



*Fueling life sciences through transformative transactions*

**LOCUST WALK Q2 2018 TRENDS IN  
BIOPHARMA TRANSACTIONS**

# Introduction

Locust Walk is a global life science transaction firm. Our integrated team-based approach across capabilities, geographies, and industry segments delivers the right products, the right partners, and the most attractive sources of capital to get the right deals done for biopharma and medtech companies.

Each quarter, Locust Walk deal team members compile key statistics and trends on strategic transactions and financings. Our *Q2 2018 Trends in Biopharma Transactions* report applies the latest data to analyze current activities in the life science deal landscape.

In this quarter's report you can find an overview and analysis of the following across the biopharma markets in the US, Europe, Japan, and China:

- Key performance indicators for the biopharma market
- IPO and private financing activity and performance
- Deal activity for strategic partnership and M&A

# Summary of Findings

## In the US

- In Q2 2018, public and private biopharma markets remain strong with record breaking private financings, a strong IPO market, and stable M&A
- Public biopharma market performance outpaced major indices even with global volatility; biopharma IPOs outperformed due to select strong performances
- Private financing remains on pace to surpass 2017's record highs in both volume and aggregate value
- Licensing and M&A volume has remained relatively stable, with 'mega' deals driving M&A aggregate value past 2017 totals

## In Europe

- EU VC investment has been fast-paced and rising quickly in aggregate value – already almost at 2017 levels with two quarters left to go
- The UK has dominated the region in number of deals (8) and aggregate value (\$237M) for the quarter
- Five biopharma IPOs and two secondary public offerings close across EU and US based exchanges
- Though companies have historically seen the NASDAQ as the gold-standard for biotech IPOs due to the access to the large US capital pool, companies have had significant success in raising money on EU-based exchanges in 2018

## In Japan

- Stock prices of key biopharma companies have been showing a gradual decline in Q2 2018, despite steady progresses in R&D and successful deal makings
- Shares of the 39 major Japanese pharmaceutical companies listed on the 1st Section of Tokyo Stock Exchange (TSE1) were up 2.4%
- Japan deal landscape has been active with 18 deals announced for licensing and M&A

## In China

- China's top 20 pharmaceutical companies (-0.1%) by market capitalization have outperformed the SSE Composite Index (-10.1%) in Q2 2018
- No Chinese biopharma going public in Q2 2018
- In-license deal volume continues to grow with 17 in-license deals have been announced in Q2
- Chinese investors actively invest in not only domestic companies, but also overseas life science companies

# UNITED STATES

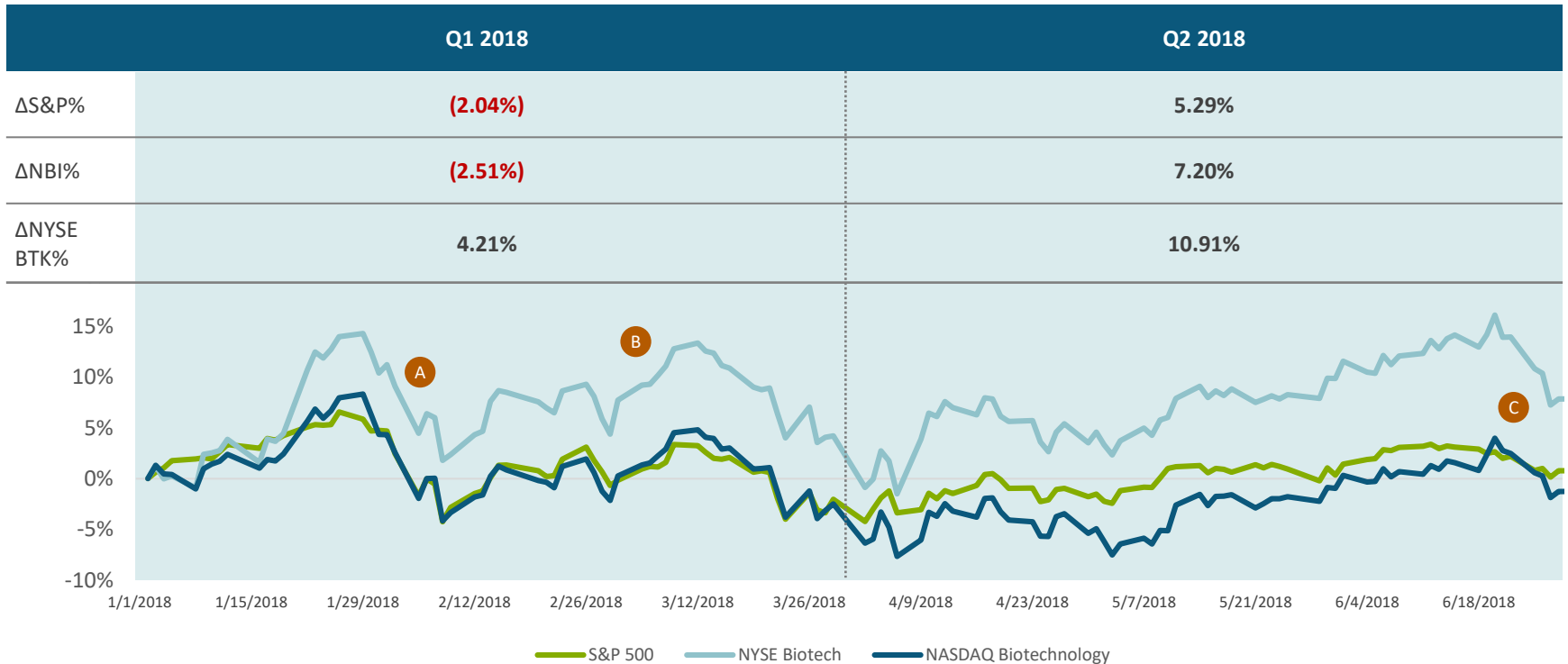
## Q2 2018 public and private biopharma markets remain strong with record breaking private financings, a strong IPO market, and stable M&A

- **Public biopharma market performance outpaced major indices even with global volatility; biopharma IPOs outperformed due to select strong performances**
  - ▶ Volume of biopharma IPOs surges in Q2 2018 with 23 companies successfully going public on US exchanges, with the average raise increasing from Q1 (\$102.9M vs. \$76.1M)
- **2018 private financing remains on pace to surpass 2017's record highs in both volume and aggregate value**
  - ▶ Record pace financing continues to be led by large number of Series A and B rounds, with multiple >\$100M Series D or later rounds contributing to a strong Q2
  - ▶ Companies targeting a wide range of TAs raised significant amounts of capital, with CAR-T player Allogene leading the way with a \$412M Series A
- **Licensing and M&A volume has remained relatively stable, with 'mega' deals driving M&A aggregate value past 2017 totals**
  - ▶ Transaction values have decreased slightly from Q1, but increase in volume has kept licensing activity on pace to vastly surpass 2017 totals
  - ▶ \$62B Takeda – Shire merger drove M&A aggregate value, with H1 2018 already surpassing 2017 aggregate value
- **Locust Walk anticipates private financing to remain strong as investors continue to deploy capital and support crossover rounds for IPO prospects**
  - ▶ Strategic deal volume is likely to continue to remain stable but is likely to pick up toward to latter half of 2018 and into 2019 as companies achieve value inflection points



# Public biopharma indices outperformed the S&P 500 as public markets witnessed continued global volatility

## Performance of Key Biopharma Indices

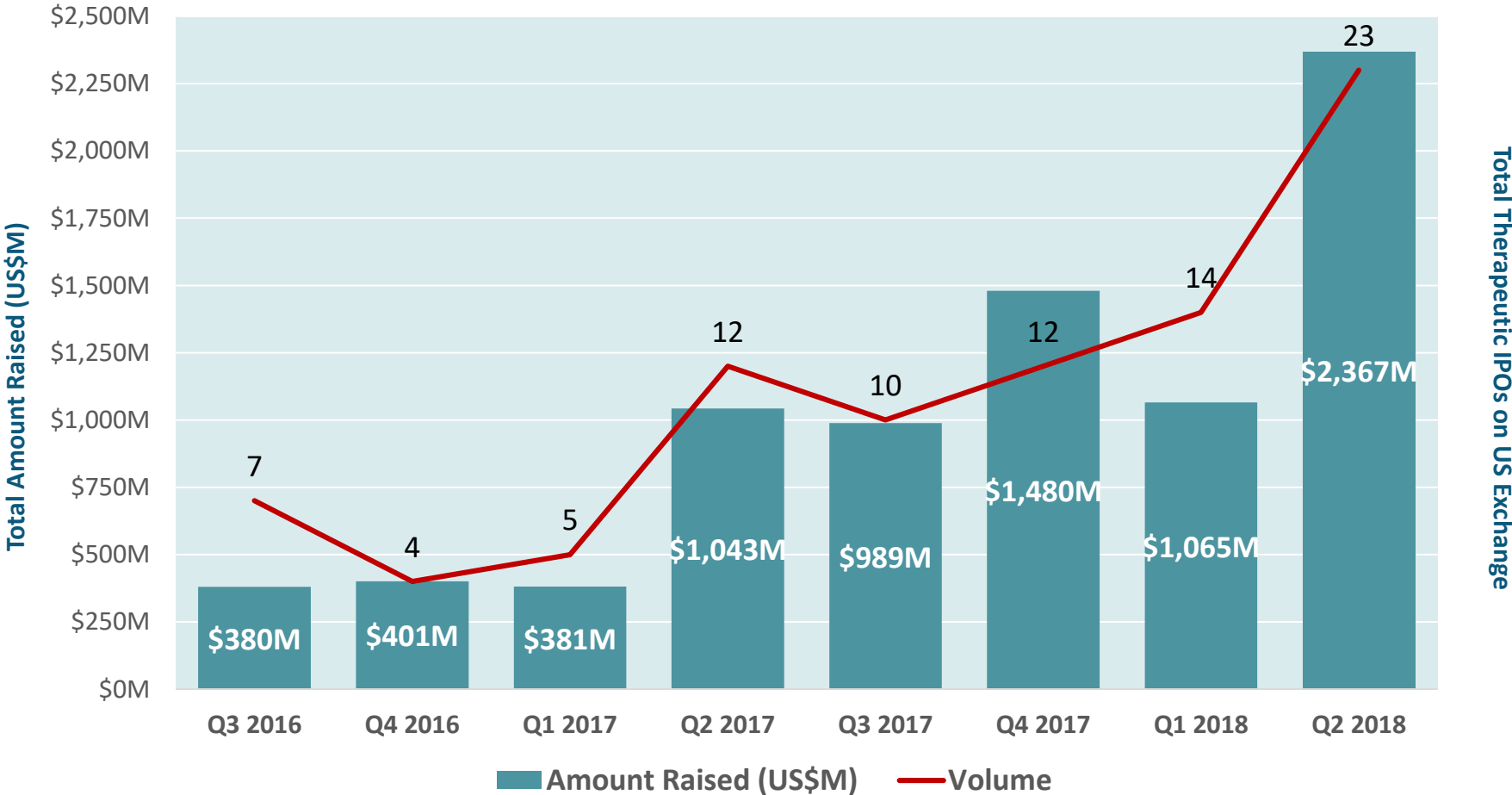


Key Event	
A	Dow plunges 1,175 points as investor pessimism rapidly rises
B	NASDAQ closes at record rising 1.8% after jobs report suggests US added 313,000 jobs in February
C	Concern over international trade negatively contributes to the rise of investor pessimism

SOURCE: Locust Walk analytics, Yahoo Finance

# H1 2018 has nearly matched 2017 total IPO volume with Q2 witnessing the highest aggregate raise since 2015 peaks

Number of Biopharma IPOs and Aggregate Total Raised By Quarter



SOURCE: EDGAR Company Filings, Yahoo Finance, Global Data, BiosciDB

## Q2 2018 saw 23 biopharma companies in a broad range of therapeutic areas successfully go public on US stock exchanges

Biopharma Issuer	Ticker	Therapeutic Area	Lead Phase	Offer Date	Price Range (US\$)	Offering Price (US\$)	Total Raise	Price Change to 6/29	Market Cap 6/29
<b>Entera Bio</b> Jerusalem, Israel	<b>ENTX</b> NASDAQ	<b>Drug delivery</b>	<b>Phase 3</b> Ready	6/28/2018	\$8 – \$10	<b>\$8.00</b> Low	\$11.2	<b>(21.25%)</b>	\$75
<b>Forty Seven</b> Menlo Park, CA	<b>FTSV</b> NASDAQ	<b>Immuno-oncology</b>	<b>Phase 2</b> Ongoing	6/28/2018	\$14 – \$16	<b>\$16.00</b> High	\$113.0	0.00%	\$479
<b>Neuronetics</b> Malvern, PA	<b>STIM</b> NASDAQ	<b>Psychiatry</b>	<b>Marketed</b>	6/28/2018	\$14 – \$16	<b>\$17.00</b> Above	\$94.0	56.53%	\$445
<b>Translate Bio</b> Lexington, MA	<b>TBIO</b> NASDAQ	<b>RNA Therapeutics</b>	<b>Phase 1/2</b> Ongoing	6/28/2018	\$12 – \$14	<b>\$13.00</b> Middle	\$121.5	<b>(2.69%)</b>	\$546
<b>Tricida</b> South San Francisco, CA	<b>TCDA</b> NASDAQ	<b>Nephrology</b>	<b>Phase 1/2</b> Complete	6/28/2018	\$16 – \$18	<b>\$19.00</b> Above	\$222.3	<b>(57.37%)</b>	\$1,160
<b>Neon Therapeutics</b> Cambridge, MA	<b>NTGN</b> NASDAQ	<b>Oncology</b>	<b>Phase 1</b> Ongoing	6/27/2018	\$15 – \$17	<b>\$16.00</b> Middle	\$100.0	<b>(21.25%)</b>	\$355
<b>Autolus Therapeutics</b> London, UK	<b>AUTL</b> NASDAQ	<b>Immuno-oncology</b>	<b>Phase 1/2</b> Ongoing	6/22/2018	\$15 – \$17	<b>\$17.00</b> High	\$150.0	57.59%	\$239
<b>Xeris Pharmaceuticals</b> Chicago, IL	<b>XERS</b> NASDAQ	<b>Injectables, metabolic diseases</b>	<b>Phase 3</b> Ongoing	6/21/2018	\$14 – \$16	<b>\$15.00</b> Middle	\$85.5	26.53%	\$375
<b>Magenta Therapeutics</b> Cambridge, MA	<b>MGTA</b> NASDAQ	<b>Autoimmune, rare</b>	<b>Phase 2</b> Ongoing	6/21/2018	\$14 – \$16	<b>\$15.00</b> Middle	\$100.0	<b>(10.00%)</b>	\$439
<b>Kezar Life Sciences</b> South San Francisco, CA	<b>KZR</b> NASDAQ	<b>Immuno-oncology</b>	<b>Phase 1b</b> Ongoing	6/21/2018	\$14 – \$16	<b>\$15.00</b> Middle	\$75.0	15.33%	\$329
<b>AVROBIO</b> Cambridge, MA	<b>AVRO</b> NASDAQ	<b>Gene therapy</b>	<b>Clinical</b> Ongoing	6/21/2018	\$16 – \$18	<b>\$19.00</b> Above	\$99.7	50.32%	\$661
<b>Aptinyx</b> Evanston, IL	<b>APTIX</b> NASDAQ	<b>Neurology</b>	<b>Phase 2</b> Ongoing	6/21/2018	\$14 – \$16	<b>\$16.00</b> High	\$102.4	51.06%	\$786
<b>Eidos Therapeutics</b> San Francisco, CA	<b>EIDX</b> NASDAQ	<b>Rare disease</b>	<b>Phase 1</b> Ongoing	6/20/2018	\$15 – \$17	<b>\$17.00</b> High	\$106.3	19.65%	\$748

