with EudraCT, number 2008–000625–19, and ClinicalTrials.gov, number NCT01288794.

Findings From April 2, 2011, to May 27, 2015, 440 patients were randomly assigned and 431 were included in the modified intention-to-treat analysis. 38 of 218 patients died in the SMT plus HA group and 46 of 213 in the SMT group. Overall 18-month survival was significantly higher in the SMT plus HA than in the SMT group (Kaplan-Meier estimates 77% vs 66%; $p=0.028$), resulting in a 38% reduction in the mortality hazard ratio (0.62 [95% CI 0.40–0.95]), 46 (22%) patients in the SMT group and 49 (22%) in the SMT plus HA group had grade 3–4 non-liver related adverse events.

Interpretation In this trial, long-term HA administration prolongs overall survival and might act as a disease modifying treatment in patients with decompensated cirrhosis.

Published Online

May 31, 2018
[http://dx.doi.org/10.1016/S0140-6736\(18\)30948-7](http://dx.doi.org/10.1016/S0140-6736(18)30948-7)

See Online/Comment
[http://dx.doi.org/10.1016/S0140-6736\(18\)30948-6](http://dx.doi.org/10.1016/S0140-6736(18)30948-6)

*Investigators listed at the end of the paper

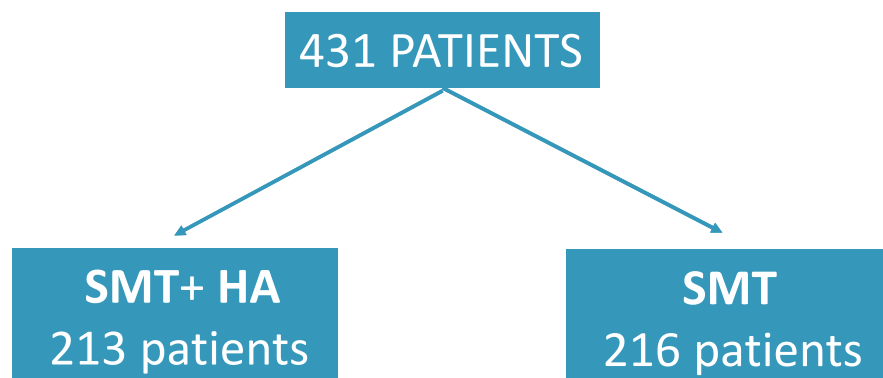
Department of Medical and Surgical Sciences, and Center for Applied Biomedical Research, University of Bologna, Bologna, Italy

(P Caraceni MD, M Baldassarre PhD, M Tufoni MD, G Zacherini MD)

Prof M Bernardi MD; Department of Clinical Medicine, Sapienza University of Rome, Rome, Italy

(O Riggio MD, S Nardelli MD, C Pasquale MD); Unit of Internal Medicine and Hepatology, Department of Medicine, University of Padua, Padua,

ANSWER STUDY: Italian MC-RCT Assessing Long-Term (18-month) Albumin Treatment in Cirrhotic Patients With Ascites



SMT: STANDARD MEDICAL THERAPY

HA: HUMAN ALBUMIN (40 g/WEEK, 2.3 Kg/year)

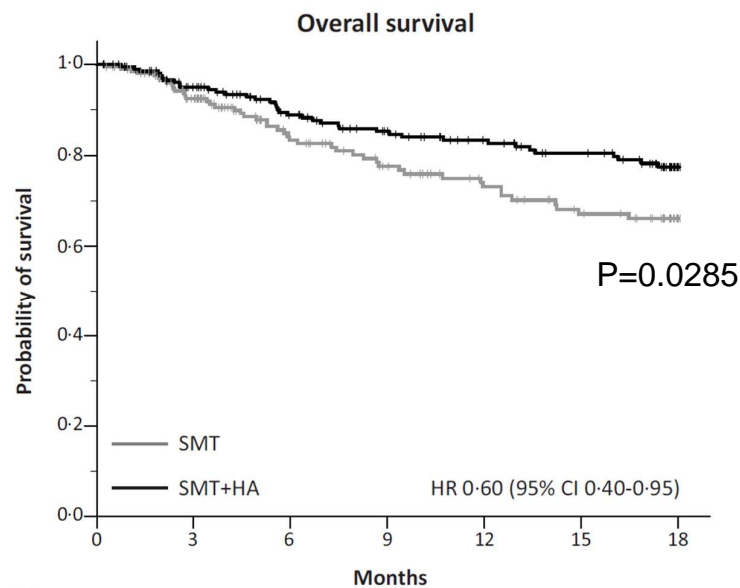
Caraceni P. et al. Lancet 2018

ANSWER Study: Impact of Long-Term Albumin Treatment on Clinical Course

	Percent reduction relative Risk * (95% CI)	p value
Ascites development	52 (36-65)	<0.0001
Refractory ascites	57 (38-71)	<0.0001
SBP	37 (50-81)	<0.0001
Other infections	30 (10-46)	<0.005
Encephalopathy	52 (37-63)	<0.0001
Renal dysfunction	50 (36-61)	<0.0001
Type-1 HRS	61 (24-81)	<0.004

* **Percent reduction** of the events in the albumin treated group versus the control group.

ANSWER STUDY: Impact of Long-Term Albumin Treatment on Survival



Research Programs to Improve the Management of Cirrhotic Patients

Grifols' research program to design new therapies with albumin for the prevention and treatment of ACLF (2015)
The APACHE and PRECIOSA studies

EF Clif's translational research program **"Albumin as a Drug"** to identify new mechanisms of action of albumin (2016)

"Albumin as a Drug" Program

Acute decompensation and ACLF occur in the setting of severe systemic inflammation (very high levels of inflammatory cytokines)
 (The CANONIC Study)

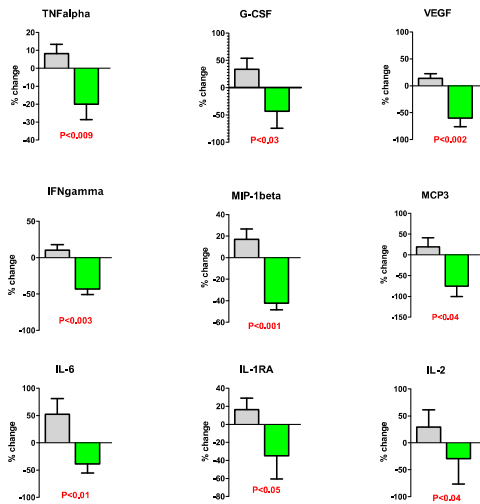
	INFLAMMATION		
	Healthy Subjects (40)	Patients with decompensated cirrhosis	
		No ACLF(342)	ACLF (180)
TNF α	9 (7-12)	20 (14-27)≠	29 (17-41)**
IL-6	0.3 (0.3-0.3)	21 (14-41)≠	39 (17-115)**
IL-8	1.6 (0.6-3.3)	37 (20-76)≠	84 (41-169)**
MIP-1 β	13 (6-17)	20 (13-34)≠	28 (19-50)**
G-CSF	2.1 (1.8-11)	23 (11-50)≠	32 (14-83)**
GM-CSF	1.7 (1.7-1.7)	4.5 (2-9.5)≠	7.3 (2.1-30)**

≠ p<0.001 vs healthy Subjects; **p<0.0001 vs No ACLF.

Claria J et al, Hepatology 2017

“Albumin as a Drug” Program

High long-term Albumin dose markedly reduces plasma cytokine levels in decompensated cirrhosis (The PRECIOSA Pilot Study)



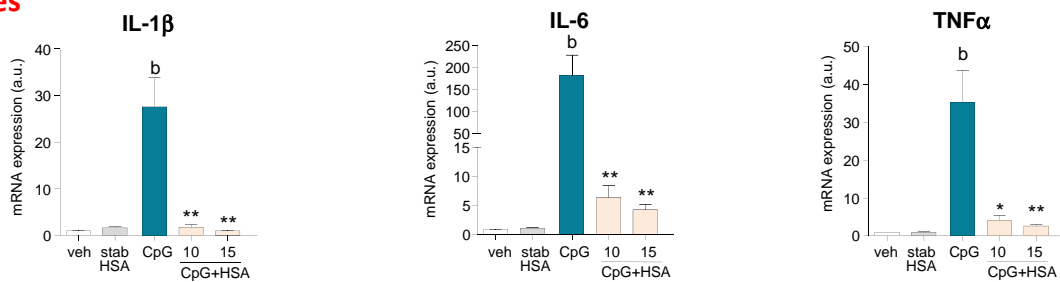
Low albumin dose
(1 g/kg every 2 weeks for 12 weeks)

High albumin dose
(1.5 g/kg every week, for 12 weeks)

