KSI-301 Anti-VEGF Antibody Biopolymer Conjugate for Diabetic Macular Edema: Primary Endpoint Efficacy and Safety Outcomes of the GLEAM and GLIMMER Phase 3 Pivotal Studies

Robert Wong, M.D.

Affiliate Faculty, Department of Ophthalmology, Wong Eye Institute, Dell-Seton Medical Center, University of Texas at Austin Partner, Austin Retina Associates, Retina Consultants of America

on behalf of the GLEAM and GLIMMER Study Groups

56th Annual Scientific Meeting of the Retina Society October 13, 2023 – New York, NY This presentation will discuss IRB/IEC approved research of an investigational medicine.

Dr. Robert Wong has the following financial interests or relationships to disclose:

Ashvattha Therapeutics (R), Bayer (R), DRCR.net (R), Eyebio (R), Genentech (R), Ionis (R), Iveric (R), Kodiak (R), Novo Nordisk (R), Ocuterra (R), Opthea (R), RCTX (R,O), and Roche (R).

C= Consultant | R= Research Support | O= Ownership/Stock Options

KSI-301 (tarcocimab tedromer) and Antibody Biopolymer Conjugates (ABCs)



ANTIBODY

IgG1 Anti-VEGF Antibody

BIOPOLYMER

Branched, Optically Clear, High Molecular Weight Phosphorylcholine Polymer CONJUGATE

KSI-301 (tarcocimab tedromer) is an anti-VEGF ABC that blocks all VEGF-A isoforms

Two identically-designed, randomized, double-masked, multi-center Phase 3 non-inferiority studies of tarcocimab tedromer 5 mg vs aflibercept 2 mg in treatment-naïve DME

Tarcocimab individualized dosing every 2 to 6 months after only 3 monthly loading doses Aflibercept dosed every 2 months after 5 monthly loading doses

Primary endpoint

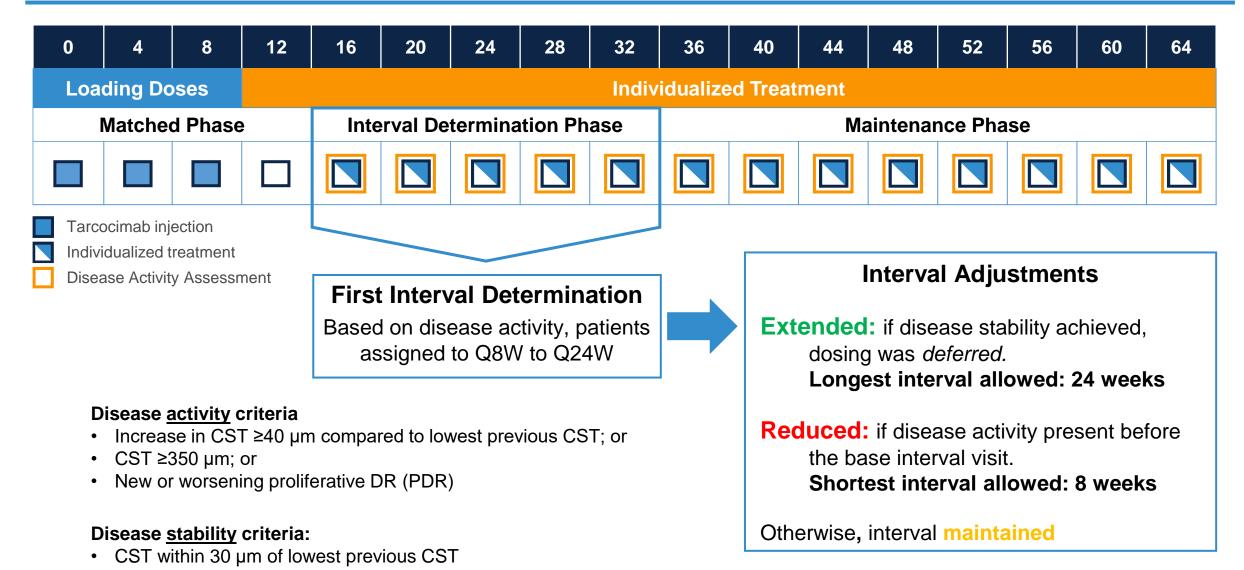
Mean BCVA change from baseline over average of Weeks 60 and 64 non-inferiority tested at 4.5 letter margin

Key secondary endpoint

Proportion of patients with ≥2-step worsening in DRSS at Week 52 non-inferiority tested at 10% margin

End of Study at Week 104

DME: diabetic macular edema; BCVA: best-corrected visual acuity; ETDRS: early treatment diabetic retinopathy study; CST: central subfield thickness; DRSS: diabetic retinopathy severity scale Q8W: every 8 weeks; Q24W: every 24 weeks. GLEAM, Study KS301P104, NCT04611152; GLIMMER, Study KS301P105, NCT04603937. Tarcocimab tedromer also referred to as tarcocimab in this presentation. Tarcocimab individualized dosing based on patient-specific disease activity assessments, allowing for dynamic interval adjustments between Q8 and Q24 week dosing



Baseline ocular characteristics well-matched between groups in each study and between studies, and typical of treatment-naïve DME patients

