ALDEYRA THERAPEUTICS™

Reproxalap
Phase 2b Dry Eye Disease Results

September 2018

NASDAQ: ALDX

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Dry Eye Disease:
A Chronic Disease with Inadequate Therapy

Large Disease Burden

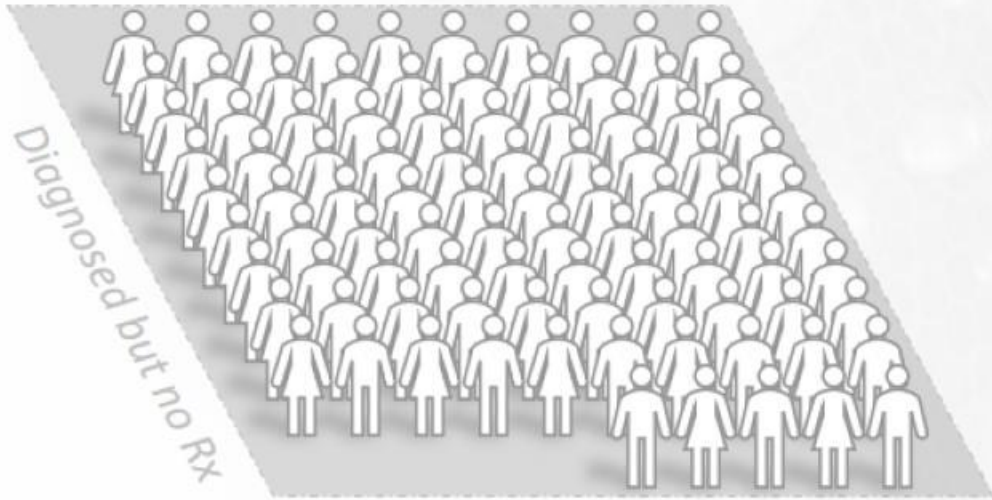
20 million # of **adults in the U.S.** estimated to suffer from Dry Eye Disease (DED)

vs **Women are twice as likely** to suffer from DED than men

Age 50+ >3x DED **increases with age**, with those over age 50 three times more likely to suffer from DED

DED can significantly effect vision-related **quality of life**

Under-served Patient Population



Only 5% of diagnosed DED patients **utilize current Rx treatments** for dry eye disease

Sources: "Dry Eyes" by R. M. Shtein, MD; www.uptodate.com, May 2018; Farrand et al; American Journal of Ophthalmology 90:98, 2017; Aldeyra primary and secondary research and estimates; Clin Ophthalmol. 2009; 3: 405–412; Symphony Rx Data.