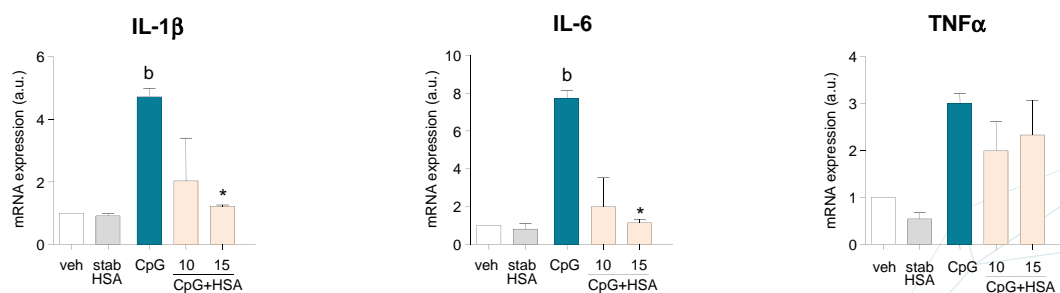
% change over pre-treatment values in the two groups

Albumin prevents the increased release of cytokines by monocytes and PMN stimulated with CpG

Monocytes



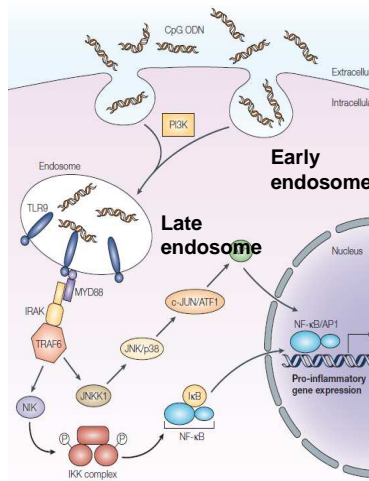
PMN



PMN: Polymorphonuclear cells

“Albumin as a drug” Program

In vitro experiments performed with bacterial DNA (CpG), which activates inflammation by interacting with intracellular endosomal TL receptors¹ in immune cells

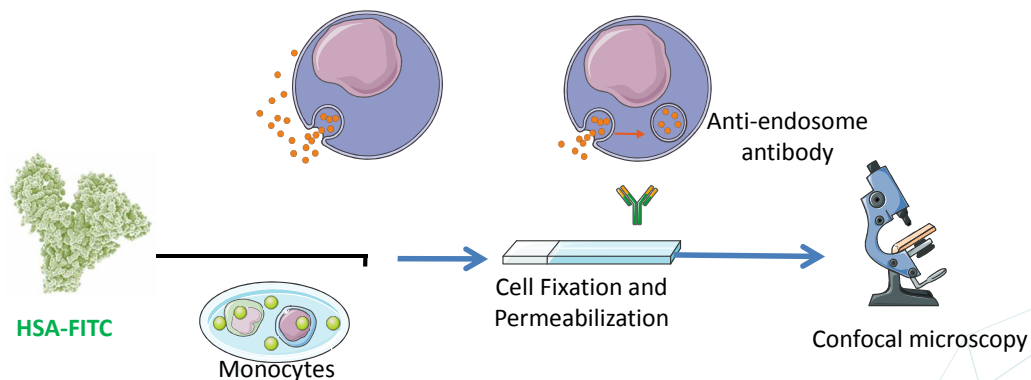


Klinman DM et al. Nature 2004

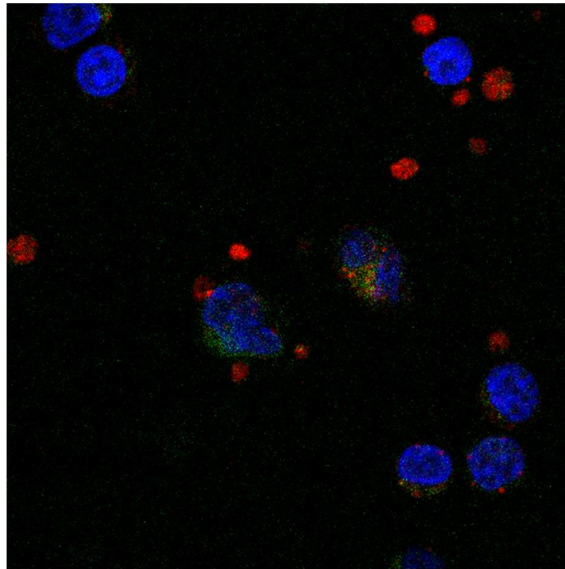
1. TL receptors = Toll-like receptors

Albumin internalization inside cells of the immune system

Hypothesis: Monocytes internalize HSA during endosome formation which immune modulates the inflammatory response at intracellular level



Albumin is detected inside the monocytes

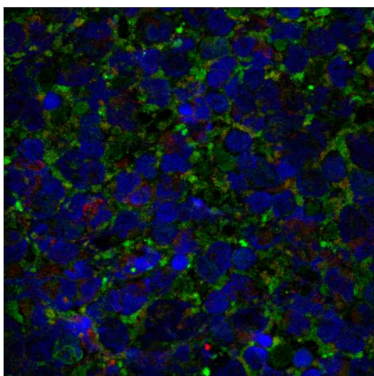


Nuclei: DAPI (blue); Albumin: FITC (green); Early endosomes: EEA1 (Red)

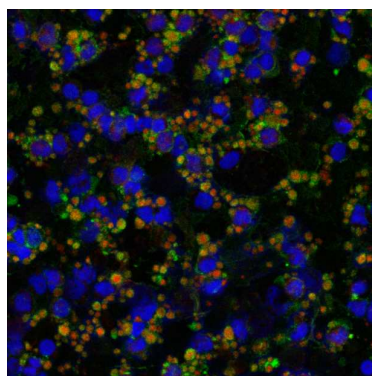
Albumin co-localizes with endosomes in monocytes

Nuclei:	DAPI (blue)
Albumin:	FITC (green)
Late endosomes:	Alexa fluor (Red)
Colocalization	FITC + Alexa fluor (yellowish)

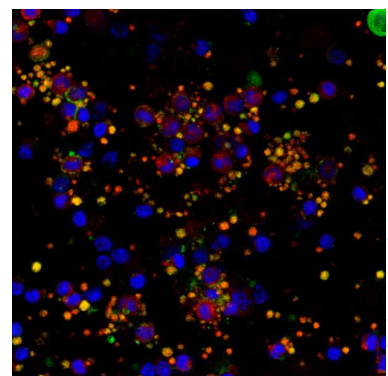
10'



60'



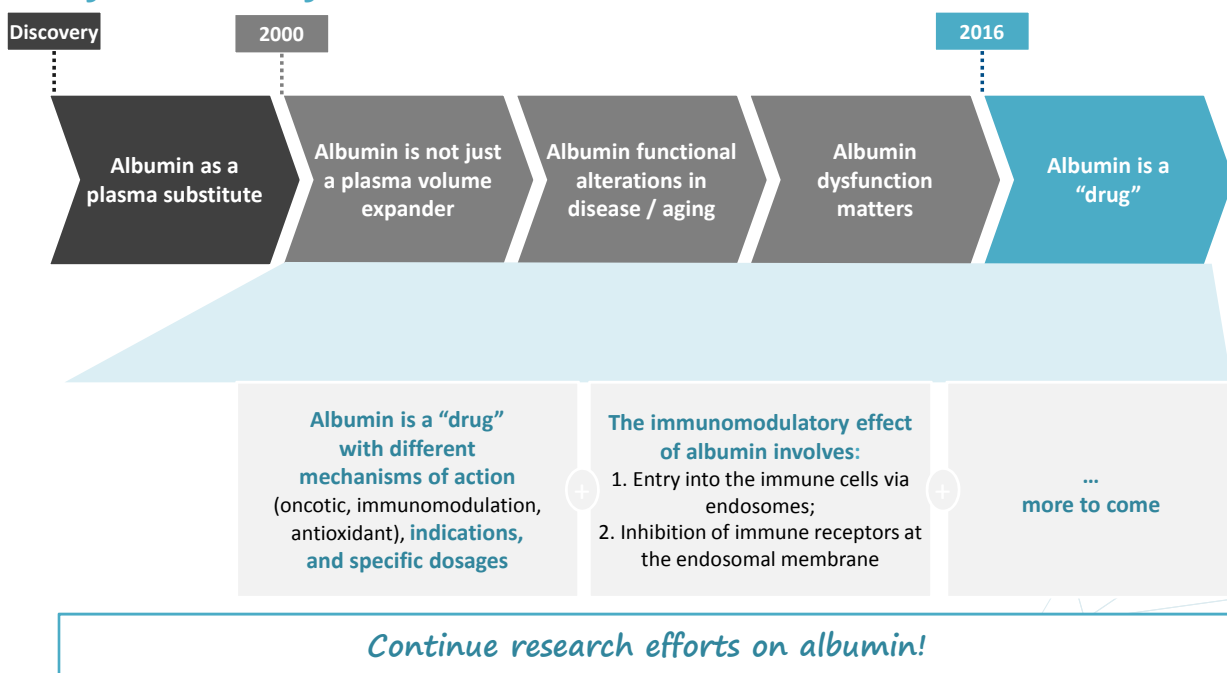
120'



Key Takeaways

1. ACLF syndrome is extremely common in patients with cirrhosis.
2. ACLF occurs in the setting of severe systemic inflammation that impairs cardio-circulatory function, produces multi-organ failure and leads to very high mortality rate (leading cause of mortality in cirrhosis).
3. Albumin is a powerful immune-modulator that markedly reduces the circulating levels of inflammatory mediators in cirrhosis.
4. Pilot PRECIOSA and APACHE studies suggest that Albumin prevents ACLF in patients with cirrhosis and improves cardio-circulatory, liver, renal and brain functions and survival in cirrhosis and ACLF. Two confirmatory Phase 3 clinical trials sponsored by Grifols, will start in September 2018 and in 2019.