	GLEAM		GLIMMER	
	Tarcocimab Q8W-Q24W n=230	Aflibercept Q8W n=230	Tarcocimab Q8W-Q24W n=229	Aflibercept Q8W n=228
BCVA, ETDRS Letters, mean (SD)	66.4 (9.78)	66.6 (9.6)	64.2 (11.43)	64.3 (11.21)
Snellen equivalent				
≥20/40 Snellen equivalent, n (%)	118 (51.3%)	122 (53.0%)	101 (44.1%)	102 (44.7%)
≤20/200 Snellen equivalent, n (%)	3 (1.3%)	3 (1.3%)	11 (4.8%)	12 (5.3%)
OCT Central Subfield Thickness (CST), µm, mean (SD)	465.9 (115.46)	458.8 (117.55)	476.2 (124.65)	477.5 (130.66)
Lens Status, n (%)				
Phakic	177 (77.0%)	178 (77.4%)	174 (76.0%)	168 (73.7%)
Pseudophakic	53 (23.0%)	52 (22.6%)	55 (24.0%)	60 (26.3%)
DR severity (ETDRS DRSS score)				
Mild to moderate NPDR (Better or equal to level 43)	95 (44.2%)	97 (44.3%)	115 (52.8%)	116 (53.2%)
Moderately severe or severe NPDR (47 or 53)	117 (54.4%)	117 (53.4%)	99 (45.4%)	98 (45.0%)
PDR (61, 65, 71/75)	3 (1.4%)	5 (2.3%)	4 (1.8%)	4 (1.8%)
Missing or Ungradable	15	11	11	10
Intraocular Pressure, mmHg, mean (SD)	14.91 (3.07)	15.54 (3.13)	15.59 (2.96)	15.31 (3.14)

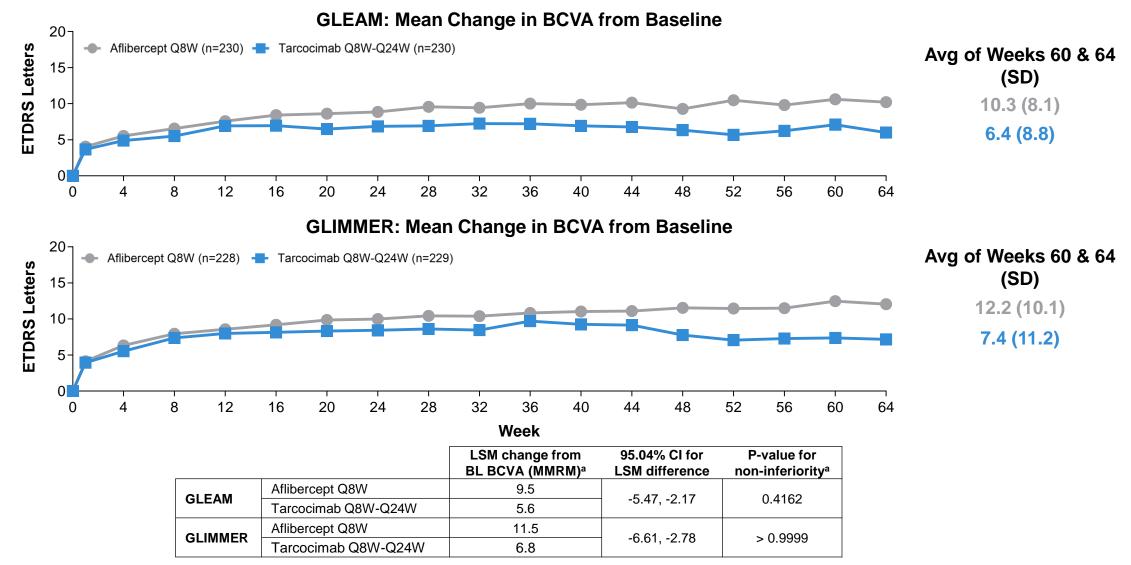
n = Number of participants treated; The denominator for percentages is the number of participants treated within each treatment arm. Snellen equivalent of 20/40 is 69 ETDRS letters and of 20/200 is 38 ETDRS letters. Denominator for percentages of Diabetic Retinopathy Severity Score is the number of subjects with gradable results at baseline. Subjects with ungradable results are not included in the denominator.

BCVA: best-corrected visual acuity; ETDRS: early treatment diabetic retinopathy study; DRSS: diabetic retinopathy severity scale; OCT: optical coherence tomography; NPDR: non-proliferative diabetic retinopathy; PDR: proliferative diabetic retinopathy

