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Deal Watch: Dragonfly Adds Gilead To Its List Of Big-Name Partners

by Joseph Haas

AbbVie inks collaboration and option deal focused on targeted protein degradation with Plexium. Cend and Calabrius merge in an all-stock transaction.

Scrip regularly covers business development and deal-making in the biopharmaceutical industry. Deal Watch is supported by deal intelligence from Biomedtracker.

Gilead Gets 5T4-Targeted NK Cell Therapy Candidate From Dragonfly

Gilead Sciences, Inc. is paying $300m up front for global licensing rights to a tri-specific natural killer (NK) cell engager candidate for solid tumors from *Dragonfly Therapeutics, Inc.* The collaboration also gives Gilead opt-in rights for multiple additional NK cell engager programs following preclinical development by Dragonfly.

Dragonfly conferred rights on 2 May to the 5T4-targeting investigational immunotherapy program DF7001 to Gilead in a deal that also could yield opt-in payments, development, regulatory and commercial milestones and sales royalties.

On track for an investigational new drug (IND) filing in the first half of 2023, DF7001 is designed to activate and direct NK and cytotoxic T-cell killing against cancer cells. The target 5T4 is a protein expressed on cancer and stromal cells that supports tumor growth and is associated with poor prognosis in non-small cell lung, pancreatic and breast cancer as well as head-and-neck squamous cell carcinoma, according to Dragonfly.

The Waltham, MA-based firm has previous tie-ups around its TriNKET platform technology with *Bristol Myers Squibb Company*, *AbbVie Inc.* and *Merck & Co., Inc.* In 2020, BMS obtained global rights to Dragonfly's IL-12 immunotherapy, a deal that continued a relationship dating back to a 2017 collaboration with *Celgene Corporation*, later acquired by BMS. (Also see "*Bristol Licenses*

Dragonfly's IL-12 Program To Boost Immunotherapies" - Scrip, 17 Aug, 2020.) Merck has licensed two TriNKET candidates under options rights it acquired in a 2018 deal with Dragonfly. (Also see "*Deal Watch: Astellas/Cytokinetics Extend Partnership, Make Progress On SMA Candidate*" - Scrip, 5 Oct, 2018.)

In related news, AbbVie announced an expansion of its 2019 collaboration with Dragonfly on 20 April, to include new targets in autoimmune and fibrotic indications in exchange for undisclosed upfront cash, along with potential milestones and royalties. Under the original partnership, Dragonfly applyed its TriNKET technology to discover NK cell therapy candidates for cancer and autoimmune targets specified by AbbVie. (Also see "*Deal Watch: Molecular Templates Aligns With Vertex On Optimizing Stem Cell Candidates*" - Scrip, 22 Nov, 2019.) AbbVie opted in on development and commercial rights for the first candidate developed under the pact in January 2021.

AbbVie Teams With Plexium In Targeted Protein Degradation

AbbVie unveiled a collaboration with *Plexium, Inc.* on 28 April to develop and commercialize novel targeted protein-degradation (TPD) therapeutics for historically challenging drug targets in neurology. Under the agreement, Plexium will employ its TPD platform technology to conduct preclinical research for the collaboration targets, after which AbbVie will hold an option to select programs for additional research and development activities.

San Diego-based Plexium gets an undisclosed upfront cash payment and can earn milestones and tiered royalties on commercialized products. It also gets the option to participate in product development in return for higher royalty rates. AbbVie will be responsible for development and commercialization of candidates resulting from the collaboration.

Plexium partnered with *Amgen, Inc.* in February on the development of novel molecular glue therapeutics. (Also see "*Deal Watch: Amgen Taps Plexium's Expertise In Targeted Protein Degradation*" - Scrip, 8 Feb, 2022.) The biotech announced a $102m financing about three weeks after that deal, led by BVF Partners LP and TCG X. (Also see "*Finance Watch: Platforms Are Great, But Investors Want To See Drug Candidates*" - Scrip, 28 Feb, 2022.)

