Antibody News You Should Know

October 1 - 15, 2022

Looking for a job at an awesome company? Genmab is currently seeking a principal scientist for In silico Discovery. This position is of interest for scientists with experience and/or interest in generating antibody-based prediction pipelines and building

prediction models at the intersection of molecular biology and data science.

Details and link to apply are here.

Business news

On October 3, 2022, **Incyte announced** that the company entered into an agreement to acquire Villaris Therapeutics, an asset-centric biopharmaceutical company seeded by Medicxi and focused on the development of novel antibody therapeutics for vitiligo. Its lead asset, auremolimab (VM6), is expected to enter clinical development in 2023. Auremolimab is a novel, ultra-humanized, anti-IL-15Rβ (CD122) antibody designed to target and deplete autoreactive resident memory T cells that has demonstrated efficacy as a treatment for vitiligo in preclinical models.

On October 3, 2022, **Oxford BioTherapeutics (OBT) announced** that Genmab licensed a novel antibody related to one of OBT's immune-oncology programs. The target was discovered using Oxford BioTherapeutics' proprietary OGAP® drug discovery platform, which incorporates one of the world's largest proteomic databases, integrating clinical, experimental and expression data. Under the terms of the agreement, Genmab will be responsible for the future development and commercialization of any products incorporating this antibody. In addition to the upfront payment, OBT will receive additional development and regulatory milestone payments as well as royalties on any future product sales.

On October 6, 2022, **Surrozen, Inc. announced** that it has entered into a collaboration and license agreement with Boehringer Ingelheim to research and develop SZN-413 for the treatment of retinal diseases. SZN-413 is a Fzd4 bi-specific antibody. Fzd4-mediated Wnt signaling is known to play a critical role in retinal vascular integrity and function. Data generated in preclinical models of retinopathy demonstrated SZN-413 stimulated Wnt signaling and was able to induce normal retinal vessel regrowth while suppressing pathological vessel growth.

On October 6, 2022, **Provention Bio, Inc. announced** that the company entered into a co-promotion agreement with Sanofi U.S. for the launch of Provention's lead investigational drug candidate teplizumab. The agreement

enables Provention Bio to leverage Sanofi's expertise, capabilities and commercial resources to support the potential launch of teplizumab currently under review by the U.S. Food and Drug Administration (FDA) for the delay of clinical type 1 diabetes in at-risk individuals, with a user fee goal date of November 17, 2022, for the Biologics License Application. Teplizumab is an anti-CD3 monoclonal antibody.

On October 12, 2022, **IPA (ImmunoPrecise Antibodies Ltd.) announced** that its subsidiary, Talem Therapeutics LLC entered into a multi-target license agreement with OmniAb, Inc. The agreement involves development and commercialization of OmniChicken-derived antibody panels against the immuno-oncology targets B7H3, CD38 and TIM3. The collaboration leverages antibodies from the OmniChicken discovery technology with Talem's advanced antibody development technologies aimed at optimizing clinical success. OmniAb is currently a subsidiary of Ligand Pharmaceuticals Incorporated, but Ligand and OmniAb will split into two independent, publicly traded companies in late October 2022.

Eftilagimod alpha granted Fast Track designation

On October 4, 2022, **Immutep Limited announced** the FDA has granted Fast Track designation to eftilagimod alpha in combination with pembrolizumab for the treatment of first line non-small cell lung cancer. Eftilagimod alpha binds to antigen-presenting cells (APCs) via MHC II molecules, activating the APCs and thereby presenting antigen to the adaptive immune system. This leads to activation and proliferation of CD4+ (helper) and CD8+ (cytotoxic) T cells. The designation is based on the data from the TACTI-002/KEYNOTE-798 Phase 2 study (NCT03625323) in 1st line NSCLC for PD-L1 all-comers.

- Eftilagimod alpha is a soluble LAG-3-Ig fusion protein, immune stimulatory factor, and MHCII agonist.

Phase 1 studies planned or started

On October 3, 2022, **Prometheus Biosciences, Inc. announced** that the FDA cleared the company to proceed with a clinical trial under its Investigational New Drug (IND) application for PRA052 in ulcerative colitis. Initiation of a Phase 1 SAD/MAD study for PRA052 in normal healthy volunteers is expected to commence in the fourth quarter of this year. PRA052 is a monoclonal antibody that blocks CD30 ligand.

On October 5, 2022, **Clarametyx Biosciences Inc. announced** that the FDA has accepted the company's IND application to initiate a first-in-human Phase 1 safety study followed by a Phase 1b trial of CMTX-101, a novel immune-enabling antibody therapy. Following a Phase 1 safety evaluation in healthy volunteers, the Phase 1b trial will aim to provide safety and exploratory efficacy data on the use of CMTX-101 among individuals hospitalized with community-acquired bacterial pneumonia.

On October 13, details were posted on clinicaltrials.gov for a Phase 1 open-label, single-arm study (**NCT05577182**) to investigate the safety, tolerability, pharmacokinetics, pharmacodynamics and preliminary activity of INCA32459 in participants with selected advanced malignancies. Sponsored by Incyte Corporation, the study will enroll an estimated 120 patients and has an estimated start date of November 17, 2022. Incyte is developing INCA32459 in collaboration with Merus N.V.

- INCA32459 is a bispecific antibody targeting LAG3 and PD-1.

On October 4, 2022, **Abcuro, Inc. announced** the start of a Phase 1/2 dose escalation trial to evaluate the safety, tolerability, and proof-of-concept of ABC008 in patients with T cell large granular lymphocytic leukemia who suffer from anemia and/or neutropenia. ABC008 has been designed to treat diseases mediated by highly cytotoxic T cells, including the autoimmune muscle disease inclusion body myositis (IBM) The FDA has granted Orphan Drug designation to ABC008 for the treatment of IBM.

- ABC008 is a first-in-class anti-KLRG1 antibody capable of selectively depleting highly cytotoxic T cells, while sparing regulatory T cells, central memory T cells, and other immune cells.

Phase 3 study results for sotatercept

On October 10, 2022, **Merck announced** positive top-line results from the pivotal Phase 3 STELLAR trial evaluating the safety and efficacy of sotatercept evaluated as an add-on to stable background therapy for the treatment of pulmonary arterial hypertension (PAH). The trial met its primary efficacy outcome measure, demonstrating a statistically significant and clinically meaningful improvement in 6-minute walk distance from baseline at 24 weeks. The European Medicines Agency has granted Priority Medicines (PRIME) designation to sotatercept for the treatment of PAH patients, and FDA has granted Breakthrough Therapy designation for the same indication.

Registration is open!