SOURCE: Locust Walk analytics, EDGAR Company Filings, Yahoo Finance, BioCentury






## Q2 2018 IPOs (continued)

Biopharma Issuer	Ticker	Therapeutic Area	Lead Phase	Offer Date	Price Range (\$)	Offering Price (\$)	Total Raise	Price Change to 6/29	Market Cap 6/29	
<b>Verrica Pharmaceuticals</b> Charlottesville, VA	<b>VRCA</b> NASDAQ	<b>Dermatology</b>	<b>Phase 3</b> Ongoing	6/15/2018	\$14 – \$16	\$15.00 Middle	\$75.0	31.53%	\$507	
<b>MeiraGTx Holdings</b> New York, NY	<b>MGTX</b> NASDAQ	<b>Gene therapy</b>	<b>Phase 1/2</b> Ongoing	6/08/2018	\$14 – \$16	\$15.00 Middle	\$75.0	(23.60%)	\$312	
<b>Iterum Therapeutics</b> Dublin, Ireland	<b>ITRM</b> NASDAQ	<b>Anti-infectives</b>	<b>Phase 3</b> Ready	5/25/2018	\$14 – \$16	\$13.00 Below	\$80.0	(17.92%)	\$152	
<b>Kiniksa Pharmaceuticals</b> Hamilton, Bermuda	<b>KNSA</b> NASDAQ	<b>Debilitating diseases</b>	<b>Phase 2</b> Ongoing	5/24/2018	\$17 – \$19	\$18.00 Middle	\$152.6	(3.61%)	\$840	
<b>Scholar Rock Holding</b> Cambridge, MA	<b>SRRK</b> NASDAQ	<b>Immuno-oncology, neuromuscular</b>	<b>Phase 1</b> Ongoing	5/24/2018	\$13 – \$15	\$14.00 Middle	\$75.0	11.43%	\$394	
<b>Evelo Biosciences</b> Cambridge, MA	<b>EVLO</b> NASDAQ	<b>GI</b>	<b>Phase 1</b> Ongoing	5/09/2018	\$15 – \$17	\$16.00 Middle	\$85.0	(26.25%)	\$347	
<b>ASLAN Pharmaceuticals</b> Singapore	<b>ASLN</b> NASDAQ	<b>Oncology</b>	<b>Phase 3</b> Ongoing	5/04/2018	N/A	\$7.03	\$42.2	26.60%	\$216	
<b>Unity Biotechnology</b> Brisbane, CA	<b>UBX</b> NASDAQ	<b>Age-related diseases</b>	<b>Phase 1</b> Ready	5/03/2018	\$16 – \$18	\$17.00 Middle	\$85.0	(11.41%)	\$637	
<b>MorphoSys AG</b> Planegg, Germany	<b>MOR</b> NASDAQ	<b>Immuno-oncology</b>	<b>Marketed</b>	4/19/2018	N/A	\$25.04	\$207.8	21.17%	\$3,940	
<b>Surface Oncology</b> Cambridge, MA	<b>SURF</b> NASDAQ	<b>Oncology</b>	<b>Phase 1</b> Ongoing	4/19/2018	\$18 – \$19	\$15.00 Below	\$108.0	8.73%	\$450	
							<b>Mean</b>	<b>\$102.9</b>	<b>12.86%</b>	<b>\$627.5</b>
							<b>Median</b>	<b>\$99.7</b>	<b>11.43%</b>	<b>\$445.0</b>

**Q2 2018 IPOs outperformed major indices with multiple companies gaining >50%, offsetting modest losses for select underperforming IPOs**

SOURCE: Locust Walk analytics, EDGAR Company Filings, Yahoo Finance, BioCentury

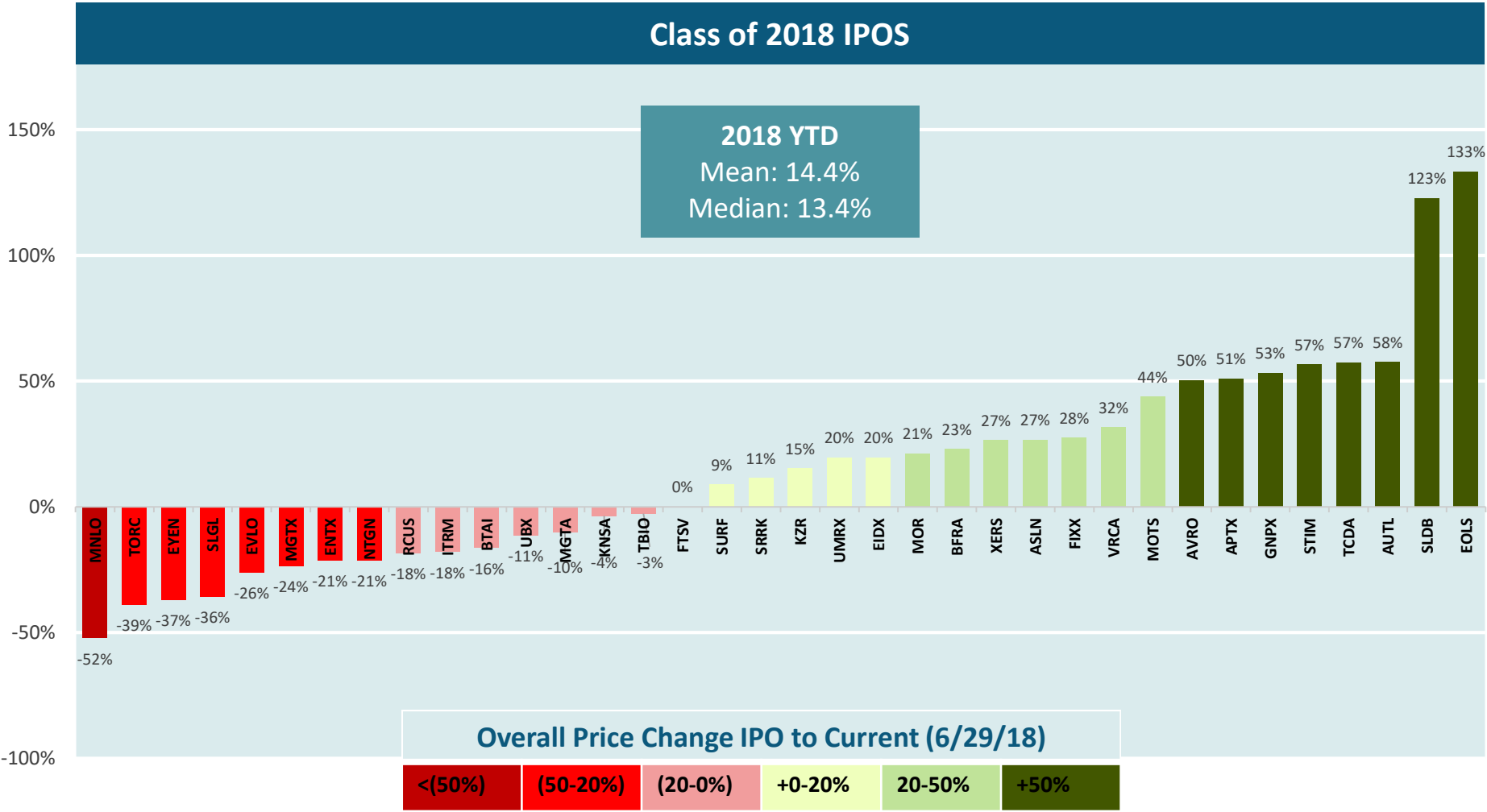
# 11 biopharma companies successfully went public with initial offerings of >\$100M, supporting the strength of the current IPO market

			
Summary	Late-stage pharmaceutical company focused on the development and commercialization of TRC101, a non-absorbed, orally-administrated polymer drug designed to treat metabolic acidosis in patients with CKD	Clinical-stage biopharma company focused on discovering, acquiring, developing and commercializing therapeutic medicines for patients suffering from debilitating diseases with significant unmet need	mRNA therapeutics company developing a new class of potentially transformative medicines to treat diseases caused by protein or gene dysfunction
Lead Program	<ul style="list-style-type: none"> <li>TRC101 for the treatment of metabolic acidosis in CKD patients</li> </ul>	<ul style="list-style-type: none"> <li>Riloncept (Ph. 2) for the treatment of recurrent pericarditis</li> </ul>	<ul style="list-style-type: none"> <li>MRT5005 (Ph. 1/2) for the treatment of cystic fibrosis</li> </ul>
Amount Raised	<b>\$223.3M</b>	<b>\$152.6M</b>	<b>\$121.5</b>
Market Cap (6/29)	<b>\$1,160B</b>	<b>\$840.5M</b>	<b>\$545.6M</b>

SOURCE: Locust Walk analytics, EDGAR Company Filings, Pitchbook, Company websites

# 2018 IPOs have outperformed the public markets, driven mainly by 8 companies with performances >50%

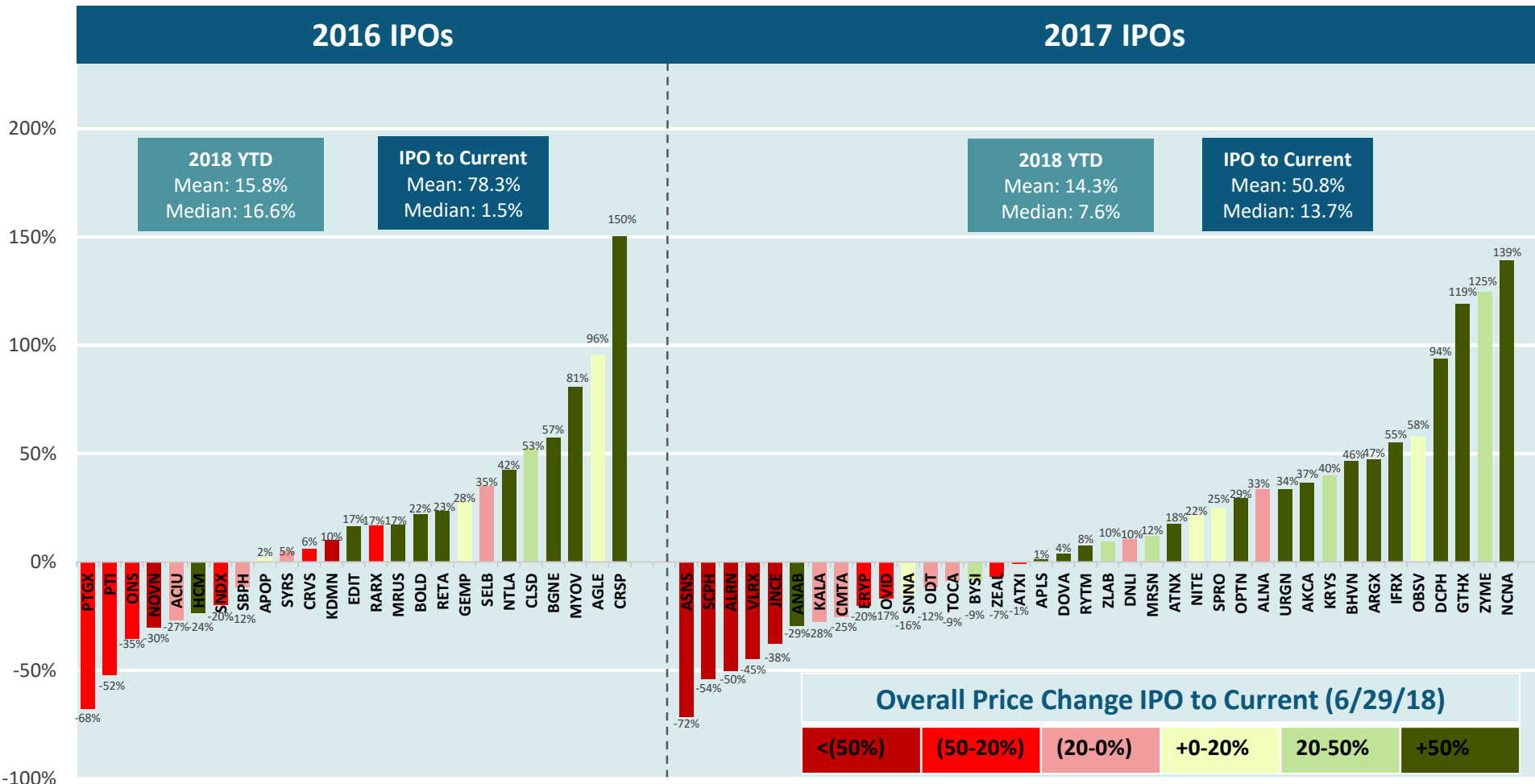
## Current Performance of 2018 Biopharma IPOs



SOURCE: Locust Walk analytics, Yahoo Finance; prices as of 6/29/2018

# 2016/2017 IPOs that have performed well since listing have continued to do so, with historically poor performers failing to rebound in 2018