Key Takeaways





2018 Investor and Analyst Meeting

Barcelona
7th and 8th June



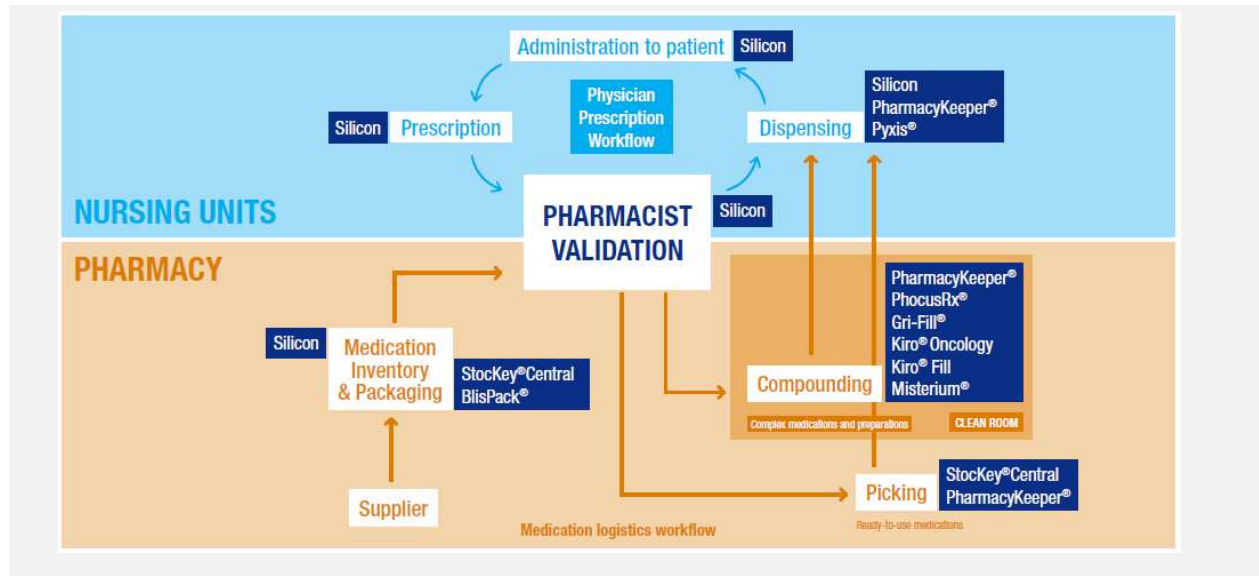
Product Showroom

Carlos Roura and Daniel Fleta
Chief Industrial Officer / Deputy Chief Industrial Officer



Hospital Medication Workflow

Grifols' Technologies Allow to Control More than the 80% of the Medication Workflow



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GRIFOLS

Compounding

The Most Comprehensive Portfolio of Consultancy, Software, Equipment, Disposables and Services to Manage the IV Compounding Workflow Improving Safety, Quality and Efficiency

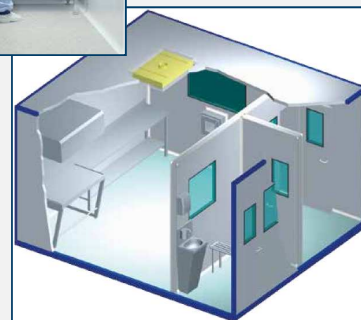
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GRIFOLS

Misterium®

Modular Cleanroom Systems

- Grifols' sterile manufacturing expertise applied to the compounding pharmacy
- High quality modular cleanrooms that can be configured to fit any space and location
- Benefits:
 - Easy installation and maintenance
 - Versatile
 - Helps regulatory compliance
- Misterium® was designed in Chile and launched in the year 2000. Nowadays, it has been installed in more than 400 sites worldwide
- Extending the Grifols Engineering knowledge on environmental control to Hospital Pharmacy



PhocusRx®

Grifols' Sterile Manufacturing Expertise Applied to the Compounding Pharmacy

- Non-invasive IV workflow management system providing safe, reliable and easy to use solution for remote validation and documentation of the manual compounding processes
- Benefits:
 - Improves pharmacy management
 - Improves patient safety
 - Reduces environmental risk
 - Helps regulatory compliance
- PhocusRx® was launched in 2008
- After the MedKeeper acquisition, its software component will be merged with the PharmacyKeeper software and still using PhocusRx® hardware



Gri-fill® 4.0

Unique Semi-Automated Compounding System

- The unique semi-automated compounding system that guaranties the sterility of final product preparations
- Benefits:
 - Guaranties the sterility of final preparations
 - Improves pharmacy management
 - Improves patient safety
 - Improves operator safety (Oncology drugs)
 - Provides efficiency and ease of to use
 - Helps regulatory compliance
- Gri-fill® was launched in 1992



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GRIFOLS

Kiro® Oncology

Fully Automated Compounding System for Oncology and Biological Drug Preparations

- **Improve patient safety**
 - Accuracy
 - Verification and traceability
 - Aseptic compounding and quality assurance
- **Improves operator safety**
 - Closed system
 - Self cleaning
 - Disposal of hazardous residues
- **Improves pharmacy management**
 - Economy
 - Flexibility
 - Efficiency
 - Connectivity
- **Helps regulatory compliance**
 - Kiro® Oncology was launched in Europe in 2013 and in the U.S. in 2015



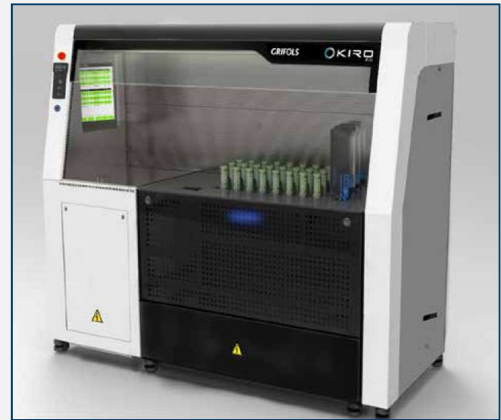
326 | 2018 Investor and Analyst Meeting | Barcelona

GRIFOLS

Kiro Fill®

High Efficiency Fully Automated Compounding System for Non-hazardous Drugs

- **Benefits:**
 - Improves pharmacy management
 - Delivers high-throughput
 - Offers flexibility and configurability for optimal productivity
 - Provides identification and traceability of processes and preparations
 - Helps regulatory compliance
- Kiro Fill® is expected to be launched in Europe and U.S. during 2019



PharmacyKeeper

Web and Mobile-Based Applications to Improve Key Pharmacy Operational Processes

- **Benefits:**
 - Provides visibility into critical pharmacy operations
 - Delivers real-time reporting and analytics
 - Fits existing workflows
 - Helps regulatory compliance
- PharmacyKeeper was launched in the U.S. in 2013



IV Fluids: IV Solution

0.9% Sodium Chloride Injection, USP, in Fleboflex® Plastic Container 500 mL.