Business news

On October 17, 2022, **Gilead Sciences, Inc. and MacroGenics, Inc. announced** an exclusive option and collaboration agreement to develop MGD024 and two additional bispecific research programs. The collaboration agreement grants Gilead the option to license MGD024, which is being evaluated in a Phase 1 study as a potential treatment for hematological malignancies, including acute myeloid leukemia and myelodysplastic syndromes. As part of the agreement, Gilead will pay MacroGenics an upfront payment of $60 million and MacroGenics will be eligible to receive up to $1.7 billion in target nomination, option fees, and development, regulatory and commercial milestones.

- MGD024 is a bispecific antibody, derived from MacroGenics' DART® platform, that binds CD123 and CD3.

On October 18, 2022, **Syncromune, Inc. announced** that the company has signed an exclusive worldwide license agreement for YH002. Under the terms of the agreement, Syncromune will acquire global rights of development and commercialization of the intratumoral combination therapy containing Eucure's YH002 and

two other active ingredients as part of the Syncrovax™ therapy. The Syncrovax™ platform is a next-generation personalized cancer therapy being developed to optimize intratumoral immunotherapy for the treatment of metastatic solid tumor cancers.

- YH002 is a recombinant, humanized IgG1 monoclonal antibody that targets human tumor necrosis factor receptor (TNFR) superfamily member 4 (OX40).

On October 20, 2022, **AbbVie announced** that it is acquiring DJS Antibodies Ltd., a privately-held UK-based biotechnology company dedicated to discovering and developing antibody medicines that target difficult-to-drug disease-causing proteins, such as G protein-coupled receptors. DJS's lead program, DJS-002 is currently in investigational preclinical studies for the treatment of Idiopathic pulmonary fibrosis and other fibrotic diseases.

- DJS-002 is a potential first-in-class lysophosphatidic acid receptor 1 antagonist antibody.

New Orphan Drug designations
On October 20, 2022, **JJP Biologics announced** that the European Commission (EC) approved the company's application for designation of its product candidate JJP-1212 as an orphan medicinal product for treatment of linear IgA bullous dermatosis. JJP-1212 interferes with the IgA/CD89 axis, and thereby may resolve IgA/autoantigen-induced inflammation and subsequent tissue damage in a variety of autoimmune diseases. The EC granted orphan drug status based on in vitro and in vivo non-clinical data showing the reduction in the influx of granulocytes into the basement membrane zone of the skin and reduction of inflammatory biomarkers, addressing the key elements of LABD skin blistering pathogenesis.

- JJP-1212 is a humanized anti-CD89 antibody.

On October 24, 2022, **Acumen Pharmaceuticals, Inc. announced** that ACU193 was granted Fast Track designation for the treatment of early Alzheimer's disease by the U.S. Food and Drug Administration (FDA). The soluble amyloid beta (Aβ) oligomers targeted by ACU193 are the most toxic and pathogenic form of Aβ, relative to Aβ monomers and amyloid plaques. ACU193 is currently being studied in the Phase 1 INTERCEPT-AD trial (NCT04931459) designed to assess its safety and proof of mechanism. The study is recruiting an estimated 62 patients and has a primary completion date in March 2023.

- ACU193 is a humanized antibody that targets soluble Aβ oligomers.

First clinical studies to start soon
On October 19, 2022, details were posted on clinicaltrials.gov for a first-in-human Phase 1 study (**NCT05586321**) to evaluate the safety and antitumor activity of GEN1056 in patients with advanced solid tumors. Sponsored by Genmab, with BioNTech SE as collaborator, the study will enroll an estimated 48 patients and is due to start October 20, 2022 (still listed as not yet recruiting on November 1). The two companies are already collaborating on the clinical development of antibody-based cancer treatments Gen1042 (DuoBody-CD40x4-1BB, BNT312) and Gen1046 (DuoBody-PD-L1x4, BNT311), but details about GEN1056 are scarce.

On October 24, 2022, details were posted on clinicaltrials.gov for a first-in-human Phase 1/2 study (**NCT05592626**) of STAR0602 in patients with unresectable, locally advanced, or metastatic solid tumors that are antigen-rich. Sponsored by Marengo Therapeutics, Inc., the study will enroll an estimated 365 participants and is due to start in November 2022.

- STAR0602 is a bispecific antibody fusion molecule that utilizes the proprietary STAR platform approach to bind and activate a specific Vβ T cell subset, while also delivering a costimulatory signal to the same T cell.

On October 28, 2022, details were posted on clinicaltrials.gov for a first-in-human Phase 1 study

(**NCT05585034**) to evaluate the safety, tolerability, and pharmacokinetics of intravenous administration of XmAb808 in combination with pembrolizumab in subjects with selected advanced solid tumors and to identify the minimum safe and biologically effective/recommended dose and schedule for XmAb808. Sponsored by Xencor, the study will enroll an estimated 220 participants and is due to start in November 2022.

- XmAb808 is a tumor-selective, co-stimulatory CD28 bispecific antibody that targets B7-H3 and CD28.

On October 28, 2022, details were posted on clinicaltrials.gov for a Phase 1/2 study (**NCT05597839**) that will evaluate DF9001 as a monotherapy and in combination with nivolumab in patients with advanced solid tumors, and expansion in selected indications. Sponsored by Dragonfly Therapeutics, Inc., the study will recruit an estimated 362 patients and is due to start in October 2022 (still listed as not yet recruiting on November 1).

- DF9001 is derived from the proprietary TriNKETs (Tri-specific, NK cell Engager Therapies) platform.

BLA and MAA submitted for epcoritamab

On October 28, 2022, **Genmab announced** that the company submitted a Biologics License Application to FDA for subcutaneous epcoritamab for the treatment of patients with relapsed/refractory large B-cell lymphoma after two or more lines of systemic therapy. Genmab also announced that AbbVie submitted a Marketing Authorization Application for epcoritamab for the treatment of patients with relapsed/refractory diffuse large B-cell lymphoma after two or more lines of systemic therapy, which has been validated by the European Medicines Agency. The submissions are supported by the EPCORE™ NHL-1 open-label, multi-center Phase 2 trial evaluating the safety and preliminary efficacy of epcoritamab in adult patients with relapsed, progressive or refractory CD20+ mature B-cell non-Hodgkin's lymphoma.

- Epcoritamab is a bispecific antibody, derived from Genmab's DuoBody®platform, that targets CD20 on B cells and CD3 on T cells.

FDA Committee votes against approval of 131I-omburtamab

On October 28, 2022, **Y-mAbs Therapeutics, Inc. announced** the FDA's Oncologic Drugs Advisory Committee, which reviewed investigational 131I-omburtamab for the treatment of CNS/leptomeningeal metastasis from neuroblastoma, voted 16 to 0 that the Company had not provided sufficient evidence to conclude that omburtamab improves overall survival. ODAC reviewed data from omburtamab's clinical development program with a focus on study 03-133 (a pivotal phase 1 study) and study 101 (a pivotal phase 2 study) as well as the historical control group. FDA's Prescription Drug User Fee Act target date is November 30, 2022. FDA is not bound by the Advisory Committee's recommendations, but generally takes the recommendation into consideration when making its decision.