## 2018 Performance of 2016 and 2017 Biopharma IPOs



SOURCE: Locust Walk analytics, Yahoo Finance; prices as of 6/29/2018

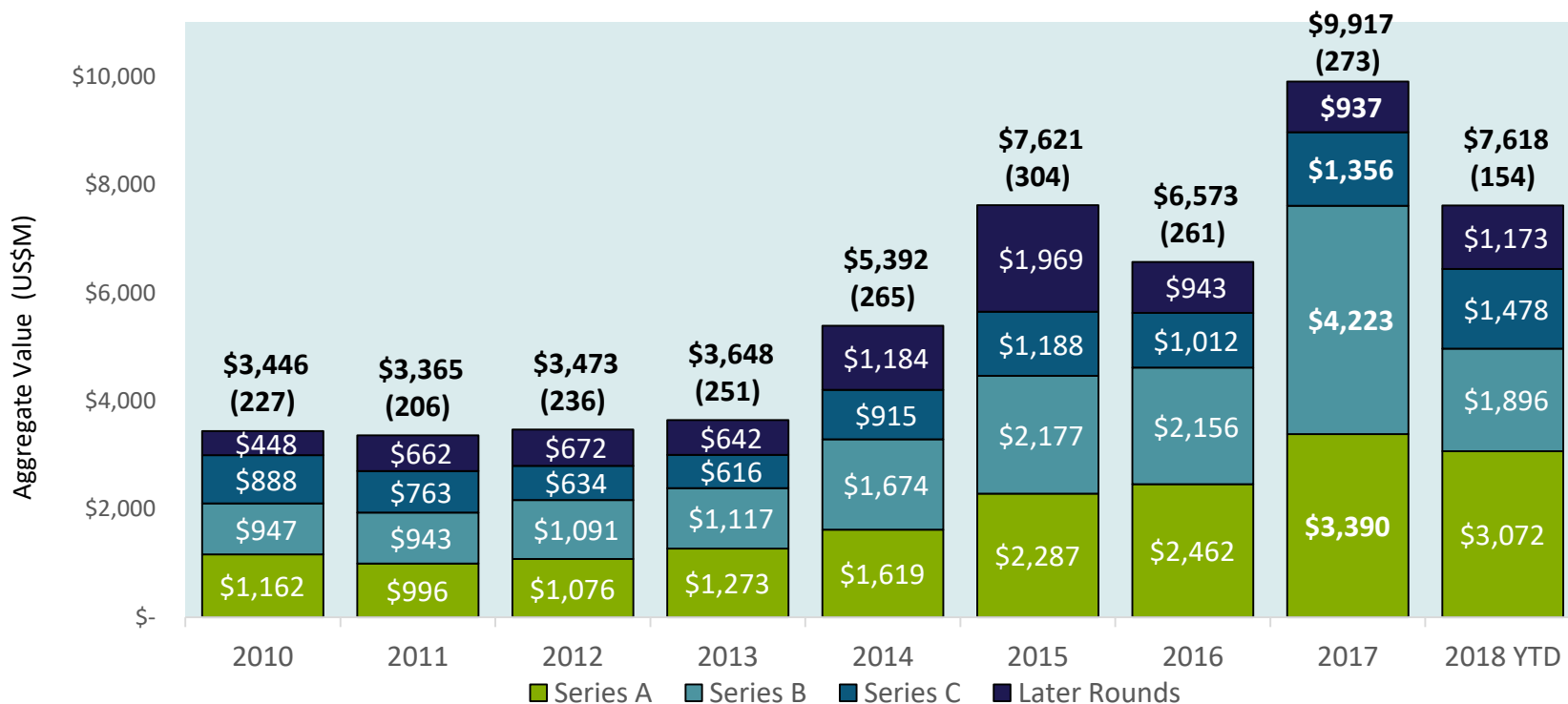
## Q2 2018 – Private Financing Trends

- **Private financing remains close to the record high of Q1 and maintains a record pace with \$7.6B raised in the first half of 2018**
  - ▶ 2018 has surpassed or equaled the private financing aggregate value of every year since 2010, excluding 2017 (\$9.(B))
- **While Series A and B rounds drove volume and aggregate value, Q2 witnessed multiple later round investments >\$100M helping further 2018's torrid start**
  - ▶ 76 Series A and 43 Series B investments were completed during the first quarter of 2018 which keeps 2018 on pace to break 2017 numbers
- **Gene therapy and immuno-oncology companies have continued raise large amounts of private capital, but companies across a wide range of TA's seen financing success**
  - ▶ CAR-T developer Allogene lead Q2 2018 with a \$412M Series A, while cancer vaccine and mRNA focused Moderna therapeutics raised \$125M in Series H funding
- **Strength of the public markets has not influenced availability of private capital, as biopharma companies have been able to access an unprecedented amount of capital**



# 2018 remains on record breaking pace for private biopharma financing in both volume and aggregate deal value















## Aggregate Value and Number of Therapeutic VC Investment by Series



Deals (#)	2010	2011	2012	2013	2014	2015	2016	2017	2018 YTD
A	112	92	116	120	117	152	134	144	76
B	58	58	65	77	88	79	73	85	43
C	35	29	28	29	34	44	33	32	24
D & Later	22	27	27	25	26	29	21	16	11
<b>Total</b>	<b>227</b>	<b>206</b>	<b>236</b>	<b>251</b>	<b>265</b>	<b>304</b>	<b>261</b>	<b>277</b>	<b>154</b>

SOURCE: Locust Walk analytics, Pitchbook; Methodology: All US series A, B, C, D, and later investments; therapeutics include drug delivery, drug discovery, pharmaceuticals, and select biotechnology companies; tools, devices, and diagnostics excluded

# Companies targeting a wide range of therapeutic areas were successfully able to raise significant amounts of private capital across multiple rounds

Company	Series	Raised (\$M)	Lead Investor	Background
 Allogene THERAPEUTICS	A	\$412	 TPG	<ul style="list-style-type: none"> <li>• Developer of allogeneic chimeric antigen receptor T-cell therapy created to catalyze cancer treatment</li> <li>• Company's therapy eliminates need to create personalized therapies by using healthy donor cells to engineer readily available treatments</li> </ul>
 Akerio	A	\$65	 VERSANT ventures	<ul style="list-style-type: none"> <li>• Developer of biotech platform designed to treat serious metabolic diseases</li> </ul>
 CORTEXYME	B	\$84	 SEQUOIA	<ul style="list-style-type: none"> <li>• Developer of therapeutics and diagnostics designed to alter course of neurodegenerative diseases</li> <li>• Company targets undisclosed pathogen tied to neurodegeneration</li> </ul>
 Kaleido	C	\$101	 FLAGSHIP PIONEERING SCIENTIFIC VENTURES FOR LIFE	<ul style="list-style-type: none"> <li>• Developer of novel chemistries created to unlock power of microbiome to help treat patients</li> <li>• R&amp;D platform capable of creating treatments that activate metabolic processes in the microbiome to treat disease and maintain health</li> </ul>
 T W I S T BIOSCIENCE	D	\$125	 biomATRICS CAPITAL	<ul style="list-style-type: none"> <li>• Focused on creating disruptive synthetic DNA technology designed to enable widespread health</li> <li>• DNA synthesis platform utilizes semiconductor-based synthetic DNA manufacturing process</li> </ul>
 10x GENOMICS	D	\$125	 MERITECH CAPITAL PARTNERS	<ul style="list-style-type: none"> <li>• Developer of genomics platform that combines microfluidics, chemistry, and bioinformatics to enable researches around the world to better understand the fundamentals of biology at an unprecedented scale</li> </ul>
 moderna™ messenger therapeutics	H	\$125	 MERCK VENTURES	<ul style="list-style-type: none"> <li>• mRNA therapeutics and vaccines developer focused on treating inherited genetic disorders, hemophilic and blood factors, and oncology</li> </ul>

SOURCE: Locust Walk analytics, Pitchbook

## Q2 2018 – Strategic Partnering and M&A Trends

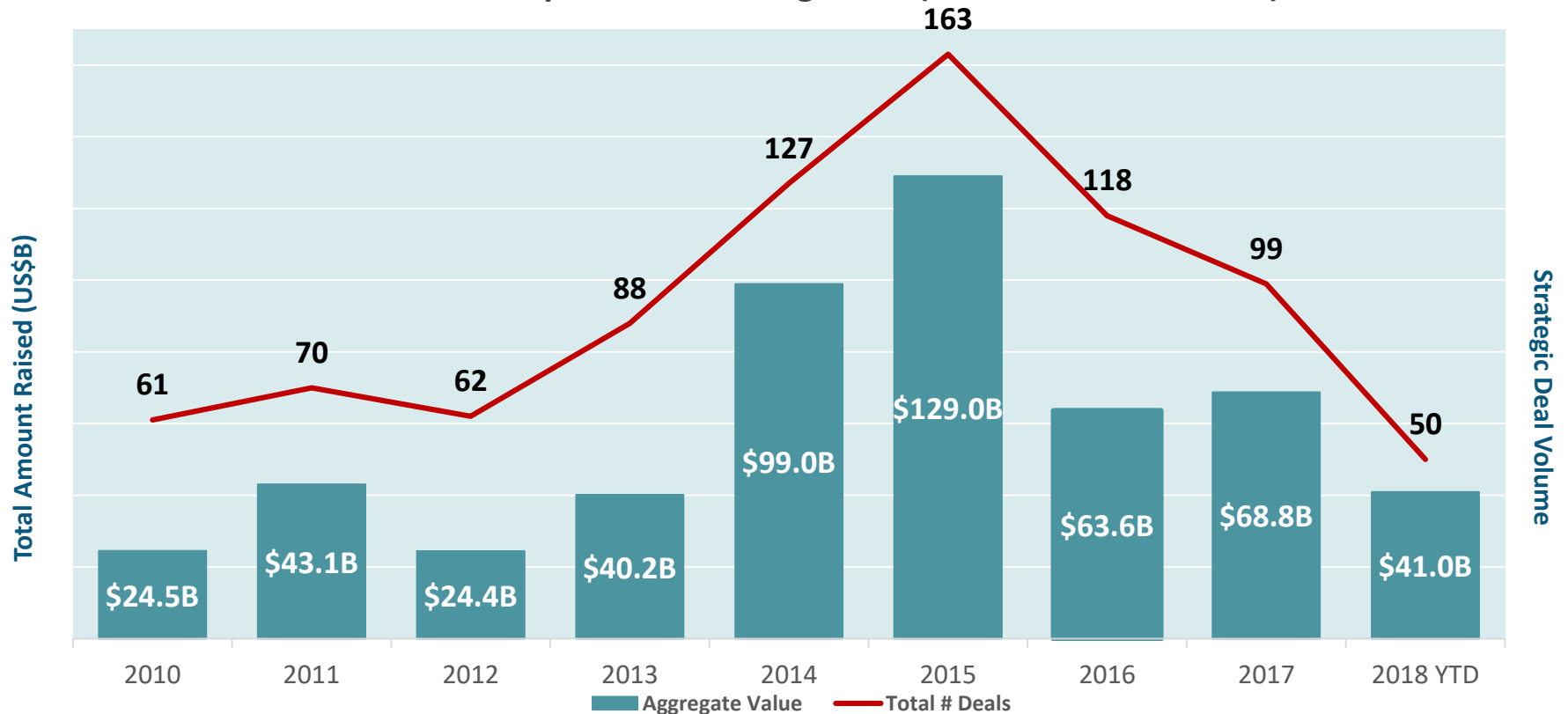
- **2018 licensing volume has remained stable for the past two years and has recently seen a rise in average deal value remains above 2014/2015 peak levels at >\$800M**
  - ▶ Strong private capital markets have forced licensing and M&A buyers to provide more attractive terms to companies in order to capture opportunities
  - ▶ Aggregate value driven by Sanofi – Advent International and Biogen – Ionis >\$1B deals
- **Q2 2018 M&A activity nearly doubled compared to Q1 with 13 acquisitions**
  - ▶ Proposed Takeda – Shire merger (\$62B) to account for ~57% of H1 2018 aggregate deal value
  - ▶ Potential return of the ‘mega’ M&A market of 2014/2015 as large pharma companies look to take advantage of changes in tax infrastructure
- **Locust Walk anticipates deal volume to remain stable as private financing continues to provide a path forward for emerging biopharma companies**
  - ▶ Second half of 2018 will likely see a modest increase in licensing and M&A activity as companies financed in 2017 start to hit inflection points and buyers look to deploy capital
  - ▶ We anticipate licensing and M&A activity to ramp up in 2019 as companies continue to achieve value inflections and must weight the option of a deal vs. continued financing more carefully





Licensing volume remains light relative to 2014/2015 but avg. deal values have risen to record highs as partners compete with financing alternatives

US and WW Biopharma Licensing Deals (>\$50M Total Deal Size)

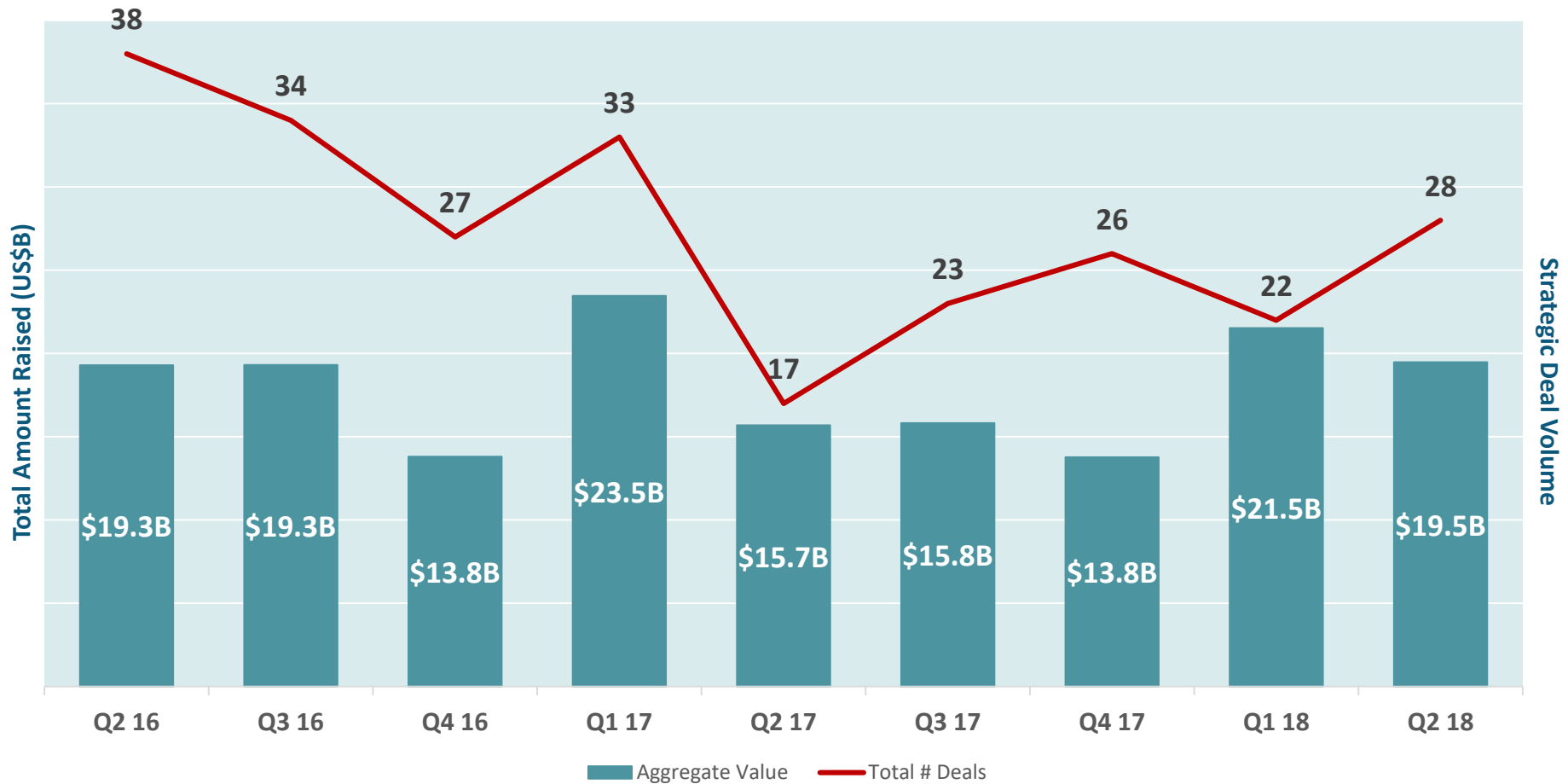


	2010	2011	2012	2013	2014	2015	2016	2017	2018 YTD
Avg Deal Size	\$402M	\$615M	\$394M	\$456M	\$779M	\$791M	\$539M	\$695M	\$820M