Merged Cend/Caladrius To Focus First On Pancreatic Cancer

Cell therapy firm *Caladrius Biosciences, Inc.* and cancer-focused *Cend Therapeutics, Inc.* announced a definitive merger agreement on 27 April that entails an all-stock merger-of-equals transaction unanimously approved by each company's board of directors. The combined company will be renamed Lisata Therapeutics and trade under the ticker symbol LSTA. In tandem with the merger, the companies negotiated a collaboration agreement covering development activities carried out before the deal.

Upon closing, Cend shareholders will receive approximately 60.5 million shares of Caladrius

common stock, resulting in the shareholders of each company owning approximately 50% of the combined company. The transaction values each company at $90m, which for Caladrius represents a 136% premium to its market cap as of market closing on 26 April.

Following closing, Lisata intends to advance CEND-1 as its lead candidate in multiple difficult-to-treat solid tumors, including pancreatic ductal adenocarcinoma (PDAC) with ongoing Phase I and Phase II studies initiated by Cend and its Chinese partner *Qilu Pharmaceutical Co., Ltd.* (Also see "*Asia Deal Watch: Genexine Teams With KGBio In Immuno-Oncology, COVID-19 Therapy*" - Scrip, 18 Feb, 2021.) CEND-1 is a cyclic peptide that undergoes protease-mediated cleavage in the tumor microenvironment, according to Cend, producing a C-end Rule or CendR peptide that potentiates transport across the tumor stroma and improves cancer drug delivery to the tumor.

Phase Ib/II PDAC clinical data are expected as early as 2023, Cend and Qilu say. Lisata also plans to study CEND-1 in PDAC in combination with immunotherapy; other therapeutic combinations will be tested in future programs in hepatocellular, gastric and breast cancers.

VantAI Sets Collaborations With Boehringer, Janssen

Roivant Sciences Ltd.'s drug discovery affiliate *VantAI*, focused on computational design and optimization of targeted protein degraders, recently announced discovery collaborations with *Boehringer Ingelheim GmbH* and *Johnson & Johnson*. The 20 April tie-up with BI is focused on degrading traditionally undruggable targets and will initially focus on one degrader program combined with multiple proprietary E3 ligase platforms.

The German pharma paid VantAI undisclosed upfront compensation along with the potential for preclinical, clinical and commercial milestones. In addition, BI obtained exclusive development and commercial rights to degraders developed for the initial target.

The companies will leverage VantAI's geometric deep learning platform to streamline the design of new molecules optimized for each E3 platform, which BI said could yield novel methods for drug parameters such as potency and selectivity.

VantAI also unveiled a multi-year collaboration on 13 April with J&J's *Janssen Pharmaceutica NV*. Janssen will get access to VantAI's platform technology to generate novel molecular-glue and hetero-bifunctional, protein degrader drug candidates for important disease targets under the deal, which was facilitated by Johnson & Johnson Innovation.

The firms will partner on the discovery and implementation of novel E3 ubiquitin ligase platforms with an initial focus on two degrader programs and a novel E3 ligase platform development program. Janssen gets exclusive rights to all programs under the collaboration and will be responsible for global development and commercialization.

VantAI began developing novel technologies for in silico drug design, target prediction, interactome mapping and ADMET optimization in early 2019. It signed an early partnership with South Korea's SK Group. (Also see "*Roivant Alliance Takes SK Into Cancer, Intractable Diseases*" - Scrip, 8 Dec, 2020.)

BMS Invests In, Explores Inflammation Pathways With Octant

Bristol Myers Squibb announced a partnership 21 April to use precision medicine specialist *Octant Bio, Inc.*'s Deep Mutational Scanning (DMS) drug discovery platform. The platform leverages synthetic biology, high-throughput multiplexed assays, synthetic chemistry and computation to engineer and interrogate drugs, proteins and cellular pathways, according to the Emeryville, CA-based company.

