Company Overview

Investor Presentation

May 2021

Important Information

The information in this presentation does not contain all of the information that a potential investor should review before investing in Aerie shares. The descriptions of Aerie Pharmaceuticals, Inc. (the "Company" or "Aerie") in this presentation are qualified in their entirety by reference to reports filed with the SEC. Certain information in this presentation has been obtained from outside sources or is anecdotal in nature. While such information is believed to be reliable for the purposes used herein, no representations are made as to the accuracy or completeness thereof and we take no responsibility for such information.

Any discussion of the potential use or expected success of Rhopressa® (netarsudil ophthalmic solution) 0.02% or Rocklatan® (netarsudil and latanoprost ophthalmic solution) 0.02%/0.005%, with respect to foreign approval or additional indications, and our current or any future product candidates, including AR-1105, AR-13503, AR-14034 and AR-15512, is subject to regulatory approval. In addition, any discussion of U.S. Food and Drug Administration ("FDA") approval of Rhopressa® or Rocklatan® does not guarantee successful commercialization of Rhopressa® or Rocklatan®. For more information on Rhopressa®, including prescribing information, refer to the full Rhopressa® product label at www.rhopressa.com. For more information on Rocklatan®, including prescribing information, refer to the full Rocklatan® product label at www.rocklatan.com.

The information in this presentation is current only as of its date and may have changed or may change in the future. We undertake no obligation to update this information in light of new information, future events or otherwise. We are not making any representation or warranty that the information in this presentation is accurate or complete. This presentation shall not constitute an offer to sell, nor a solicitation of an offer to buy, any of Aerie's securities.

Certain statements in this presentation, including any guidance or timelines presented herein, are "forward-looking statements" within the meaning of the federal securities laws. Words such as "may," "will," "should," "would," "could," "believe," "expects," "anticipates," "plans," "intends," "estimates," "targets," "projects," "potential" or similar expressions are intended to identify these forward-looking statements. These statements are based on the Company's current plans and expectations. Known and unknown risks, uncertainties and other factors could cause actual results to differ materially from those contemplated by the statements. In evaluating these statements, you should specifically consider various factors that may cause our actual results to differ materially from any forward-looking statements. For example, uncertainties around the duration and severity of the current global COVID-19 pandemic including its possible impact on our clinical and commercial operations and our global supply chain could cause our actual results to be materially different than those expressed in our forward-looking statements. In particular, these statements include any discussion of potential commercial sales, placement or utilization of Rocklatan® or Rhopressa® in the United States or any other market. Likewise, FDA approval of Rhopressa® and Rocklatan® does not constitute approval of any future product candidates. Any top line data presented herein is preliminary and based solely on information available to us as of the date of this presentation and additional information about the results may be disclosed at any time. FDA approval of Rhopressa® and Rocklatan® also does not constitute regulatory approval of Rhopressa® or Rocklatan® in jurisdictions outside the United States and there can be no assurance that we will receive regulatory approval for Rhopressa® or Rocklatan® in jurisdictions outside the United States. In addition, any discussion in this presentation about preclinical activities or opportunities associated with our products or discussions involving the potential for our dry eye or retinal product candidates are preliminary and the outcome of any studies may not be predictive of the outcome of later trials and ultimate regulatory approval. Any future clinical trial results may not demonstrate safety and efficacy sufficient to obtain regulatory approval related to the preclinical research findings discussed in this presentation. Any statements regarding Aerie's future liquidity, cash balances or financing transactions also constitute forward-looking statements as are discussions of the possibility of, or possible results of, any commercial transactions or collaborations. These risks and uncertainties are described more fully in the quarterly and annual reports that we file with the SEC, particularly in the sections titled "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations." Such forward-looking statements only speak as of the date they are made. We undertake no obligation to publicly update or revise any forward-looking statements, whether because of new information, future events or otherwise, except as otherwise required by law.

Aerie Overview

Aerie IOP–Reducing Products (IP 2030+)

- **Rhopressa® and Rocklatan® gaining momentum in the U.S.**
  - Total prescriptions and shipments to pharmacies are achieving record levels
- **Glaucoma Franchise Approved in Europe**
- **Globalization Plan Under Way** – Concluded licensing agreement with Santen for Rhopressa ® and Rocklatan ®, potential collaborators pursuing European opportunity

Key Pipeline Opportunities

- **Dry Eye**

  AR-15512 TRPM8 agonist: Fully enrolled, Phase 2b Topline readout expected Q3 2021
- **Sustained-Release Retinal Implant Platform**

AR-1105 (Dex): Positive Topline P2 results, Phase 3 plans underway for U.S. and Europe

AR-13503 SR (ROCK/PKC): First-in-human clinical study commenced Q3 2019

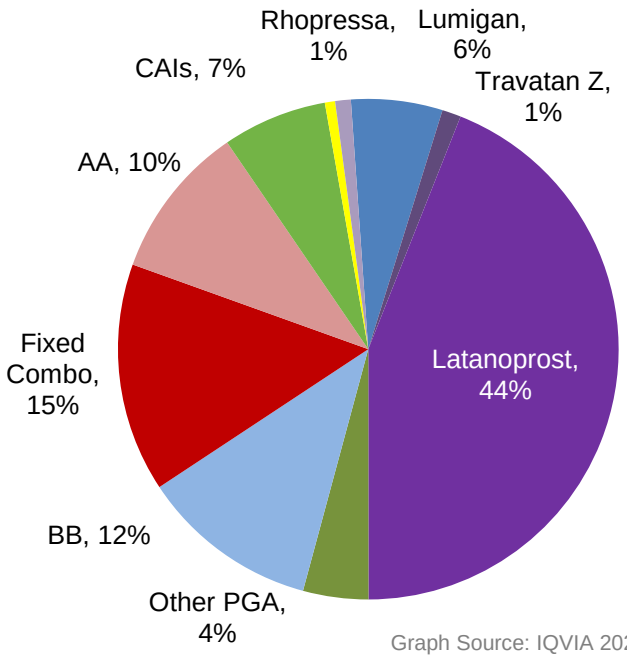
AR-14034 SR (Pan-VEGF inhibitor): IND-enabling preclinical studies underway; IND filing H2 2022

Rhopressa® and Rocklatan® have not been approved by any regulatory authority other than the FDA and EMA. AR-15512, AR-1105, AR-13503 and AR-14034 are development stage product candidates and are not approved by any regulatory agency. Dex: Dexamethasone

Aerie Overview

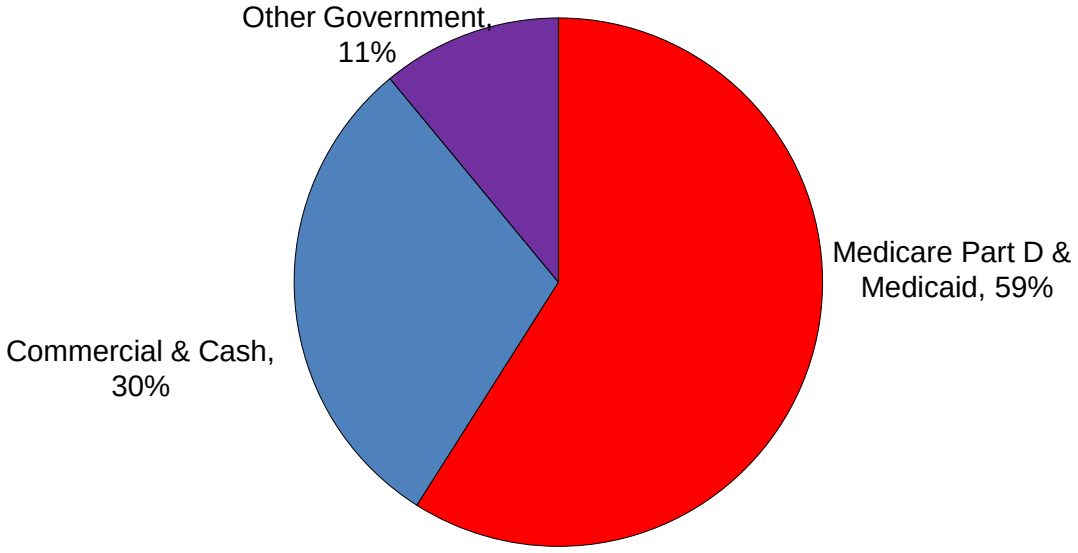
2020 U.S. Glaucoma Market

- ~$3B Market, 34M TRx, **55M bottles**
- 55% of unit volume first-line (PGAs)
- 45% of unit volume 2-3X/Day Adjuncts