- 131I-omburtamab is a radiolabeled, murine IgG1 antibody that targets B7-H3 (CD276).

Approvals in the US and EU

On October 24, 2022, **AstraZeneca announced** that Imjudo (tremelimumab) in combination with Imfinzi (durvalumab) had been approved in the US for the treatment of adult patients with unresectable hepatocellular carcinoma. The approval was based on results of the Phase 3 HIMALAYA trial, which showed single priming dose of Imjudo added to Imfinzi reduced risk of death by 22% vs. sorafenib. Regulatory applications for Imjudo in combination with Imfinzi are currently under review in Europe, Japan and several other countries for the treatment of patients with advanced liver cancer based on the HIMALAYA results.

- Tremelimumab is a human monoclonal antibody that targets the activity of cytotoxic T-lymphocyte-associated protein 4.

On October 25, 2022, **FDA granted accelerated approval to teclistamab-cqyv** (Tecvayli, Janssen Biotech, Inc.) for adult patients with relapsed or refractory multiple myeloma (RRMM) who have received at

Business news

On November 2, 2022, **AbCellera announced** that Regeneron elected to exercise its right to advance a therapeutic antibody candidate, discovered in partnership with AbCellera as part of a multi-target collaboration between the companies, into further preclinical development. The partnership, which commenced in March 2020 and allows for four discovery programs selected by Regeneron, leverages AbCellera's antibody discovery engine and Regeneron's VelocImmune® mice to identify novel therapeutic antibodies. This is the first potential candidate selected by Regeneron to move into further evaluation, and it targets an undisclosed G-protein coupled receptor.

On November 8, 2022, **Salipro Biotech AB announced** that it has entered into a research collaboration and license agreement with Sanofi! The collaboration brings together Salipro Biotech's unique expertise in developing stable antigens of GPCRs, ion channels and transporters via its proprietary Salipro® platform with Sanofi's discovery programs to identify biologics with the desired therapeutic properties against a selected target.

On November 15, 2022, **Ablexis, LLC and AlivaMab Discovery Services, LLC announced** an expansion of their platforms and capabilities in antibody drug discovery and engineering, in particular highlighting their:

- Molecularly diverse panels of lead-quality antibodies ready for reformatting into multispecific formats of the partner's choice, including a large panel of T-cell-engaging CD3 antibodies that potently eliminate cancer cells with minimal cytokine release.
- New strains of AlivaMab XKL Mice offered by Ablexis that further expand the molecular and epitope diversity of the immune response to promote even broader responses against the increasingly complex types of antigens at the cutting edge of antibody drug discovery.
- NGS-based hit-expansion capabilities that expand upon ADS' existing advanced hybridoma-based approaches, increasing captured diversity.
- Immune repertoire display technology offered by ADS, which enhances the capture of alternative diversities of the immune response, downstream screening, and antibody drug engineering.

Elranatamab granted Breakthrough Therapy designation

On November 3, 2022, **Pfizer announced** that elranatamab, was granted FDA Breakthrough Therapy Designation for relapsed or refractory multiple myeloma. The Breakthrough Therapy Designation was based on updated data from Phase 2 MagnetisMM-3 study that showed an overall response rate of 61.0% and a manageable

safety profile after a median follow-up of 6.8 months. MagnetisMM-3 is a registration-enabling trial of elranatamab.

- Elranatamab is a bispecific antibody that targets BCMA on cancer cells and CD3 on T cells.

EMB07 enters clinical study
On November 7, 2022, details were posted on clinicaltrials.gov for a first-in-human, Phase 1, open-label study **(NCT05607498)** of EMB-07 in patients with locally advanced/metastatic solid tumors. Sponsored by EpimAb Biotherapeutics, Inc., the study will assess safety and tolerability, and identify the maximum tolerated dose and/or recommended Phase 2 dose for EMB-07. Estimated enrollment is 75 patients and the estimated study start date is November 17, 2022.

- EMB-07 is a bispecific antibody targeting Receptor Tyrosine Kinase-like Orphan Receptor 1 (ROR1) and CD3.

Primary endpoint missed in Phase 3 studies of gantenerumab
On November 14, 2022, **Roche announced** results from the Phase 3 GRADUATE I and II studies evaluating gantenerumab in people with mild cognitive impairment due to Alzheimer's and mild Alzheimer's dementia, collectively called early Alzheimer's disease. The studies did not meet their primary endpoint of slowing clinical decline. Although relative reductions in clinical decline of 8% in GRADUATE I and 6% in GRADUATE II compared with placebo were observed, the results were not statistically significant. Gantenerumab was well tolerated, including the subcutaneous administration.

- Gantenerumab is a monoclonal antibody that binds aggregated forms of beta-amyloid.

MAA for toripalimab submitted to EMA
On November 15, 2022, **Shanghai Junshi Biosciences Co Ltd announced** that the company submitted a marketing authorization application to the European Medicines Agency for toripalimab. The indications requested in the MAA are:

1. Toripalimab combined with cisplatin and gemcitabine for the first-line treatment of patients with locally recurrent or metastatic nasopharyngeal carcinoma;
2. Toripalimab combined with paclitaxel and cisplatin for the first-line treatment of patients with unresectable locally advanced/recurrent or metastatic esophageal squamous cell carcinoma.

A biologics license application has already been submitted to FDA.

- Toripalimab is an anti-PD1 monoclonal antibody.

Approvals granted in the EU and US
On November 4, 2022, **Sanofi and AstraZeneca announced** that the European Commission has approved Beyfortus® (nirsevimab) for the prevention of respiratory syncytial virus (RSV) lower respiratory tract disease in newborns and infants during their first RSV season. The safety and efficacy of Beyfortus were evaluated under an accelerated assessment procedure by the EMA.

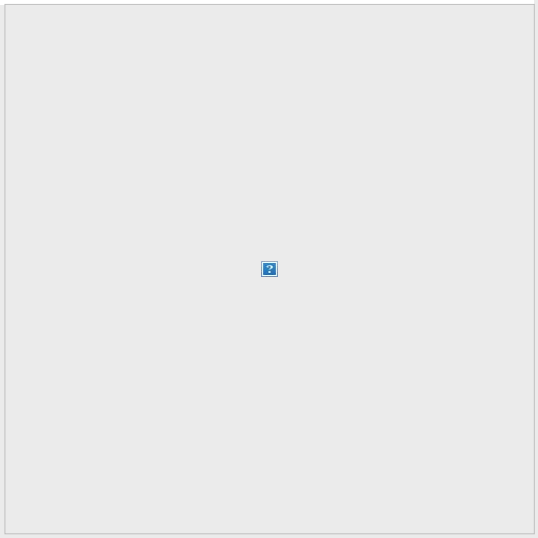
- Nirsevimab is a human anti-RSV IgG1 antibody engineered for extended half-life (YTE; mAb-M252Y, S254T, T256E).