- Non-PVC, non-DEHP and non-latex flexible container
- The solution is only in contact with polypropylene, highly compatible material
- Designed for a safe and easy handling: rounded upper and lower corners and integrated eyelet support.
- High sealing resistance to pressure cuffs responding satisfactorily to 400 mmHg pressure for 72 hours
- Totally collapsible, lightweight and transparent
- Safe attachment of the infusion set thanks to the outlet port internal membrane
- No parts of the cover have to be removed to access the outlet port



IV Fluids: Fleboflex® Luer

Efficacy and Safety in the Preparation of Mixtures in the Hospital Pharmacy

- Non-PVC, non-DEHP and non-latex flexible container
- Rapid addition of medication and solution extraction from the Fleboflex® Luer bag using a needle-free syringe, eliminating the risk of accidental punctures
- A vial adapter can be connected for reconstitution
- No dripping when connecting and disconnecting the syringe and vial adapter
- Large additive volume: only partially filled bag with luer lock connection in the Spanish market



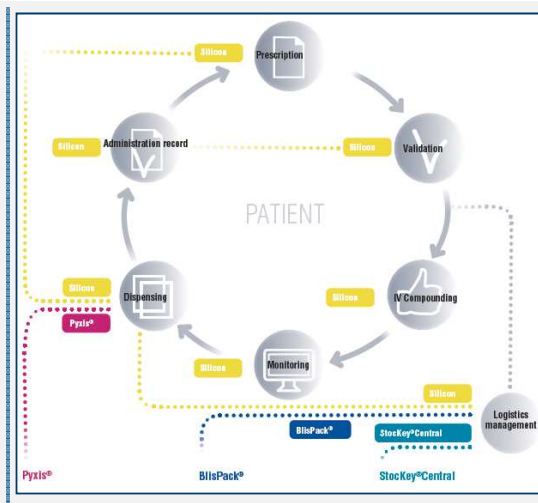
Logistics

The Most Comprehensive Portfolio of Consultancy, Software, Equipment and Services to Manage the Medication Flow in the Hospital Improving Safety, Quality and Efficiency

Silicon

Modular Software System for Electronic Prescription Order Entry

- **Central pharmacy**
 - Prescription validation
 - Inventory management
- **Nursing Units**
 - Medication prescription
 - Medication administration record (eMar)
- **Outpatients**
 - Day hospital management
 - Ambulatory and home care patients management
- **Benefits:**
 - Increases safety in the use of the medication
 - Offers specific designs for physicians, nurses and pharmacists
 - Offers configurability and modularity



The first version of Silicon was launched in 2001. Grifols has been providing Pharmacy Information Systems since 1983

BlisPack®: System for Automatically Identification, Cut & Overwrap Blister Sheets to Produce Medication in Unit Dose Format

- Benefits:
 - Keeps manufacturer conditions for medicines (no deblistering)
 - Uses bar code unit dose identification
 - Allows efficient use of medication
 - Optimizes inventory management
- BlisPack® was launched in 2008



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StocKey® RFID

RFID System to Monitor and Ensure Traceability of High Value Products in Real Time

- Benefits:
 - Improves cost efficiency by inventory monitoring
 - Provides real time visibility of the inventory
 - Improves critical inventory traceability



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StocKey® Central

Logistics Management Software for Central Warehouses in the Healthcare Sector

- Benefits:
 - Improves efficiency, safety and reliability of medication picking
 - Provides concentration and optimization of warehouse space
 - Delivers integrated connectivity with the hospital information systems (HIS)
- The first version of Silicon was launched in 2001.
- Grifols has been providing pharmacy information systems since 1983



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7th and 8th June

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Financials

Financial Strength Drives Sustainable and Profitable Growth

Alfredo Arroyo
Chief Financial Officer



Robust Fundamentals

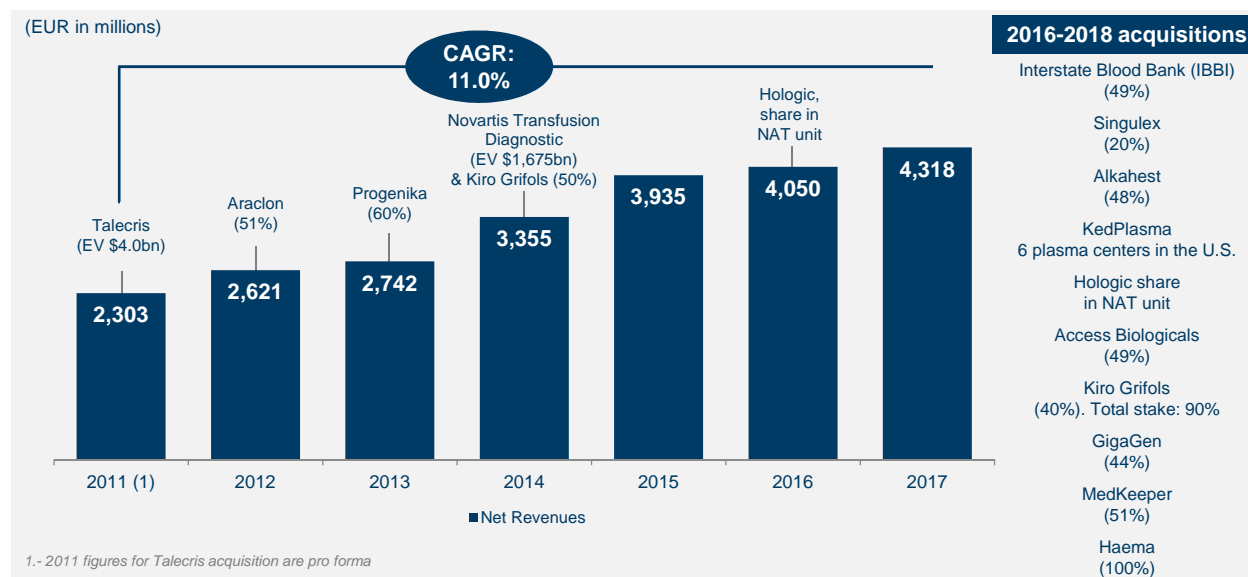
Fundamentals Drive Long-Term Value

Competitive Advantage Across Divisions

- Constant focus on **business fundamentals** and **long-term**
- Integrated business models to capture **opportunities across divisions**
- Demonstrated ability to successfully **grow businesses** both **organically** and through **acquisitions**
- **Strategic investments** bolster competitive advantage
- **Leader in plasma centers**, with more than 225 centers in the U.S. and Europe
- Emphasis on **cash generation**
- **Financial strength** provides further growth opportunities

Strengthening the Business With a Long-Term View

A Proven Track Record of Sustainable Growth

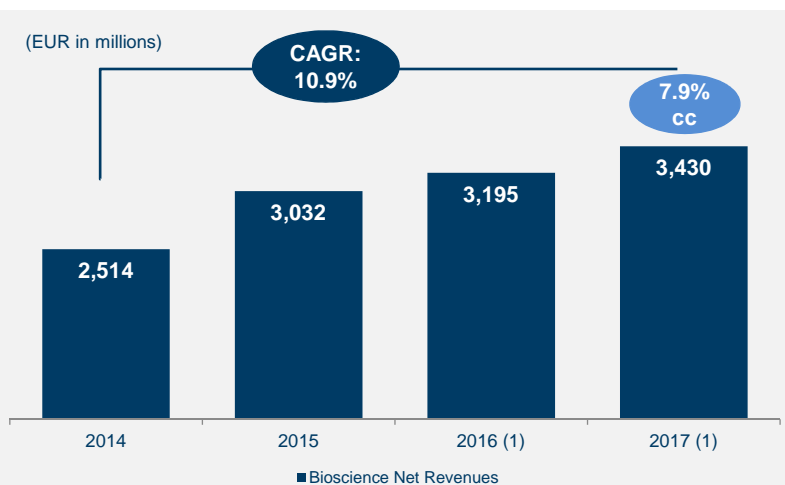


Financial Highlights

Solid Integrated Business Structure

Bioscience Division

- Solid upward growth
- Robust demand for main plasma proteins throughout 2017
- Plasma-derived products expect to continue growing fueled by favorable demand and supply dynamics, global expansion and innovation



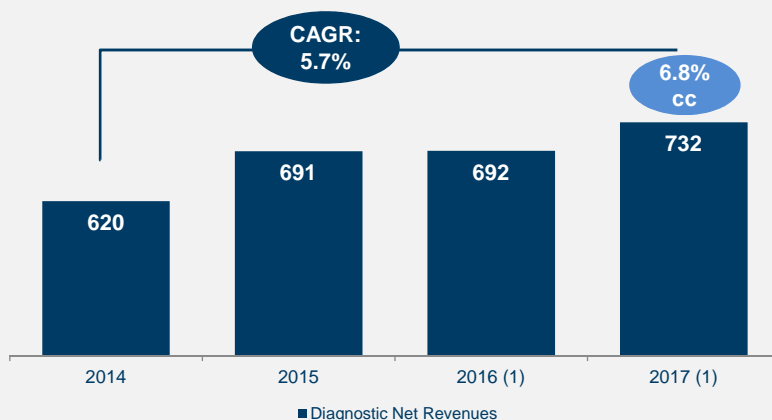
1.- Net revenues considering intersegment sales and the reclassification of sales of biological products for non-therapeutic use reported as Bio Supplies Division sales, from January 2017 onwards