SOURCE: Locust Walk analytics, BioSciDB; \*Locust Walk has altered methodology beginning Q3 2017; includes WW and US licensing deals; ex-US regional deals are excluded

# Q2 2018 licensing volume has remained relatively stable over the past two years

US and WW Biopharma Licensing Deals (>\$50M Total Deal Size)



SOURCE: Locust Walk analytics, BioSciDB; \*Locust Walk has altered methodology beginning Q3 2017; includes WW and US licensing deals; ex-US regional deals are excluded

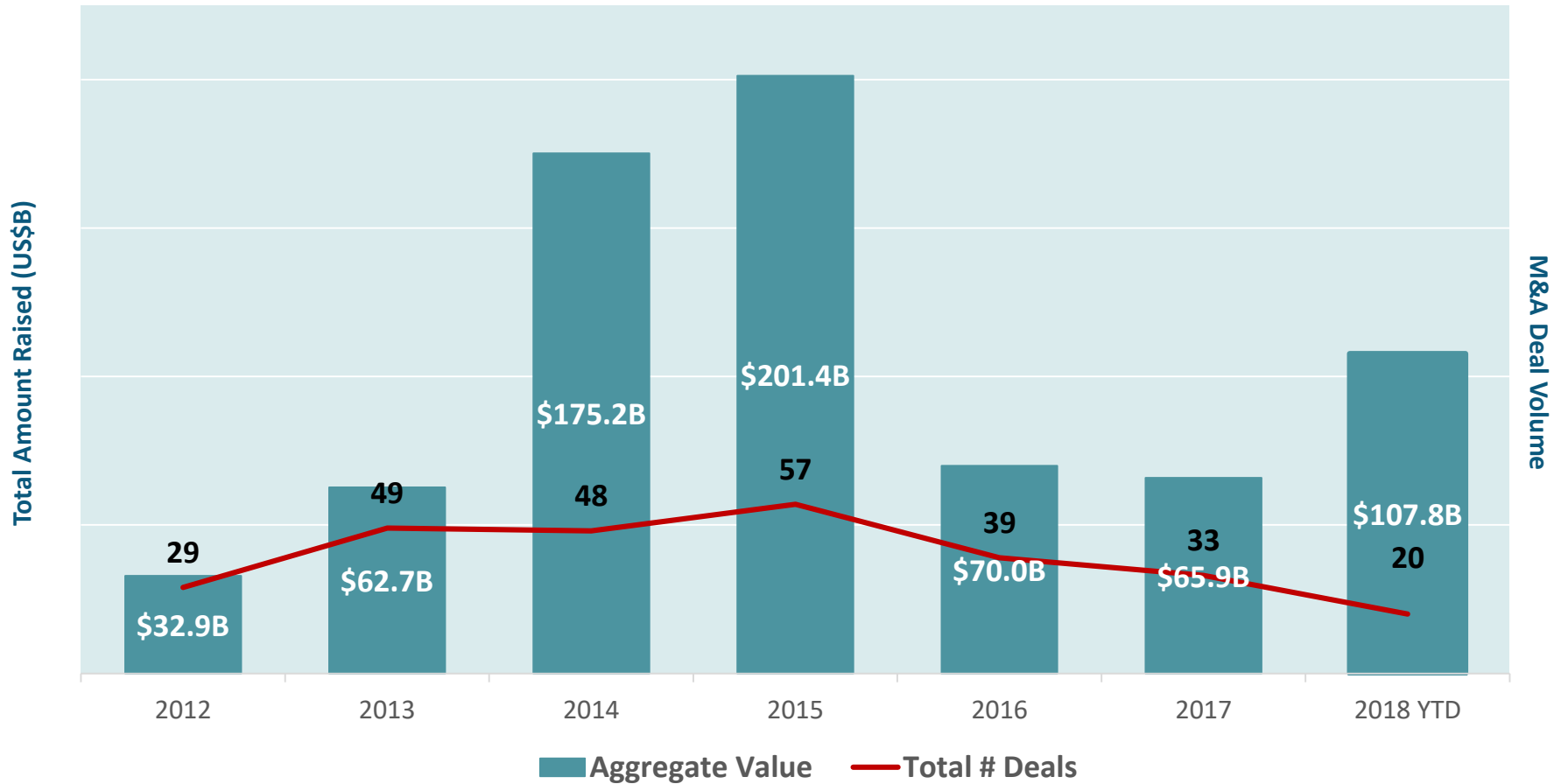
## Q2 licensing deals show increasing licensing of US therapeutics to Asian markets with a focus on mainly oncology treatments

Licensee	Licensor	Date	Stage	Total Deal Size (\$M)	Therapeutic Area	Subject
OSE Immunotherapeutics	Boehringer Ingelheim	04/2018	Preclinical	1,437.0	Cancer	OSE-172 (Effi-DEM) anti-SIRP-alpha monoclonal antibody for solid tumors
Oxford BioMedica	Axovant	06/2018	Preclinical	842.5	Central Nervous System	OXB-102 (AXOLenti-PD) lentiviral gene therapy and ProSavin for Parkinson's disease
Aerpio Pharmaceuticals	Gossamer Bio	06/2018	Phase 1	420.0	Gastrointestinal	GB004 (AKB-4924) HIF-1 alpha stabilizer for inflammatory bowel disease
EpiDestiny	Novo Nordisk	04/2018	Phase 1	400.0	Hematologic	EPI01 for sickle cell disease and beta-thalassaemia
Blueprint Medicines	CStone Pharmaceuticals	06/2018	Phase 1	386.0	Cancer	Avapritinib, BLU-554 and BLU-667 for cancer in China
Sage Therapeutics	Shionogi	06/2018	Phase 2	575.0	Psychiatric	SAGE-217 to treat major depressive disorder in Japan, Taiwan and South Korea
Entasis Therapeutics	Zai Laboratory	04/2018	Phase 2	103.6	Infectious-Bacterial	ETX2514SUL (ETX2514 and sulbactam fixed-dose combination) antibiotic in Asia-Pacific
Cara Therapeutics	Vifor Fresenius Medical Care Renal Pharma	05/2018	Phase 3	540.0	Dermatologic, Renal	Korsuva (CR845/difelikefalin) injection for CKD-aP in dialysis patients ex-US, Japan and South Korea
ArQule	Basilea Pharmaceutica	04/2018	Phase 3	336.0	Cancer	Derazantinib pan-FGFR inhibitor for cholangiocarcinoma WW ex-China
Karyopharm Therapeutics	Antengene	05/2018	Phase 3	162.0	Cancer	Selinexor, Eltanexor, Verdinexor and KPT-9274 in China and other Asian countries
AstraZeneca	Luye Pharma	05/2018	Approved	538.0	Psychiatric	Seroquel and Seroquel XR dibenzothiazepine atypical antipsychotic

SOURCE: Locust Walk analytics, BioSciDB, Global Data, SEC filings

2018 M&A aggregate value has already surpassed 2016 and 2017 totals driven mainly by the impending Shire – Takeda merger


Biopharma Therapeutic M&A Deals (>\$100M)



SOURCE: Locust Walk analytics, BioSciDB; \*Locust Walk has altered methodology beginning Q3 2017, previous reports' numbers may not reflect this. Data includes Takeda/Shire

# Q2 2018 observed multiple >\$1B deals, with the planned \$62B Takeda – Shire deal demonstrating a return of ‘mega’ biopharma deals

April 9, 2018



**Novartis enters agreement to acquire AveXis for \$8.7B**

Novartis entered into agreement and plan of merger with AveXis to acquire the US-based NASDAQ listed clinical stage gene therapy company for \$218 per share in cash


May 10, 2018



**Lilly acquires Armo BioSciences for \$1.6B**

Eli Lilly acquired Armo BioSciences for \$1.6B to expand its portfolio of drugs that help the body's immune system fight cancer. Lilly paid \$50 per share in cash, representing a 68% premium to Armo's final close

June 19, 2018



**Roche acquires Foundation Medicine for \$2.4B**

Roche and Foundation Medicine (FMI) entered into a definitive merger agreement with Roche acquiring Foundation for \$137 per share, representing a 29% premium over its final close

Pending approval



**Takeda acquires Shire in \$62B buyout**

Takeda and Shire agreed on merger worth \$62B. Takeda to finance transaction with 46% cash, 54% stock, representing a 60% premium to the Shire share price low before Takeda confirmed interest in purchase. Shire shareholders will own ~50% of combined company. A group of Takeda shareholders is attempting to block the transaction

SOURCE: Locust Walk analysis

# FDA approvals in Q2 2018

## Select Approvals

**Zemdri**  
Complicated urinary tract infections  
Achaogen  
6/25

**Epidiolex**  
Cannabis treatment for rare severe forms of epilepsy  
GW Pharmaceuticals  
6/25

**Olumiant**  
Moderate to severe active rheumatoid arthritis  
Lilly  
5/31

**Palynziq**  
Rare genetic disease Phenylketonuria (PKU)  
BioMarin  
5/24

**Doptelet**  
Thrombocytopenia in adults with chronic liver disease  
Dova Pharmaceuticals  
5/21

**Lokelma**  
Hyperkalemia  
Astrazeneca  
5/18

**Aimovig**  
Preventative treatment for migraine  
Amgen, Novartis  
5/17

**Lucemyra**  
Non-opioid treatment for opioid withdrawal symptoms  
US WorldMed  
5/16

**Akynzeo**  
Preventative treatment for nausea associated with chemotherapy  
Helsinn Group  
4/19

**Crysvita**  
X-linked hypophosphatemia (XLH), inherited form of rickets  
Ultragenyx, Kyowa Kirin  
4/17

**Tavalisse**  
Thrombocytopenia  
Rigel Pharmaceuticals  
4/17

SOURCE: Locust Walk analytics, Fierce Biotech, Fierce Pharma

# EUROPE

## Q2 2018 – EU Biopharma Financing Trends

- **Red-hot EU VC investment climate**

- ▶ EU VC investment has been fast-paced and rising quickly in aggregate value – already almost at 2017 levels with two quarters left to go
- ▶ The UK has dominated the region in number of deals (8) and aggregate value (\$237M) for the quarter
- ▶ Given the overall health of the global economy and excitement around novel, high-value programs in immuno-oncology, Locust Walk expects to see the continued strength in EU VC investment for 2018

- **Five biopharma IPOs and two secondary public offerings close across EU and US based exchanges**

- ▶ Two EU companies chose to have their initial listing on EU-based exchanges, while three chose to have their initial listing on the US' NASDAQ, a more traditional exchange for US biotech companies
- ▶ Though companies have historically seen the NASDAQ as the gold-standard for biotech IPOs due to the access to the large US capital pool, companies have had significant success in raising money on EU-based exchanges in 2018
  - Locust Walk expects to see this trend continue as EU-based investors become more willing to invest in biotech, and companies

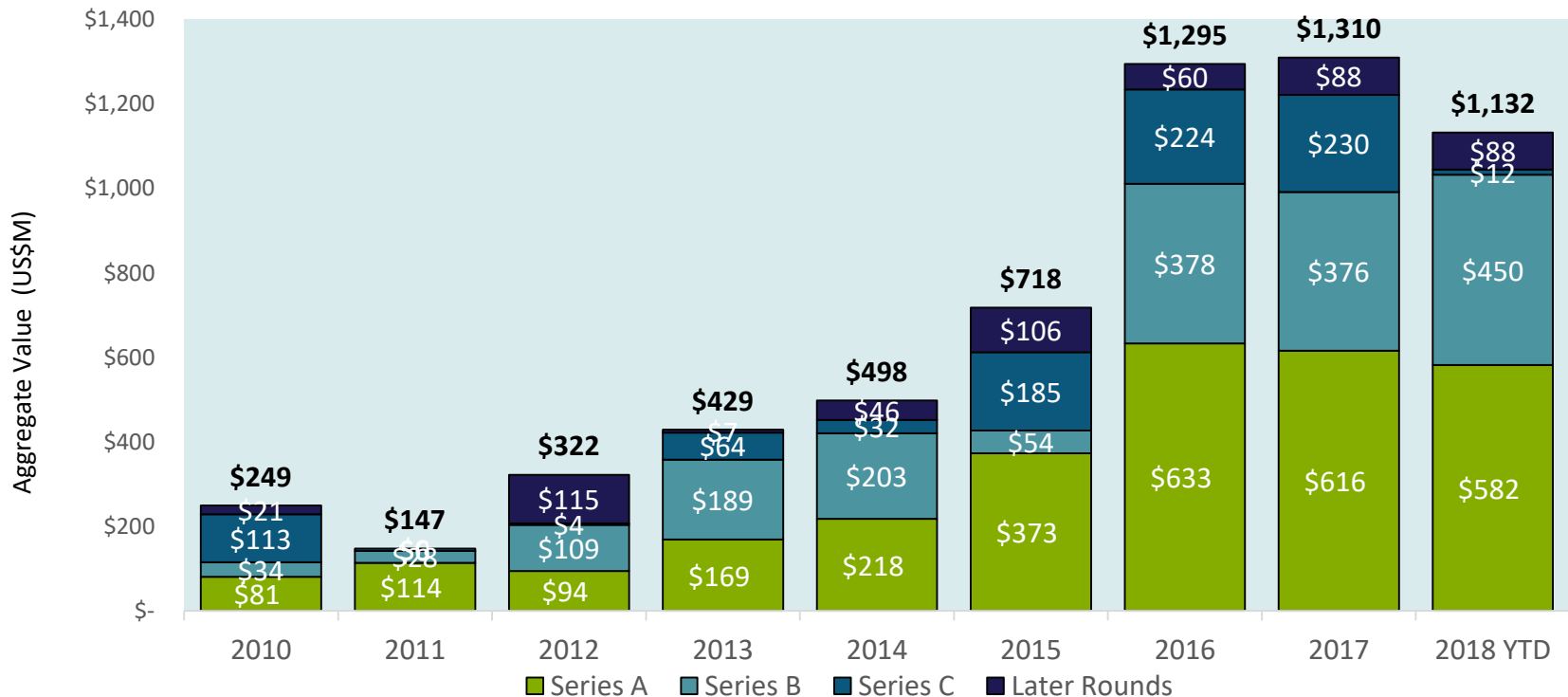
SOURCE: Pitchbook; Global Data





# EU private financing is on track for a record year, and is already almost at 2017 levels

## Aggregate Value VC Investment by Series



Deals (#)	2010	2011	2012	2013	2014	2015	2016	2017	2018
A	16	19	19	21	26	33	37	38	21
B	4	4	11	14	10	5	14	15	13
C	3	1	1	3	1	7	7	6	1
D & Later	2	0	3	1	1	1	1	2	1
<b>Total</b>	<b>25</b>	<b>24</b>	<b>34</b>	<b>39</b>	<b>38</b>	<b>46</b>	<b>59</b>	<b>61</b>	<b>36</b>

SOURCE: Locust Walk Analysis, Pitchbook Methodology: All US series A, B, C, D, and later investments; Healthcare > Pharmaceuticals and Biotechnology Industry only; EU HQ only