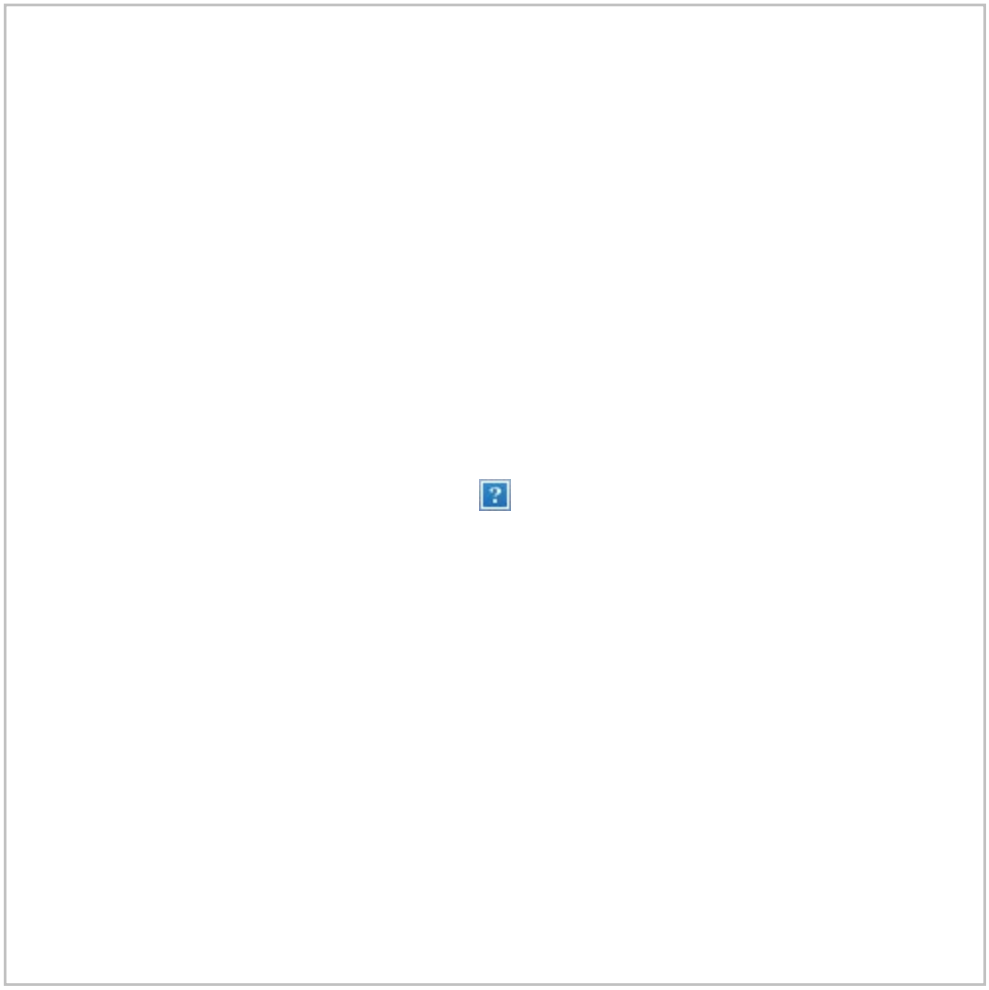
On November 11, 2022, **AstraZeneca announced** that the combination of Imjudo (tremelimumab) with Imfinzi (durvalumab) and platinum-based chemotherapy, was approved by the FDA as a treatment for adult patients with metastatic non-small cell lung cancer with no anaplastic lymphoma kinase genomic tumor aberrations or epidermal growth factor receptor mutation. In the POSEIDON Phase 3 trial, patients treated with a limited course of five cycles of Imjudo added to Imfinzi plus four cycles of platinum-based chemotherapy experienced a 23% reduction in the risk of death versus a range of chemotherapy options. The combination of Imjudo with Imfinzi was first approved by FDA for hepatocellular carcinoma in October 2022.

- Tremelimumab and durvalumab are monoclonal antibodies that target the immune checkpoints CTLA-4 and PD-L1, respectively.

On November 14, 2022, **ImmunoGen, Inc. announced** that the FDA granted accelerated approval for ELAHERE™ (mirvetuximab soravtansine-gynx) for the treatment of adult patients with folate receptor alpha-positive, platinum-resistant epithelial ovarian, fallopian tube, or primary peritoneal cancer, who have received one to three prior systemic treatment regimens. ELAHERE was approved under FDA's accelerated approval program based on objective response rate and duration of response data from the pivotal SORAYA trial.

- ELAHERE is an antibody-drug conjugate that targets folate receptor alpha.





Business news

On November 15, 2022, **OmniAb, Inc.'s third quarter 2022 update** noted that the company had entered into new platform licensing agreements with Dianthus Therapeutics, Hillstream Biopharma, NGM Bio, TriPhase Accelerator, and a stealth-mode biotech company focused on multi-specific antibodies. Additionally, OmniAb entered into a licensing agreement with Talem Therapeutics for three internally discovered antibody programs targeting B7-H3, CD38 and TIM3.

On November 17, 2022, **Regeneron Pharmaceuticals, Inc. and CytomX Therapeutics, Inc. announced** a collaboration and licensing agreement to create conditionally-activated investigational bispecific cancer therapies utilizing CytomX's Probody® therapeutic platform and Regeneron's Veloci-Bi® bispecific antibody development platform. CytomX will receive $30 million upfront payment with the potential for up to $2 billion in research,

development, regulatory and sales-based milestones.

On November 21, 2022, **Sensei Bio announced** that they entered into a Sponsored Research Agreement with Washington University in St. Louis, MO, to support development of SNS-101. The company recently presented **preclinical data** for the program at the Society for Immunotherapy of Cancer (SITC) 37th Annual Meeting. Sensei is on track to submit an Investigational New Drug (IND) application for SNS-101 in the first half of 2023.

- SNS-101 is a conditionally active VISTA-blocking antibody.

On November 29, 2022, **SOTIO Biotech announced** that it has exercised its first of five exclusive, target-specific options with LegoChem Biosciences (LCB) for antibody-drug conjugate SOT106, which is currently being evaluated in preclinical studies across a multitude of solid tumor indications. The exercise of the first option triggers an undisclosed milestone payment by SOTIO to LCB.

- SOT106 is a novel ADC based on SOTIO Biotech's proprietary antibodies and LCB's industry-leading ConjuAllTM ADC platform technology currently in preclinical development.