Graph Source: IQVIA 2020
CAI: Carbonic Anhydrase Inhibitor
AA: Alpha Agonist
BB: Beta Blocker

Estimated Glaucoma Market TRx Mix



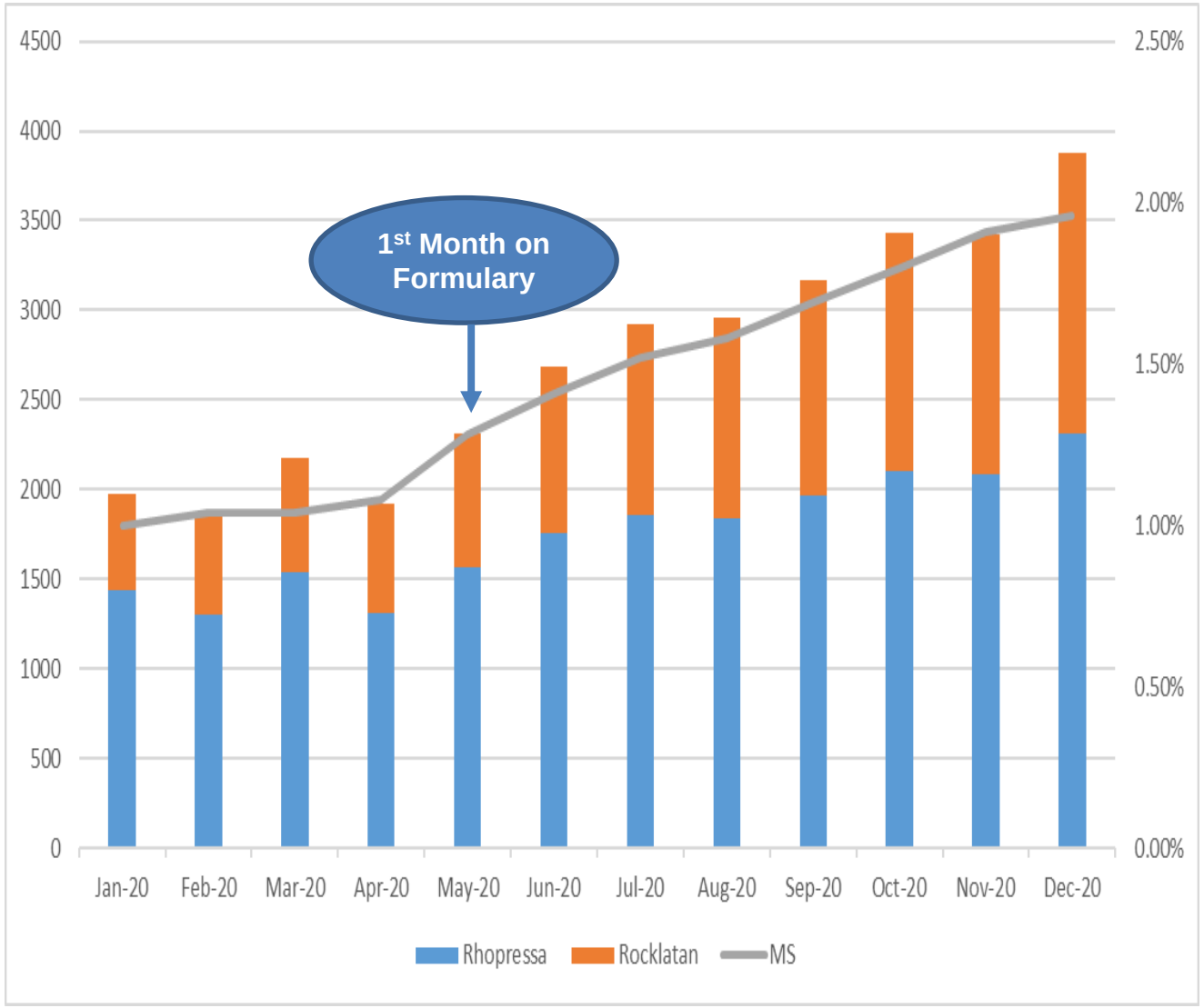
Aerie's franchise bottles per Rx were 1.44 in Q1 2021, reflecting an increase in 90 days' supply.

Sources: IQVIA: NPA Rx and NSP Unit data

Glaucoma Commercialization Focus

- Ongoing communication of the MOST Data and coverage via various communication channels
  - **Rhopressa® Coverage: 90% Commercial, 89% Med D**
  - **Rocklatan® Coverage: 89% Commercial, 59% Med D plus 15% Low Income Subsidy**
- Continued execution of the Pulse Strategy, focused on driving **monthly prescribers (now nearly 10,000)** to **weekly prescribers (now nearly 5,000)**
  - Franchise prescribers currently over 18,000
- Increasing share of voice with HCP's to further bolster sales momentum
  - Aerie reps calling on top 10,400 highest prescribers
  - Contract Sales Organization calling on next 1,400 highest prescribers
  - Telesales team calling on next 4,400 highest prescribers

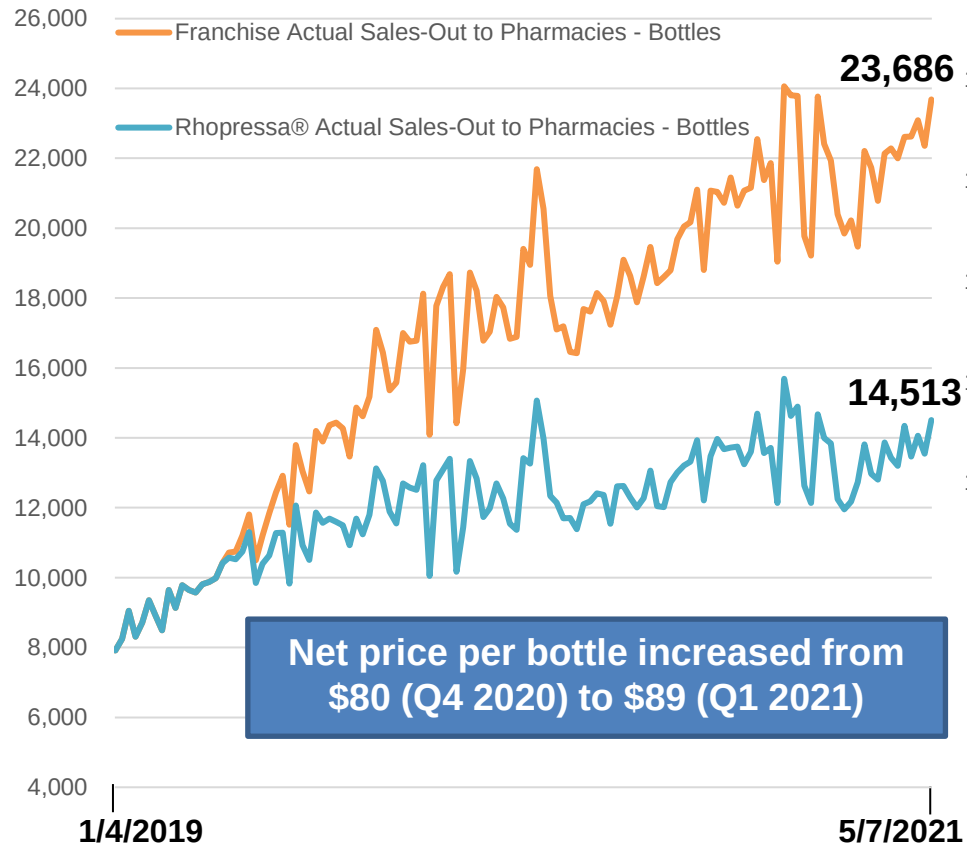
Focused on "Pull-Through" to Gain Share: Example from 05/01/20 Med D Coverage Win