## The second quarter saw 5 notable IPOs from EU based companies and 2 secondary public offerings

EU-based companies are able to raise significant amounts of capital on European exchanges, representing a departure from the concept that the majority of capital for biopharma exists on US exchanges

Offering Type	Biopharma Issuer	Ticker	Key Therapeutic Area	Lead Phase	Offer Date	Price Range (\$)	Offering Price (\$)	Total Raise	Price Change to 6/29	Market Cap 6/29	
Secondary Offering	<b>Collectis</b> Paris, France	<b>CLLS</b> NASDAQ	<b>Oncology</b>	<b>Phase 1</b>	4/10/2018	N/A	<b>\$31.00</b>	<b>\$164</b>	<b>-8.1%</b>	<b>\$1,231</b>	
Secondary Offering	<b>Morphosys</b> Munich, Germany	<b>MPSYY</b> OTC	<b>Oncology</b>	<b>Phase 3</b>	4/18/2018	N/A	<b>\$25.04</b>	<b>\$208</b>	<b>11.5%</b>	<b>\$3,431</b>	
IPO	<b>Polyphor</b> Allschwil, Switzerland	<b>POLN</b> SWX	<b>Anti-Infectives</b>	<b>Phase 3</b>	5/15/2018	<b>\$30.33 – \$40.44</b>	<b>\$38.42</b> (CHF 38)	<b>\$165</b>	<b>-16.9%</b>	<b>\$346</b> (CHF 338M)	
IPO	<b>Iterm Therapeutics</b> Dublin, Ireland	<b>ITRM</b> NAS	<b>Anti-Infectives</b>	<b>Phase 3 Ready</b>	5/25/2018	<b>\$14 – \$16</b>	<b>\$13.00</b>	<b>\$80</b>	<b>-16.2%</b>	<b>\$143</b>	
IPO	<b>MeiraGTx</b> London, UK	<b>MGTX</b> NAS	<b>Neurology</b>	<b>Phase 1/2</b>	6/8/2018	<b>\$ 14 – \$16</b>	<b>\$15.00</b>	<b>\$75</b>	<b>-23.6%</b>	<b>\$312</b>	
IPO	<b>Calliditas Therapeutics</b> Stockholm, Sweden	<b>CALTX</b> STO	<b>Nephrology</b>	<b>Phase 3 Ready</b>	6/15/2018	N/A	<b>\$5.20</b> (SEK 47)	<b>\$74</b>	<b>1%</b>	<b>\$174</b> (SEK 1,565M)	
IPO	<b>Autolus</b> London, UK	<b>AUTL</b> NAS	<b>Immuno-Oncology</b>	<b>Phase 1/2</b>	6/22/2018	<b>\$15 – \$17</b>	<b>\$17.00</b>	<b>\$160</b>	<b>57%</b>	<b>\$1,020</b> (SEK 1,565M)	
								<b>Mean</b>	<b>\$132</b>	<b>1%</b>	<b>\$951</b>
								<b>Median</b>	<b>\$160</b>	<b>-8%</b>	<b>\$346</b>

Note: AUTL, MGTX, ITRM are included in US biopharma section given NASDAQ listing

SOURCE: Locust Walk analysis, EDGAR Company Filings, Yahoo Finance, Pitchbook, Methodology: EU IPOs in 2018. Healthcare > Pharmaceuticals and Biotechnology (Primary Industry only), EU HQ only; Ad hoc addition of companies filing secondary offerings on US exchanges (i.e. ADS)

## Q2 saw a strong IPO raise on the Swiss exchange from Polyphor and a significant raise from Iterum on NASDAQ



<p><b>Summary</b></p>	<ul style="list-style-type: none"> <li>• Company is based in Allschwil, Switzerland</li> <li>• Listed on the SIX Swiss Exchange</li> <li>• Polyphor is a clinical-stage biopharmaceutical company focused on the discovery and development of innovative antibiotics and other specialty pharma products for severe or life-threatening diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Company is based in Dublin, Ireland</li> <li>• Listed on NASDAQ</li> <li>• Iterum Therapeutics is a clinical-stage pharmaceutical company dedicated to developing significantly differentiated anti-infectives aimed at combatting the global crisis of multi-drug resistant (MDR) pathogens</li> <li>• Use of proceeds from the IPO will be to advance their Sulopenem etzadroxil through phase 3 trials</li> </ul>
<p><b>Key Program(s)</b></p>	<ul style="list-style-type: none"> <li>• Murepavadin (POL7080), a phase 3 antibiotic to treat Pseudomonas infections</li> <li>• Balixafortide (POL6326), phase 1b CXCR4 antagonist for breast cancer</li> <li>• POL6014, a phase 1 inhaled inhibitor of neutrophil elastase to treat CF and other neutrophilic lung diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Sulopenem etzadroxil, which is phase 3 ready for complicated and uncomplicated urinary tract infections, and intra-abdominal infections</li> </ul>
<p><b>Amount Raised</b></p>	<p>\$155M (CHF 165M)</p>	<p>\$80M</p>
<p><b>Market Cap (6/29)</b></p>	<p>\$346M (CHF 338M)</p>	<p>\$143M</p>

SOURCE: Locust Walk analysis, Pitchbook, Company Website, Press Releases

## Q2 2018 – EU Biopharma M&A and Licensing Trends

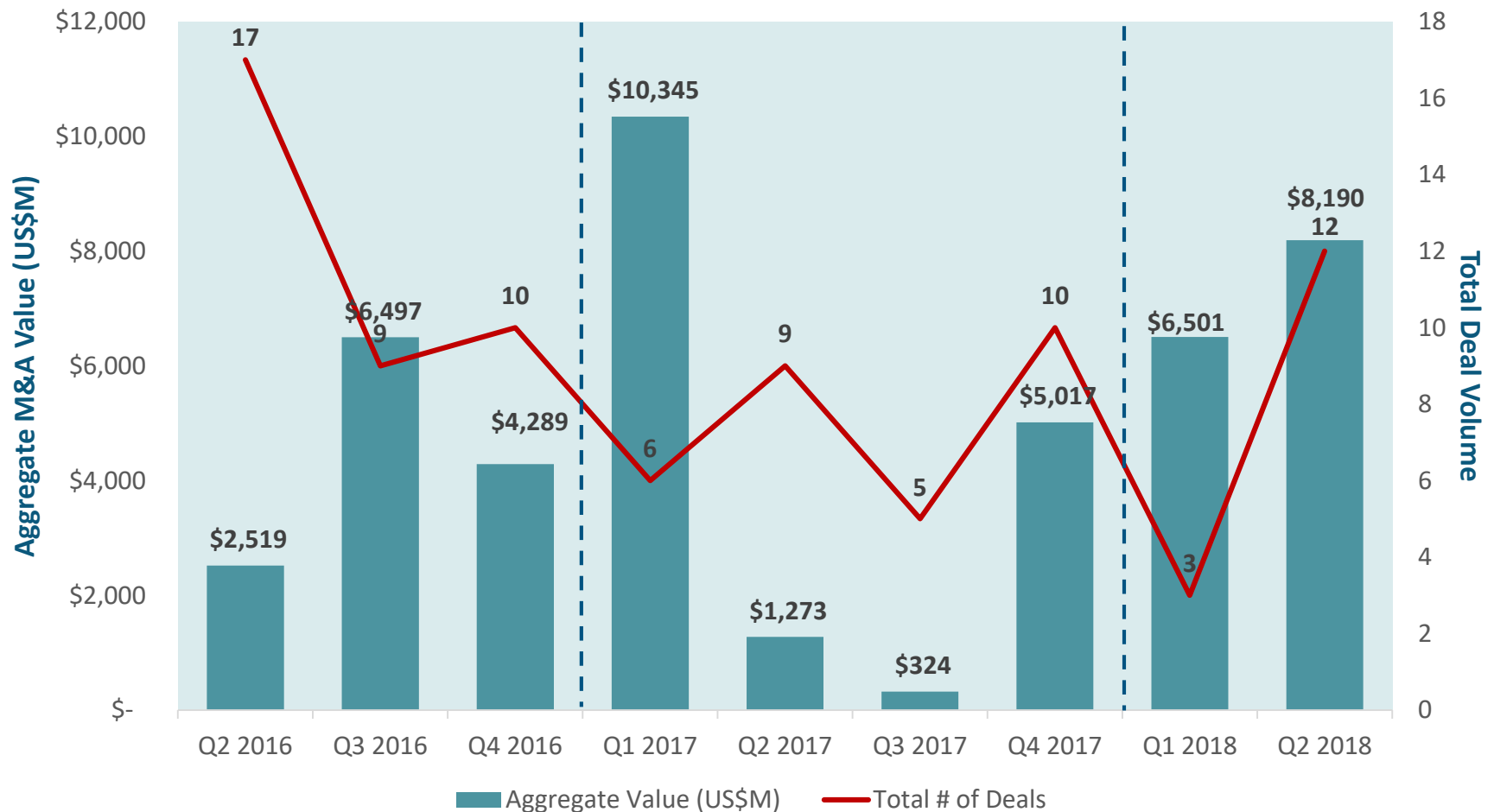
- **Uptick in EU M&A and licensing activity as compared to the first quarter**
  - ▶ After a quiet first quarter, the EU saw an explosion of M&A deals for high dollar values dominate the news
  - ▶ Largest aggregate value and volume seen in >1 year
  - ▶ Locust Walk expects to see this trend continue as macro-economic health is strong and overall investment is on the rise
- **Business unit sell-offs contribute most to aggregate M&A deal value**
  - ▶ Notably, Merck sold its consumer health unit to Proctor and Gamble for €3.4B (\$4.2B), giving it vitamin brands such as Seven Seas and greater exposure to Latin American and Asian markets
  - ▶ Outside of Big Pharma, Alexion acquired Wilson Therapeutics for \$841M in a play to expand their rare diseases pipeline
- **Immuno-oncology collaborations draw the highest value licensing deals**
  - ▶ Immuno-oncology collaborations continue to produce licensing transactions with the highest biobucks, however renal and nephrology therapeutic areas had several exciting high-value collaborations this quarter
  - ▶ Due to the early stage of many IO collaborations, Locust Walk expects this trend of ultra-backloaded deals in IO to continue for the foreseeable future

SOURCE: Pitchbook; Global Data



Regional EU M&A activity saw an uptick in value and activity in Q2 2017, headlined by Merck selling its consumer health business to Proctor & Gamble

## EU Biopharma M&A Deals





SOURCE: Pitchbook; Methodology: Target Company HQ Located in EU, Pharmaceuticals and Biotechnology; Deals without size disclosed are excluded; Deal date reflects the announced date. Select major global deals (i.e. J+J/Actelion, Takeda/Shire) are excluded from this dataset, and displayed in the US biopharma section of the report.



# Notable second quarter EU M&A

Locust Walk expects a flurry of M&A activity to continue as Big Pharma continues to turn to smaller Biotechs for innovation in the field



April 11, 2018



**Alexion Pharmaceuticals acquires Wilson Therapeutics for \$841M**

Alexion acquires Wilson Therapeutics to rebuild their clinical pipeline and focus on metabolic and neurological disorders. Notably, WTX101 is in phase 3 development as a novel treatment for Wilson Disease, a rare, genetic and chronic copper-mediated liver disorder.

April 16, 2018



**Servier to acquire Shire's oncology business unit for \$2.4B**

Servier acquired Shire's oncology business for a total consideration of \$2.4B in cash. The transaction covers products such as ONCASPAR and ONIVYDE. The Portfolio also include two early stage IO pipeline collaborations. The Deal happened prior to Takeda's \$64B takeover of Shire

April 19, 2018



**Merck divests its consumer health business to Procter and Gamble for \$4.2B**

Procter & Gamble Co (P&G) has agreed to acquire Merck KGaA's consumer health unit for €3.4B (\$4.2B), giving it vitamin brands such as Seven Seas and greater exposure to Latin American and Asian markets

May 30, 2018



**Denali Therapeutics exercises option to acquire F-Star Gamma for \$471M**

Denali and F-Star had teamed up in 2016 on bispecific antibodies to deliver drugs across the blood-brain barrier. In May 2018, Denali exercised an option to acquire F-Star Gamma for \$24M upfront, while F-Star stands to earn an additional \$447M in milestones.

SOURCE: Locust Walk analysis

# Select EU Licensing Deals in Q2 2018

Immuno-oncology collaborations continue to produce deals with the highest biobucks, however renal and nephrology therapeutic areas had several exciting high-value collaborations this quarter

Licensee	Licensor	Announced Date	Therapeutic Area	Upfront (\$M)	Total Deal Size (\$M)	Comments
Allogene Therapeutics	Cellectis	4/3/2018	Immuno-Oncology	0	2,800	As part of Allogene's acquisition of Pfizer allogeneic CAR T-Cell therapy portfolio, they assume the license agreement with Cellectis to develop up to 15 targets for \$185M each
Boehringer Ingelheim	OSE Immuno-therapeutics	4/4/2018	Immuno-Oncology	18	1,389	Deal centers around OSE-172, an anti-SIRP-alpha mAb in late preclinical development which primes macrophages to attack tumors cells
AstraZeneca	Ionis Pharmaceuticals	4/9/2018	Renal	30	300	AZ licenses Ionis' preclinical compound for NASH designed to inhibit an undisclosed target
Basilea Pharmaceutica	ArQule	4/17/2018	Oncology	10	336	Basilea licenses WW rights (ex-China) for the phase 3 oncology asset, derazantinib, from ArQule in a largely back-ended deal
Tonghua Dongbao Pharmaceutical	Adocia	4/26/2018	Metabolic	50	135	Adocia grants rights for the fixed ratio insulin glargine and insulin lispro combination in China and certain other countries
Outpost Medicine	Arena Pharmaceuticals	5/1/2018	Genitourinary	3	100	licensing agreement to advance an undisclosed, preclinical compound with potential utility in treating genitourinary disorders. The compound targets an undisclosed GPCR
Vifor-Fresenius Medical Care Renal Pharma	Cara Therapeutics	5/17/2018	Nephrology	70	540	A JV of Vifor and Fresenius paid \$70M in cash and stock for global commercialization rights (ex-US, JP, and SK) to an opioid analgesic for severe itching associated with CKD hemodialysis
Novo Nordisk	Epigen Biosciences	5/24/2018	Nephrology	UNK	200	Novo pays an undisclosed upfront fee plus potential milestones for up to \$200M for WW rights to a preclinical LPA1 antagonist
Axovant Sciences	Oxford BioMedica	6/6/2018	CNS	30	843	Oxford BioMedica licenses WW rights to develop and commercialize a gene therapy for Parkinson's disease. The deal includes development milestones and a 7% to 10% tiered royalty
Gilead	Hookipa Biotech	6/6/2018	Infectious Diseases	10	410	Gilead licenses access to arenavirus vector-based immunization technologies for HIV an Hepatitis B; Gilead had participated in Hookipa's \$60M series C around in 2017

SOURCE: Locust Walk analysis; Global Data. Methodology: EU licensing transactions >\$100M