Reproxalap:
A Novel Drug Candidate for the Treatment of Dry Eye Disease

Positive Phase 2b Clinical Trial Results

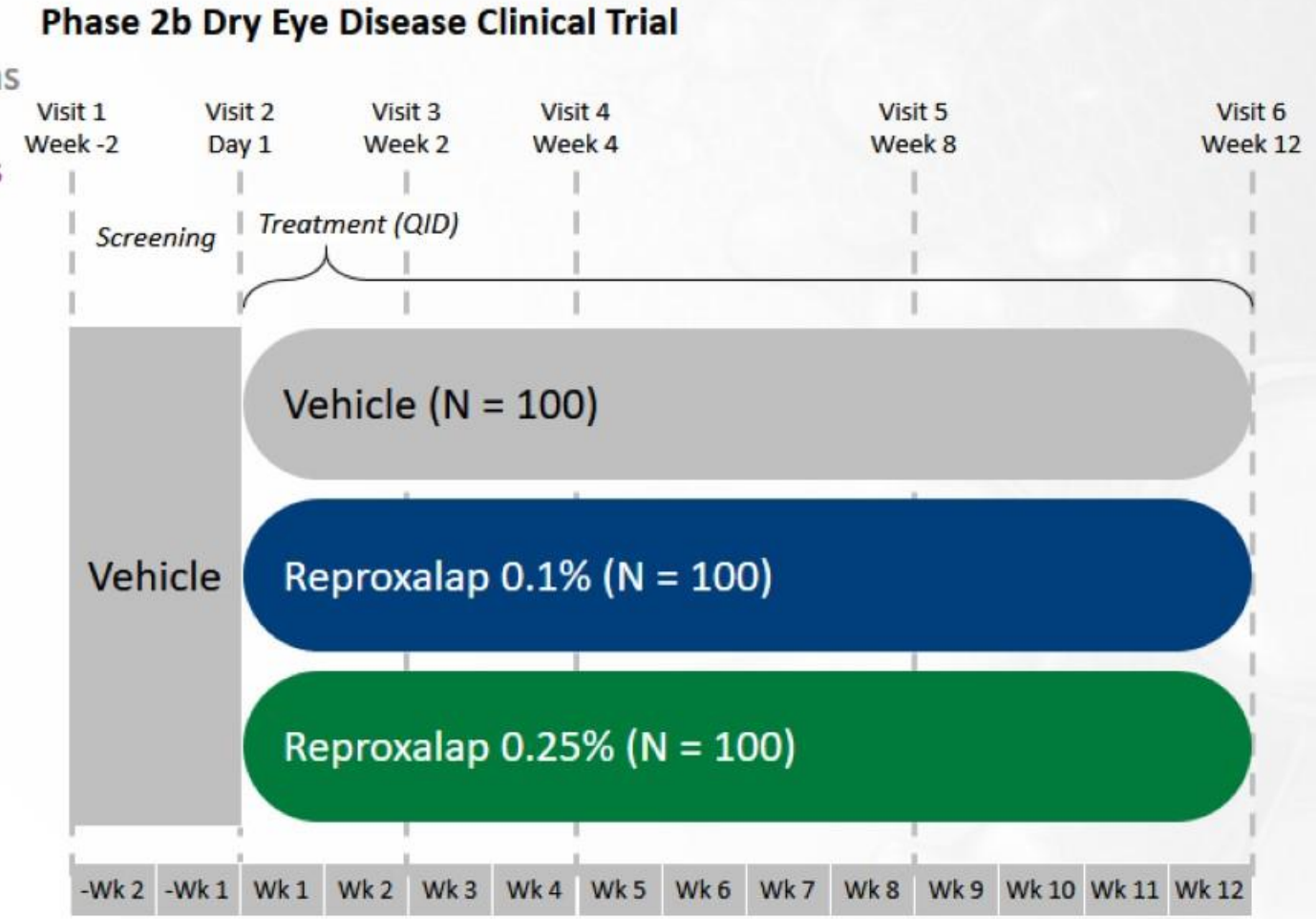
- **Primary objective achieved:**
  Endpoint selection and sample size powering confirmed for Phase 3 clinical trials
- Reproxalap demonstrated **statistically significant improvements** versus vehicle across multiple symptom and sign measures, consistent with novel and broad mechanism of action
- **Pathway to registration trials confirmed** with ocular dryness symptom score, ocular staining score, and 0.25% reproxalap dose
- **Improvements in symptoms and signs observed as early as two weeks**, consistent with prior reproxalap clinical trial results and supportive of differentiated product profile
- Aldeyra plans to discuss results with regulatory authorities, and expects to **initiate Phase 3 clinical trials in 2019**
- Rigorous clinical data demonstrate the efficacy and safety of reproxalap in **dry eye disease and allergic conjunctivitis**, two medical conditions with considerable overlap

Phase 2b Dry Eye Disease Clinical Trial Design
January – July 2018

- **Primary objective:**
  - Evaluate efficacy of reproxalap ophthalmic solutions vs. baseline and vehicle to **confirm endpoint selection and sample size for Phase 3 clinical trials**

- **Inclusion/exclusion highlights:**
  - History of dry eye disease for at least 6 months
  - Moderate to severe dry eye disease
    - ≥ 2 on OD & 4-Symptom Questionnaire (in at least one symptom score)
    - Schirmer's Test ≤ 10 mm and ≥ 1 mm
    - Tear Film Break-Up Time ≤ 5 sec
    - ≥ 2 staining score in at least one corneal region, and ≥ 4 in sum corneal
    - ≥ 2 staining score in sum conjunctival
    - Demonstrate Controlled Adverse Environment (CAE) response