	Apr 2020[1]	Dec 2020
National Market Share (Part D)	Aerie Franchise	
	1.9%	2.3%
New Payer Part D Market Share	Aerie Franchise	
	1.1% →	2.0%
	Difference vs National MS (-0.8%)	Difference vs National MS (-0.3%)

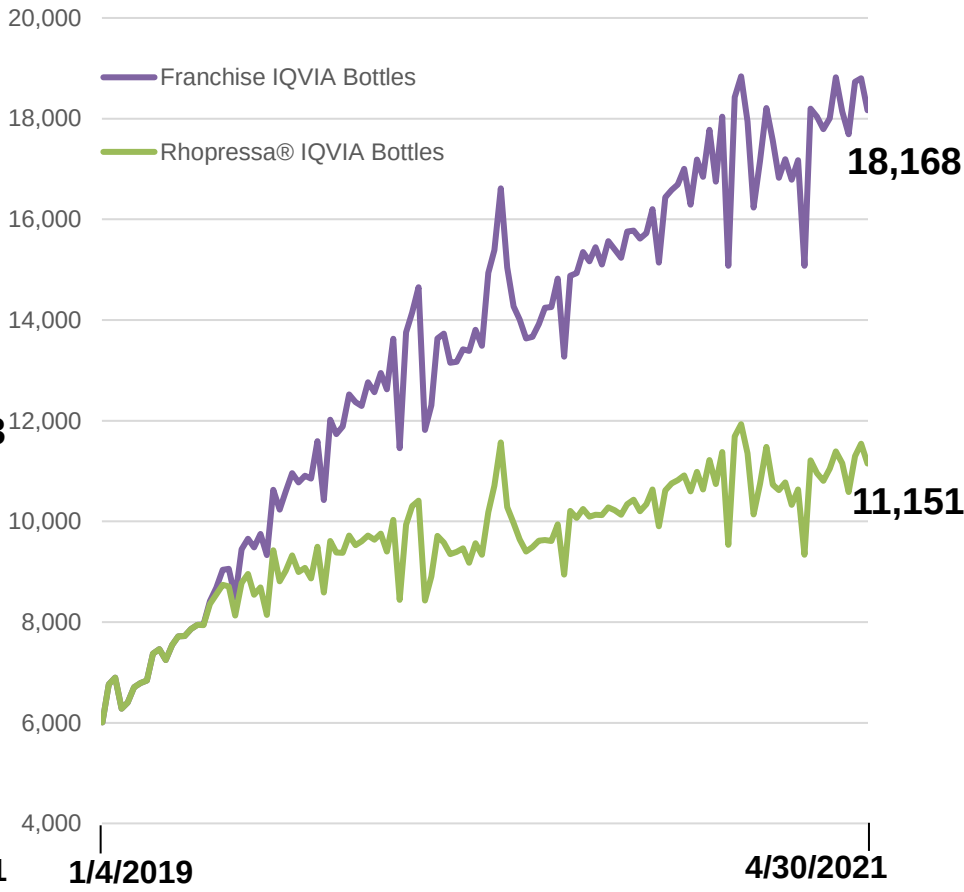
U.S. Glaucoma Franchise Update

Actual Weekly Sales-Out to Pharmacies Data as of 5/7/2021



Net price per bottle increased from $80 (Q4 2020) to $89 (Q1 2021)

IQVIA Weekly Data as of 4/30/2021



IQVIA reporting for all reported industry products changed in January 2021 with the prior two years restated, on top of an earlier restatement effective January 2019. Volumes for the weeks of February 1st, February 8th and February 15th (President's Day week) were impacted by the weather. Volumes for the week of April 2nd were impacted by the holiday week.

Aerie Franchise vs Key Brand Competitors

Aerie franchise continues to far exceed market & competitive product growth

Product	March '21 TRx	March '21 vs March '20	TRx Gain / (Loss)
Aerie (Rhopressa® & Rocklatan®)	**56,700**	**14%**	**7,050**
Vyzulta®	18,221	12%	1,916
Simbrinza®	32,213	(21%)	(8,691)
Azopt®	25,715	(39%)	(6,122)
Alphagan® P	69,821	(13%)	(10,564)
Combigan®	140,138	(12%)	(18,317)
Lumigan®	180,361	(11%)	(22,887)
Glaucoma Market	2,950,538	(6%)	(190,702)

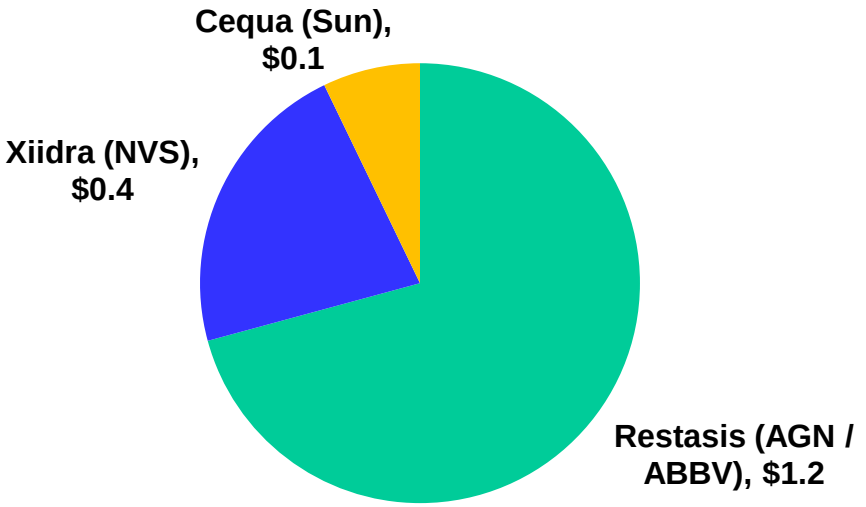
Source: IQVIA

Advancing the Pipeline

Drug/Target	Indication	Development Stage		
		Preclinical	Phase 1/2a	Phase 2b
Front of the Eye				
AR-15512 (TRPM8 agonist)	Dry Eye			
Back of the Eye				
AR-1105 Implant (Dexamethasone)	RVO/DME			
AR-13503 SR Implant (ROCK, PKC)	wAMD			
	DME/DR			
	Glaucoma Neuro-enhancement			
AR-14034 SR Implant (VEGF-A/B/C/D)	wAMD/DME			

U.S. Dry Eye Market: Under-diagnosed and Under-treated

US 2020 Sales: $1.7B est.



- Estimated 30 million dry eye sufferers in the United States; less than 3 million treated
- Dry eye related symptoms are one of the most common reasons for patients to visit an eye care professional
- Represents a significant health care burden, contributing to approximately 25% of visits to ophthalmic clinics
- Current pharmaceutical therapies are anti-inflammatories, often with poor maintenance on therapy and poor tolerability
- DED affects quality of life and interferes with reading, driving ability, computer use, work productivity and is associated with increased anxiety, stress and depression
- Unmet need for different MOAs, better tolerability, and treatment of symptoms

Sources: Mixture of public information, IQVIA , Market Scope and estimates – Feb 2020; Gayton JL. Clin Ophthalmol. 2009; 3:405-412.; Stonecipher KG et al. Ther Clin Risk Manag. 2013; Asrini Noor N. W J Opthalmol & Vision Res 2018.

