SCRIP
CITELINE COMMERCIAL

11 Jan 2023 | **News**

Deal Watch: AbbVie Leads J.P. Morgan Deal Rush, But BI, Genentech And Lilly Also Big Players

by Joseph Haas

As the usual flurry of deals coincides with the J.P. Morgan Healthcare Conference, AbbVie signed an mRNA pact with Anima and a cancer research tie-up with Immunome.

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

AbbVie Taps Anima's mRNA Platform, Immunome's Antibody Discovery

AbbVie Inc. began the 2023 deal-making year by inking a pair of partnerships with US biotechs just prior to the start of the J.P. Morgan Healthcare Conference in San Francisco. On 9 January, the Chicago-area pharma signed on with New Jersey-based *Anima Biotech Inc.* to discover and develop mRNA biology modulators for three targets across oncology and immunology.

Anima said it will use its mRNA Lightning platform – which combines phenotypic screening with AI-driven elucidation of the mechanisms of action – to discover novel mRNA biology modulators against targets selected by AbbVie, giving the latter exclusive rights to license and develop and commercialize the resulting candidates.

Under the agreement, Anima gets $42m up front and can earn up to $540m in option fees and research and development milestones across the three targets, with potential for further commercial milestones and tiered sales royalties on net sales. AbbVie also holds an option to expand the collaboration with up to three additional targets under the same terms as the initial collaboration.

AbbVie and *Immunome Inc.* agreed upon a worldwide collaboration and option deal on 6 January focused on discovery of up to 10 novel antibody-target pairs arising from three specified tumor

types using the Exton, PA-based firm's discovery engine. Immunome gets $30m up front and is eligible for up to $70m in additional platform-access payments under the agreement.

In addition, Immunome can realize development and first commercial sale milestones of up to $120m per target, with potential for further sales-based milestones as well as tiered royalties on global sales.

Boehringer Calls On Startup 3T Biosciences For TCR Discovery Effort

Boehringer Ingelheim GmbH revealed on 9 January that it is partnering with *3T Biosciences* to discover and develop next-generation cancer therapies using the latter's TRACE (T-Cell Receptor Antigen and Cross-Reactivity Engine) discovery platform. The companies said their work will focus on developing therapies for cancers with high unmet medical need.

3T, which licensed T-cell receptor (TCR) therapy technology from *Stanford University* and announced a $40m series A financing in August, said its platform can yield safer, tumor-specific TCR therapeutics that can be administered at higher doses. (Also see "*Finance Watch: Certain Offerings Find Their Way To Investors In Tough Market*" - Scrip, 22 Jun, 2022.) The platform identified novel shared TCR targets of productive immune responses and comprehensively screens TCRs and TCR mimetics for specificity and off-target cross-reactivities, according to the South San Francisco biotech.

BI said it will provide patient-derived TCR data to drive 3T's discovery efforts. The German pharma will make an undisclosed upfront payment and provide R&D funding to 3T, which could also realize up to $268m in discovery, preclinical, clinical, regulatory, and commercial milestones as well as sales royalties under the agreement.

In addition to the alliance with 3T, BI also announced a non-exclusive license agreement on 10 January with Berlin's *ProBioGen AG* to use the latter's DirectedLuck transposase platform technology. Financial terms and how BI will use ProBioGen's technology were not disclosed, but the family-owned pharma said it has partnered with ProBioGen since 2011 as part of its efforts to use "cutting-edge technologies across the whole biopharmaceutical value chain to achieve its goal of accelerating the development of novel treatments."

Kronos Will Evaluate Cancer Transcription Factor Targets For Genentech

Roche Holding AG affiliate *Genentech, Inc.* unveiled a partnership on 9 January with *Kronos Bio, Inc.* to discover and develop small molecule drugs that modulate transcription factor targets selected by Genentech. San Mateo-CA-based Kronos said its discovery platform can identify protein-protein interactions, genetic dependencies and gene expression signatures to better understand and target the oncogenic activity of cancer-related transcription factors.

