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Start-Up Quarterly Statistics, Q2 2016

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A review of biopharma start-up dealmaking and financing from April through June 2016, based on data from *Strategic Transactions*.

In the second quarter, start-up biopharmas raised $1.63bn, an increase over the $1.34bn raised in the first quarter of 2016, but well down from the impressive $2.47bn raised back in Q2 2015. New and emerging biopharma companies also penned 26 alliances and signed five acquisitions.

Financings

During the second quarter of 2016, start-up biopharma companies raised a total of $1.6 billion, $280 million more than the previous quarter. Of the 44 firms getting funding, half closed Series A financings, combining for $480 million. (*See Exhibit 1.*)

Exhibit 1

Start-Up Biopharma Financings, Q2 2016 ($m)

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Total Raised: $1,625m *Note: The chart doesn't include a Series A round in which the amount raised was not disclosed (EnBiotix Inc.).*

SOURCE: Source: Strategic Transactions

Four companies were seeded during the quarter. Leading the group was *Arrivo BioVentures LLC*, which received $49m from lead investor *Jazz Pharmaceuticals PLC* along with Solas BioVentures Fund, Rex Health Ventures, and private investors. *[See Deal]* The start-up intends to develop four to six new drugs and move them through clinical proof of concept.

Twenty-two biopharmas closed first round financings. The top Series A fund-raiser was *Aptinyx*

Inc. with $65m to support initial clinical trials of N-methyl-D-aspartic acid receptor modulators for neurological disorders. [See Deal] Leading the Series B rounds, cardiovascular-focused DalCor Pharmaceuticals raised $100m to fund a Phase III trial of its cholesteryl ester transfer protein inhibitor dalcetrapib in a genetically distinct population of patients with acute coronary syndrome, adding to $50m already raised. [See Deal] (Also see "DalCor To Develop Failed Roche CETP Inhibitor In Genetic Subgroup" - Scrip, 22 Apr, 2016.) Dalcetrapib originated at Japan Tobacco Inc., which licensed the compound to Roche in 2004. [See Deal] Roche dropped it in 2012 after it, as has the rest of the CETP class, failed to show an effect on cardiovascular outcomes. DalCor got rights in 2015. [See Deal]

(*See Exhibit 2.*)

Exhibit 2

Source: Strategic Transactions

Date	Company	Amount Raised ($m)	Round
April	DalCor Pharmaceuticals	100.0	B
May	Aptinyx	65.0	A
June	Morphic Therapeutic	51.5	A
April	Entasis Therapeutics	50.0	A
April	FLX Bio	50.0	A
May	Arrivo BioVentures	49.0	Seed
June	Alpine Immune Sciences	48.0	A
May	IDEAYA Biosciences	46.0	A
June	Blade Therapeutics	45.0	B
May	Homology Medicines	43.5	A

In the largest financing to date for a UK academic spin-out,OxStem Ltd. raised $24.4m (£16.9m) to develop regenerative medicines to treat various age-related diseases. [See Deal] Oxford Sciences Innovation, Human Longevity Inc., and Robert Duggan, former CEO of Pharmacyclics (prior to its 2015 acquisition by AbbVie Inc. [See Deal]), provided the Series A funding.

Four start-ups went public in Q2, bringing in a total of $273m. Raking in the most was Intellia Therapeutics Inc. with $115.5m through the sale of 6.9 million common shares (including the overallotment) at $18. [See Deal] The company is developing therapies based on CRISPR/Cas9 gene editing technology, with plans to design treatments that can permanently edit disease-associated genes in one treatment. It's using *in vivo* (via lipid nanoparticles) and *ex vivo* (electroporation) delivery methods to create therapies that can either knock out, repair, or insert genes. (Also see "IPO Update: Intellia Launch Shows CRISPR Still Excites While Others Struggle" - Scrip, 8 May, 2016.) Syros Pharmaceuticals Inc. ($53.5m) [See Deal], Aeglea Biotherapeutics Inc.

($51m) *[See Deal]*, and *Clearside Biomedical Inc.* ($53m) *[See Deal]* also completed their IPOs.