# JAPAN



## Q2 2018 – Biopharma Trends in Japan

- **Stock prices of key biopharma companies have been showing a gradual decline in Q2 2018, despite steady progresses in R&D and successful deal makings; major Japanese pharmaceuticals enjoyed a modest increase in their stock prices**
  - ▶ Shares of the key 40 Japanese biotech/biopharma companies were **down 11.3%** in Q2 2018
    - **TakaraBio**, entered into an agreement with Otsuka for co-development and sales rights for NY-ESO-1 siTCRTM and CD19 CAR gene therapies, which led to its record high stock price in the past 5 years
    - **Sosei** and **PeptiDream**, the two leading biotechnology companies in Japan, announced entering into a strategic collaboration in discovery, development and commercialization of novel therapeutics targeting a specific G protein-coupled receptor; however, the announcement did not result in any visible impact on the stock prices of either companies
  - ▶ Shares of the 39 major Japanese pharmaceutical companies listed on the 1<sup>st</sup> Section of Tokyo Stock Exchange (TSE1) were **up 2.4%** in Q2 2018
- **Japan deal landscape has been active with 18 deals announced for licensing and M&A:**
  - ▶ Shionogi: >\$575M in-licensing deal of a Phase 3 ready drug from Sage Therapeutics
  - ▶ Daichi Sankyo: \$485M in-licensing deal of a drug in discovery stage, from Zymeworks
  - ▶ Takeda: acquisition of Shire for \$62B
    - The acquisition is expected to make Takeda one of the top 10 global pharmaceutical leaders; however, Takeda's stock price has been suffering from a gradual decline due to shareholders' pessimistic perspective on the >\$30B additional debt as a result of the Shire deal

SOURCE: Locust Walk Analytics, BioSciDB, GlobalData, Pharma Japan Web



# Pharma shares were in line with market trends, however Biotech shares showed a steep drop in stock price in Q2 2018

## Q2 2018 and Historical Performance of Market Indices



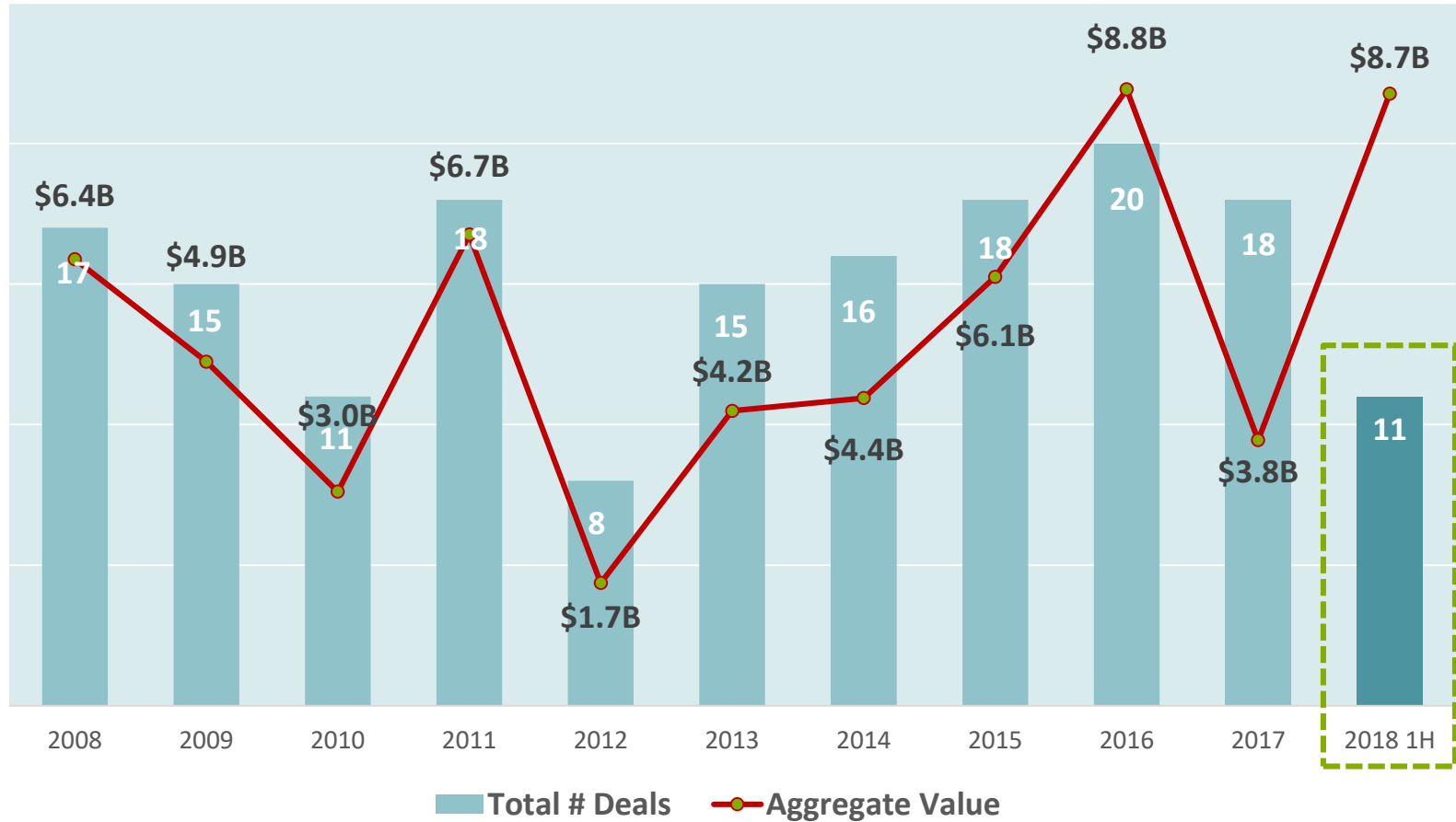
Key Event	
<b>A</b>	Nikkei 225 set a 21-year high in Oct. after it's longest winning streak; the upward trend has been reflected in the biotech companies
<b>B</b>	Japanese stock markets kept up with the global trend in stock price rise
<b>C</b>	NBC fell in line with Nikkei 225's radical fall after the US market suffering from heavy losses in February
<b>D</b>	Mar 30, 2018: TSE1P and NBC close 0.0% and 11.4%, respectively, since the beginning of 2018
<b>E</b>	May 8, 2018: Takeda Pharmaceutical agreed to buy Shire for \$62 billion, which made Takeda a global pharmaceutical leader
<b>F</b>	<b>June 29, 2018: TSE1P and NBC close 2.4% and -11.3%, respectively, since the beginning of 2018</b>

SOURCE: Locust Walk Analytics; Nikkei BioTech Online; Yahoo! Japan Finance 06-29-2018

\* MOTHERS (Market of the high-growth and emerging stocks): The stock market at the Tokyo Stock Exchange for emerging businesses, including Sosei Group, Green Peptide, and Solasia

# In-license and out-license deal making in 2018 posing steady growth, already marking the 2<sup>nd</sup> highest aggregate value in the past 10 years

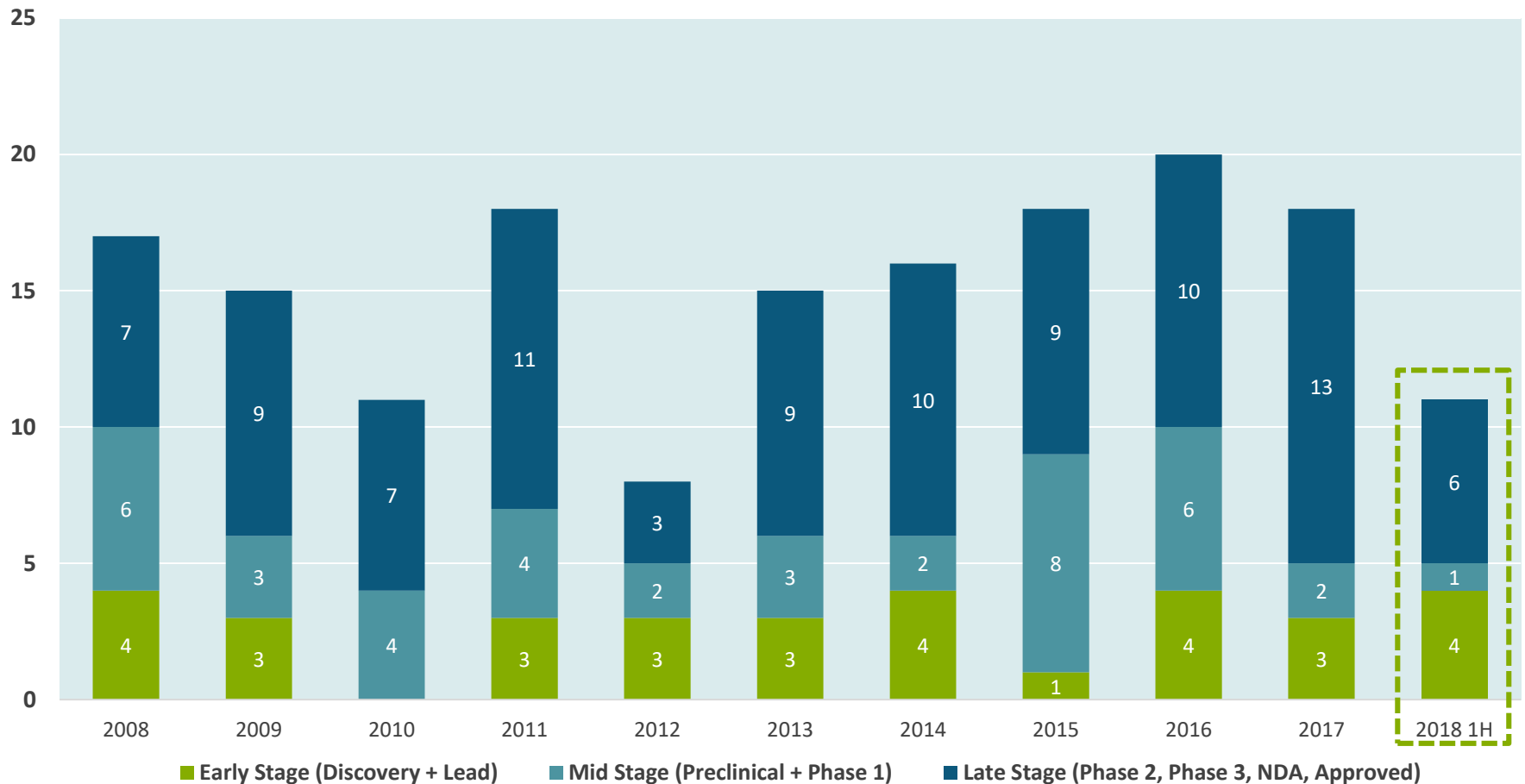
Biopharma deal >\$10M in announced deal size



SOURCE: Locust Walk Analytics, BioSciDB, GlobalData, Pharma Japan Web

# The number of late stage transactions generating total value over \$10M hits 80% of the average of those made in the last 10 years

## Biopharma deal >\$10M in announced size



SOURCE: Locust Walk Analytics, BioSciDB, GlobalData, Pharma Japan Web

## Aggregate deal size of agreements made in Q2 reached ~ \$1.5B

Licensee	Licensor	Date	Stage	Deal Size (\$M)	Subject
<b>Yakult</b>	Verastem	06/2018	Filed	100	Collaboration on future development of EPA-based drug products and indications.
<b>Shionogi</b>	Sage Therapeutics	06/2018	Phase III	575	Strategic collaboration to develop and commercialize SAGE-217 for MDD and other Indications in Asia.
<b>Daiichi Sankyo</b>	Zymeworks	05/2018	Discovery	485	Immuno-oncology collaboration focused on bispecific antibodies
<b>Astellas</b>	Aquinox	05/2018	Phase III	155	License to develop and commercialize rosiptor for interstitial cystitis/bladder pain syndrome.
<b>Otsuka</b>	<b>Takara Bio</b>	05/2018	Phase II	59	Co-development and sales rights in Japan for NY-ESO-1 siTCR and CD19 CAR.
Biogen	<b>TMS</b>	06/2018	Phase II	22	Exclusive option agreement for development and commercialization of a thrombolytic, TMS-007.

## Takeda announced its acquisition of Shire in May 2018

Seller	Buyer	Date	Deal Size (\$M)	Subject
<b>Takeda</b>	Shanghai Pharma	05/2018	280	Divestiture of 51.34% stake in Guangdong Techpool Bio-Pharma Co. for cash
Shire	<b>Takeda</b>	05/2018	62,200	Acquisition of a leading global rare disease company for cash and shares

Japan pharmas are indicated in bold, blue letters

# CHINA

## Q2 2018 – Biopharma trends in China

- **China's top 20 pharmaceutical companies by market capitalization (-0.1%) have outperformed the SSE Composite Index (-10.1%) in Q2 2018**
  - ▶ Hengrui, leading pharma in China with strong presence in oncology, has seen its stock price drop 12.9% in Q2, China's new "0" tariff policy towards imported oncology products which could negatively impact its oncology business
  - ▶ Due to the "US-China trade war", SSE Composite Index has dropped 10.1% vs. end of Q1
- **No Chinese biopharma going public in Q2 2018**
  - ▶ Two pre-revenue companies, Ascleptis and Hua Medicine have filed for Hong Kong IPO. With its new listing application rules taking effect April 30, 2018, Hongkong is expected to be the IPO venue of choice for young Chinese life science companies
- **In-license deal volume continues to grow, 17 in-license deals have been announced in Q2 with first half 2018 volume approaching full year 2017 numbers**
- **Chinese investors actively invest in not only domestic, but also overseas life science companies**
  - ▶ Stealth Bio, a Boston clinical-stage biopharma, completed a \$100M financing in two convertible note rounds led by Nan Fung Technology's Pivotal Beta