Using its small molecule microarray (SMM) platform, Kronos will build upon Genentech research

and lead early discovery and research work on two initial programs, with the latter getting exclusive rights to carry out preclinical and clinical development and commercialization. Financial terms include a $20m upfront payment to Kronos, up to $177m per program in preclinical, clinical and regulatory (including first-sale) milestones, $100m in sales milestones per program as well as tiered royalties. In total, milestone payments to Kronos could reach $554m.

Lilly Licenses Three Immunology Candidates From TRexBio

Exercising an option it held since the companies first linked up in 2021, *Eli Lilly and Company* licensed global rights on 9 January to develop and commercialize drug candidates from three *TRexBio* programs. Lilly pays $55m up front and could hand over more than $1.1bn in development, regulatory and sales milestones, plus tiered royalties.

TRexBio raised $59m in series A funding in 2021 with Lilly as one of the investors. (Also see "*Finance Watch: Insilico Raises $255m To Take AI-Discovered Drugs Into The Clinic*" - Scrip, 23 Jun, 2021.) One month prior to announcing the series A, TRexBio hired Johnston Erwin as CEO; Erwin had just retired after spending 36 years at Lilly.

TRexBio said it and Lilly have been quietly working together since the financing with the South San Francisco-based firm, using its Deep Biology platform to characterize Treg biology pathways and map Treg behavior to disease processes to identify and characterize novel therapeutic targets. Under the multi-year agreement, Lilly will develop the preclinical candidates TRB-051 (in IND-enabling studies), TRB-031 and TRB-041 for undisclosed immune-mediated diseases.

Neurocrine, Voyager Team On Gene Therapy In Neurological Disease

Neurocrine Biosciences, Inc. and *Voyager Therapeutics, Inc* unveiled a collaboration on 9 January to advance multiple gene therapies for the treatment of neurological diseases. Neurocrine obtains global research, development, manufacturing and commercialization rights to Voyager's GBA1 gene therapy program directed to the gene that encodes glucosylceramidase beta 1 (GBA1) for Parkinson's disease as well as three new gene therapy programs directed to rare central nervous system targets.

Sanofi-Backed Voyager Therapeutics Hails Gene Therapy's Arrival

By Lubna Ahmed

22 Aug 2017

The deal includes a preclinical GBA1 gene therapy program for Parkinson's and other GBA1-mediated diseases, which combines a GBA1 gene-replacement payload with novel capsids from Voyager's TRACER (Tropism Redirection of AAV by Cell-type-specific Expression of RNA) platform. In addition, the partners will collaborate on three new gene therapy programs directed at rare CNS targets, each

leveraging Voyager's novel TRACER capsids.

Voyager gets approximately $175m up front, comprised of $136m in cash plus the purchase of 4.4 million Voyager shares at $8.88 apiece (roughly $39m), a 50% premium. In addition, it can earn development milestones of up to $985m for new collaboration products under the GBA1 program and up to $175m for each of the three new discovery programs (for a total of $525m), along with tiered sales royalties. The Cambridge, MA, biotech can also realize milestone payments for up to two new collaboration products of up to $950m per product and for one new collaboration product of up to $275m.

Emerging Company Profile: With a pipeline of products for neurological diseases and a collaboration with Sanofi's Genzyme, Voyager Therapeutics is confident that its 'one-shot' gene therapy could be the answer to treating serious diseases of the brain. CEO Steven Paul shares development and funding plans and hopes to make Voyager's gene therapies the answer to neurological maladies.

Read the full article here

Moderna And CytomX Combine Technologies For Conditionally Activated Medicines

CytomX Therapeutics, Inc. and *Moderna, Inc.* inked a collaboration and licensing agreement on 5 January to create investigational mRNA-based, conditionally activated therapies that will combine Moderna's mRNA technology and CytomX's Probody therapeutic platform. The Probody platform enables proteins to be activated locally in diseased tissue, while remaining masked in systemic circulation, according to CytomX.

Under the agreement, CytomX gets $35m up front, including $5m of pre-paid research funding. The South San Francisco biotech could realize up to $1.2bn in development, regulatory and commercial milestone payments along with global royalties on net sales of any resulting product.

Moderna and CytomX said they will collaborate on discovery and preclinical development, with Moderna to lead clinical development and commercialization. Moderna also receives an option to participate in a future equity financing by CytomX.