Seven public start-ups closed follow-on public offerings, combining for $495m. Specialty pharma company *Knight Therapeutics Inc.* raised the most with $179m *[See Deal]*, followed by *Spark Therapeutics Inc.* (gene therapies for genetic conditions including retinal, liver-related, and neurodegenerative diseases) with $128m *[See Deal]*, and *Global Blood Therapeutics Inc.* (therapies for blood-based diseases) netting $112.8m. *[See Deal]*

Alliances

Twenty-six biopharma start-ups penned alliances during the second quarter of 2016. In terms of potential deal value, the gold-winning deal was signed in April between *Regeneron Pharmaceuticals Inc.* and Intellia Therapeutics. *[See Deal]* (*See Exhibit 3.*) In the six-year tie-up, the firms seek to advance Intellia's CRISPR/Cas9 gene editing technology for *in vivo* therapeutic use. Regeneron shelled out $75m up front for exclusive rights to CRISPR-based candidates against up to 10 targets, with an initial focus on diseases that could be treated by editing genes in the liver. Of the 10, Regeneron may choose five non-liver targets for further development (not including any non-liver targets that Intellia is already working on). For each target, Intellia is eligible for up to $25m, $110m, and $185m in development, regulatory, and sales milestones, respectively, in addition to royalties from the high-single digits to low-teens. (Also see "*Regeneron Looks To Use CRISPR Inside/Outside The Liver With Intellia Pact*" - Pink Sheet, 12 Apr, 2016.) In addition, Regeneron made a $50m equity investment in Intellia through the purchase of IPO shares. (Also see "*Intellia Plans IPO, Signs Gene-Editing Pact With Regeneron* " - Scrip, 12 Apr, 2016.)

Coming in second in alliance value, *Wave Life Sciences Ltd.* and *Pfizer Inc.* signed an option agreement involving nucleic acid therapies that can silence the underlying causes of debilitating metabolic diseases. *[See Deal]* Wave is responsible for advancing up to five programs from discovery through to the selection of clinical candidates, at which time Pfizer may opt for exclusive development and commercial rights. Pfizer paid $10m in cash up front and made a $30m equity investment in Wave, which is also eligible for as much as $871m in research, development, and commercial milestones if all five projects are developed successfully. Wave is also eligible for tiered sales royalties up to low double-digits (*Strategic Transactions* assumes 1%-30%). Wave will use its stereopure drug development platform to create nucleic acid candidates such as mRNA-targeted antisense therapeutics and exon-skipping therapies. In addition, Wave gets rights to Pfizer's hepatic targeting technology for use in hepatic programs outside the collaboration. In return, Pfizer is eligible for development and commercial milestones and tiered royalties. (Also see "*Wave Keeps Neuro Focus Via Pfizer Collaboration For Five Metabolic Targets*" - Scrip, 5 May, 2016.)

And the bronze medal for deal value goes to private Irish specialty pharma *Noden Pharma DAC*'s in-licensing of two *Novartis AG* hypertension drugs – *Rasilez* (aliskiren) and *Rasilez HCT*

(aliskiren/hydrochlorothiazide). *[See Deal]* Novartis receives $110m up front, $89m on the deal's first anniversary, and $95m in milestones. This agreement is tied to a concurrent transaction in which *PDL BioPharma Inc.* purchased a majority stake in Noden. *[See Deal]* Under the acquisition, PDL will pay $75m up front, at least $32m on the deal's first anniversary, and $38m if the milestones under the Novartis deal are reached. However, those amounts could increase if Noden fails to secure debt financing from a third party in relation to the alliance. As a result of its investment, PDL gets an 88% equity stake in Noden.

Exhibit 3

Source: Strategic Transactions

Licenser	Licensee	Therapy area	PDV ($m)
Intellia Therapeutics	Regeneron Pharmaceuticals	Hepatic	1,725
Wave Life Science	Pfizer	Metabolic	911
Novartis	Noden	Hypertension	294
Jubilant Biosys	Checkpoint Therapeutics	Solid tumors	182
Checkpoint Therapeutics	TG Therapeutics	Blood cancer	178

Besides Pfizer and Novartis, three other big pharma companies inked alliances with start-ups during Q2. In May, Roche licensed *Strekin AG* rights to preclinical pamapimod in undisclosed indications. *[See Deal]* Roche had been working on the P38 mitogen-activated protein kinase inhibitor for rheumatoid arthritis but halted development because it failed to meet the required efficacy threshold.

Takeda Pharmaceutical Co. Ltd. and *Roivant Sciences Ltd.* teamed up and launched *Myovant Sciences Ltd.* to create therapeutics for women's health conditions and prostate cancer. *[See Deal]* Takeda licensed the start-up rights to Phase III relugolix (globally except in Japan and other Asian countries) for uterine fibroids, endometriosis, and prostate cancer, along with worldwide rights to Phase II TAK448 (RVT602) for infertility in women. (Also see "*Takeda Continues To Shed Pipeline Assets In Roivant Deal*" - Scrip, 7 Jun, 2016.)