US Orphan Drug designation granted to ZB131

On November 15, 2022, **ZielBio, Inc. announced** that the U.S. Food and Drug Administration (FDA) granted Orphan Drug Designation to its lead program, ZB131, for the treatment of cholangiocarcinoma, a rare solid-tumor cancer originating from the bile duct system. Currently undergoing evaluation in a Phase 1/2 study (NCT05074472), ZB131 targets a cell surface protein identified in a wide range of cancers that correlates with poor prognosis and aggressive tumors.

- ZB131 is a monoclonal antibody with a high affinity and specificity for cancer-specific plectin (CSP).

Phase 1 studies planned or started

On November 15, 2022, **Kineta, Inc. announced** that the FDA accepted its IND application to evaluate KVA12123 (formerly referred to as KVA12.1), as a potential treatment for patients with advanced solid tumors. Kineta is planning to conduct a Phase 1/Phase 2 clinical study evaluating KVA12123 as a single agent and in combination with pembrolizumab in patients with advanced solid tumors. Kineta expects to initiate the clinical trial in the fourth quarter of 2022.

- KVA12123 is a human engineered IgG1 monoclonal antibody that binds VISTA through a unique epitope.

On November 16, 2022, **Compugen Ltd. announced** that it expects to receive a milestone payment of $7.5 million from AstraZeneca, after AstraZeneca dosed the first patient in its **ARTEMIDE Phase 2 study** with AZD2936, which was derived from COM902, Compugen's clinical-stage anti-TIGIT antibody. The Phase 1/2 study (NCT04995523) will evaluate the safety, pharmacokinetics, pharmacodynamics and efficacy of AZD2936 in participants with advanced or metastatic non-small cell lung cancer.

- AZD2936, is a bispecific antibody targeting PD-1 and TIGIT.

Phase 3 results for zolbetuximab

On November 17, 2022, **Astellas Pharma Inc. announced** positive topline results from the Phase 3 SPOTLIGHT clinical trial evaluating the efficacy and safety of zolbetuximab in combination with mFOLFOX6 in patients with Claudin 18.2 (CLDN18.2)-positive, HER2-negative, locally advanced unresectable or metastatic gastric or gastroesophageal junction (GEJ) adenocarcinoma The study met its primary endpoint showing statistical significance in progression-free survival for patients treated with zolbetuximab plus mFOLFOX6 compared to placebo plus mFOLFOX6. In addition, the study met a secondary endpoint, overall survival, showing statistical significance for patients treated with zolbetuximab plus mFOLFOX6 compared to placebo plus mFOLFOX6. Astellas aims to file for regulatory approval of zolbetuximab for GEJ adenocarcinoma in their fiscal year 2023 (April 1, 2023 – March 31, 2024).

- Zolbetuximab is a monoclonal antibody targeting CLDN18.2.

BLA for epcoritamab granted Priority review

On November 21, 2022, **Genmab A/S announced** that the FDA accepted for Priority Review the Biologics License Application for subcutaneous epcoritamab, an investigational T-cell engaging bispecific antibody, for the treatment of patients with relapsed/refractory large B-cell lymphoma after two or more lines of systemic therapy. Under the Prescription Drug User Fee Act, the FDA has set an application target action date of May 21, 2023.

- Epcoritamab is a bispecific antibody that targets CD20 and CD3, derived from Genmab’s DuoBody®platform.

New approvals granted

On November 17, 2022, **Provention Bio announced** that the FDA approved TZIELD for intravenous use, as the first and only immunomodulatory treatment to delay the onset of Stage 3 T1D in adult and pediatric patients aged 8 years and older with stage 2 T1D. In a clinical trial in Stage 2 T1D patients, TZIELD delayed the median onset of Stage 3 T1D by 25 months, or approximately 2 years, compared to placebo.

- TZIELD (teplizumab-mzwv) is an anti-CD3 antibody.

On November 17, 2022, **Sanofi announced** that the European Commission has granted marketing authorization for Enjaymo® (sutimlimab) for the treatment of hemolytic anemia in adult patients with cold agglutinin disease, a rare, serious, and chronic autoimmune hemolytic anemia, where the body's immune system mistakenly attacks healthy red blood cells and causes their rupture, known as hemolysis.

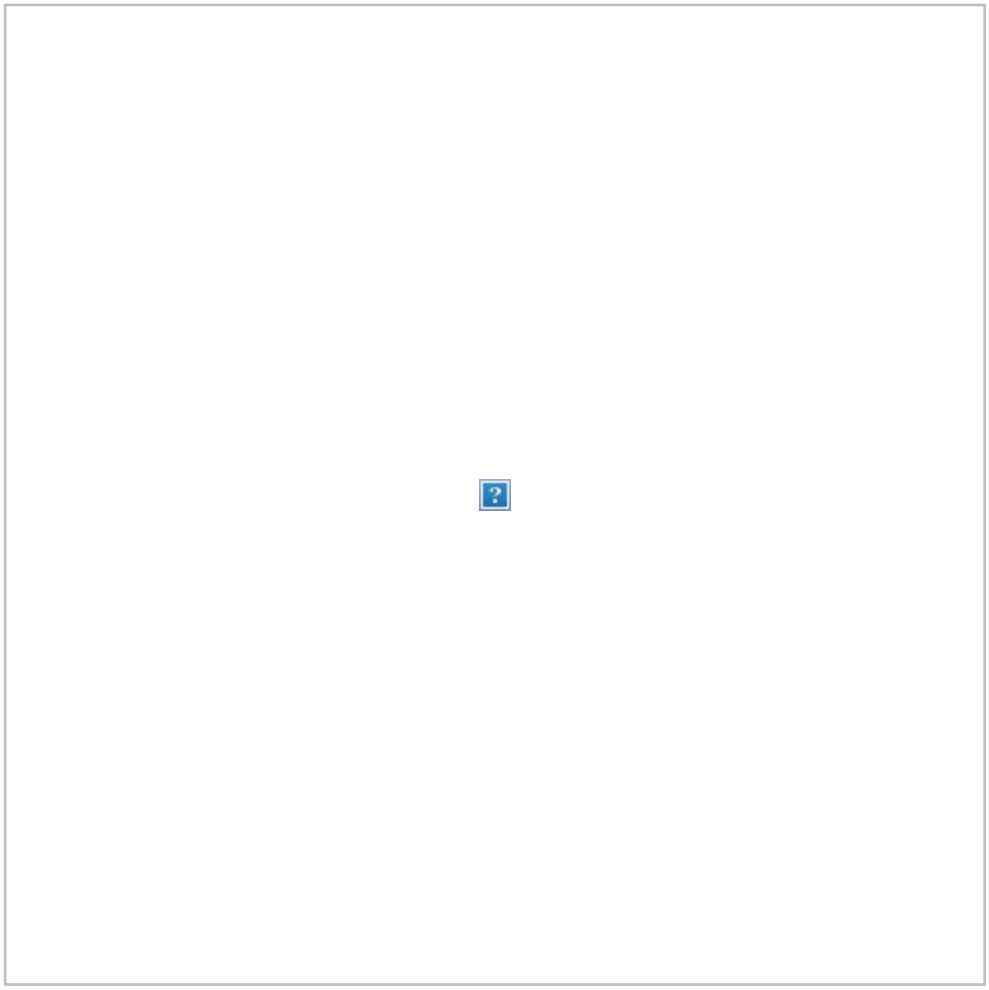
- Enjaymo® is a humanized monoclonal antibody designed to selectively target and inhibit the classical complement pathway specific serine protease, C1s.