Fully Integrated Transfusion Diagnostics

Diagnostic Division

- Value capture from integration
- Highly profitable business
- Grifols' comprehensive transfusional medicine portfolio delivers strong cash generation and top-line growth

(EUR in millions)



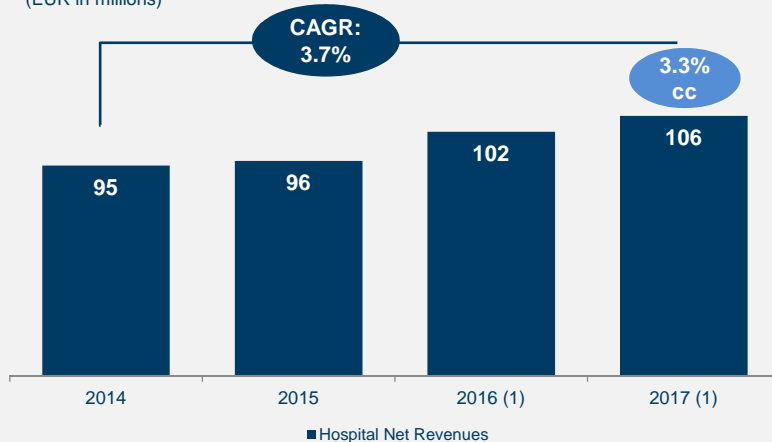
1.- Net revenues considering intersegment sales

Significant Growth Potential in the U.S.

Hospital Division

- Growth driven primarily by IV saline solutions and the Pharmatech line - with higher growth projected following the MedKeeper acquisition
- Product portfolio expansion and focus on the U.S. market

(EUR in millions)



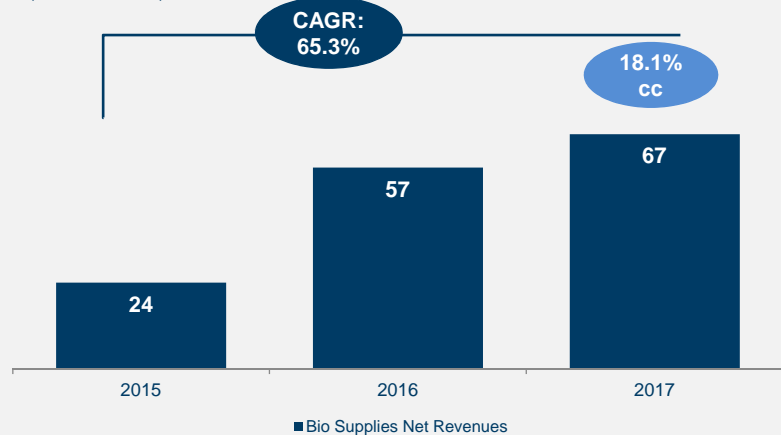
1.- Net revenues considering intersegment sales

Diversifying the Revenue Base

Bio Supplies Division

- Comprised mainly by sales of biological products for non-therapeutic uses and manufacturing agreements
- Highly profitable revenue stream

(EUR in millions)

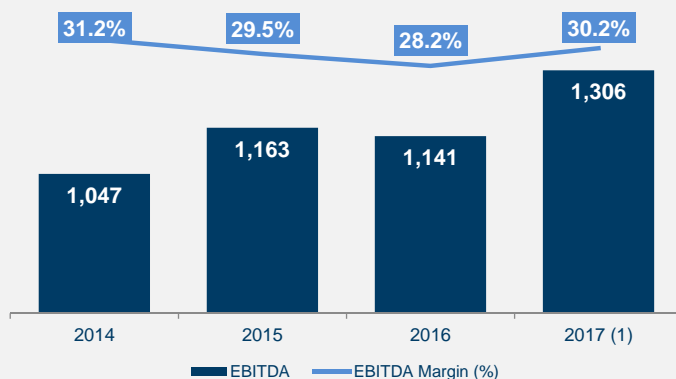


1.- Net revenues considering intersegment sales

High Margins With Significant Cash Flow Generation

EBITDA and Margin

(EUR in millions)

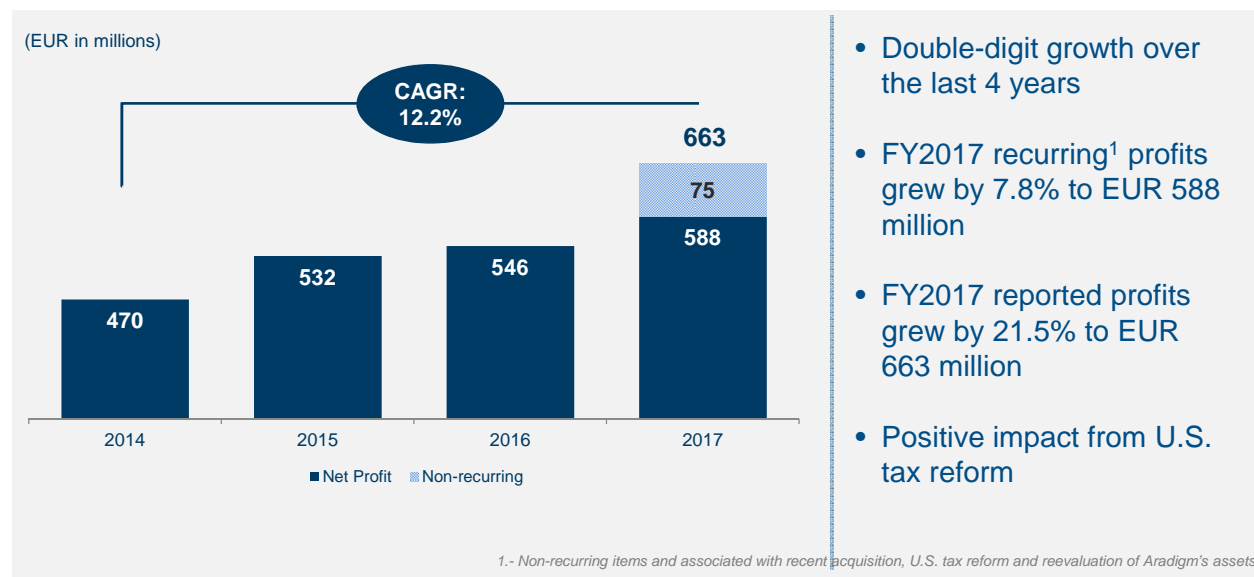


- Acquisition of the NAT share unit enabled Grifols to increase EBITDA margin and cash conversion rate
- Grifols has increased its efforts over recent years to grow plasma volume from existing centers and through new openings

1.- 2017 EBITDA is Adjusted EBITDA

Improving Bottom-Line Profitability

Demonstrated Ability to Grow Net Profit



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1Q 2018 Performance

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1Q 2018 Revenue Performance

Consistent Delivery

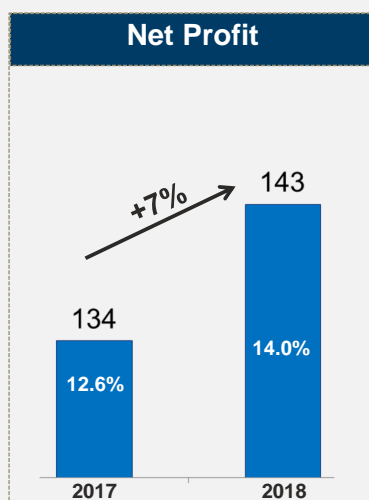
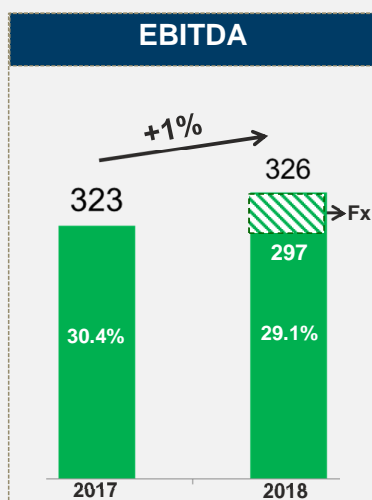
(EUR in millions)

	1Q 2018	1Q 2017	% Var. at cc
Bioscience	807.5	853.6	5.8%
Diagnostic	164.9	175.1	4.0%
Hospital	27.3	23.9	18.1%
Bio Supplies	26.2	14.4	105.8%
Others	4.4	-	n/m
Intersegments	-7.4	-5.4	52.6%
TOTAL	1,023.0	1,061.7	7.4%

- **Bioscience:** strong growth of the main proteins, which offset the decline in FVIII amid a tight plasma market
- **Diagnostic:** steady growth in the transfusion medicine business
- **Hospital:** robust double-digit growth driven by stronger performance in the U.S. on the back of IV Therapy and Pharmatech, including MedKeeper
- **Bio Supplies:** revenues doubled due to third-party manufacturing agreement