AR-15512 for Dry Eye

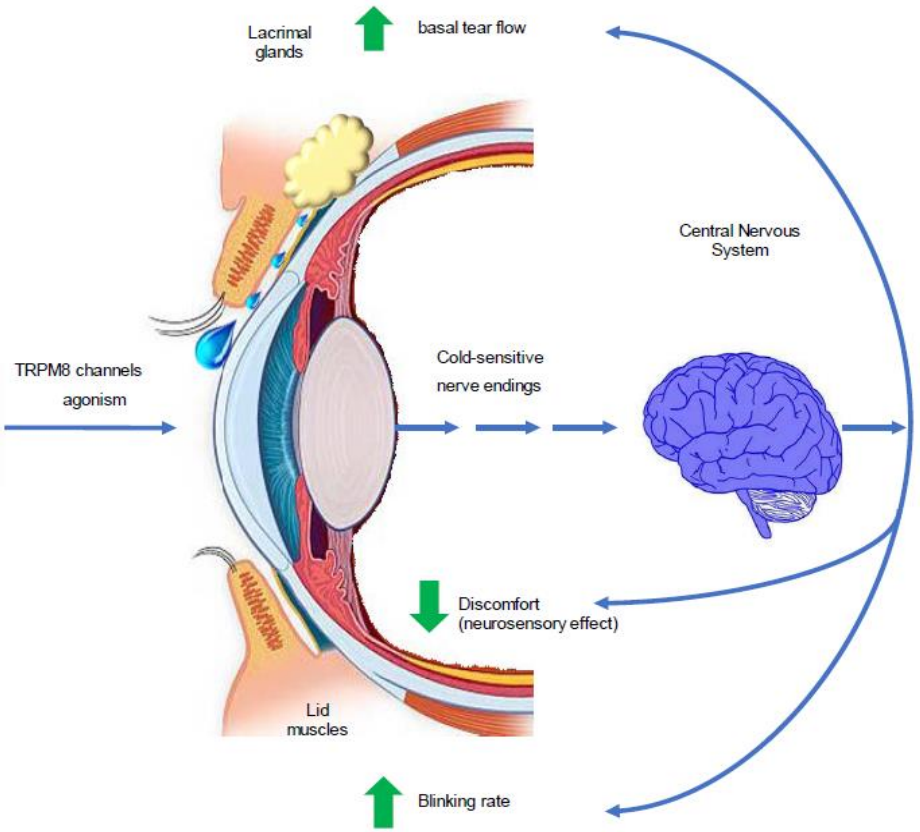
- **Novel Mechanism of Action – Modulation of Corneal TRPM8 receptors**
  - Topical eye drop
  - TRPM8 receptor is a cold thermoreceptor ion channel located on corneal nerve endings
  - Reduced corneal temperature triggered by tear evaporation activates TRPM8 which leads to:
    - **Increased basal tear production (sign for DED)**
    - **A cooling sensation leading to reduction in discomfort / ocular pain (symptom for DED)**
  - This dual mechanism of action is different than those of current prescription dry eye products and supports use as monotherapy as well in conjunction with approved products
- **Basal tearing depending on TRPM8 stimulation is independent of pain-evolved reflex tearing**
- **IP protection for AR-15512 (AVX-012) pharmaceutical composition and method of use through 2031**

Data on file.
AR-15512 is a development stage product candidate and is not approved by any regulatory agency

AR-15512 (TRPM8 Agonist) for Dry Eye

How AR-15512 works

By activating cold thermoreceptors in the cornea increases tear production and blinking rate, restoring tear film stability and reducing discomfort



AR-15512 for Dry Eye

- **Avizorex completed a Phase 2a study in early 2019 in 109 subjects**
  - One concentration (0.0014%) and two dosing regimens (BID/TID) for 4 weeks were evaluated
  - Primary endpoint: % of patients ≥ 20 points change in symptoms questionnaire (SANDE)
  - Secondary endpoints:
    - Schirmer's test (tear production)
    - Tear film break-up-time (TBUT)
    - Corneal staining
- **Key findings:**
  - BID dosing demonstrated greater separation from vehicle, especially in subjects with higher symptoms at baseline
  - Statistical differences from vehicle observed in BID dosing arm in symptoms (severe subjects) and Schirmer's change ≥ 3 mm

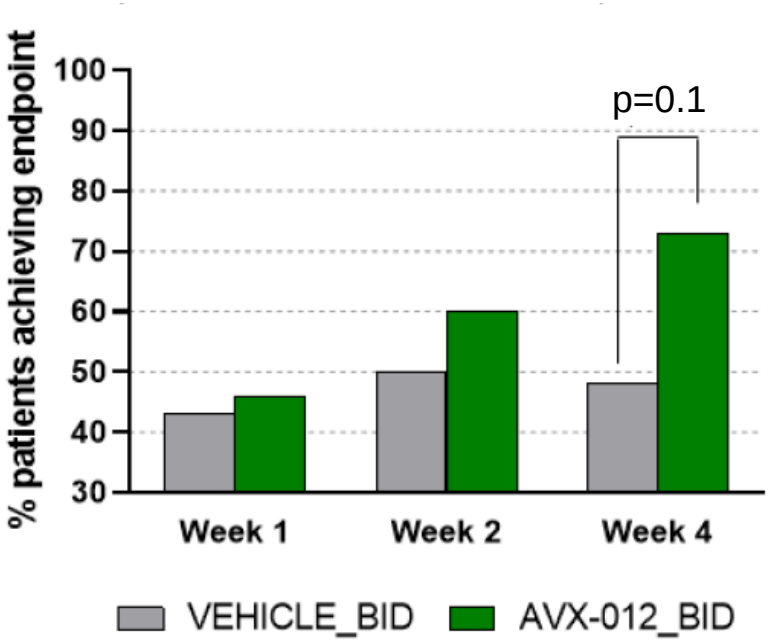
Data on file.
AR-15512 is a development stage product candidate and is not approved by any regulatory agency

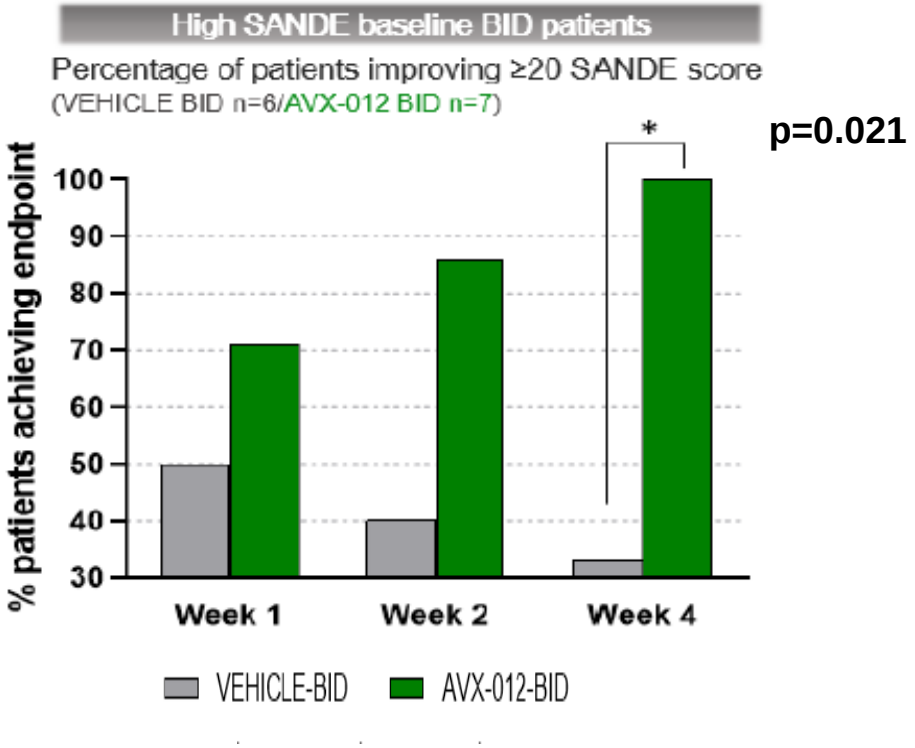
AVX-012 (AR-15512) Dry Eye Clinical Trial Highlights