OD = Ocular Discomfort
QID = four times daily
Source: Reproxalap DED Phase 2b clinical trial protocol



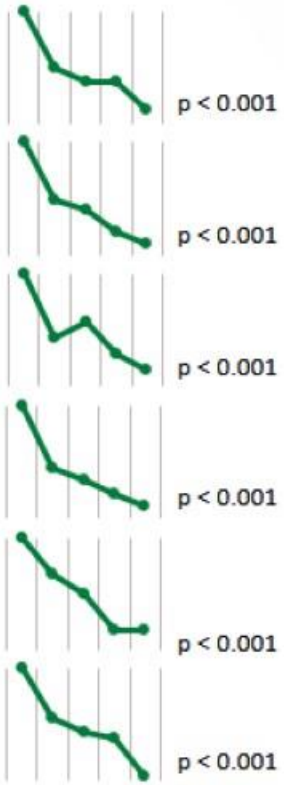
Reproxalap's Broad Activity Across Dry Eye Symptoms and Signs Consistent with Previous Clinical Trials

0.25% Reproxalap Change From Baseline (N=100)

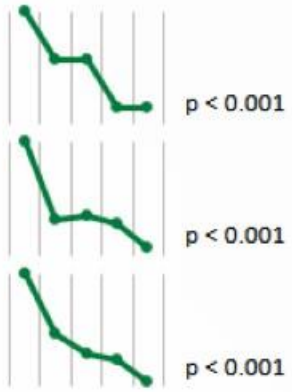
Baseline | Wk 2 | Wk 4 | Wk 8 | Wk 12

ITT Population with Observed Data Only

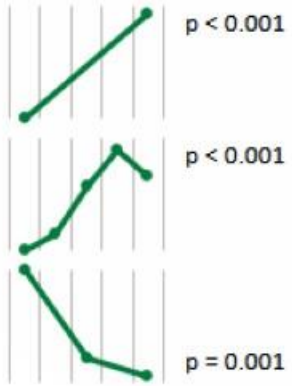
Symptom Severity Measures



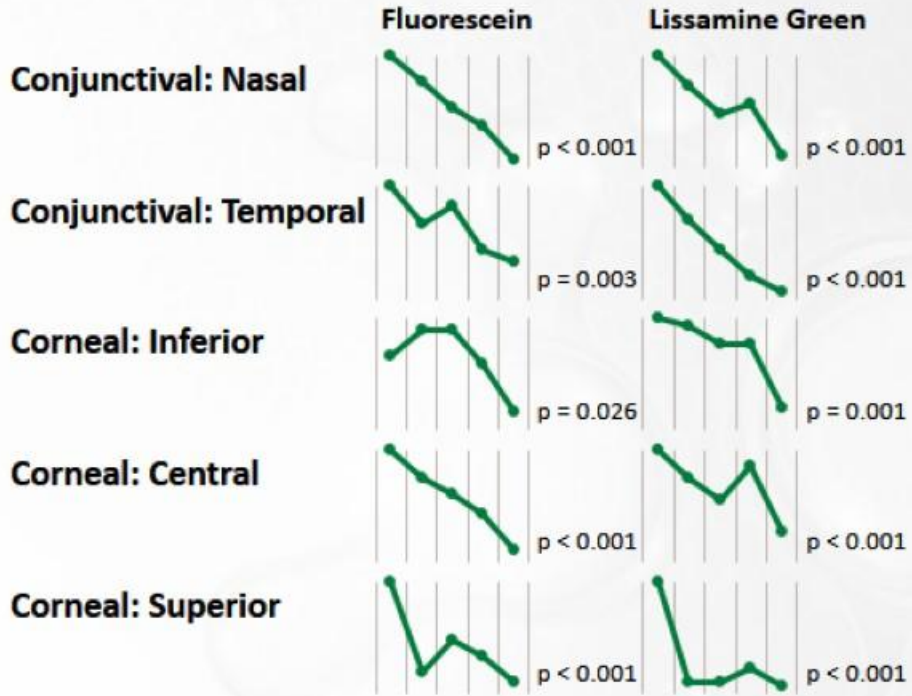
Symptom Frequency Measures



Tear Quantity and Quality Signs



Ocular Surface Damage Signs (Stains)