1Q 2018 Performance

Steady Earnings Growth



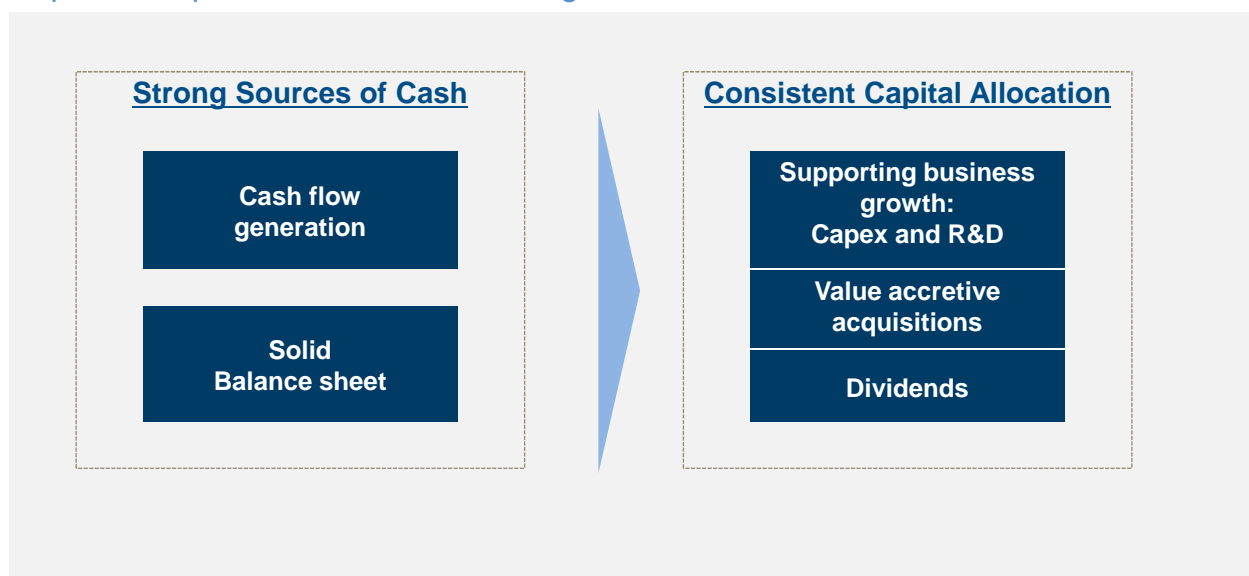
(EUR in millions except for %. Percentages are as % of Net Revenue)

- ⊖ Plasma costs
- ⊖ Exchange rate variations
- ⊖ Lower FVIII utilization
- ⊕ Opex control / optimization
- ⊕ Lower financial expenses
- ⊕ Effective tax rate: c.20%

Capital Allocation

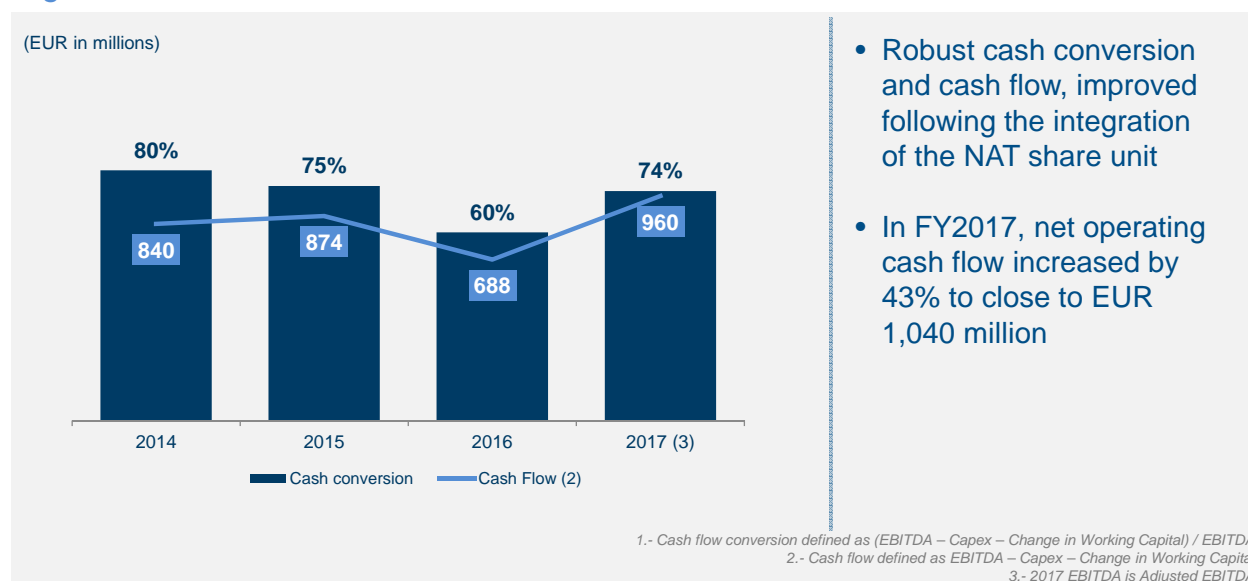
Consistent Capital Allocation Supports Profitable Growth

Capital Discipline Focused on Creating Value



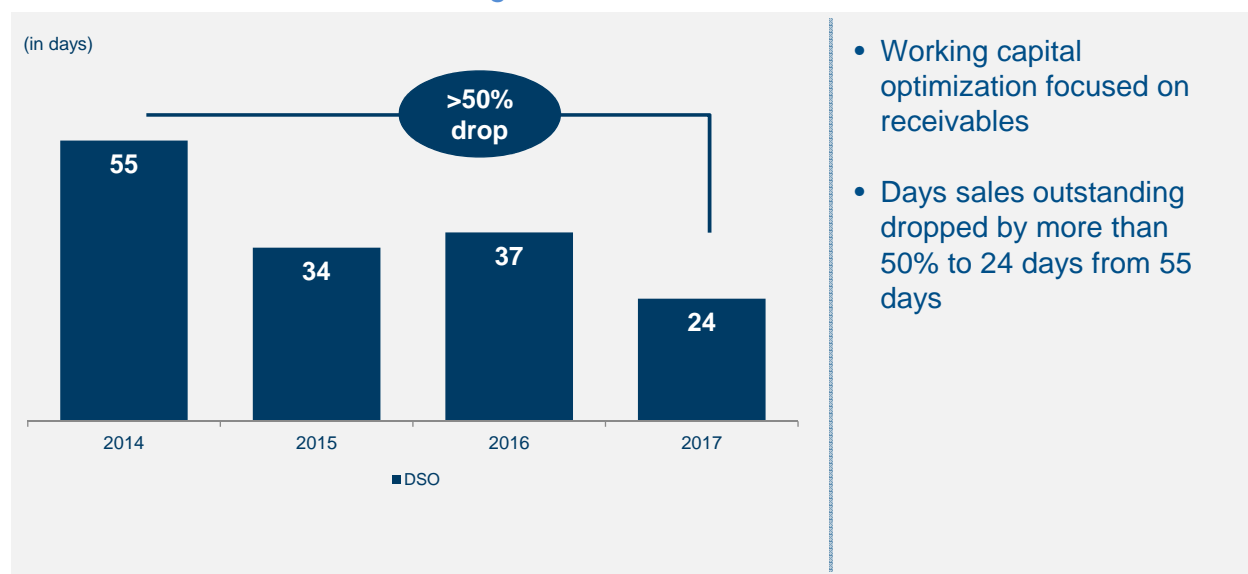
Strong Sources of Cash: Excellent Cash Flow Generation

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



Strong Sources of Cash: Working Capital Optimization

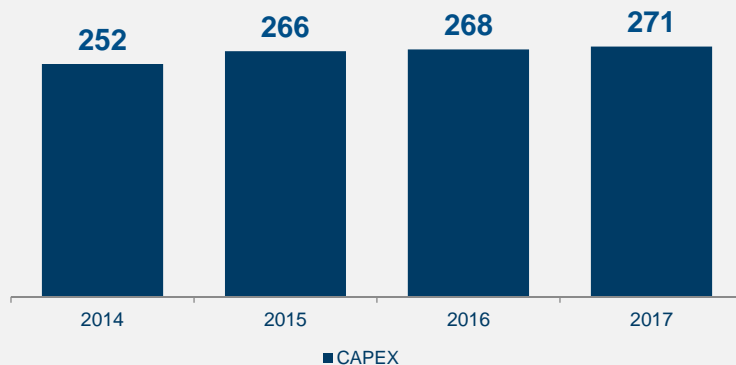
Best-in-Class Receivables Management



Consistent Capital Allocation: Capex

Capex Supports Long-Term Growth

(EUR in millions)