Synaffix Adds Another ADC Partner In Hummingbird Pact

One day prior to licensing its antibody conjugation technology platforms GlycoConnect and HydraSpace, along with select toxSYN linker-payloads to *Amgen, Inc.*, *Synaffix B.V.* licensed access to those same platform technologies to *Hummingbird Bioscience* on 4 January for use in developing a cancer ADC product. It could realize up to $150m under the agreement, including upfront and milestone payments; the Dutch firm can also earn sales royalties under the deal.

All told, Synaffix has now partnered its ADC technology with 12 separate biopharmaceutical companies, also including *Genmab A/S*, *Mersana Therapeutics, Inc.*, *ADC Therapeutics SA* and *MacroGenics, Inc.*. (Also see "*Synaffix Aims For Top ADC Tech Provider Spot After Inking MacroGenics Deal*" - Scrip, 8 Feb, 2022.)

Capsida Partners AAV Capabilities With Lilly Affiliate Prevail

Capsida Biotherapeutics Inc. announced a multi-year collaboration on 4 January with Lilly subsidiary *Prevail Therapeutics Inc.* to leverage its novel adeno-associated virus (AAV) engineering platform to identify and advance clinically translatable capsids paired with Prevail's cargo to develop best-in-class, intravenous gene therapies. If successful, the resulting products will address specified targets known to cause serious diseases that affect the central nervous system (CNS), the partners said.

Capsida said its high-throughput platform is able to biologically screen and identify engineered AAV capsids that target specific tissues, such as the brain, while limiting transduction of tissues and cell types not relevant to the disease of focus.

Under the agreement, Capsida gets $55m consisting of an upfront payment and a commitment to participate in the Prevail's next financing round, plus the potential to earn up to $685m in research and development and commercial milestones as well as tiered royalties. In addition, Capsida will have an option to participate in development and commercialization on one of the programs in the US in exchange for a gross margin share in that program.

In Brief:

- Scotland’s Pheno Therapeutics Ltd. announced on 11 January that it has licensed preclinical small molecules from *UCB S.A.* to develop for remyelination in neurological diseases. Pheno plans to deploy its human phenotypic screening platform against the molecules in search of candidates that can modulate oligodendrocyte biology, for possible therapeutic benefit in diseases like multiple sclerosis. UCB gets an undisclosed upfront payment under the deal and could realize milestone payments and tiered sales royalties.

- *Myrtelle Inc.*, focused on gene therapy for neurodegenerative diseases, said on 11 January that it is partnering with rAAVen Therapeutics to develop recombination adeno-associated virus (AAV) vectors for use as a delivery mechanism for gene therapies targeting myelin. Wakefield, MA-based Myrtelle said it will test the vectors in a range of myelin-associated disorders and hold global rights to commercialize any resulting gene therapy products. In return, rAAVen will be eligible for milestone payments and sales royalties.

- Catania, Italy-based ophthalmology firm *SIFI S.p.A.* announced on 10 January that it will partner with Netherlands-based Avanzanite Bioscience to market the investigational rare disease drug Akantior (polihaxanide) in Switzerland and 26 markets in the European

Economic Area. Avanzanite will provide access to the product to several hundred patients in those markets who suffer from acanthamoeba keratitis, a severe and progressive parasitic corneal infection. SIFI, which expects approval decisions on the drug from the European Medicines Agency and the US Food and Drug Administration this year, will continue handling regulatory responsibilities as well as commercial activities in the UK, France, Germany, Italy, Spain, Romania and Turkey. (Also see "*SIFI's Parasitic Eye Infection Drug & Biosimilar Aflibercept Among Raft Of EU Filings*" - Pink Sheet, 17 Jun, 2022.)

- UK-based *Prokarium Ltd.* and *Ginkgo Bioworks* signed an agreement on 9 January to develop a bactofection platform to deliver RNA-based therapeutics. Most gene therapies today leverage viral delivery systems, the companies noted, while bactofection, the process of transferring genetic material into a mammalian cell via bacteria, could offer an alternative delivery system. In collaboration with Prokarium, Ginkgo will aim to engineer a *Salmonella*-based bactofection platform for the delivery of RNA payloads to treat cancer patients.