Finally, *Eisai Co. Ltd.*'s *EA Pharma Co. Ltd.* received Japanese co-promotion rights to AbbVie Inc.'s (via its Japanese subsidiary *AbbVie GK*) *Humira* (adalimumab) for gastrointestinal disease indications including ulcerative colitis, Crohn's disease, and intestinal Behçet's disease. *[See Deal]* The firms will also co-promote *Humira* for ex-GI indications including rheumatoid arthritis and for conditions, including psoriasis vulgaris, arthropathic psoriasis, ankylosing spondylitis, and polyarticular juvenile idiopathic arthritis, that fail to sufficiently respond to existing therapies.

Checkpoint Therapeutics Inc. signed two deals during the quarter. It first in-licensed exclusive global rights to patents covering BRD4 inhibitor compounds for cancer from *Jubilant Biosys Ltd. [See Deal]* BRD4 is a member of the BET (bromodomain and extra terminal) domain. In exchange, Checkpoint is handing over $2m up front and up to $180m in preclinical, clinical, regulatory, and sales milestones, plus royalties. Checkpoint then turned around and sublicensed some of the rights (specifically for hematological cancers) to *TG Therapeutics Inc. [See Deal]* Under that deal, Checkpoint is eligible for $1m up front; preclinical, clinical, regulatory, and sales milestones of up to $177m; and single-digit royalties. Checkpoint and TG partnered in March 2015 in a similar situation in which Checkpoint got a handful of preclinical immuno-oncology antibodies from the *Dana-Farber Cancer Institute*, and concurrently licensed them to TG. *[See Deal] [See Deal]*

Acquisitions

Five biopharma start-up acquisitions were announced in Q2. *ContraVir Pharmaceuticals Inc.* bought fellow antivirals developer *Ciclofilin Pharmaceuticals Inc.* in exchange for the right to receive future earn-out payments in the form of up to $17m in cash and up to 10% of ContraVir's issued and outstanding common stock. *[See Deal]* (Also see "*ContraVir Strikes Deal With Rival Early Stage Hep B Drug Developer*" - Scrip, 1 Jun, 2016.) The earn-outs are tied to development and regulatory milestones related to Ciclofilin's lead compound CPI43132, a non-immunosuppressive cyclophilin A inhibitor for treating hepatitis B. The candidate is currently in preclinical studies and could enter the clinic in 2017. CPI43132 is complementary to ContraVir's own HBV candidate CMX157, a Phase I/II analog of *Gilead Sciences Inc.*'s *Viread* (tenofovir disoproxil fumarate). (Also see "*ContraVir Hopes To Establish Backbone For Hepatitis B Combo Therapy*" - Scrip, 25 Jul, 2016.)

Also in the infectious disease space, *Citius Pharmaceuticals Inc.* purchased *Leonard Meron Biosciences Inc.* in a stock swap. *[See Deal]* Post-transaction, Leonard Meron holds a 49% stake in the merged entity. Citius gains the Phase III-ready *Mino-Lok* antibiotic lock solution for treating catheter-related bloodstream infections. The company has the marketed product *Suprenza* (phentermine) for obesity and a Phase II topical formulation of hydrocortisone and lidocaine for hemorrhoids.

In May, *Biogen Inc.* spun off its hemophilia business as an independent publicly traded company. *[See Deal]* Post-transaction, Biogen will focus on its neurology pipeline. The current hemophilia market is dominated by few players including *Bayer AG*, *Novo Nordisk AS*, and *Shire PLC*'s *Baxalta Inc.* Because these firms currently have competing marketed products or candidates in late-stage development, none of them were interested in buying Biogen's business. (Also see "*Biogen Backs Out Of Hemophilia, But Who Benefits?*" - Scrip, 3 May, 2016.) The spin-off was recently named [Bioverativ] and is expected to launch in early 2017 and trade on Nasdaq. (Also see "*Biogen Hemophilia Spin Out Bioverativ On Track For Early 2017*" - Scrip, 9 Aug, 2016.)

Rounding out second quarter M&A activity, cancer firms *Oncternal Therapeutics Inc.* and Tokalas

Inc. merged and will carry the Oncternal name. *[See Deal]* The combined entity's pipeline consists of two clinical candidates. Oncternal's Phase I cirmtuzumab for relapsed or refractory chronic lymphocytic leukemia was licensed from the *University of California*'s *University of California, San Diego* at the start of Q1 2016 and is slated for additional trials in CLL, mantle cell lymphoma, and breast cancer. *[See Deal]* Tokala brings to the table its TK216, an ets-family transcription factor inhibitor entering Phase I for Ewing sarcoma. This program originated at *Georgetown University* and additional studies are planned in glioblastoma and prostate cancer.

From the editors of Start-Up.