SOURCE: Locust Walk analytics, Hengrui company documents



# “US-China trade war” has negatively impacted the SSE Composite Index

## Performance of SSE Composite Index and Hengrui



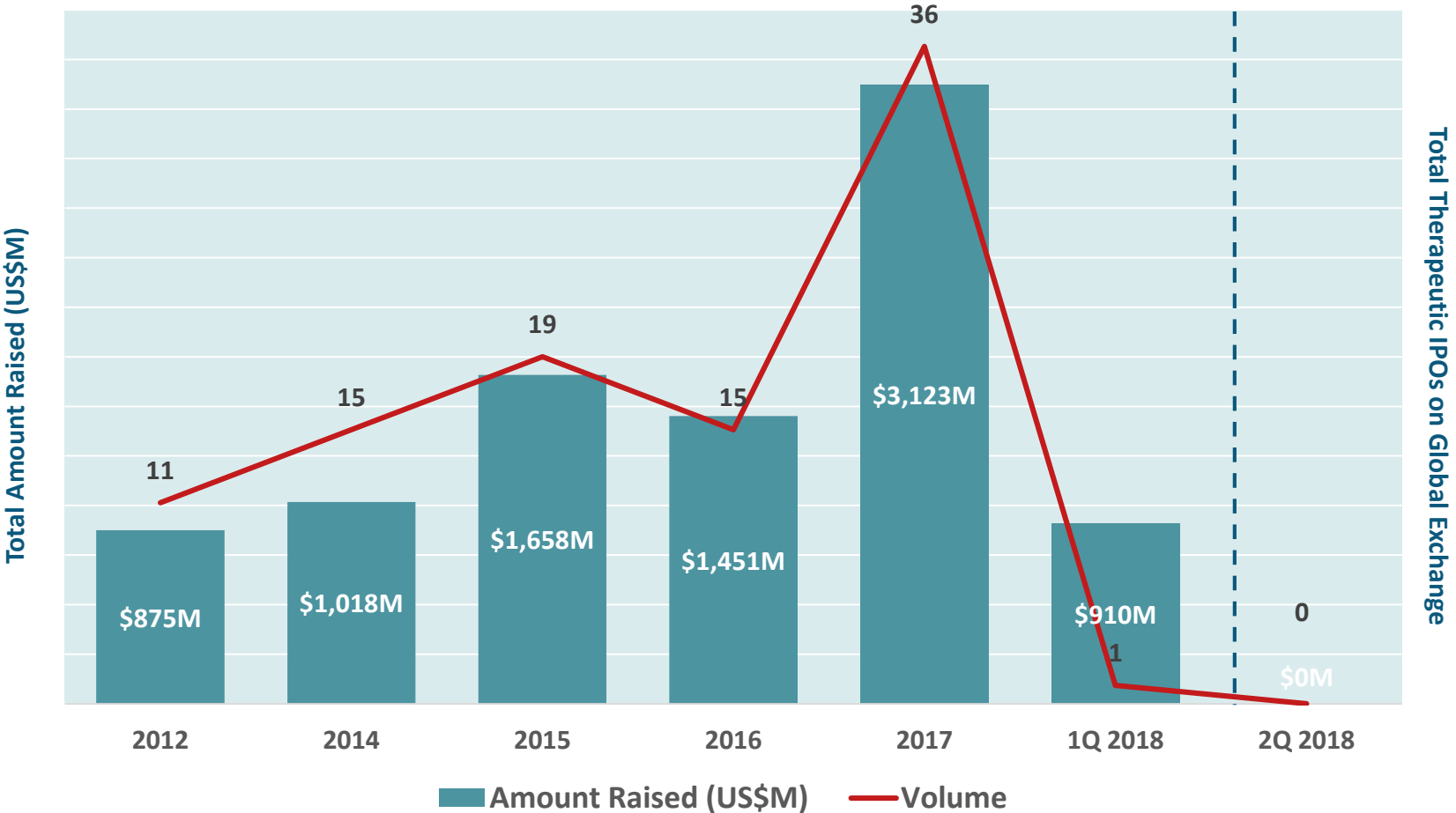
Key Event	
A	Following the release of 2016 annual and Q1 report in Mar and Apr, the price has since appreciated to 60.2CNY (+10.5% vs. Jan 2017)
B	Hengrui published its profit distribution plan
C	Stock price of Pharmaceutical companies have seen their price soar including Hengrui
D	SSE composite index has seen its price drop due to the poor performance of US stock market
E	Listed 845M new outstanding common stock

SOURCE: Locust Walk analytics, Yahoo Finance



# Due to the stricter approval criteria, China's IPO approval rate significantly dropped

**Number of Biopharma IPOs and Aggregate Total Raised By Quarter**



SOURCE: Locust Walk analytics ; Eastmoney, Chinabio Today

## Deal volumes and economics are on the rise in China, driven by increasing capital availability and improved regulatory environment

- **Oncology continues to be a hot therapeutic area for investments, followed by pain, anti-infectious and metabolic diseases**
  - ▶ 8 out of 17 deals announced involved oncology assets
  - ▶ CStone, an oncology focused clinical stage biopharma, trying to expand its oncology pipeline by establishing licensing partnership with overseas partners
    - CStone in-licensed Greater China rights to ivosidenib (IDH1 inhibitor) from Agio with \$12M upfront and \$412M milestone payment
    - CStone in-licensed China rights to 3 oral oncology assets from Blueprint with \$40M upfront and up to \$386M in milestone payments
  - ▶ Zai Lab, which already has >10 assets in its pipeline announced 2 further in-license deals in this Q2
- **Domestic and overseas biopharma & MedTech to raise large funds from Chinese investors**
  - ▶ JHL Biotech, a China-Taiwan biosimilar company, placed \$106M in convertible bonds in a financing led by VMS Investment Group, a Hong Kong PE firm
  - ▶ CStone, a Chinese clinical stage biopharma, raised record-breaking \$260M in series B led by GIC Private Limited

SOURCE: Locust Walk analytics, ChinaBio® Today, Globaldata



# Cross-border in-licensing deal volumes continues to grow in China along with increases in upfront payments and aggregate deal value



**Increasing economics for Chinese in-licensing deals likely to increase activity as US companies turn to China for deals that bring in meaningful non-dilutive capital**

SOURCE: Locust Walk analytics, ChinaBio® Today

## Major Chinese in-licensing deals in Q2 2018

Licensor	Licensee	Area/Indication	Date	Stage	Upfront (\$M)	Total deal (\$M)
Agio	CStone	Oncology	06/2018	Pre-registration	12	424
Pacira Pharma	Nuance Biotech	Pain	06/2018	Approved	3	58
CrystalGenomics	Aptose	Oncology	06/2018	Pre-clinical	3	125
Blueprint	CStone	Oncology	06/2018	NA*	40	386
Karyopharm	Antengene	Oncology, anti-viral	05/2018	NA	12	162
Kitov	Changshan Biochemical Pharma	osteoarthritis	05/2018	NDA	0	9
Adocia	Tonghua Dongbao	Type 2 Diabetes	04/2018	Ph1b	40	90
Adocia	Tonghua Dongbao	Type 1 Diabetes	04/2018	PK study	10	45
Entasis Therapeutics	Zai Lab	Antibiotics	04/2018	Ph2	5	114
Tocagen	Apollo Bio	Oncology	04/2018	Ph2/3	16	127

SOURCE: Locust Walk analytics, ChinaBio Today, Globaldata \* Multiple assets included in the transition

## Fundraising activities for China biotech in Q2 2018

Company	Date	Raised (\$M)	Lead Investor	Background
Adlai Nortye	06/18	50	Yuanming Capital	<ul style="list-style-type: none"> <li>China clinical stage biopharma that in-licenses immuno-oncology assets</li> </ul>
Stealth bio	06/18	100	Nan Fung Technology's Pivotal Beta	<ul style="list-style-type: none"> <li>Clinical-stage US biopharma that targets mitochondrial dysfunction</li> </ul>
AlphaBio	06/18	65	Qiming venture Partners	<ul style="list-style-type: none"> <li>Raised funds to support the global trial of its NSCLC drug</li> </ul>
JHL Biotech	05/18	106	VMS Investment Group	<ul style="list-style-type: none"> <li>A China-Taiwan biosimilar company, raised funds to support clinical trials and further development of its biosimilar portfolio</li> </ul>
HitGen	05/18	39	CDH	<ul style="list-style-type: none"> <li>Established over 50 active drug discovery collaborations with pharmaceutical companies from around the world based on its DNA-encoded library</li> </ul>
AnSun	05/18	85	Sinopharm Healthcare Fund	<ul style="list-style-type: none"> <li>Developing novel broad spectrum anti-viral biologic therapeutics that treat severe viral respiratory tract infections</li> </ul>
CStone	05/18	260	GIC; Sovereign wealth fund	<ul style="list-style-type: none"> <li>A newly established (2017) biopharma with a broad immuno-oncology pipeline</li> </ul>
Innovent	04/18	150	Capital Group Private Markets	<ul style="list-style-type: none"> <li>Innovent has established a pipeline of 13 drug candidates covering oncology, ophthalmology, autoimmune and cardiovascular diseases, and likely to seek Hongkong IPO in the end of 2018</li> </ul>

SOURCE: Locust Walk analysis, ChinaBio today

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This report was prepared by the following Locust Walk deal team members:



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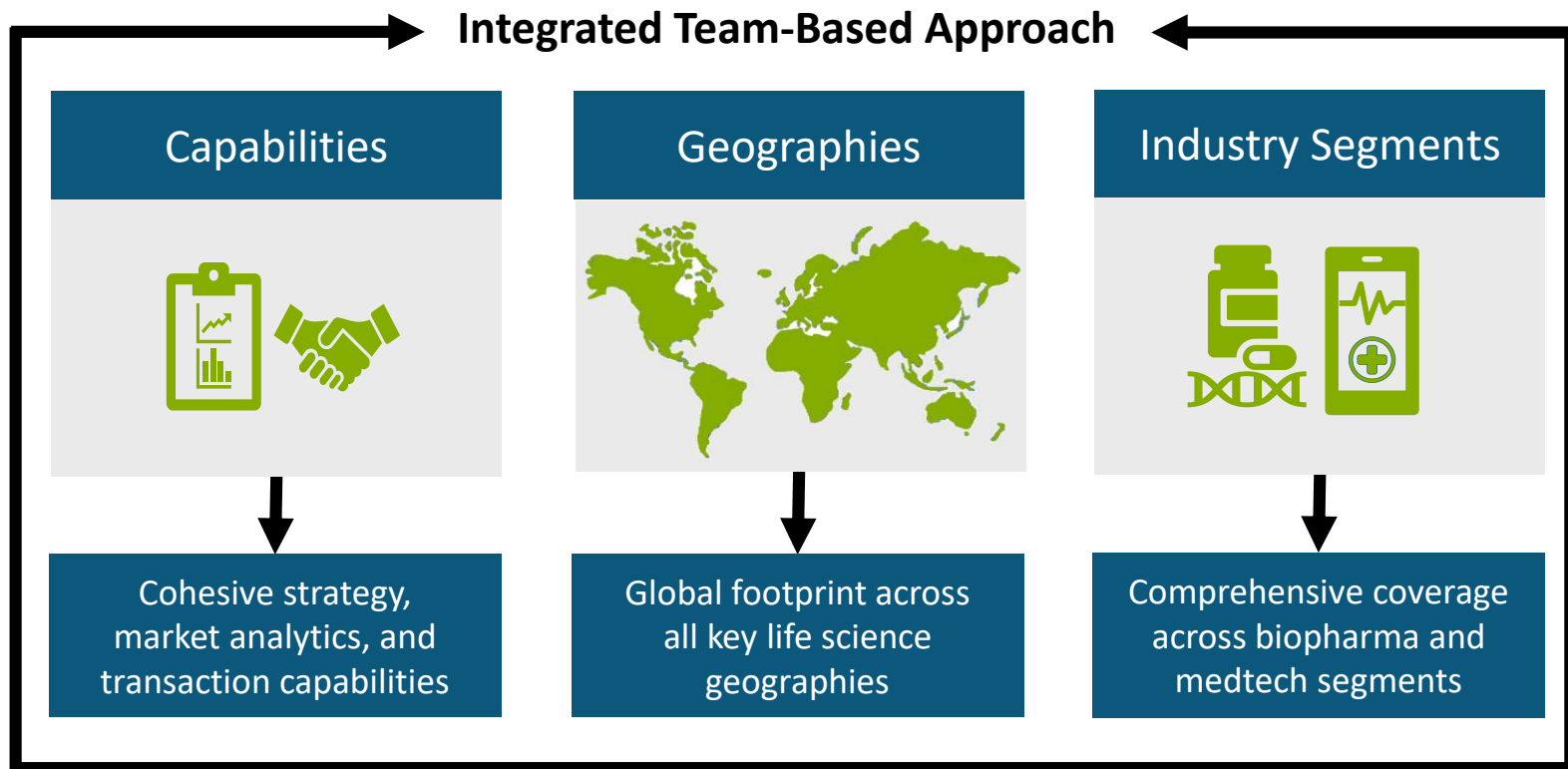
**China**

*For more information, visit us at [www.locustwalk.com](http://www.locustwalk.com)*

# ABOUT LOCUST WALK

## Locust Walk is a global life science transaction firm.

Our integrated team-based approach across capabilities, geographies, and industry segments delivers the right products, the right partners, and the most attractive sources of capital to get the right deals done for biopharma and medtech companies.





# Locust Walk is the **only** firm to **integrate** strategy, market analytics, and transaction **capabilities** from both **biopharma** and **medtech** perspectives on a **global** scale

## Capabilities

Cohesive strategy,  
market analytics, and  
transaction capabilities

- One integrated team focused on your entire deal process.
- Track record of addressing key strategic questions for companies at the corporate, portfolio, and asset levels, so we have the experience to execute most any deal from licensing to M&A to financing.
- Strategy capabilities generate holistic alternatives, actionable commercial strategies, and a powerful value prop.
- Our market analytics capabilities lay the foundation to evidence-based strategies that support groundbreaking deals and partnerships.
- Our transaction process—beginning with an upfront transactability diagnostic and valuation— ensures that you realize maximum deal value in a timely manner, outweighing the opportunity costs of alternative transactions.