- Significant efficacy achieved for sign and symptoms with BID dosing of 0.0014% (50µM) AVX-012 (AR-15512) over 28 days

Symptoms: SANDE Score

Percentage of patients improving ≥20 score





- Graph on the right represents primary endpoint with a subset of more severe symptoms
- Demonstrated statistical significance

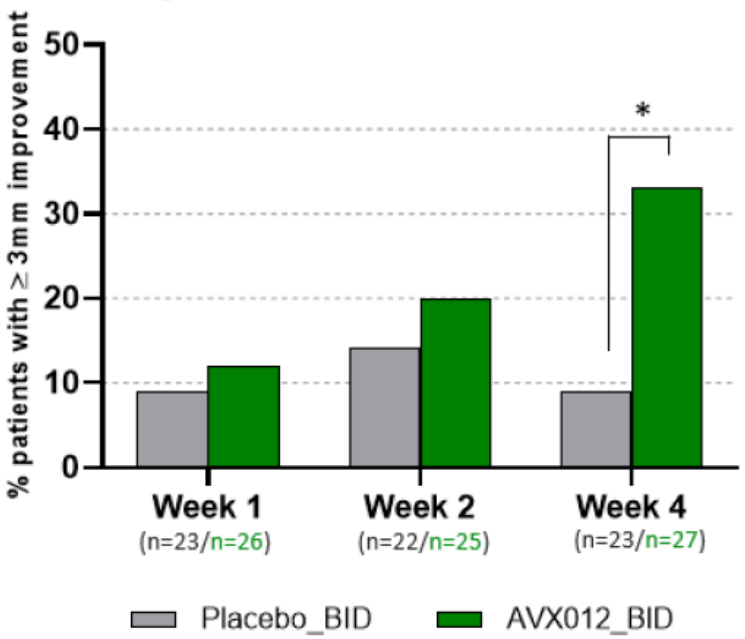
++Data on File

AVX-012 (AR-15512) Dry Eye Clinical Trial Highlights

- Significant efficacy achieved for sign and symptoms with BID dosing of 0.0014% (50µM) AVX-012 (AR-15512) over 28 days

Sign: Schirmer Evaluation

Percentage of patients improving ≥3mm



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Dry Eye Program: AR-15512

- Target symptoms: significant step in addressing the symptoms of dry eye patients and providing a cooling sensation
- Impact basal tear production: production of natural tears and not just an acute reflex tear
- Safe for long-term use
- Other approved products on the market:
  - Xiidra®: only approved product for the treatment of signs and symptoms
  - Restasis®, Cequa™ and TrueTear®: approved for increase in tear production

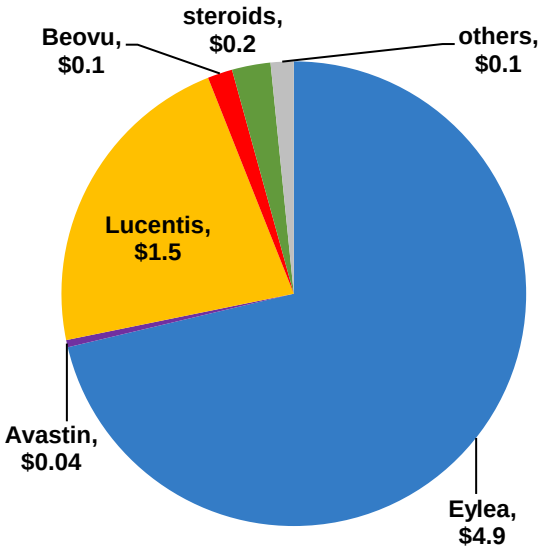
AR-15512: COMET-1 Phase 2b Underway

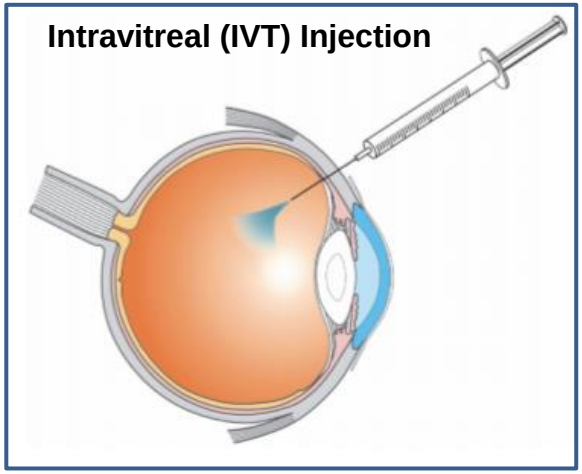
- Clinical Trial Series named “COMET” = Cold Thermoreceptor Modulation as an Effective Treatment
- Phase 2b clinical study commenced October 2020; enrollment completed April 2021
- Phase 2b study is evaluating efficacy and safety of 0.0014% and 0.003% BID
  - 360 patients (1:1:1) for 3 months
  - Environmental and Controlled Adverse Environment (CAE) conditions
  - Primary endpoints: ocular discomfort (symptom) and tear production (sign) at day 28
  - Secondary endpoints include: SANDE, staining TBUT, changes post CAE

COMET-1 Phase 2b topline results expected Q3 2021

2019 U.S. Retinal Disease Market: Need for Reduced Injection Frequency, New MOAs

2020 U.S. Sales: $6.9B



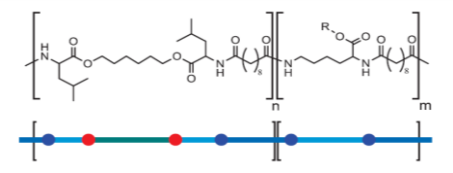


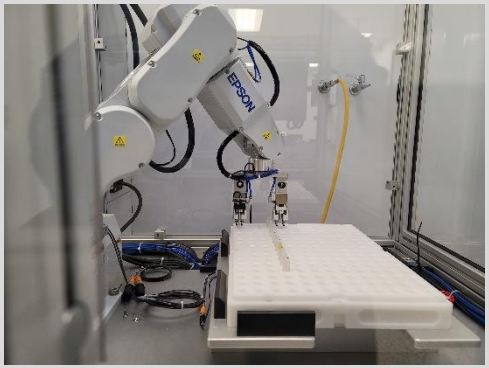
- Frequent intravitreal injections required to maintain vision gains
  - Represents a significant burden for patients and physicians
- Only 2 drug classes approved for treatment of wAMD, DME (anti-VEGF, steroids)
  - Not sufficient to fully address complex pathology that drives disease progression
- Opportunity for improved efficacy over current standards of care

Sources: Mixture of public information, IQVIA, Market-Scope and estimates – Feb 2020

Aerie's Proprietary Drug Delivery Platform for Retinal Disease – Predictable and Flexible

PRINT® Platform



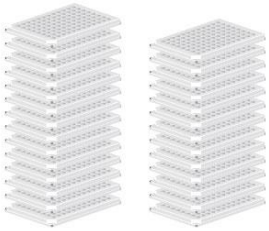


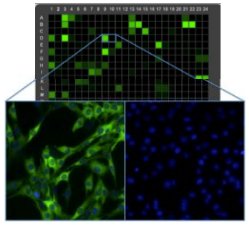
- Customizable drug elution, reproducible manufacturing
  - Proprietary bio-erodible formulations, PRINT® manufacturing
- Longer treatment duration, reduced injection frequency
  - Enables once or twice per year IVT injections
- Greater diversity of drug targets via small molecule drugs
  - Monoclonal antibodies limited to extracellular targets