Blenrep to be withdrawn from the US market
On November 22, 2022 **GSK announced** that the company has voluntarily initiated the process for withdrawal of the US marketing authorization for Blenrep following a request from FDA. Blenrep was granted an accelerated approval in 2020 is a monotherapy treatment for adult patients with r/r multiple myeloma who have received at least four prior therapies, but the confirmatory Phase 3 DREAMM-3 trial did not meet the requirements of the accelerated approval regulations. Other ongoing potentially confirmatory trials (DREAMM-7, DREAMM-8) of belantamab mafodotin may allow the drug to return to the US market in the future.

- Blenrep (belantamab mafodotin-blmf) is an antibody-drug conjugate targeting BCMA.

Bebtelovimab not currently authorized in any US region
On November 30, 2022, the FDA announced bebtelovimab is not currently authorized for emergency use in the U.S. because it is not expected to neutralize Omicron subvariants BQ.1 and BQ.1.1., according to data included in the **Health Care Provider Fact Sheet**.

- Bebtelovimab is a recombinant neutralizing human IgG1λ monoclonal



Business news

On December 1, 2022, **AbCellera and Rallybio Corporation announced** that they entered into a strategic alliance to discover, develop, and commercialize novel antibody-based therapeutics for rare diseases. This multi-year, multi-target collaboration will combine AbCellera's antibody discovery engine with Rallybio's clinical and commercial expertise in rare diseases to identify optimal clinical candidates and ultimately deliver therapies to patients. Under the terms of the agreement, AbCellera and Rallybio will co-develop up to five rare disease therapeutic targets, which will be chosen together by both companies.

On December 1, 2022, **Pfizer announced** its intent to invest €1.2 billion in the construction and development of a new manufacturing plant in Dublin, adding 400-500 new permanent jobs. The development will see a new facility built in Grange Castle, which will double the capacity for biological drug substance manufacturing there. The project is currently in preliminary design phase with

construction expected to commence onsite in 2024 and the new facility due for completion in 2027. The investment will ensure that Pfizer has capacity for licensed and pipeline products in oncology, rare disease, inflammation & immunology and internal medicines.

Upifitamab rilsodotin granted Orphan Drug designation in the EU
On December 14, 2022, **Mersana announced** that the European Commission has designated upifitamab rilsodotin (UpRi) as an orphan medicinal product for the treatment of ovarian cancer. UpRi is undergoing evaluation in UP-NEXT, a Phase 3 trial (NCT05329545) of UpRi monotherapy maintenance in platinum-sensitive recurrent ovarian cancer with a design informed by FDA and CHMP feedback.

- Upifitamab rilsodotin is a first-in-class NaPi2b-targeting antibody-drug conjugate with a novel scaffold-linker-payload that is designed to enable a high drug-to-antibody ratio and controlled bystander effect.

First clinical studies pending or initiated
On December 6, 2022, **Vega Therapeutics announced** its launch and oral presentation of its first-in-class antibody therapy, VGA039, at the 64th American Society of Hematology Annual Meeting. Vega was spun out of its parent company, Star Therapeutics, to advance the discovery and development of antibody therapies for patients with blood disorders, starting with von Willebrand disease. The company has received approval of a Clinical Trial Application for Phase 1 study of VGA039.

- VGA039 is an anti-Protein S monoclonal antibody being developed as a universal hemostatic agent for various bleeding disorders.

On December 2, 2022, details were posted on clinicaltirals.gov for a first-in-human Phase 1/2 clinical study (**NCT05635643**) of SRF114. Sponsored by Surface Oncology Inc. and due to start in December 2022, the study will enroll an estimated 70 patients with solid tumors.

- SRF114 is a monoclonal antibody that targets CCR8.

On December 2, 2022, details were posted on clinicaltirals.gov for a first-in-human, dose escalation and expansion study (**NCT05647122**) of AZD9592 as monotherapy and in combination with anti-cancer agents in patients with advanced solid tumors. Sponsored by AstraZeneca, the study will enroll an estimated 108 participants who will be administered AZD9592 alone or in

combination with the epidermal growth factor receptor tyrosine kinase inhibitor osimertinib (Tagrisso®).

- AZD9592 is a bispecific antibody-drug conjugate targeting EGFR and c-MET.

On December 8, 2022, **Dragonfly Therapeutics, Inc. announced** that the first patient was dosed in a first-in-human Phase 1/2 clinical study to investigate the safety, tolerability, pharmacokinetics, biological, and clinical activity of DF9001 alone and in combination with a PD-1 checkpoint inhibitor in patients with locally advanced or metastatic solid tumors, followed by expansion in selected indications, including head and neck squamous cell carcinoma, colorectal cancer, and non-small cell lung cancer (NCT05597839).

- DF9001 is an EGFR-targeting TriNKET, i.e., a trispecific antibody that directs endogenous NK cells toward tumor cells. TriNKETs target two distinct activating receptors on NK cells, plus a tumor antigen.

BLA submitted for talquetamab

On December 9, 2022, the **Janssen Pharmaceutical Companies of Johnson & Johnson announced** that the company submitted a Biologics License Application (BLA) to the U.S. Food and Drug Administration (FDA) for talquetamab for the treatment of patients with relapsed or refractory multiple myeloma. Talquetamab, which is given by subcutaneous injection, is currently being evaluated in the Phase 1/2 MonumenTAL-1 clinical study for the treatment of relapsed or refractory multiple myeloma (NCT03399799), and in combination studies RedirecTT-1 (NCT04586426), TRIMM-2 (NCT04108195), TRIMM-3 (NCT05338775), MonumenTAL-2 (NCT05050097) and MonumenTAL-3 (NCT05455320).

- Talquetamab is a bispecific T-cell engager antibody targeting both GPRC5D, a novel drug target that is on some normal cells but overexpressed on myeloma cells, and CD3 on T cells.