## Geographies

Global footprint  
across all key  
life science geographies

- On-the-ground presence in all major life science markets across the United States, Europe, and Asia.
- Offices are staffed with local teams, who also have experience working around the globe.
- Experience ensures that we maintain relationships with local companies and investors, can navigate cultural and language differences, and have a feel for geography-specific trends impacting the deal landscape.
- Maintaining a global presence enables us to tap a combination of deal sources regardless of where they reside, so that your deal isn't limited by geographical borders

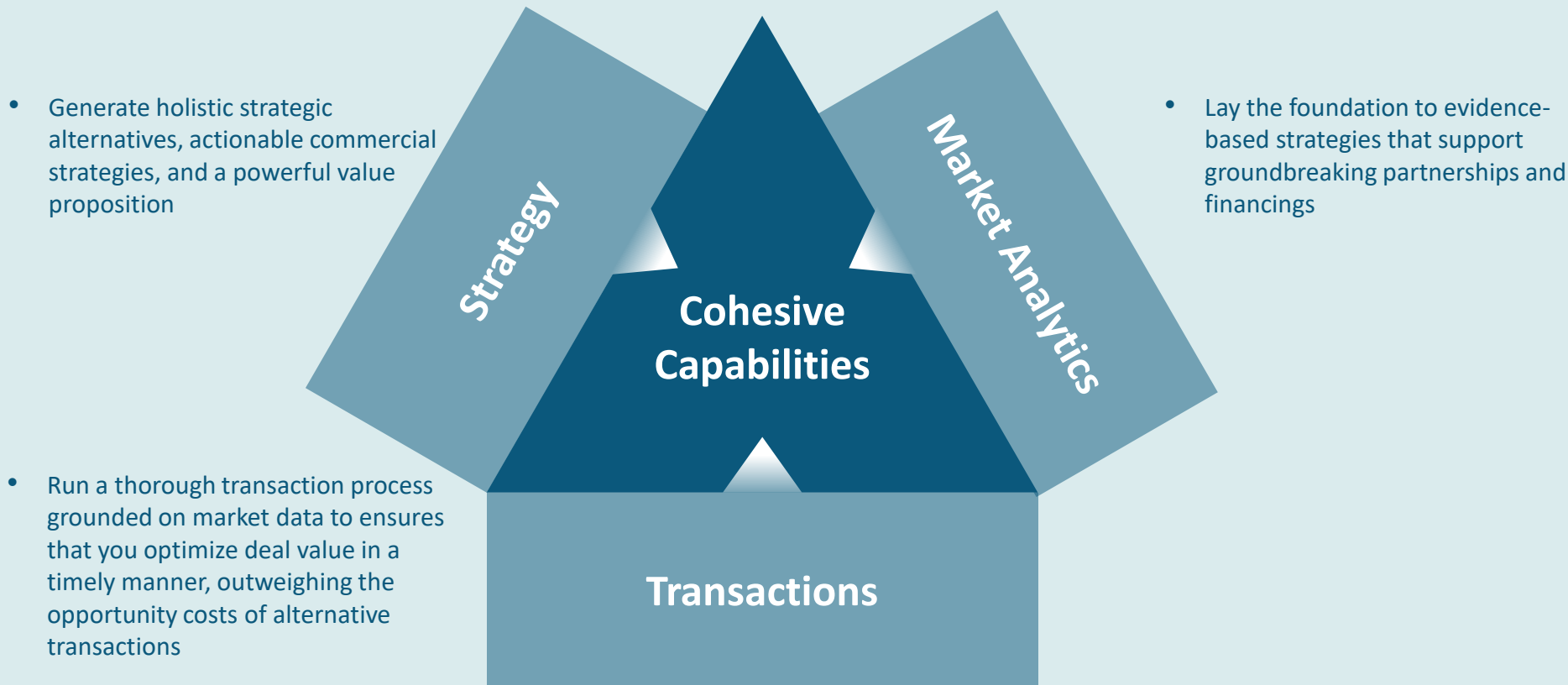
## Industry Segments

Comprehensive coverage  
across biopharma and  
medtech segments

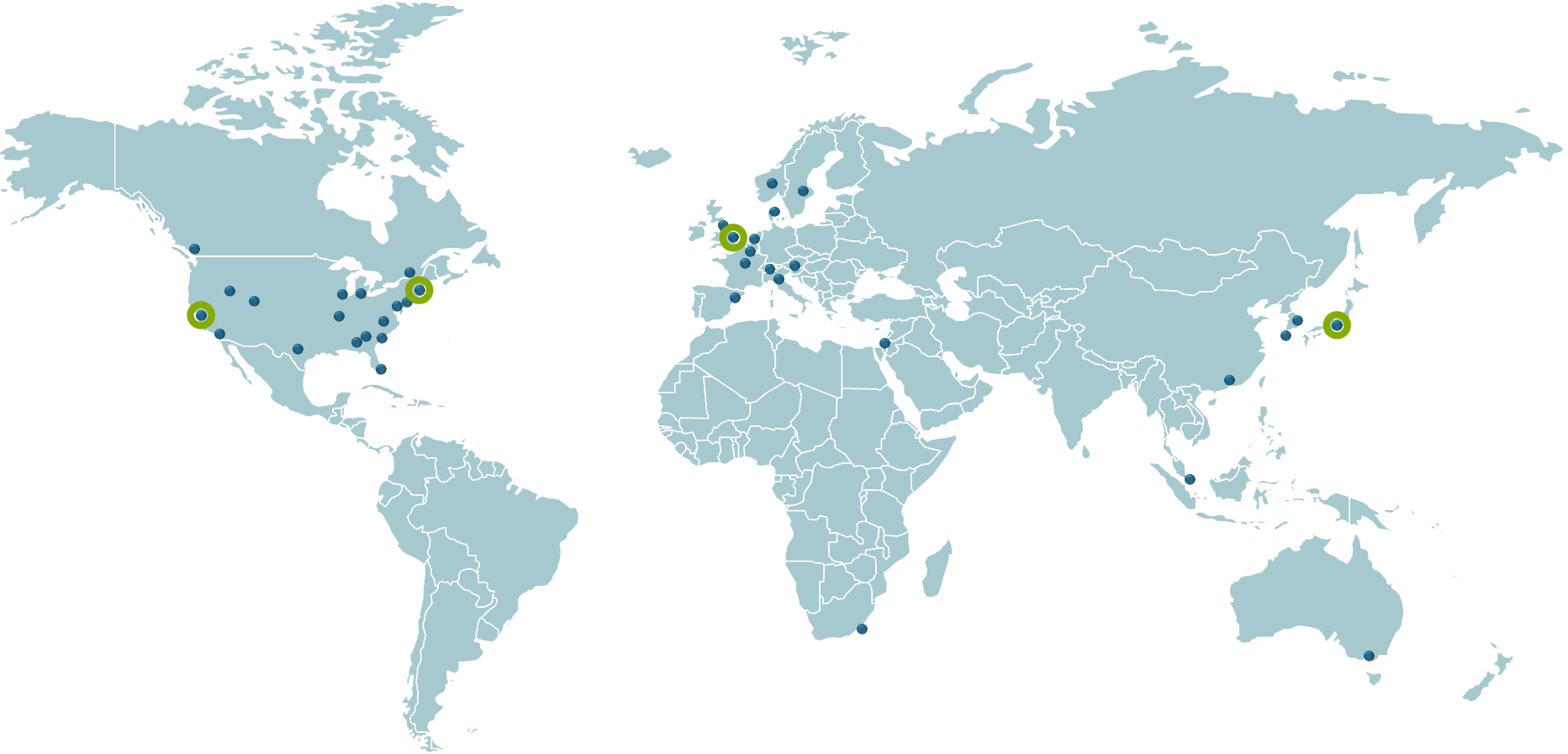
- Strong understanding of value drivers, deal structures, and transaction precedents as well as how they differ between the biopharma and medtech segments.
- Biopharma team has completed over 40 transactions at Locust Walk across a range of therapeutic areas, modalities, and all stages of development and marketed products.
- Medtech team brings deep, segment-specific experience from over 25 transactions across various therapeutic areas and care settings for medical device, diagnostics, tools and digital health companies.
- Strong understanding of both the biopharma and medtech segments helps our team identify and maximize the potential of convergence opportunities that many innovative life science companies have top-of-mind.

Locust Walk's **cohesive** combination of strategy, market analytics, and transaction **capabilities** means that you have **one integrated team** focused on your entire deal process

Track record of addressing key strategic questions for companies at the corporate, portfolio, and asset levels



# Locust Walk maintains a global footprint across all key life science geographies



● Locust Walk clients or partners since 2008

○ Locust Walk Office (size)



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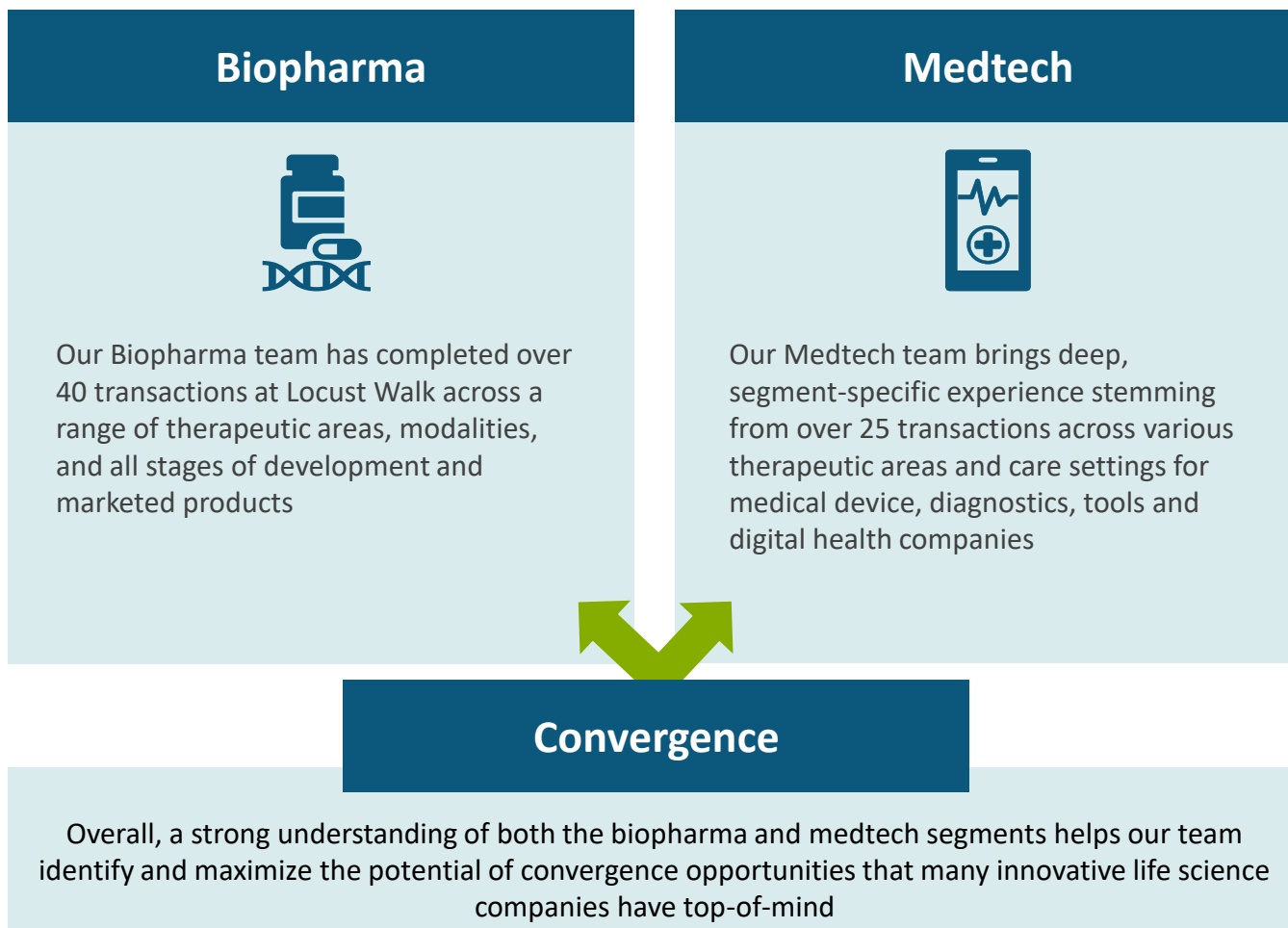


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Locust Walk has a strong **understanding** of value drivers, deal structures, and transaction precedents as well as how they differ between the **biopharma** and **medtech** segments



# Locust Walk's leadership team includes successful life science operating, investing, and transaction executives



**Geoff Meyerson\***  
 Managing Partner, Co-founder  
 Boston

- Bus Dev: **MedImmune, Zelos**
- Healthcare Banker: **UBS**
- Life Science VC: **SR One**
- MBA: **Wharton, MB: Penn, BS: Duke**

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**Chris Ehrlich\***  
 Managing Director, Global Head of Biopharma  
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- Life Science VC: **InterWest**
- Bus Dev: **Purdue, Genentech**
- Healthcare Consultant: **L.E.K**
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**Hunt Henrie\***  
 Managing Director, Global Head of Medtech  
 Boston

- Bus Dev: **Ferghana, IL**
- Medtech PE/VC: **Chase Capital, Werfen Life**
- CFO: **IL, Informed Clinical Sciences**
- MA: **Johns Hopkins, BA: Boston University**

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**Brian W. Coleman**  
 Managing Director, Global Head of Financing  
 and Sales | Boston

- Global Head of Equity Sales: **Jefferies**
- Banking: **JPMorgan Chase, Bank of America**  
**Lehman Brothers, ABN AMRO, LaSalle Bank**  
**BS: Le Moyne College**

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**Hayato Watanabe**  
 CFA, Senior Vice President, Head of Asia  
 Tokyo

- VC: **Eight Roads, INCJ**
- Private Equity: **Merrill Lynch, Shinsei Bank**
- Investment banker: **Citigroup**
- LLM/LLB: **Hitotsubashi University**

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**Lubor Gaal**  
 Senior Vice President, Head of Europe  
 London

- Pharma BD : **Bristol- Myers Squibb, Almirall, Berlex**
- Biotech BD: **Vectron Therapeutics, Neuro3d**  
 Advisory: **Burrill & Co**
- Ph.D: **UC Berkeley, B.Sc: University of Sussex**

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# Our advisory board extends our experience, connectivity and deal flow



**David Cassak**

Managing Partner,  
Innovation In Medtech  
EiC, The MedTech Strategist

- MD, VP: **Elsevier**
- Partner: **Windhover**
- Publications: **The Gray Sheet and The Pink Sheet, START-UP, IN VIVOMedtech Insights**



**Rod Ferguson, PhD**

Managing Director,  
Panorama Capital

- Co-founder & Managing Director: **JPMorgan Partners, InterWest Partners**
- PhD: **SUNY Buffalo**, JD: **Northwestern**, BS: **IL**



**Laurie Halloran**

Consulting,  
President & CEO

- Founder/CEO: **Halloran Consulting**
- Academic: **Lectures at BU Medical School, Tufts Center for Drug Dev't**
- MS: **Leslie**, BS: **Russel Sage**



**Skip Irving**

Vice President,  
Noveome Biotherapeutics

- Managing Director: **Health Advances**
- VP: **Massachusetts Biotech Research Inst.**
- Board Member: **MJFF**
- MBA: **Tuck**, BS: **MA College of Pharmacy**



**Steve James**

CEO **Labrys**,  
sold to **Teva**  
KAI, sold to **Amgen**

- CEO: **Labrys, KAI**
- Business Development: **Exelixis**
- MBA: **Kellogg**, BA: **Brown**



**David Kabakoff, PhD**

Executive Partner,  
Sofinnova Ventures

- Co-founder and CEO: **Salmedix**
- Exec leader: **Dura, Spiros, Corvas, Hybritech**
- PhD: **Yale**, BS: **Case Western Reserve**



**Barbara Kosacz**

Partner,  
Cooley

- VP/Bus Dev: **iScribe**
- JD: **University of California, Berkeley**, Boalt Hall School of Law; BA: **Stanford University**



**Roger Longman**

CEO,  
Real Endpoints

- Managing Director, **Elsevier Business Intelligence**
- MA: **UNC – Chapel Hill**, BA: **Cornell**



**Doug MacDougall**

Managing Partner,  
MacDougall BioMedical  
Communications

- Board Member, **Boston Museum of Science, The BioScience Network, MIT Venture Mentor Service**
- BA: **Rochester Institute of Technology**



**Scott Minick, PhD**

Venture Partner,  
ARCH Ventures

- Former Pres/CEO, **BIND Therapeutics**
- Board Member, **Chiasma and Alzheon**
- PhD: **Salk Institute** MBA: **Northwestern**, BA: **UCSD**



**Stephen Oesterle, MD**

Venture Partner  
New Enterprise Associates

- VP: **Medtronic**
- Board Director: **HeartWare, Sigilon, SmartZyme, Cardiologic**
- MD: **Yale**, BA: **Harvard**



**Dale Pfost, PhD**

General Partner,  
Advent Life Sciences

- CEO: **Oxford GlycoSciences, Orchid BioSciences, Acuity Pharma, Receptor BioLogix**
- PhD: **Brown**, BS: **University California**

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