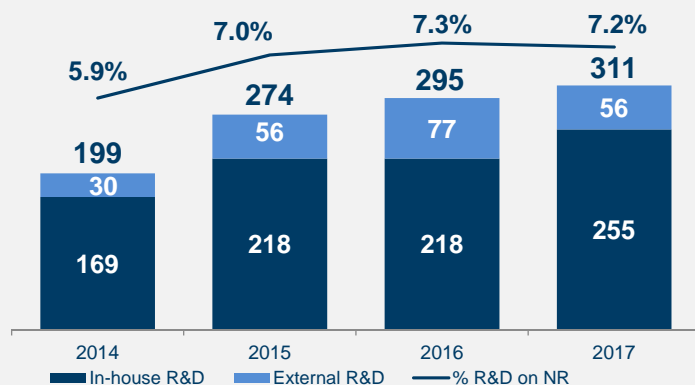


- Capex plan 2016-2020: EUR 1.2bn
- Significant investments to support growth initiatives
- Over 50% of capex is dedicated to expansion
- Continued emphasis on execution and capital allocation efficacy and return

Consistent Capital Allocation: R&D Supports Long-Term Growth

Firm Commitment to an Integrated Approach

(EUR in millions)



- R&D drives long-term growth and profitability
- Includes strategic collaborations: leveraging internal and external expertise

Consistent Capital Allocation: Value Accretive Acquisitions

Ability to Pursue Attractive Opportunities

- Integral part of Grifols' strategy
- Targeted investments to support growth and maximize cash flow generation
- Focused on **value accretive transactions**
- Ability to capture opportunities
- **Best-in-class M&A deal execution** and **seamless integration**
- Continuous improvement in financial terms

Consistent Capital Allocation: Value Accretive Acquisitions

Growing Value Through Strategic Decisions

January 2017	January 2017	February 2017	July 2017
Hologic's share of NAT screening unit	Access Biologicals	6 plasma centers in the U.S. (Kedplasma)	GigaGen
USD 1,850m	49% stake USD 51m	USD 47m	44% stake USD 35m
Creates a vertically integrated NAT business across R&D, manufacturing, sales and marketing and corporate functions	Manufacture of biological products for non- therapeutic uses including plasma reagents to support specific in-vitro diagnostic and R&D activities	6 plasma centers as of March 1, 2017	Biopharmaceutical firm specialized in the development of innovative monoclonal and polyclonal antibody therapies
Captures operational efficiency across the whole value chain	5-year call option	300,000 liters	
The acquisition transformed Diagnostic into an integrated, high-margin business			

Consistent Capital Allocation: Value Accretive Acquisitions

Growing Value Through Strategic Decisions

January 2018	March 2018	May 2018	1Q 2019
MedKeeper	Haema	Agreement with Boya Bio-Pharmaceutical	IBBI
51% stake USD 98m	Full ownership Euros 220m	Euros 25m	51% stake USD 100m
U.S.-based technology firm that develops mobile and web-based solutions to enhance hospital pharmacy operations	With 35 centers, operates the largest independent network of donation centers in Germany and offers a range of transfusion medicine services 800,000 liters	Plasma collection centers to be built and managed in adherence to the criteria established by the health authorities of the United States, the European Union and China	1Q 2019 execution of option to acquire the remaining 51% Includes 8 whole blood centers, 22 plasma centers and a laboratory that provides human blood and/or blood components to the therapeutic and diagnostic industries 900,000 liters

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Consistent Capital Allocation: Dividends

Sharing Success With Shareholders

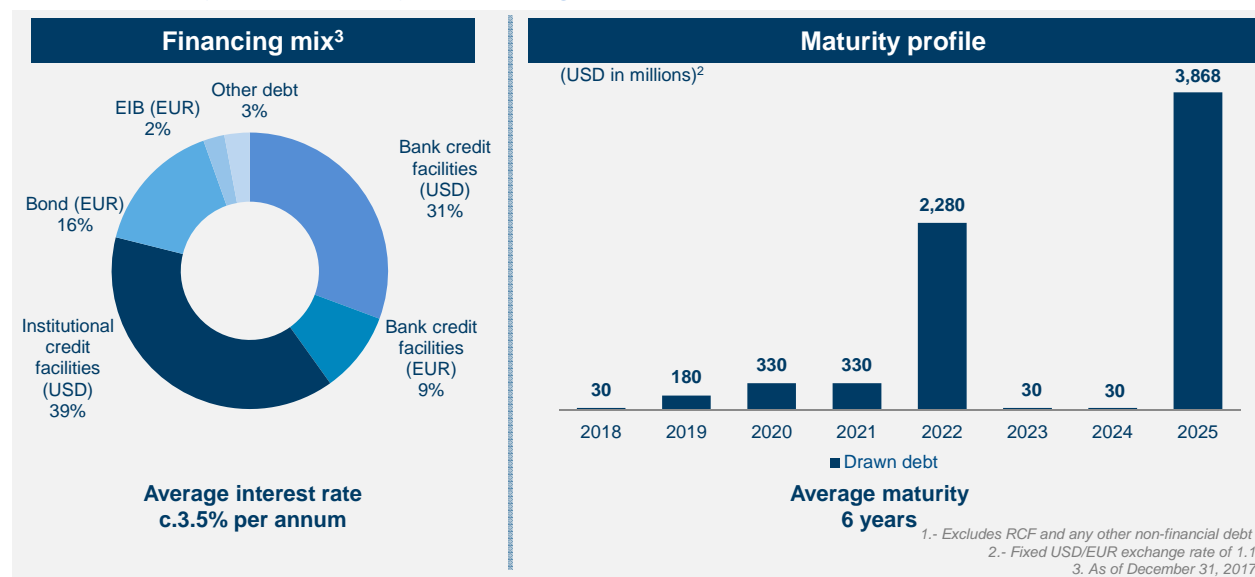
- Established dividend policy, including **payout ratio of 40%** of consolidated group profit
- Consistent **growth of cash dividend** payment
- Strong earnings profile
- Maintenance of financial strength

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Well Balanced Financing Mix and Long-Term Debt Maturity Profile

Debt¹ Maturity Profile: c.6-year Average Tenor



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A Unique Competitive Position

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Continuous Efforts to Enhance Growth and Margin - Actions

Pulling All Levers

Actions	<ul style="list-style-type: none">• Bioscience drives organic growth through diagnosis/treatments and expansion into new markets• Productivity initiatives to boost plasma collection and overcome plasma tightness• Plasma supply: significant capex allocated to open new collection centers and relocate/improve/upgrade existing centers. Expansion and diversification through acquisitions and integration• Leverage leadership position in Diagnostic transfusion medicine to boost growth of immunohematology and hemostasis• Hospital to increase scale and profitability while expanding its presence in the U.S. market• Increased R&D investments over the last years will trigger future sales growth• Bolt-on acquisitions, partnerships and agreements will further reinforce short-term growth across divisions
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Continuous Efforts to Enhance Growth and Margin - Results

Pulling All Levers

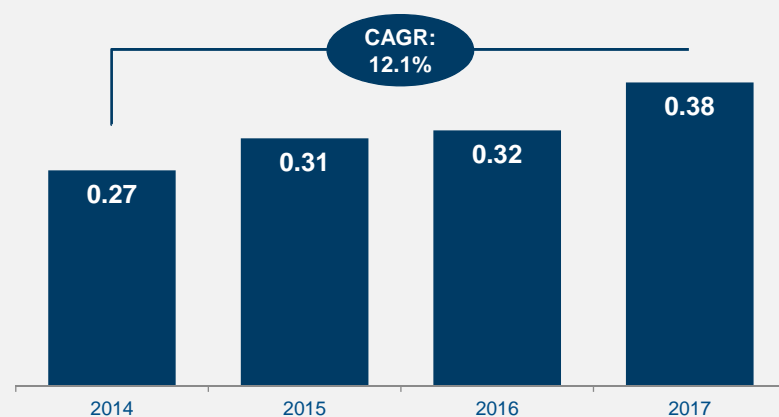
Results	<ul style="list-style-type: none">• Significant collection growth over recent months. Productivity ramp-up in new centers is ahead of schedule, leveraging cost per liter of plasma• Increase and diversify in-house plasma collections and acquisitions to support sales growth and enable company to meet current strong demand• Value accretive acquisitions• Regulatory approvals across all divisions: Prolastin®-C Liquid; Fibrin sealant; Hyper-rabies; genetic test for alpha-1; hemostasis; saline solution and Grifols Misterium® cleanroom solutions• Beckman-Coulter agreements to support specialty Diagnostic sales growth• Additional market expansion in France, UK, Germany and Asia Pacific (China and India)
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Continued Commitment to Growing Shareholder Value

Consistent Growth in Dividends

Dividend Grows by Double Digits for the Last 4 Years

(EUR per share)