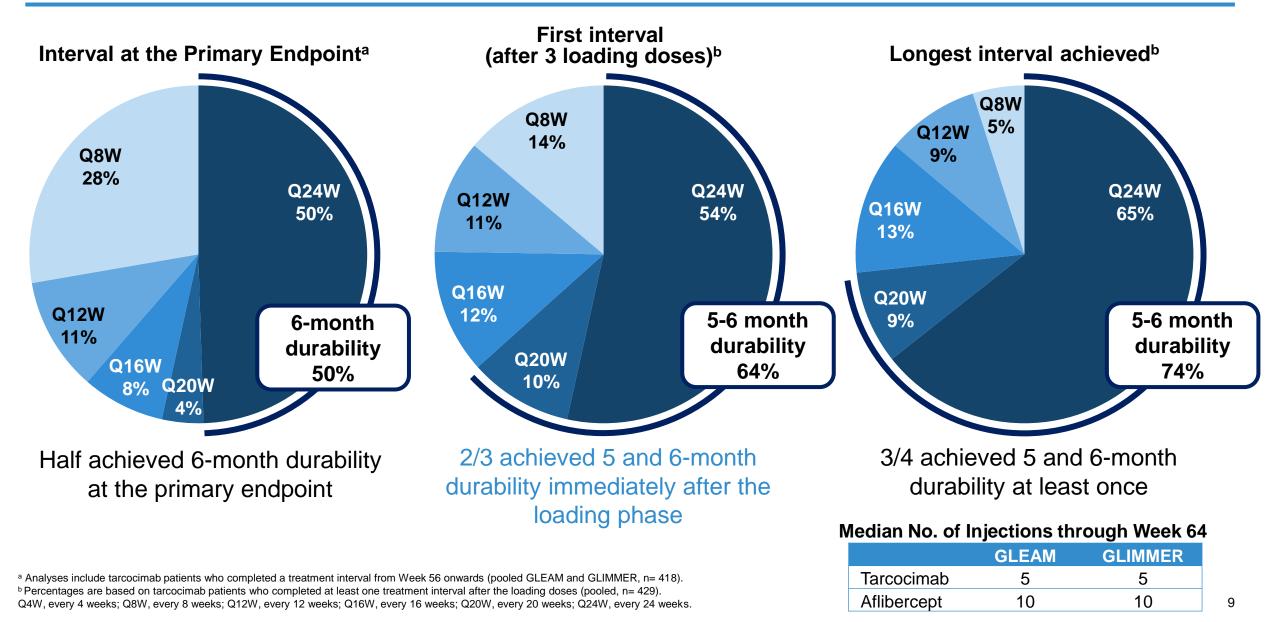
Patient disposition

	GLE	EAM	GLIM	MER
	Tarcocimab Q8W-Q24W n=230	Aflibercept Q8W n=230	Tarcocimab Q8W-Q24W n=231	Aflibercept Q8W n=228
Patients treated	230 (100%)	230 (100%)	229 (99.1%)	228 (100%)
Patients completing Week 64	204 (88.7%)	211 (91.7%)	210 (90.9%)	204 (89.5%)
Discontinuations prior to Week 64	26 (11.3%)	19 (8.3%)	21 (9.1%)	24 (10.5%)
Reasons for discontinuation				
Adverse events	9 (3.9%)	8 (3.5%)	9 (3.9%)	10 (4.4%)
Withdrew consent	5 (2.2%)	6 (2.6%)	7 (3.0%)	6 (2.6%)
Lost to follow-up	11 (4.8%)	2 (0.9%)	5 (2.2%)	6 (2.6%)
Non-compliance	1 (0.4%)	3 (1.3%)	0	0
Physician decision	0	0	0	1 (0.4%)
Other	0	0	0	1 (0.4%)

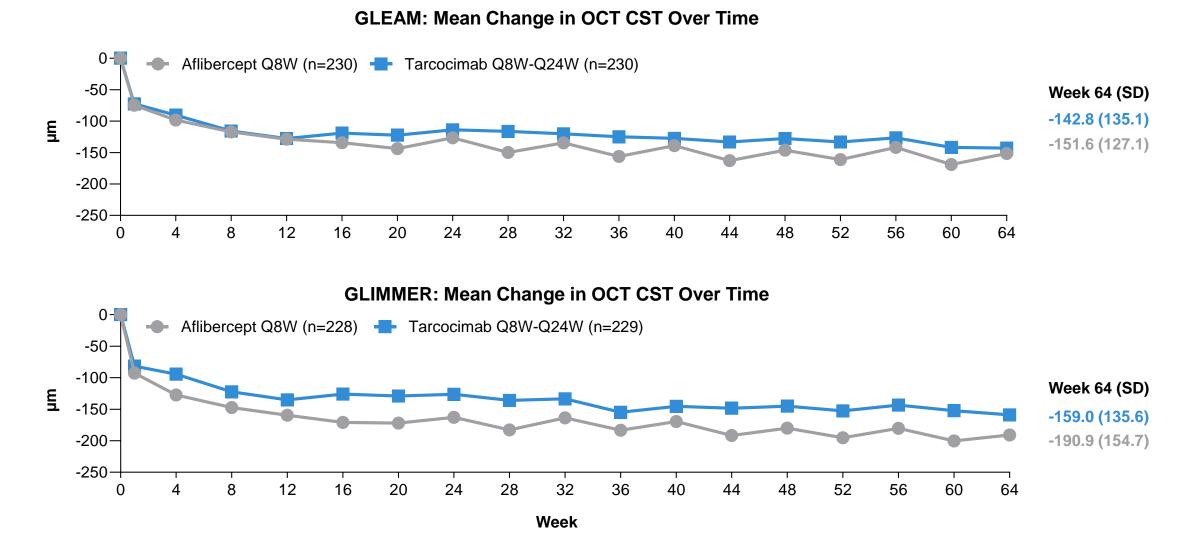
Primary endpoint: mean change in BCVA from baseline at average of weeks 60-64. Tarcocimab did not demonstrate non-inferiority to aflibercept in GLEAM or GLIMMER