Under the agreement, Octant will apply its technology to a set of inflammation-related pathways specified by BMS, which is also participating in the biotech's concurrent $80 series B financing. Catalio Capital Management is leading the financing, with participation from existing investors Andreessen Horowitz Bio Fund, Allen & Co. and 50 Years VC. To date, Octant has raised $115m in funding.

Octant said proceeds from the B round will be used to expand its platform capabilities and pipeline, advance its proprietary drug discovery technology and generate datasets that map the relationships between drug candidates, genetics and the biochemical mechanisms of human cells. The company also plans to develop small molecule chaperone therapies for rare genetic diseases.

Lilly Out-Licenses Cancer, CV Compounds To Telix And Kyttaro

Eli Lilly and Company offloaded some non-core pipeline assets in a pair of deals in mid-April, including a cancer drug it withdrew from the market due to lack of efficacy. On 10 April, it granted *Telix Pharmaceuticals Limited* global development and commercial rights on 10 April to the PDGFRα-targeting olaratumab for soft tissue sarcoma (STS). Lilly previously marketed the drug as Lartruvo, but withdrew it after data showed no improvement in survival rates for STS patients. (Also see "*Lartruvo Could Be A Failure Of The Drug, The Design Or The Disease*" - Scrip, 4 Jun, 2019.)

Telix plans to repurpose olaratumab as a targeting agent for radiopharmaceutical cancer imaging and therapy, based on its established safety profile for potential use as a radionuclide targeting agent. Telix paid $5m up front to obtain Lilly's intellectual property surrounding the drug and access to materials to support preclinical and early development. Lilly also could realize up to $225m in development, regulatory and commercialization milestones under the pact, plus royalties.

The deal also brings Lilly an option for an exclusive license to a radiolabeled companion

diagnostic developed by Telix. If the option is exercised, Lilly will pay Telix $5m and up to $30m in development milestones, plus royalties.

Meanwhile, *Kyttaro Ltd.* licensed worldwide rights on 11 April to Lilly's anti-angiopoietin-like (ANGPTL) 3/8 monoclonal antibody program for potential treatment of atherosclerotic cardiovascular disease (ASCVD) and linked dyslipidemias: hypertriglyceridemia and hypercholesterolemia. ANGPTL3 and ANGPTL8 are genetically validated targets for ASCVD and form the ANGPTL3/8 complex, which is a potent endogenous inhibitor of lipoprotein lipase (LPL).

London-headquartered Kyttaro said the antibodies it is acquiring have demonstrated a high affinity for the target with potential to treat patients at high-risk for ASCVD based on their ability to increase LPL activity and lower triglycerides. Financial terms of the deal were not disclosed, but Lilly obtained an equity stake in Kyttaro under the deal.

Coeptis Agrees To Acquire TLR5 Agonist Portfolio From Statera

Cancer cell therapy firm *Coeptis Therapeutics, Inc.* acquired *Statera BioPharma, Inc.*'s toll-like receptor 5 (TLR5) agonist platform on 13 April. The pending deal includes rights to entolimod a Phase II candidate for acute radiation syndrome.

Under the agreement, Coeptis will pay Statera $6m with the potential for revenue-based milestones that will be defined at closing, which is contingent on Coeptis achieved undisclosed financial objectives. The deal will confer rights to any product containing entolimod as an active ingredient and all other related TLR5 agonists, related intellectual property, contract rights, inventory and data related to such products.

Actinium, Immedica Team On Antibody-Radiation Conjugate For AML

Actinium Pharmaceuticals, Inc. and *Immedica AB* announced a license and supply agreement on 12 April for Iomab-B, an antibody-radiation conjugate comprised of apamistamab, a CD45-targeting antibody, and radioisotope iodine-131, being developed for targeted conditioning to facilitate bone marrow transplant and other cell and gene therapy applications.

Under the agreement, Actinium gets $35m up front and could realize an additional $417m in regulatory and commercial milestones as well as sales royalties. Stockholm-based Immedica acquires commercialization rights in Europe and Middle East/North Africa (MENA) countries. Actinium retains all rights in the US and the rest of the world, and will be responsible for certain clinical and regulatory activities as well as manufacturing of Iomab-B.