- *GreenLight Biosciences Holdings* and *EpiVax, Inc.* agreed on 9 January to jointly develop and commercialize personalized mRNA-based vaccine candidates for cancer, with an initial focus on bladder cancer. The companies are granting each other royalty-free exclusive licenses to each other's technology platforms: EpiVax's Ancer tumor genome-sequencing tool and GreenLight's mRNA vaccine design, formulation and manufacturing expertise. Each firm will pay its own development costs up to an agreed upon point, after which development costs, as well as pre-tax profits and losses, will be shared 50/50.

- Paris-based artificial intelligence and quantum physics specialist *Aqemia* revealed on 9 January that it received additional upfront cash in an expansion of a December 2021 immuno-oncology collaboration with *Les Laboratoires Servier SAS*. The expansion also could mean additional milestone payments for Aqemia in its work against an undruggable IO target.

- *Bayer AG* subsidiary *Asklepios BioPharmaceutical, Inc.* (AskBio) inked a multi-year collaboration and option agreement on 9 January with *ReCode Therapeutics* to partner on discovery of precision genetic medicines through the development of a novel platform for full gene insertion by single-vector delivery of gene editing and DNA cargoes. The collaboration combines AskBio's expertise in synthetic DNA and gene-editing nuclease applications with ReCode's SORT lipid nanoparticle (LNP) delivery technology.

- Privately held *EVQLV, Inc.* announced a collaboration on 8 January with Spain's Libera Bio to use the latter's Multifunctional Polymeric Nanocapsule (MPN) technology platform to deliver novel antibody therapeutics to intracellular targets in cancer. New York-based EVQLV will design the novel antibodies to be combined with the MPN delivery technology.

- *bluebird bio* spinout *2seventy Bio, Inc.* is amending the parent company's 2018 partnership with *Regeneron Pharmaceuticals, Inc.* on 6 January to develop novel cell-based therapies for solid tumors. (Also see "*Regeneron And Bluebird Team Up In Cell Therapy "Joint Venture"-Style Deal* " - Scrip, 6 Aug, 2018.) Regeneron made a $20m equity investment in 2seventy under the new agreement and committed to $20m in near-term development milestones.

- *Acelyrin, Inc.* acquired privately held *ValenzaBio, Inc.* in an all-stock transaction on 5 January. Founded in 2019, ValenzaBio explores approaches in immunology to develop treatment candidates for underserved indications. The acquisition brings Acelyrin assets including Phase I lonigutamab (VB-421) for thyroid eye disease and VB-517, a preclinical anti-c-KIT being studied in chronic urticaria.

- Genentech and Madison, WI-based *Nimble Therapeutics, Inc* announced an expansion of their February 2020 collaboration focused on peptide therapies in multiple therapeutic areas on 5 January. (Also see "*Deal Watch: Genentech Sees Bicycle As Route To Novel Targeted Cancer Immunotherapies*" - Scrip, 25 Feb, 2020.) Nimble, which is employing peptide-synthesis technology against Genentech-selected targets, gets $20m up front under the expanded pact, which includes a license agreement and increases the firm's earnout potential under the deal to more than $1.1bn.

- *Ensoma* agreed on 5 January to acquire the privately held CRISPR engineering company *Twelve Bio ApS*. In tandem with the deal, Ensoma announced an $85m series B financing. (Also see "*Finance Watch: VC Round Extensions Attractive While Stock Market Wobbles*" - Scrip, 6 Jan, 2023.) Twelve Bio is focused on X-ray crystallography and cryogenic electron microscopy to further engineer and evolve CRISPR-Cas12a into wholly novel sequences with unique properties useful for a range of DNA editing strategies.

- Wisconsin-based *Fujifilm Cellular Dynamics Inc.* signed an agreement on 5 January with *Novo Nordisk A/S* to use the former's iPSC platform for the development and commercialization of iPSC-derived cell therapies with a focus on addressing serious chronic diseases. Terms were not disclosed.

- US biotechs *Caris Life Sciences* and *Xencor, Inc.* agreed on 5 January to add targets to their 2 August partnership to develop and commercialize XmAB bispecific antibodies for cancer. (Also see "*Deal Watch: Gemini Goes Through Second Re-Invention Via Reverse Merger With Disc Medicine*" - Scrip, 10 Aug, 2022.) Xencor gets rights to three targets under the revised deal with Caris getting an undisclosed upfront payment plus up to $187m in additional development and commercial milestone payments, expanding the firm's earnout potential under the agreement to approximately $300m.