FDA issues complete response letter for 131I-omburtamab BLA

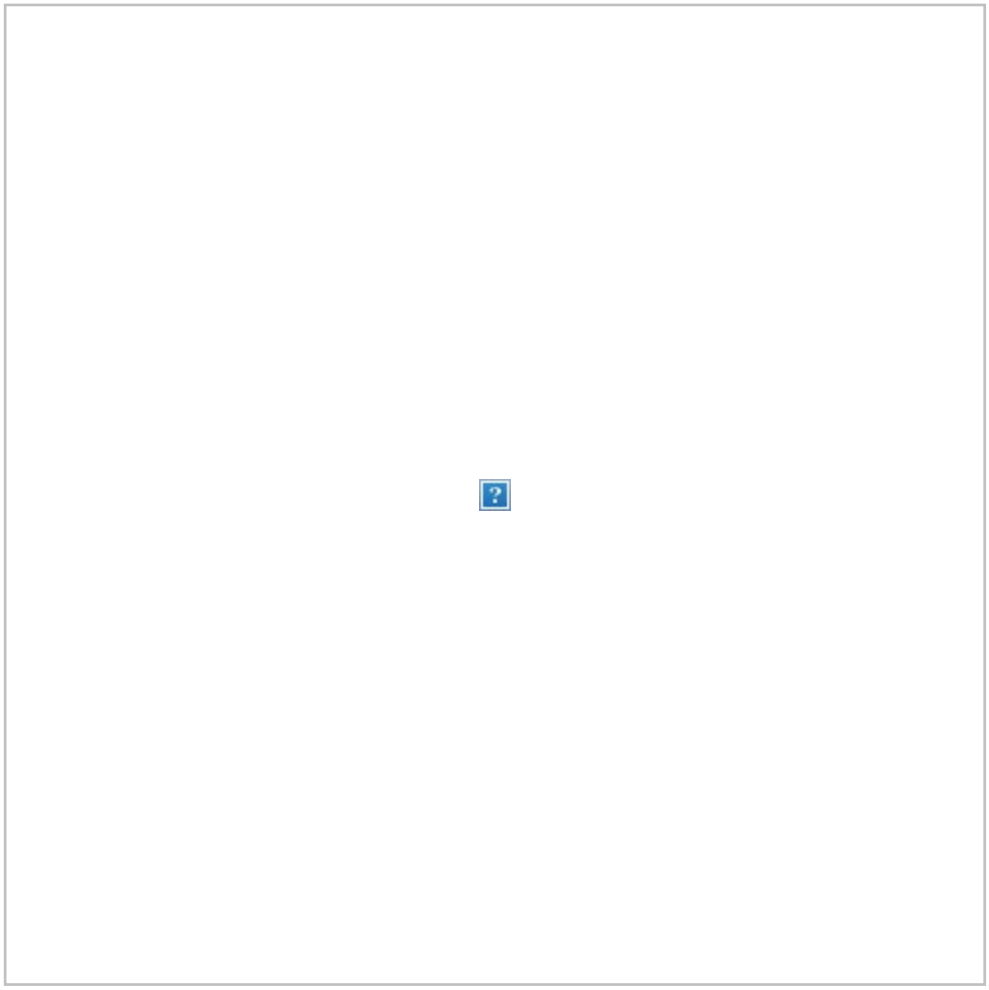
On December 1, 2022, **Y-mAbs Therapeutics, Inc. announced** that the FDA issued a complete response letter (CRL) for the BLA for the investigational medicine 131I-omburtamab for the treatment of CNS/leptomeningeal metastasis from neuroblastoma. The letter indicates FDA completed the review of the application and determined that it is unable to approve the BLA in its

current form. This is consistent with the outcome of the Oncologic Drugs Advisory Committee Meeting in October. The CRL includes a recommendation for meeting with the agency to discuss adequate and well-controlled trial design to demonstrate substantial evidence of effectiveness and a favorable benefit-risk profile.

- 131I-omburtamab is a radiolabeled, murine IgG1 monoclonal antibody that targets B7-H3.

Spesolimab approved in the European Union
On December 13, 2022, **Boehringer Ingelheim announced** that the European Commission granted a conditional marketing authorization for spesolimab as first-in-class treatment for generalized pustular psoriasis (GPP) flares in adults. The EC´s decision builds on existing approvals in the USA and Japan.

- Spesolimab is a novel, selective antibody that blocks the activation of the interleukin-36 receptor, a signaling pathway within the immune system shown to be involved in the pathogenesis of GPP.



Business news

On December 15, 2022, **AbCellera announced** that it has entered into a multi-year, multi-target strategic collaboration with AbbVie Inc. The partnership will leverage AbCellera's antibody discovery and development engine to deliver optimized development candidates for up to five targets selected by AbbVie across multiple indications. Under the terms of the agreement, AbbVie has the right to develop and commercialize therapeutic antibodies resulting from the collaboration. AbCellera will receive research payments and is eligible to receive downstream clinical and commercial milestone payments and royalties on net sales of products.

US Orphan Drug designation granted to ZB131

On December 27, 2022, **ZielBio, Inc. announced** that the U.S. Food and Drug Administration (FDA) granted Orphan Drug Designation to its lead program, ZB131, for the treatment of treatment of pancreatic cancer, a rare solid-tumor

cancer originating from the pancreas. ZielBio previously received Orphan Drug Designation for ZB131 for the treatment of cholangiocarcinoma.

- ZB131 is a monoclonal antibody with a high affinity and specificity for cancer-specific plectin.

Phase 1 studies planned or started

On December 19, 2022, **Biocytogen announced** that the US FDA approved the investigational new drug application (IND) for a Phase 1 study of YH008. The IND application was completed by Biocytogen's wholly owned subsidiary Eucure Biopharma. The trial is an open-label, dose-escalation study that will evaluate the safety, tolerability, pharmacokinetics (PK) and preliminary anti-tumor activity of YH008 monotherapy in patients with PD-(L)1-resistant advanced solid tumors or hematological malignancies.

- YH008 is a bispecific antibody targeting PD-1 and CD40.

On December 22, 2022, **Affimed N.V. announced** that the French ANSM has authorized a clinical trials application (CTA) for the Phase 1 study of AFM28 in relapsed/refractory acute myeloid leukemia. CTA applications for AFM28-101 in other European jurisdictions are ongoing, and additional applications are planned for submission early in 2023.

- AFM28 is a tetravalent bispecific CD123- and CD16A-binding Innate Cell Engager (ICE®) developed on Affimed's Redirected Optimized Cell Killing (ROCK®) platform.

On December 27, 2022, **Janux Therapeutics, Inc**., a clinical-stage biopharmaceutical company developing a broad pipeline of novel immunotherapies by applying its proprietary technology to its Tumor Activated T Cell Engager (TRACTr) and Tumor Activated Immunomodulator (TRACIr) platforms, announced that the company has submitted an IND application for JANX008 to FDA. JANX008 is in development as a treatment of epidermal growth factor receptor (EGFR)-expressing solid tumors, including non-small cell lung cancer, colorectal cancer, renal cell carcinoma, and squamous cell carcinoma of the head and neck.