The pivotal Phase III SIERRA trial of Iomab-B completed enrollment in Q3 2021 with top-line data expected in Q3 2022. Bone marrow transplant is the only potentially curative treatment option for patients with active, relapsed or refractory acute myeloid leukemia, the partners

noted.

In Brief:

- Connecticut-based *AI Therapeutics, Inc.* licensed a novel, targeted therapy for rare pediatric and other cancers on 25 April from *EntreChem SL*. Financial terms were not disclosed. AI Therapeutics said EC-8042/AIT-102 targets mutations responsible for the development and progression of two rare cancer types, rhabdoid tumors and Ewing sarcoma, and may have potential in a wide range of tumors with mutations of the SWI/SNF protein complex.

- *Consegna Pharma, Inc.* acquired *Fathom Pharma, LLC* on 19 April at undisclosed terms, in a transaction that combines two biotechs focused on long-acting therapies. Consegna uses computational technology to create delivery systems for long-acting injectable drugs, while Fathom's focus is on long-acting therapies for moderate-to-severe chronic pain that address the safety and efficacy gaps in the current treatment paradigm. Lead product FP01 is being developed initially for the treatment of chronic pain in terminally ill patients.

- *Otologic Pharmaceutics, Inc.*'s subsidiary Autigen inked a research collaboration and license agreement on 13 April with Boehringer Ingelheim to discover, develop and commercialize therapies with sensorineural hearing loss (SNHL), which can lead to deafness. SNHL accounts for about 90% of reported hearing loss cases, the companies said, and is related to a degeneration of sensory hair cells in the inner ear. Under the agreement, Autigen gets an undisclosed upfront payment and research funding support. It can also realize up to $100m in milestone payments, plus royalties.

- Privately held Terran Biosciences agreed on 13 April to acquire *Blumentech S.L.*'s full patent portfolio and accompanying data, which includes multiple discoveries in psychedelics research. Blumentech's patents further complement Terran's rapidly growing IP portfolio of more than 150 patent applications in the psychedelic space. Eight days later, Terran licensed a pair of central nervous system candidates from *Sanofi*, the most recent of four deals Terran has struck this year. (Also see "*Deal Watch: AbbVie Partners With Gedeon Richter In Neuropsychiatry*" - Scrip, 18 Mar, 2022.)

- *Janssen Biotech Inc.* obtained options rights on 11 April to research, develop and commercialize novel products based on *Bioasis Technologies, Inc.*'s xB3 platform, which delivers therapeutics across the blood-brain barrier. Preclinical studies have demonstrated that Bioasis's technology can transport molecules of varying sizes and types including monoclonal antibodies, enzymes, small molecules, small-interfering RNA (siRNA) and gene therapies into the brain. Janssen said the platform offers the potential to treat numerous brain and central nervous system (CNS) diseases, including brain cancer, metabolic and neurodegenerative diseases.

- Messenger RNA specialist *BioNTech SE* and New Jersey-based *Matinas BioPharma Holdings, Inc.* agreed on 11 April to evaluate the combination of mRNA formats and the latter firm's proprietary lipid nanocrystal (LNC) platform technology for targeted vaccine delivery. The companies said they will collaborate on formulation, optimization and *in vitro* testing of potential oral mRNA vaccines. Under the agreement, Matinas gets a $2.75m upfront fee to work exclusively with BioNTech, as well as additional research funding.

- *Twist Bioscience Corporation*, which develops synthetic DNA with its silicon platform, and cell therapy firm *MediSix Therapeutics Pte. Ltd.* announced a collaboration on 7 April to discover novel antibodies against five undisclosed targets in leukemia and lymphoma. After Twist's discovery work, MediSix will develop novel chimeric antigen receptor T-cell therapies targeting malignancies and autoimmune diseases without any CAR T-cell fratricide. Twist gets an upfront payment and can earn clinical and regulatory milestones, as well as sales royalties.