- *Biogen, Inc.* announced a license and collaboration agreement on 4 January to develop

Alcyone Lifesciences, Inc.'s implantable ThecaFlex DRx System for subcutaneous delivery of antisense oligonucleotide therapies into the intrathecal space. Biogen said it hopes to use the technology to improve the treatment experience for patients with neurological disorders such as spinal muscular atrophy and amyotrophic lateral sclerosis, with an initial plan to test the system as a delivery mechanism for SMA drug Spinraza (nusinersen). Alcyone gets $10m up front under the deal and could earn up to $41m in development and commercial milestones.

- Cell-engineering firm *MaxCyte, Inc.* signed a strategic platform license on 3 January with *Catamaran Bio Inc.*, giving it non-exclusive clinical and commercial rights to use MaxCyte's Flow Electroporation technology and ExPERT platform. In return, MaxCyte gets platform-licensing fees and can earn program-related revenue. Catamaran uses synthetic biology and non-viral cell engineering to develop allogeneic, cryopreserved CAR-NK (natural killer) cell therapies to treat cancers, including solid tumors.

- Gene therapy ophthalmic disease specialist *Opus Genetics* acquired the rights to two preclinical AAV-based gene therapy product candidates on 27 December for inherited retinal diseases from *Iveric Bio*. Opus said it will develop the candidates to address bestrophin-1 (BEST1)-related inherited retinal diseases and rhodopsin-mediated autosomal dominant retinitis pigmentosa (RHO-adRP), respectively. Under the deal, Iveric gets $500,000 up front plus 2.63 million shares of Opus stock. It can also earn milestones and sales royalties under the agreement.

- The all-stock merger of California biotechs *Equillium, Inc.* and *Metacrine, Inc.* announced in September was terminated by mutual agreement on 23 December. (Also see "*Equillium Buys Metacrine For Its Cash, Will Outsource Lead Drug Candidate*" - Scrip, 7 Sep, 2022.) The deal would have been valued at $26m, with Equillium acquiring Metacrine's shares at a 25% premium.

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 "*BioNTech Beefs Up AI/ML Investment With InstaDeep Buy*" - Scrip, 10 Jan, 2023.)	BioNTech is spending up to more than half a billion pounds to acquire AI/machine learning company InstaDeep.
(Also see "*M&A Has Been Down, But EY Argues Conditions Are Right For An Uptick In 2023*" - Scrip, 9 Jan, 2023.)	Despite concerns about the impact of the Inflation Reduction Act and constraining factors like inflation, EY believes more than $1.4tn in life sciences industry "firepower" should result in increased deal-making this

	year.
(Also see "*AstraZeneca Nabs CinCor's Hypertension Asset In $1.3bn Acquisition*" - Scrip, 9 Jan, 2023.)	AstraZeneca is acquiring CinCor in a deal that could be worth up to $1.8bn, in return getting hold of its Phase II hypertension candidate, baxdrostat, which offers combination potential with Farxiga.
(Also see "*Ipsen Eyes Opportunity In Rare Liver Diseases With Albireo Buy*" - Scrip, 9 Jan, 2023.)	Ipsen is paying a 104% premium plus contingent value rights of an additional $10 per share to get hold of AstraZeneca spin-off Albireo and its lead asset Bylvay, which is approved for progressive familial intrahepatic cholestasis and is showing promise in two other more lucrative indications.
(Also see "*Chiesi Expands Its Rare Disease Reach With $1.48bn Amryt Buyout*" - Scrip, 9 Jan, 2023.)	Privately owned Chiesi currently earns most of its revenues in respiratory medicine in Europe, but has set its sights on expanding in rare diseases and the US market.
(Also see "*Fate Uncertain As Cell Therapy Biotech Pulls Out Of J&J Deal, Restructures*" - Scrip, 6 Jan, 2023.)	Fate Therapeutics is discontinuing its lead clinical programs and planning major layoffs as it seeks to reprioritize its pipeline and extend cash runway.
(Also see "*Celltrion Allies With Rani As Exclusive Oral Ustekinumab Partner*" - Generics Bulletin, 9 Jan, 2023.)	Having previously an agreement with BioFactura to assess the company's proposed ustekinumab biosimilar with its RaniPill oral drug delivery technology, Rani has now unveiled a deal with Korean major Celltrion for use of its CT-P43 Stelara biosimilar candidate.
(Also see "*Coherus Makes U-Turn On Eylea Biosimilar With Klinge BioPharma Deal*" - Generics Bulletin, 9 Jan, 2023.)	Buoyed by the recent launch and leverage of its biosimilar ranibizumab biosimilar, Coherus BioSciences has brokered a deal with Klinge BioPharma/Formycon for the commercialization rights to the firms' Eylea (aflibercept) biosimilar candidate.
(Also see "*Stalicla Seals Deal To Advance Novartis Drug For Cocaine Misuse*" - Scrip, 9 Jan, 2023.)	Stalicla has persuaded its fellow Swiss firm that it can advance mavoglurant, a Novartis drug that has failed in Parkinson's and Fragile X syndrome, for cocaine use and neurodevelopmental disorders.