- **Potential across a broad range of molecules and a variety of polymers (or custom polymer combinations) uniquely designed to optimize delivery of the active molecule**
- **Highly predictive when translating from preclinical models to humans**
- **Efficient low-cost tool to achieve proof of concept**

Aerie's Proprietary Drug Delivery Technology: A Platform for Future Innovation

Small Molecule Drug Candidates

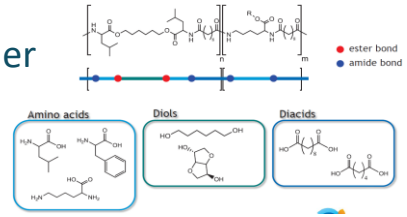


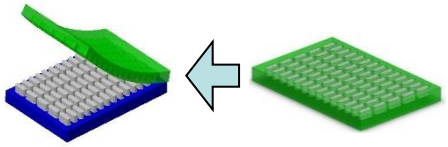


- Aerie Kinase Library
- Non-Aerie drug candidates

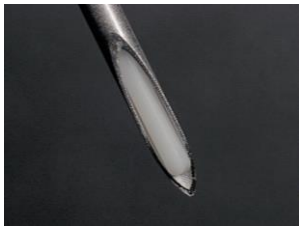
Proprietary Drug Delivery Technology

- DSM PEA Polymer
- PLGA





- PRINT® Mfg



- Bio-erodible, sustained-release implant for intravitreal injection

wAMD **DME** **RVO** **Dry AMD/GA** **Glaucoma** **Others**

AR-1105 (Dexamethasone) Implant

- Positive Topline Phase 2 results in RVO
- Phase 3 plans underway for the U.S. and Europe for DME
- Target product profile vs. Ozurdex®
  - Designed for longer duration of efficacy (6 mo vs 3 mo)
  - Designed for improved administration due to smaller needle
  - Potential for fewer adverse effects due to lower peak drug levels

For more information on Ozurdex® please see the product webpage https://www.ozurdex.com
AR-1105 and AR-13503 are development stage product candidates and are not approved by any regulatory agency

AR-1105 (Dexamethasone) Implant: Phase 2 Topline Summary

- The Phase 2 clinical trial (AR-1105-CS201) was conducted at 19 centers in the United States.
- The objective was to evaluate two clinical formulations of AR-1105, CF-1 and CF-2 (each containing 340 µg dexamethasone), with different release profiles, in patients with chronic macular edema secondary to retinal vein occlusion (RVO).
- A total of 49 patients completed the study. Both formulations demonstrated sustained treatment effects in best corrected visual acuity and reductions in macular edema. Peak efficacy was observed earlier with CF-1, while CF-2 demonstrated a longer overall duration of effect of up to six months.
- Both formulations were well tolerated with no unexpected safety findings. Adverse events were consistent with other corticosteroid treatments and intravitreal injection procedures.

The results match expectations from preclinical models and demonstrate the flexibility and predictability of the PRINT® technology platform in developing longer duration therapies

Data on file.

AR-1105 Opportunity

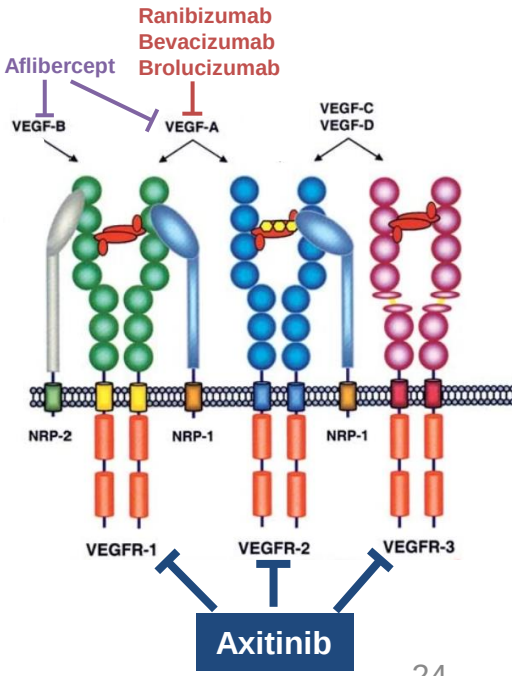
- The DME market is growing in the United States and abroad
- The 6-month sustained efficacy of AR-1105 in the P2 study may render this product, if approved, highly competitive in both the U.S. and European markets
- AR-1105 may be viewed as a more favorable treatment alternative for anti-VEGF non-responders
- Aerie's exclusive PRINT® platform may allow for low-cost production and significant pricing flexibility
- Six-month dosing may also benefit physician productivity and overall health economics
- Opportunity for market expansion – market currently over $100M in the U.S. and nearly $300M in Europe

Positive AR-1105 P2 topline sustained efficacy data supports advancement as a potentially significant pipeline asset for Aerie, of particular value in Europe

AR-1105 is a development stage product candidate and is not approved by any regulatory agency

AR-14034 SR (Axitinib) Implant Opportunity

- 2019 IVT anti-VEGF worldwide market $13B; est. $22B by 2025[1]
- Current anti-VEGF pipeline dominated by longer duration products targeting injection every 4 - 6 months
  - Significant value to healthcare system of longer duration therapies
- AR-14034 SR (axitinib) Implant offers multiple potential advantages vs. current and future products
  - Duration: targeting once-per-year injection to treat a patient for up to 12 months
  - Efficacy: potential for greater efficacy through broad inhibition of all VEGF receptor signaling (pan-VEGF inhibitor; blocks VEGF-A/B/C/D)
  - Safety: proprietary polymer blend provides controlled drug release, avoids microparticles that can migrate to front of the eye



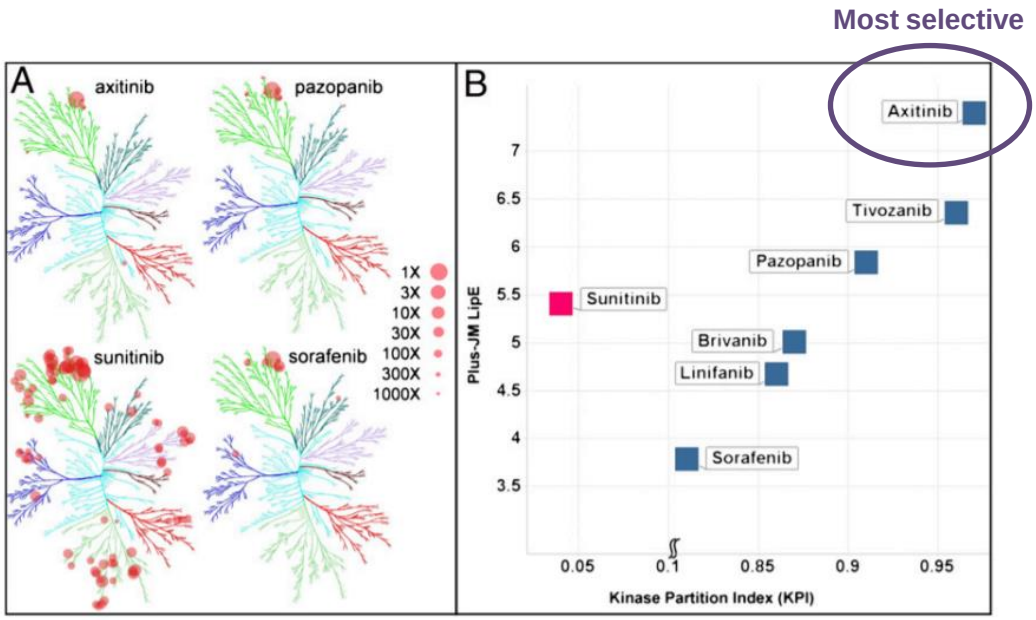
AR-14034 is a development stage product candidate and is not approved by any regulatory agency.