- Canada's *Sequence Bio* unveiled a discovery collaboration on 7 April with dermatology-focused *LEO Pharma A/S*. Under the three-year agreement, Sequence will perform multi-omic analyses of samples from discovery cohorts across multiple dermatologic indications. LEO hopes to leverage insights generated from the collaboration to support novel potential approaches to treating dermatologic conditions.

Stay tuned for the next edition of Deal Watch. You can read more about other deals that have been covered in depth by Scrip and Generics Bulletin in recent days below:

(Also see "*Lupin Builds On Chinese Ambitions With Yabao Alliance*" - Generics Bulletin, 28 Apr, 2022.)	Lupin has built on a recent alliance in China with Foncoo by agreeing a further partnership for the Chinese market, this time with Yabao Pharmaceutical.
(Also see "*Sanofi Takes Manufacturing Up A Gear With McLaren Pact*" - Scrip, 27 Apr, 2022.)	By tapping into the data analytics and expertise used to choreograph pitstops in Formula One, Sanofi is hoping to "maximize performance and operational excellence," according to CEO Paul Hudson.
(Also see "*Cryptic Terran Licences Advanced CNS Assets From Sanofi*" - Scrip, 22 Apr, 2022.)	Terran Biosciences has nabbed a couple of Sanofi's Phase III CNS candidates, its third deal of the year aimed at transforming the neuropsychiatry market.
(Also see "*Hikma Gets FTC Nod For Custopharm Deal – But With Strings Attached*" - Generics Bulletin, 21 Apr, 2022.)	Hikma has moved closer to completing a deal worth more than $400m to acquire Custopharm, which promises to bolster its US

	injectables business. However, the FTC's approval of the transaction comes with conditions.
(Also see "*As Biotech M&A Activity Gingerly Rises, Regeneron Makes Moves On Checkmate*" - Scrip, 20 Apr, 2022.)	Regeneron hopes to bolster its immuno-oncology pipeline with the acquisition of Checkmate, which joins a spate of similar deals suggesting renewed interest in biotech investment despite an industry-wide slowdown.
(Also see "*Blow For Sweden's BioArctic As AbbVie Exits Parkinson's Pact*" - Scrip, 20 Apr, 2022.)	Novartis and Roche may be committed to the target, but AbbVie has decided that its efforts in Parkinson's will not include a Phase II trial of its Swedish partner's alpha synuclein drug.
(Also see "*J&J Continues Signaling Aggressive M&A Approach To Drive Growth*" - Scrip, 19 Apr, 2022.)	Johnson & Johnson reported disappointing Q1 sales for its COVID-19 vaccine but called the Carvykti launch solid and discussed plans for further diversification of its multiple myeloma portfolio.
(Also see "*Halozyme Buys Antares, Expanding Drug Delivery Ambitions*" - Scrip, 13 Apr, 2022.)	Halozyme will pay $960m to acquire Antares, gaining an auto-injector drug delivery platform, which the company said has broad licensing potential, as well as a commercial portfolio.
(Also see "*Another New Home For Momelotinib As GSK Buys Sierra*" - Scrip, 13 Apr, 2022.)	GlaxoSmithKline is paying a 39% premium to buy Sierra Oncology and its myelofibrosis therapy momelotinib which is set to be filed shortly in the US on the back of a strong Phase III package.
(Also see "*Controversial Ginkgo Will Team With Persephone On Bacterial Delivery Of Microbial Therapies*" - Scrip, 12 Apr, 2022.)	In its third biopharma collaboration this year, Ginkgo will apply its genetic engineering technologies to using Bacteroides for stable delivery of microbiome medicines.
(Also see "*Carlyle Bets Big On Late-Stage Biotech With Abingworth Buy*" - Scrip, 11 Apr, 2022.)	Tapping into Abingworth's pioneering clinical co-development model, the private equity behemoth is using that experience to form Launch Therapeutics which will seek to partner with biotech and biopharma on "best-in-class, late-stage clinical assets [and] bring life-saving therapies to market better, faster and cheaper."