Observed values shown in graphs. LSM, least square mean; MMRM, mixed model for repeated measures. Non-inferiority margin = 4.5 ETDRS letters. BCVA: best-corrected visual acuity; ETDRS: early treatment diabetic retinopathy study. a. Results are based on a MMRM model including the change from baseline value as the dependent variable; treatment, visit (Week 1 through Week 64), and treatment by visit interaction, and the randomization stratification variables [baseline BCVA (78-69, 68-49, and 48 or worse letters), OCT CST (<420 and >420 microns), and geographical location (North America and Rest of World)], as well as continuous covariates of baseline BCVA value and OCT CST value, as fixed effects; and subject as a random effect. Durability: ≥50% of tarcocimab patients consistently achieved 6-month dosing Three in every 4 tarcocimab patients successfully completed at least one 5 to 6-month interval



Tarcocimab dosed Q8W-Q24W and aflibercept dosed Q8W resulted in similar improvements in retinal thickness by Week 64, achieved with half the doses (median of 5 vs 10 doses, respectively)



Rates of common ocular adverse events were low. An imbalance in cataracts was observed

Pooled GLEAM and GLIM	MER
-----------------------	-----

Common Ocular Adverse Events (AEs) up to Week 64 ^a	Tarcocimab Q8W-Q24W (n=458)	Aflibercept Q8W (n=459)
Subjects with any AE in the Study Eye	220 (48.0%)	160 (34.9%)
Total number of AEs		
Cataract	69 (15.1%)	32 (7.0%)
Conjunctival haemorrhage	40 (8.7%)	23 (5.0%)
Cataract subcapsular	23 (5.0%)	4 (0.9%)
Diabetic retinal oedema	21 (4.6%)	7 (1.5%)
Vitreous detachment	20 (4.4%)	19 (4.1%)
Dry eye	19 (4.1%)	13 (2.8%)
Vitreous floaters	17 (3.7%)	7 (1.5%)

Pooled GLEAM and GLIMMER

Cataract in Study Eye up to Week 64 ^b	Tarcocimab Q8W-Q24W (n=458)	Aflibercept Q8W (n=459)
Subjects with Cataract AE in the Study Eye	89 (19.4%)	40 (8.7%)

Results presented for the Safety Population (≥2.0% in either study arm). Events are investigator reported. Adverse events are events with start date ≥first study drug date and ≤last study drug date + 28 days.

a. Includes all adverse events (AE) reported. A single patient can have multiple events of the same AE term reported.

b. Total number of patients with one or more events of cataract. A patient with multiple events of the same AE term reported are only counted once.

Rates of intraocular inflammation were low in both treatment groups

Pooled GLEAM and GLIMMER

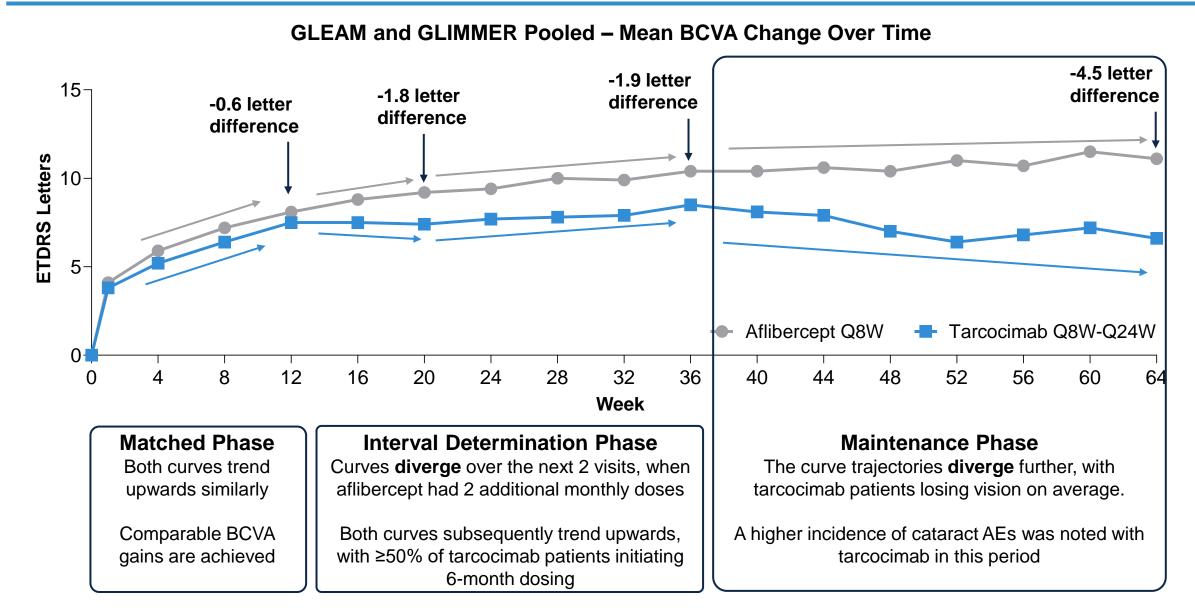
Intraocular Inflammation in Study Eye up to Week 64	Tarcocimab Q8W-Q24W (n=458)	Aflibercept Q8W (n=459)
Subjects with at Least 1 Intraocular Inflammation AE*	6 (1.3%)	1 (0.2%)

Endophthalmitis in Study Eye up to Week 64	Tarcocimab Q8W-Q24W (n=458)	Aflibercept Q8W (n=459)	
Subjects with at Least 1 Endophthalmitis AE	1 (0.2%)	2 (0.4%)	