(Also see "*Hikma Adds Another Celltrion Biosimilar To MENA Collaboration*" - Generics Bulletin, 6 Jan, 2023.)	Hikma has further expanded its portfolio of biosimilars in the MENA region with the addition of Celltrion's Vegzelma bevacizumab rival to Avastin. Meanwhile, Hikma has also just launched a new pre-filled syringe version of naloxone in the US.
(Also see "*IRA Already Impacting Merck & Co. BD Decisions, CEO Davis Says*" - Scrip, 5 Jan, 2023.)	Merck & Co. CEO Rob Davis said the company is already factoring policy changes from the Inflation Reduction Act into its business development decisions.
(Also see "*Amneal Reveals Orion As European Partner*" - Generics Bulletin, 5 Jan, 2023.)	Amneal has delivered on promises that it would soon finalize a European partnership by announcing a long-term licensing collaboration with Finnish firm Orion that will also cover Australia and New Zealand.
(Also see "*Amgen And Synaffix Alliance Could Be Biggest Preclinical ADC Licensing Deal Yet*" - Scrip, 5 Jan, 2023.)	Amgen has signed two big early-stage deals in a matter of days, signaling that antibody-drug conjugates are a priority target in oncology for the firm.
(Also see "*Merck KGaA Cancer Deal-Making Spree Continues With PDS Tie-Up*" - Scrip, 4 Jan, 2023.)	PDS is getting rights to Merck KGaA's M9241, a tumor-targeting interleukin-12 fusion compound which is a key component, together with its own investigational HPV16-targeted immunotherapy, in a triple combination being studied to treat advanced HPV-positive cancers.
(Also see "*Sandoz Ups Biosimilar Game With Alteogen Subcutaneous Tech Deal*" - Generics Bulletin, 4 Jan, 2023.)	Sandoz is eyeing development of up to three subcutaneous formulation biosimilars, which offer greater benefits to both patients and healthcare providers, via a technology agreement with Korean firm Alteogen.
(Also see "*Hikma Delivers On Authorized Xyrem In US*" - Generics Bulletin, 3 Jan, 2023.)	Hikma has begun 2023 with the long-awaited launch of a US authorized generic version of Xyrem (sodium oxybate). Meanwhile, the company has also struck a deal with Junshi Biosciences for toripalimab in the MENA region.
(Also see "*EVOQ Partners With Gilead On NanoDisc Approach To RA, Lupus*" - Scrip, 3 Jan, 2023.)	Michigan's EVOQ follows 2021 collaboration in autoimmune disease with Amgen with its second tie-up, teaming up with Gilead in

	rheumatoid arthritis and systemic lupus erythematosus.
(Also see "*Zentiva Grows In Italy With Acquisition Of Sanofi OTC Brands*" - Generics Bulletin, 3 Jan, 2023.)	Zentiva has added the Zerinol and Schoum Solution OTC brands to its Italian portfolio. Meanwhile, the firm has also agreed a “major product acquisition” with Tillomed Spain in the hospital oncology segment.