1. Market Scope Estimates 2020; http://market-scope.com/

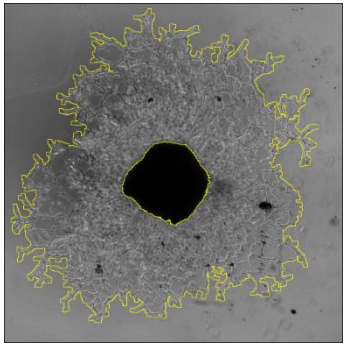
Axitinib Is Preferred Small Molecule for VEGF Inhibition

- Pan-VEGF receptor inhibitor (inhibits all isoforms of VEGF-R)
- Approved for systemic use in 2012 for the treatment of renal cell carcinoma
- Higher potency and less off-target activity than other small molecule inhibitors

Kinase Selectivity Assay



Choroid Sprouting Assay



Compound	IC50 (nM)	IC90 (nM)
Axitinib	**65 ±43**	**124 ±62**
Sunitinib	676 ±500	1901 ±1103

McTigue M, et al. Proc Natl Acad Sci U S A. 2012 Nov 6;109(45):18281-9.

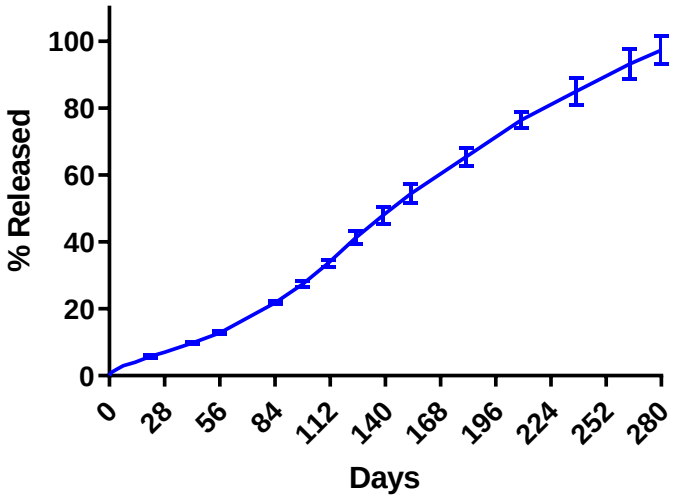
AR-14034 is a development stage product candidate and is not approved by any regulatory agency.

Data on File

For Investor Use

Axitinib Implant: Results Support Up to 12 Months Duration in Clinic

Cumulative Drug Release In Vitro



In vitro: In vivo Comparison

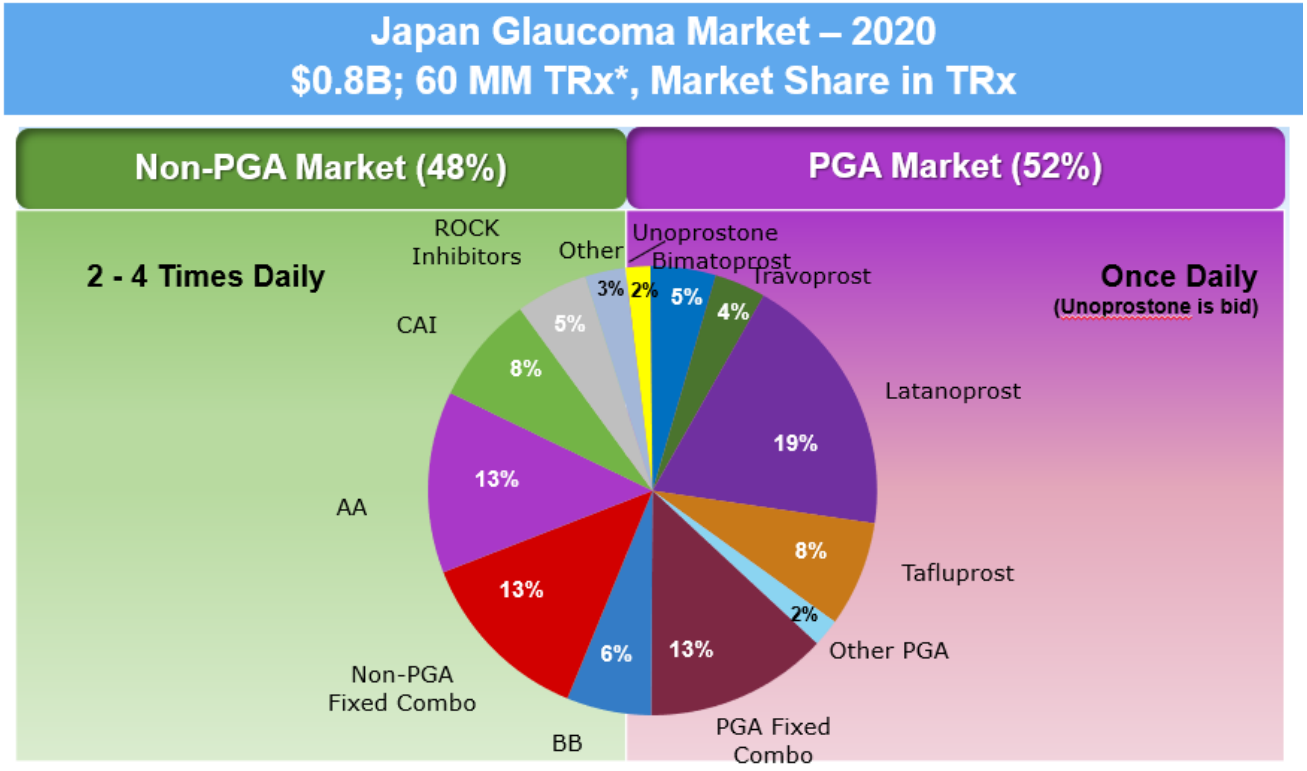
Time	Percent drug released	
	In vitro	In rabbits
Day 14/16	10%	6-9%
Day 29/31	17%	14%
Month 5	60%	50-60%

- Proprietary polymer blend produces optimal drug elution profile
  - Maintains high elution rate over time
- Drug release rate in rabbits predicts up to 12-months duration (once a year injection) in clinic
  - Aerie rabbit data accurately predicted AR-1105 6-month duration in clinic

IND-enabling preclinical studies underway;
IND filing planned for 2H 2022

AR-14034 is a development stage product candidate and is not approved by any regulatory agency.
Data on File

Expanding Aerie Franchise: Japan



- Phase 2 study successful topline results released in November 2019
- First Phase 3 trial commenced in Japan in December 2020

Recently announced licensing agreement with Santen for Japan along with rights for several other Asian countries

Sources: IMS Analytics link at ex-manufacturer price level and Unit-April 2021. *TRx calculated from IQVIA unit data (1 month = 1 TRx)