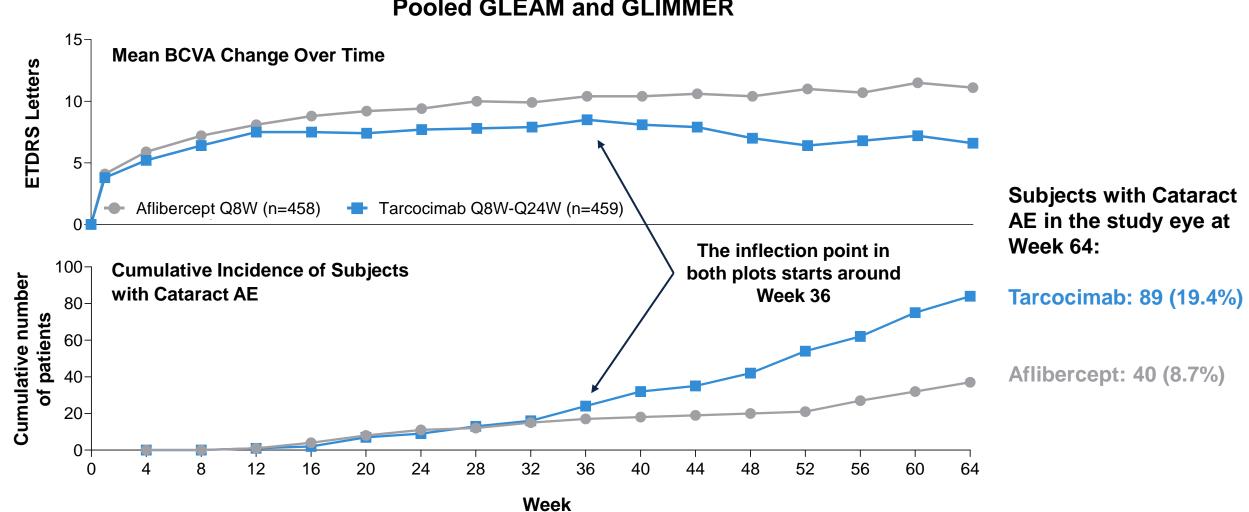
No cases of intraocular inflammation with vasculitis or vascular occlusion were observed

Why did tarcocimab not meet the primary endpoint?

The main difference in BCVA was noted in the maintenance phase An unexpected cataract finding was the main driver



The divergence of the BCVA curves between groups coincides with a relative increase in cataract adverse events in the tarcocimab group

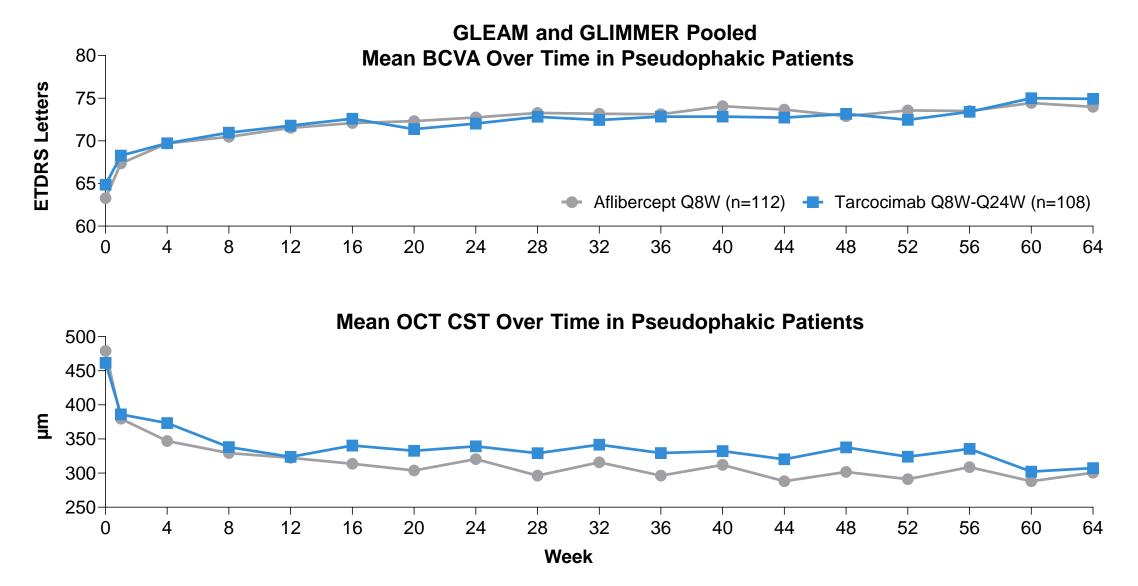


Pooled GLEAM and GLIMMER

Cumulative incidence of cataract AE is reported for the safety population (tarcocimab: 458, aflibercept: 459)

How did the pseudophakic patients do?

Pseudophakic patients in both groups did well and improved over time, while receiving the same median doses as the overall groups (5 tarcocimab vs 10 aflibercept)



Observed values. BCVA: best-corrected visual acuity; ETDRS: early treatment diabetic retinopathy study. OCT: optical coherence tomography; CST: central subfield thickness

What have we learned about the increased incidence of cataracts?