- JANX008 is a double-masked TRACTr in which the EGFR-binding domain and the T cell-specific binding domain (CD3) is masked.

On December 27, 2022, **Deka Biosciences, Inc announced** the submission of

an IND application to the FDA for Deka's DK210 (EGFR), developed as part of Deka's Diakine™ platform of molecules. Each Diakine™ in Deka's platform consists of two complementary cytokines coupled together via attachment to a single-chain variable fragment (scFv) that enables the cytokines to accumulate more specifically in targeted tissues.

- DK210 (EGFR) is an scFv coupled with a normal interleukin-2 and a high affinity interleukin-10.

On December 15, 2022, details were posted on clinical trials.gov for a first-in-human study of JNJ-79635322 (**NCT05652335**) in participants with relapsed or refractory multiple myeloma. Sponsored by The Janssen Pharmaceutical Companies of Johnson & Johnson, the study has an estimated enrollment of 90 participants and is currently recruiting patients.

- JNJ-79635322 is a trispecific antibody.

On December 15, 2022, details were posted on clinical trials.gov for a Phase 1 study (**NCT05652868**) for the antibody-drug conjugate (ADC) MYTX-011. Sponsored by Mythic Therapeutics, Inc., the study will assess the safety and tolerability of MYTX-011 and identify the dose to be studied in Part 2. Part 2 will include subjects with non-small cell lung cancer with cMET overexpression or MET amplification/exon 14 skipping mutations, populations with a current unmet medical need. Due to start in January 2023, the study has an estimated enrollment of 150 participants.

- MYTX-011 is composed of a pH-dependent anti-cMET antibody and the potent antimicrotubule drug monomethyl auristatin E.

On December 16, 2022, details were posted on clinical trials.gov for a first-in-human study (**NCT05653882**) to evaluate the safety, tolerability, PK profile, and preliminary efficacy of AB248 as monotherapy or in combination with pembrolizumab in adult participants with locally advanced or metastatic solid tumors. Sponsored by Asher Biotherapeutics, the study has an estimated enrollment of 90 participants and estimated start date in December 2022.

- AB248 is an anti-CD8 antibody conjugated to an attenuated IL-2 mutein.

On December 22, 2022, **OSE Immunotherapeutics announced** that the first patient has been dosed in the Phase 1/2 clinical trial evaluating OSE-279 in patients with advanced solid tumors or lymphomas. This first-in-human open

label Phase 1/2 dose escalation and expansion study aims to determine the Maximum Tolerated Dose and/or the recommended Phase 2 dose of OSE-279 as a monotherapy in advanced solid tumors or lymphomas. Secondary objectives include assessment of OSE-279's antitumor activity, evaluation of the safety profile, PK and receptor occupancy or pharmacodynamic profile.

- OSE-279 is a high affinity anti-PD1 blocking monoclonal antibody.

Marketing application submission news

On December 23, 2022, **UCB announced** that the FDA accepted for review the Biologics License Application (BLA) resubmission for bimekizumab for the treatment of adults with moderate to severe plaque psoriasis. The FDA action is expected in the second quarter of 2023. Bimekizumab is marketed in numerous countries. In August 2021, bimekizumab (BIMZELX) was approved in the European Union (EU)/European Economic Area (EEA) and in Great Britain, for the treatment of moderate to severe plaque psoriasis in adults who are candidates for systemic therapy. In January 2022, bimekizumab received marketing authorization in Japan for the treatment of plaque psoriasis, generalized pustular psoriasis and psoriatic erythroderma in patients who are not sufficiently responding to existing treatments. In February and March 2022, bimekizumab received marketing authorization in Canada and Australia, respectively, for the treatment of moderate to severe plaque psoriasis in adults who are candidates for systemic therapy or phototherapy. In July and October 2022, bimekizumab received marketing authorization in Saudi Arabia and Switzerland, respectively, for the treatment of moderate to severe plaque psoriasis in adults who are candidates for systemic therapy.

- Bimekizumab is a monospecific humanized monoclonal antibody that targets an epitope on IL-17A and F. IL-17F shares ~50% structural homology with IL-17A,.

On December 24, 2022, **Shanghai Junshi Biosciences Co Ltd and Coherus BioSciences, Inc. announced** that the companies had not received an action letter from the FDA regarding the BLA for toripalimab (Tuoyi) in combination with chemotherapy as treatment for recurrent or metastatic nasopharyngeal carcinoma by the Prescription Drug User Fee Action date of December 23, 2022. The FDA had previously communicated that an on-site inspection of Junshi Biosciences' manufacturing facility for toripalimab is required before the application can be approved, but they were unable to conduct the inspection during the current review cycle due to the ongoing impact of COVID-19 related

restrictions on travel in China. The BLA for toripalimab remains under review.

- Toripalimab is a humanized monoclonal antibody targeting PD-1.

New approvals granted in the EU and US
On December 21, 2022, **Sobi - Swedish Orphan Biovitrum AB (publ)® and ADC Therapeutics SA announced** that the European Commission granted conditional marketing authorisation for the use of Zynlonta® (loncastuximab tesirine) for the treatment of relapsed or refractory diffuse large B-cell lymphoma. The approval follows a positive opinion issued in September by the Committee for Medicinal Products for Human Use of the European Medicines Agency. Zynlonta was approved by FDA in April 2021.

- Zynlonta® is an ADC composed of a humanized antibody directed against CD19 stochastically conjugated via a valine-alanine cleavable, maleimide linker to a pyrrolobenzodiazepine (PBD) dimer cytotoxin.

On December 22, 2022, the **FDA approved Lunsumio® (mosunetuzumab-axgb)** for the treatment of adult patients with relapsed or refractory follicular lymphoma (FL) after two or more lines of systemic therapy. This indication is approved under accelerated approval based on response rate. The FDA approval is based on positive results from the Phase 2 GO29781 study of Lunsumio in people with heavily pretreated FL, including those who were at high risk of disease progression or whose disease was refractory to prior therapies. Lunsumio® was approved in the EU in June 2022.

- Lunsumio® is a bispecific, aglycosylated T-cell engaging monoclonal antibody targeting CD20 and CD3.

On December 28, 2022, **TG Therapeutics, Inc. announced** that the FDA approved BRIUMVI™ (ublituximab-xiiy) for the treatment of relapsing forms of multiple sclerosis, to include clinically isolated syndrome, relapsing-remitting disease, and active secondary progressive disease, in adults. Approval was granted for this indication based on data from the ULTIMATE I & II Phase 3 trials, which demonstrated superiority over teriflunomide in significantly reducing the annualized relapse rate (the primary endpoint), the number of T1 Gd-enhancing lesions and the number of new or enlarging T2 lesions.

- BRIUMVI is a glyco-engineered monoclonal antibody that targets a unique epitope on CD20-expressing B-cells.