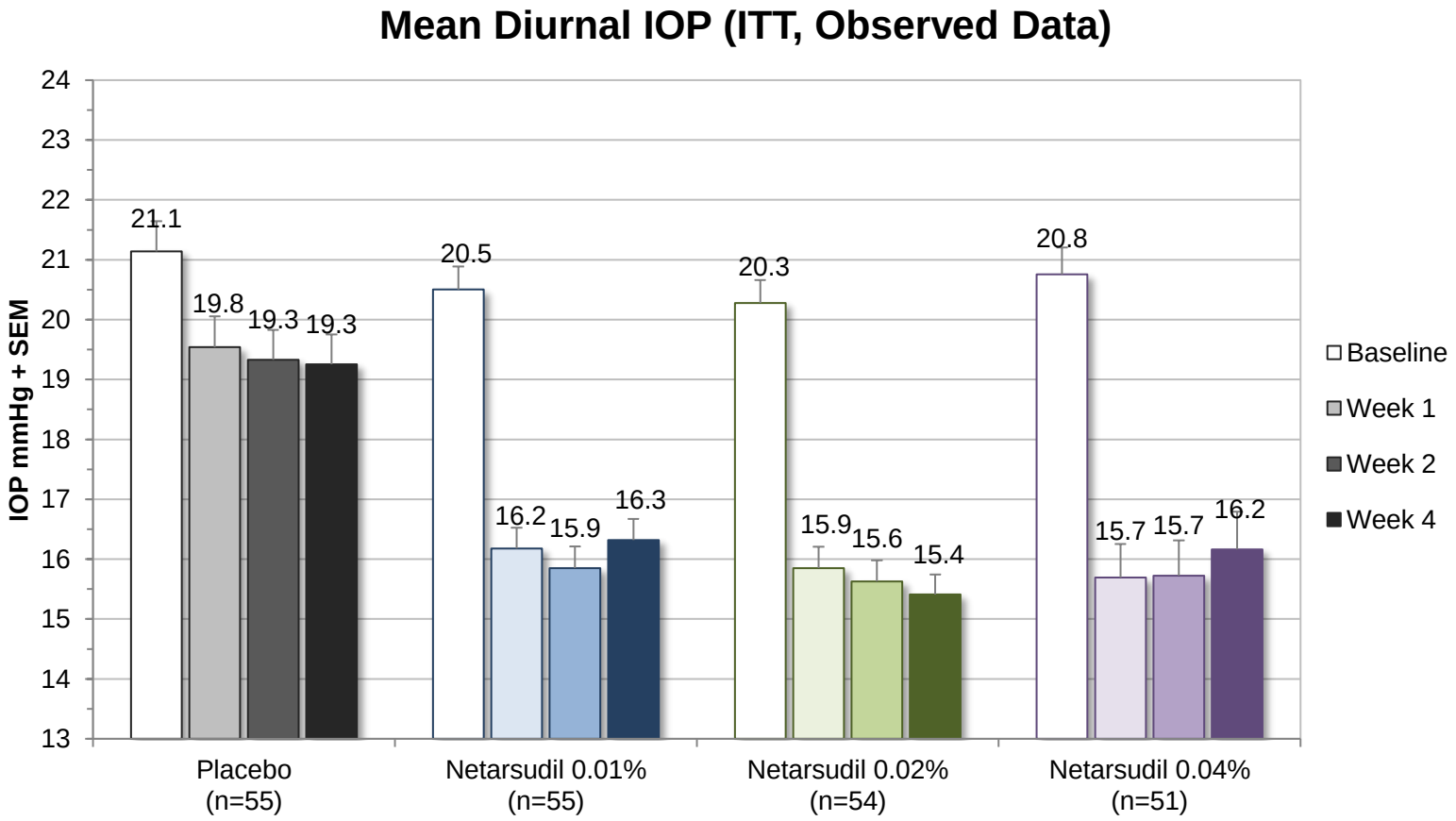
AR-13324-CS208 Japan Phase 2 Study Topline Results

- **28-day prospective, double-masked, placebo-controlled, dose-ranging study of netarsudil efficacy and safety in Japanese subjects with open-angle glaucoma (OAG) or ocular hypertension (OHT)**
- **Netarsudil 0.01%, 0.02% and 0.04% were efficacious, met primary endpoint of superiority to placebo in mean diurnal IOP at Week 4[1], were safe and generally well tolerated**
  - Baseline mean diurnal IOPs 20-21 mmHg across study arms[2] (Japanese IOPs ~3 – 4 mmHg lower than in the U.S.)
  - Week 4 mean diurnal IOP was 16.3 (-4.1), 15.4 (-4.8), 16.2 (-4.8) and 19.3 (-1.7) mmHg in the netarsudil 0.01%, 0.02%, 0.04%, and placebo groups, respectively[2]
  - No serious adverse events
- **Netarsudil 0.02% (concentration of Rhopressa® in the U.S) provided best balance of efficacy and safety**
  - Most common AE was Conjunctival Hyperemia (37.0%), discontinuation rate was 1.9%, all lower than in US trials[3-5]

Netarsudil generated up to 4.8 mmHg reduction in IOP from baseline

1. ANCOVA with MCMC imputation. 2. Observed data. 3. Bacharach J, et al. Ophthalmology. 2015 Feb;122(2):302-7. 4. Serle JB, et al. Am J Ophthalmol. 2018 Feb;186:116-127. 5. Khouri AS, et al. Am J Ophthalmol. 2019 Aug;204:97-104.

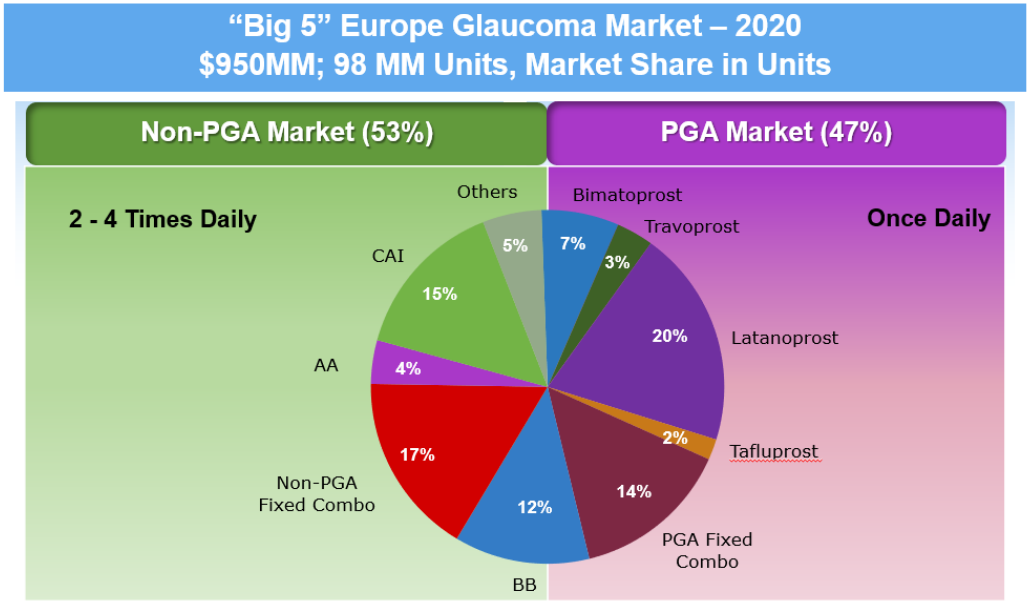
AR-13324-CS208 Japan Phase 2 Study Topline Results



- P<0.0001 vs. placebo at Week 4 for all dose levels[1]
- 0.02% achieved lowest mean diurnal IOP at Week 4

1. ANCOVA with MCMC imputation

Expanding Aerie Franchise: Europe



- Marketing authorisation granted for Rhokiinsa® (Rhopressa®) in November 2019 and for Roclanda® (Rocklatan®) in January 2021
- Mercury 3: Reported successful 90-day topline data in September 2020; Rocklatan® (known as Roclanda® in Europe) achieved non-inferiority to a fixed-dose combo in Europe (Ganfort®)
- Ireland Plant approved for U.S. production of Rhopressa® and Rocklatan®

Preparing for pricing discussions in Germany;

Potential collaborators actively pursuing European opportunity

Sources: IQVIA Midas data at ex-manufacturer price level and Unit-April 2021. *TRx calculated from IQVIA unit data (1 month = 1 TRx)

Summary

- **Key Priorities**
  - Driving continued Rhopressa® and Rocklatan® volume growth in the U.S.
- **Globalization Strategy**
  - Japan: Santen collaboration commencing and first Phase 3 trial underway
  - Europe: Significant interest from potential collaborators
  - Ireland Manufacturing Facility approved for U.S. production of Rhopressa® and Rocklatan®
- **Research Initiatives**
  - TRPM8 agonist for dry eye P2b underway
  - Retina Programs, including AR-1105 prospects with positive P2 topline; and
  - AR-14034 SR (Axitinib Pan-VEGF inhibitor) sustained-release implant
- **Well-Financed**
  - $208.2M cash/investments at 3/31/21
  - Santen upfront payment of $50M received in fourth-quarter 2020