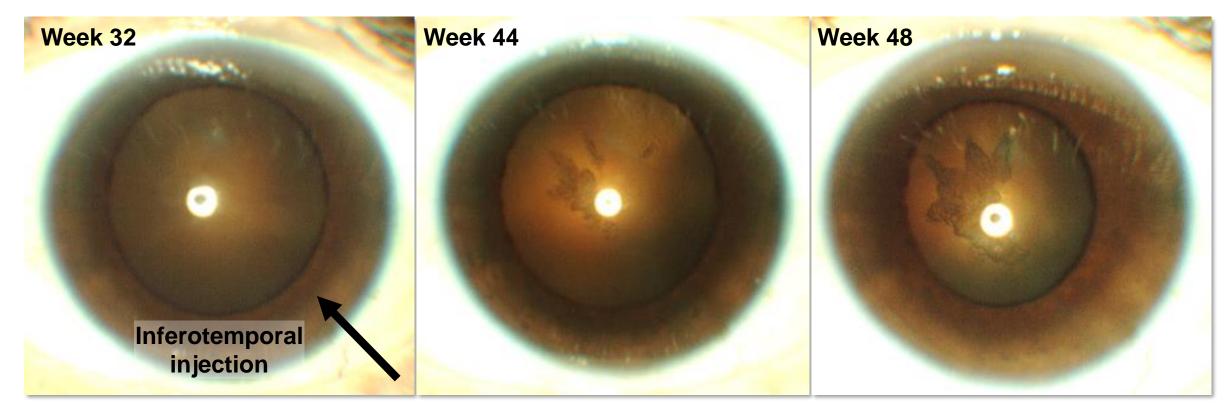
Cataract imbalance in GLEAM and GLIMMER not observed with monthly dosing in DAYLIGHT, which indicates that exposure or accumulation does not play a significant role

	GLEAM + GLIMMER (DME)		DAYLIGHT (wAMD)		DAZZLE (wAMD)		BEACON (RVO)	
Duration of Follow-Up	64 W	eeks	eks 48 Weeks 52 Weeks 48 W		52 Weeks		eeks	
Cataract in Study Eye up to Primary Endpoint	Tarcocimab Q8W-Q24W (n=458)	Aflibercept Q8W (n=459)	Tarcocimab Q4W (n=276)	Aflibercept Q8W (n=281)	Tarcocimab Q12W-Q20W (n=277)	Aflibercept Q8W (n=280)	Tarcocimab Q4W (n=284)	Aflibercept Q8W (n=284)
Subjects with Cataract AEs in the Study Eye, n (%)	89 (19.4%)*	40 (8.7%)	9 (3.3%)	13 (4.6%)	19 (6.9%)	12 (4.3%)	14 (4.9%)	8 (2.8%)
Median number of doses	5	10	12	7	5	8	5	7

In DAYLIGHT, the Phase 3 **monthly dosing** study in wAMD patients, an imbalance in cataracts is **not** seen, even though patients received 7 more injections compared to tarcocimab patients in GLEAM and GLIMMER

Tarcocimab has a higher cataract incidence. What do we believe it *is* related to?

• The triggering insult seems to be localized to the back of the lens. A progressive posterior subcapsular cataract is a noticeable finding.



Diabetic patient treated with tarcocimab at Week 32. No posterior cataract is noted. This is the last injection the patient received prior to the cataract event 12 weeks later, a noticeable posterior cataract with sharp edges has developed. 4 weeks after, the cataract has progressed significantly

Tarcocimab has a higher cataract incidence. What do we believe it *is* related to?

Seems to be highly specific to diabetic patients <u>with</u> diabetic eye disease (retinopathy).

- wAMD patients receiving 12 monthly doses in DAYLIGHT over one year did not show an increased cataract incidence.
- RVO patients had low, comparable rates of cataract over 1 year.

	Tarcocimab across 5 Kodiak pivotal trials (wAMD, DME and RVO patients combined) 1,312 patient-years of experience		Aflibercept across 5 Kodiak pivotal trials (wAMD, DME and RVO patients combined) 1,342 patient-years of experience		ts combined)	
	of diabetes WITH retinopathy retinopathy		No medical history of diabetes N=665	Medical history of diabetes WITH retinopathy N=470	Medical history of diabetes WITHOUT retinopathy N=165	No medical history of diabetes N=669
Phakic at baseline	351 (74.5%)	92 (57.9%)	387 (58.2%)	350 (74.5%)	86 (52.1%)	422 (63.1%)
Cataract event*	88 (25.1%)	8 (8.7%)	33 (8.5%)	40 (11.4%)	5 (5.8%)	27 (6.4%)

Diabetic patients <u>without</u> retinopathy treated with tarcocimab have similar cataract event incidence as non-diabetics

*Includes patients with medical history of diabetic retinopathy and/or DME.

wAMD: wet age-related macular degeneration; DME: diabetic macular edema; RVO: retinal vein occlusion.

The higher cataract incidence seen with tarcocimab seems to be a relationship between <u>a local insult in a susceptible environment</u>

Diabetic patients with retinopathy are the susceptible population

The lens in diabetics is under metabolic duress

- Sorbitol accumulates intracellularly, leading to a hyperosmotic effect that damages lens fibers.^{1,2}
- Free radical formation, reactive oxygen species and advanced glycation end products all generate oxidative stress.²⁻⁴

Local insult due to injection procedure

Intravitreal injections are known to cause microtrauma in the posterior lens capsule

Intravitreal injections are a risk factor for posterior capsule rupture during cataract surgery.⁵⁻⁷

The posterior lens capsule is more fragile in diabetics <u>with</u> diabetic retinopathy (DR)

Diabetics with DR have a significantly increased risk of posterior capsule rupture during cataract surgery, whereas diabetics without DR do not have an increased risk.⁵

Local insult due to gel-like consistency

Expression of the gel-like medication in close proximity to the posterior lens capsule

The gel-like consistency of tarcocimab requires a 5x–10x increase in injection force & injection time, which results in variability in where and how tarcocimab is expressed

22

Cataract Formation

A tangential microtrauma due to the expression of a gel-like medication in close proximity to a susceptible posterior lens capsule seems to be the triggering insult

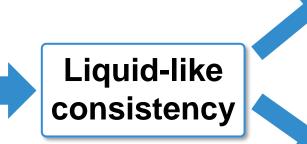
The gel-like consistency of tarcocimab results in a higher cataract incidence in diabetic patients with retinopathy. Can it be solved?