- Accumulated annual dividend up by 12.1% over the last 4 years
- More than EUR 800m returned to shareholders over the last 4 years
- Continuous DPS increase on the back of profit growth

Key Takeaways

Key Takeaways

Committed to Long-Term Sustainable and Profitable Growth

CONSISTENT DELIVERY

- Relentless focus on **business fundamentals** and **long term**
- Maintain long term growth and profitability:
 - Steady **sustainable growth** of **core Bioscience products**
 - **Strengthening** our **leadership** in **transfusion medicine**
 - Significant **boost** in the **Hospital Division growth**
- As the **industry leader** in plasma **collection** and **manufacturing capacity**, Grifols is in a **unique position to benefit from accelerated growth** in the plasma business
- **On track** to continue delivering **profitable growth** and **cash generation**

Key Takeaways

Committed to Long-Term Sustainable and Profitable Growth

CAPITAL ALLOCATION

- Continuous support to fund business growth, with a strong commitment to innovation
- Capital allocation focus on manufacturing and plasma collection capacity increase

VALUE CREATION

- Grifols will continue to grow dividend per share supported by growth in underlying earnings

Grifols competitive advantages drive long-term sustainable and profitable growth

Closing

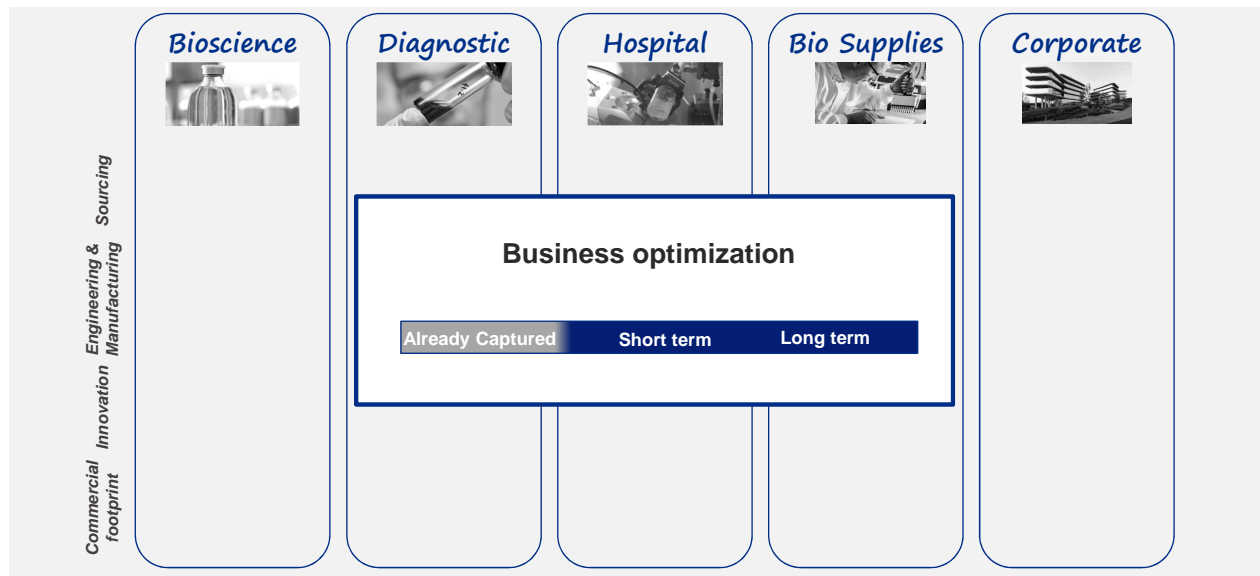
Grifols Value Grid (GVG)

Víctor Grifols Deu
Co-CEO

GRIFOLS



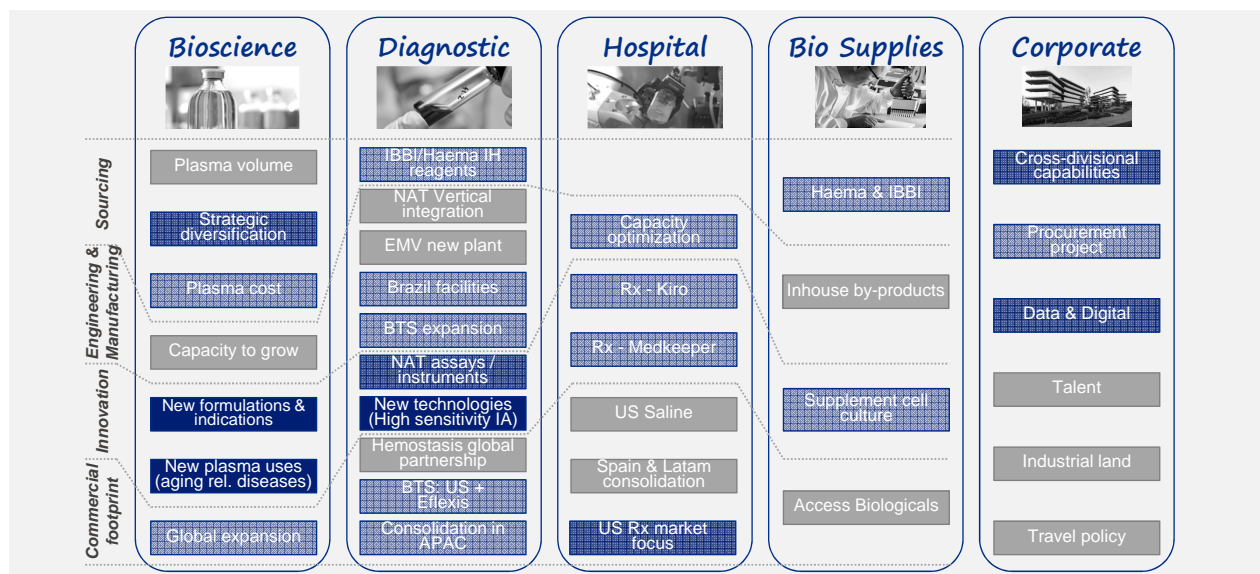
Grifols Value Grid



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Grifols Value Grid



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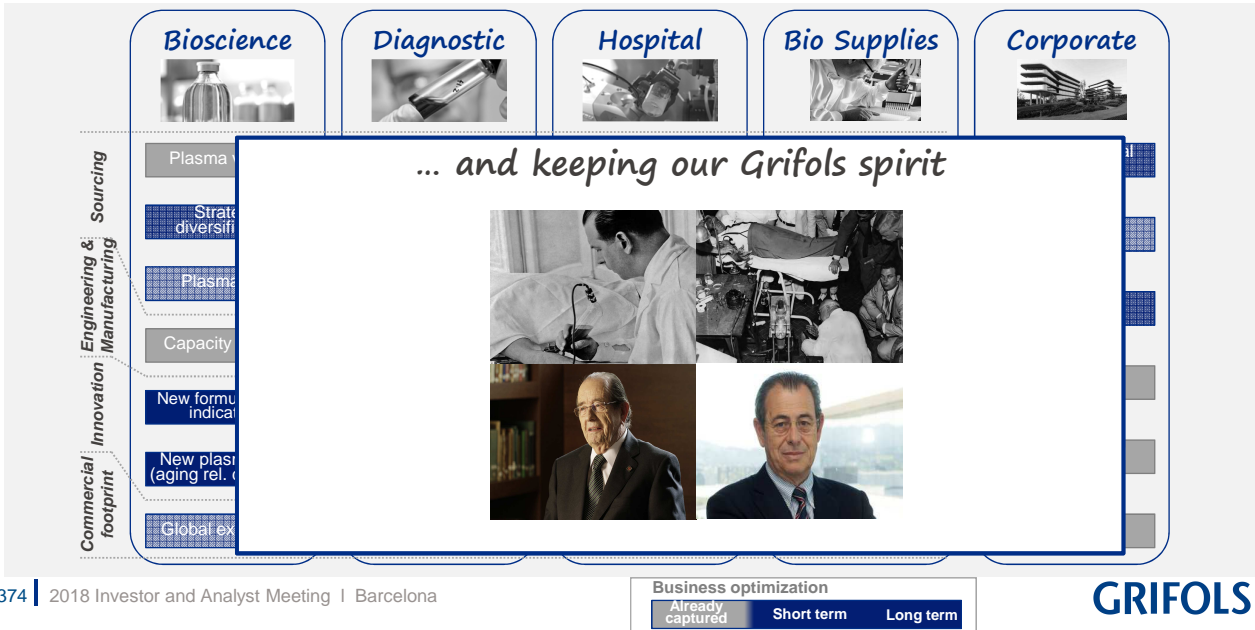
Business optimization
Already captured Short term Long term

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Grifols Value Grid



Grifols Value Grid





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Barcelona
7th and 8th June