An improved formulation for all antibody biopolymer conjugates is a plausible solution

Improved formulations combine 'naked' and conjugated antibody

Tarcocimab clinical formulation is 100% antibody-biopolymer-conjugate.

Enhancing the formulation of the ABC's by maintaining a proportion of 'naked' antibody together with conjugated antibody results in a liquid-like consistency while keeping the same formulation strength of antibody.



Improved injection procedure					
(decreased injection time and force					
needed)					
Average time to inject 100µl					
Tarcocimab clinical formulation: 7 seconds					

Tarcocimab commercial formulation:

KSI-501 enhanced formulation:

Significantly less or no insult from medication

Additional benefits for dose preparation and commercial manufacturing

Tarcocimab commercial formulation was manufactured as part of pivotal program development. KSI-501 enhanced formulation is expected to be ready for clinical use in 1H 2024.

2-3 seconds

1-2 seconds

Tarcocimab has higher cataract incidence. What do we believe it is *not* related to?

Patient Characteristics			Injectors	Animal Toxicology
Not related to mid-term metabolic control Mean (SD) HbA1c at baseline was 8.0 (1.6) vs 8.0 (1.4), in tarcocimab patients with vs without cataract development.	Not related to diabetes duration Mean (SD) diabetes duration at baseline was 16.0 (9.7) vs 16.5 (10.3) years, in tarcocimab patients with vs without cataract development.	Not related to age Mean (SD) age at baseline was 62.2 (9.4) vs 62.0 (9.6) in tarcocimab patients with vs without cataract development.	Not site related The cataract events occurred across 59 different sites in the US and Europe.	Not seen in non- clinical studies
	Molecule Characteristics		Exposure	Manufacturing
Not related to the anti-VEGF effect The imbalance is in diabetic patients with retinopathy; further, is not seen in RVO (the highest VEGF load retinal vascular disease).	Not due to the biopolymer alone Not seen in any animal model, not seen outside of diabetic patients, and importantly not seen in wAMD patients dosed with 12 monthly doses.	Not related to tarcocimab's biophysical properties pH, osmolality, water solubility, and other properties are consistent with intravitreal biologics, with the notable exception of the gel-like consistency.	Not related to cumulative drug exposure Cataract events occurred from one active tarcocimab dose ("insult") prior to the event (median of 5, range 1-8). In wAMD patients, maximal (monthly) exposure resulted in a lower cataract incidence compared to aflibercept.	Not related to a specific manufac- turing lot Drug supply was pooled across the BEACON, DAYLIGHT, GLEAM and GLIMMER studies.

Conclusions

GLEAM and GLIMMER did not meet the primary endpoint	 The initial matched phase demonstrated robust efficacy Individualized dosing with tarcocimab maintained initial BCVA gains, with half or more of the patients consistently on 6-month dosing
Tarcocimab continues to demonstrate strong durability	 1/2 of patients achieved 6-month dosing at the primary endpoint 2/3 of patients on 5- or 6-month dosing at first interval after the loading doses 3/4 of patients successfully completed a 5- to 6-month dosing interval at least once
Cataracts compromised vision outcomes with tarcocimab	 Increased cataracts with tarcocimab correlated with deterioration of BCVA vs aflibercept Pseudophakic patients did well on tarcocimab with similar BCVA to aflibercept, while receiving half the median number of doses compared to aflibercept (5 vs 10, respectively)
Cataracts seem to be a relationship between a localized insult in a susceptible environment	 The higher cataract incidence seems specific to diabetic patients <u>with</u> retinopathy The usability of tarcocimab (extended injection time and force) results in a tangential microtrauma due to the expression of a gel-like medication in close proximity to a susceptible posterior lens capsule, which seems to be the triggering insult
A plausible solution is available	 An improved formulation with a liquid-like (non-gel) consistency and with the same strength of bioactive antibody may be a plausible solution
Data across tarcocimab program provides support for ABC Platform-derived medicines	 Analysis of clinical data across the tarcocimab Phase 3 pivotal program, including the GLEAM and GLIMMER studies, provides supportive evidence for the development of Kodiak's ABC Platform and platform-derived medicines. Kodiak is advancing KSI-501, a clinical stage anti-IL-6/VEGF bispecific, both as (i) its naked protein and (ii) an enhanced bioconjugate formulation

Thank you to all GLEAM and GLIMMER investigators, site staff and patients

Czech Republic: Axon Clinical, Oftex, Vseobecna Fakultni Nemocnice V Praze; France: Centre Paradis Monticelli, Centre Hospitalier Intercommunal de Créteil, Fondation Rothschild, CHRU Dijon Complexe Du Bocage, Hôpital de La Croix Rousse, Hôpital Lariboisière; Germany: St. Elisabeth Krankenhaus, Universitätsklinikum Freiburg, Universitätsklinikum Regensburg, St Franziskus Hospital, Dietrich Bonhoeffer Klinikum Neubrandenburg; Hungary: Jahn Ferenc Dél-Pesti Kórház és Rendelointézet, Bajcsy-Zsilinszky Korhaz es Rendelointezet, Budapest Retina Associates, Ganglion Medical Center, Semmelweis Egyetem, Szabolcs-Szatmar-Bereg Megyei Korhazak es Egyetemi Oktatokorhaz; Israel: Shamir Medical Center Assaf Harofeh, Tel Aviv Sourasky Medical Center, Hadassah University Hospital, Rambam Medical Center, Meir Medical Center, Rabin Medical Center, Kaplan Medical Center, Assuta HaShalom, Bnai Zion Medical Center; Italy: Ospedale San Raffaele, Fondazione PTV Policlinico Tor Vergata, Fondazione Policlinico Universitario A Gemelli, AOU dell'Università degli Studi della Campania Luigi Vanvitelli; Latvia: Pauls Stradins Clinical University Hospital, Riga Eastern Clinical University Hospital Clinic Bikernieki, Latvian American Eve Center, Signes Ozolinas Doctor Praxis In Ophthalmology; Poland: Dr. Nowosielska Okulistyka i Chirurgia Oka, Optimum Profesorskie Centrum Okulistyki, Uniwersytecki Szpital Kliniczny im. Jana Mikulicza Radeckiego we Wroclawiu, Oftalmika Sp., Specjalistyczny Szpital im. Alfreda Sokolowskiego, Uniwersyteckie Centrum Kliniczne Im. Prof. K. Gibinskiego Slaskiego Uniwersytetu Medycznego w Katowi; Slovakia: Nemocnica s Poliklinikou Trebisov, Fakultna Nemocnica Trencin, Fakultna Nemocnica s Poliklinikou Zilina, Hospital Ruzinov, Fakultna Nemocnica s Poliklinikou F. D. Roosevelta, Uvea Klinika; Spain: Hospital dos de Maig, Hospital Universitario Rio Hortega, Hospital Universitari General de Catalunya - Grupo Quironsalud, Hospital Universitario Puerta de Hierro – Majadahonda, Hospital Universitario Miguel Servet, Hospital Universitari i Politecnic La Fe de Valencia, Hospital Clinic de Barcelona, Hospital Clinico Universitario Lozano Blesa; United States: Northern California Retina Vitreous Associates, Retinal Research Institute, Retina Vitreous Associates Medical Group, Retina Research Institute of Texas, Retina Consultants of Texas - Houston, Retina Consultants of Texas - The Woodlands. Sierra Eve Associates, Retina Consultants of San Diego, Medical Center Ophthalmology Associates, Charleston Neuroscience Institute, NJ Retina - Teaneck, Retina Specialty Institute, Colorado Retina Associates, Retinal Consultants of Hawaii, Southeast Retina Center, Texas Retina Associates - Plano, Vitreoretinal Surgery PA, Cumberland Valley Retina Consultants, Retina Northwest, Austin Retina Associates - Austin, Palmetto Retina Center, Retina Vitreous Associates of Florida, Southeastern Retina Associates, Retina Associates PA, Ophthalmic Consultants of Boston, Tennessee Retina, Retina Associates of Florida, Envision Ocular, Foundation for Vision Research, Wolfe Eye Clinic, Strategic Clinical Research Group, Associated Retinal Consultants, National Ophthalmic Research Institute, Rand Eye Institute, Retina Consultants of Texas – Katy, Cascade Medical Research Institute, Retina Consultants of Orange County, Retina Associates of Kentucky, Retinal Consultants Medical Group Inc, Black Hills Regional Eye Institute, Vitreo Retinal Consultants and Surgeons, California Retina Consultants – Santa Maria, Florida Eye Associates, Springfield Clinic, Austin Retina Associates – Round Rock, Retina-Vitreous Surgeons of Central NY, Retina Group of New England, Retinal Specialists of Idaho, Emanuelli Research & Development Center, Long Island Vitreo Retinal Consultants, Retina Associates of Western New York, Retina Group of Florida, UCLA Doheny Eve Center, Charleston Neuroscience Institute, Vitreo Retinal Associates, Retina Consultants of Nevada – Henderson, Maine Eye Center, Connecticut Eye Consultants, Retina Consultants of Southern California, Center for Retina & Macular Disease, Retina Center Northwest, Talley Medical Surgical Aye Care Associates, Retina Institute of Virginia, Spokane Eye Clinic, Florida Retina Institute, Midatlantic Retina, Southern Vitreoretinal Associates, Western Carolina Retinal Associates, Ophthalmic Consultants of Long Island, Blue Ocean Clinical Research, Austin Research Center for Retina, Retina Vitreous Associates of Florida, Fort Lauderdale Eye Institute, Charles Retina Institute, Georgia Retina, The Lundquist Institute for Biomedical Innovation at Harbor – UCLA Medical Center, Texas Retina Associates – Fort Worth, Texas Retina Associates – Arlington, Florida Retina Consultants, Palmetto Retina Center, Retina Consultants of San Antonio, Star Vision Research, Charleston Neuroscience Center, Piedmont Eye Center,