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

OD&4S = Ocular Discomfort & 4 Symptom

ODS = Ocular Discomfort Scale

OSDI = Ocular Surface Disease Index

SANDE = Symptom Assessment in Dry Eye

TFBUT = Tear Film Break-Up Time

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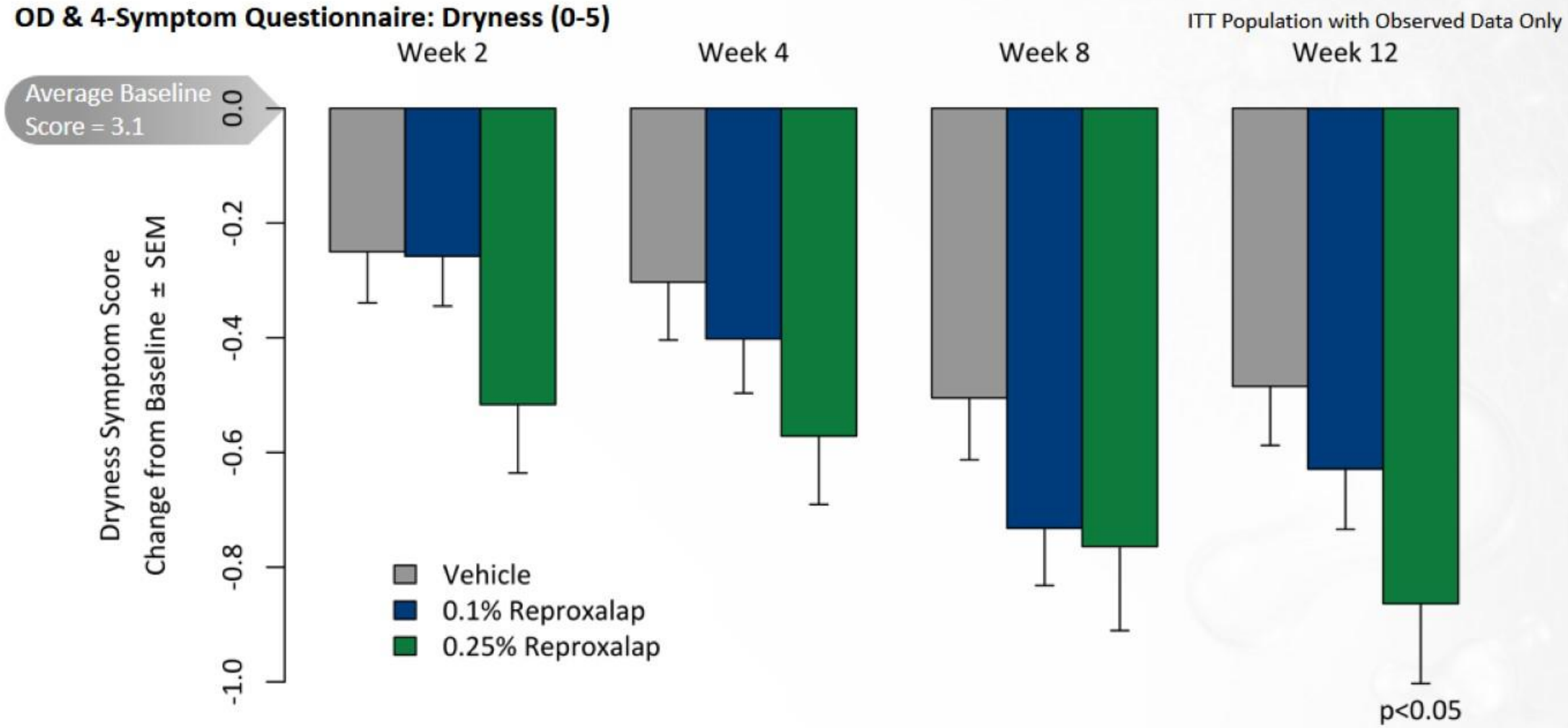
Proposed Co-Primary Endpoint: Reproxalap Improved Ocular Dryness vs. Vehicle



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

OD = Ocular Discomfort

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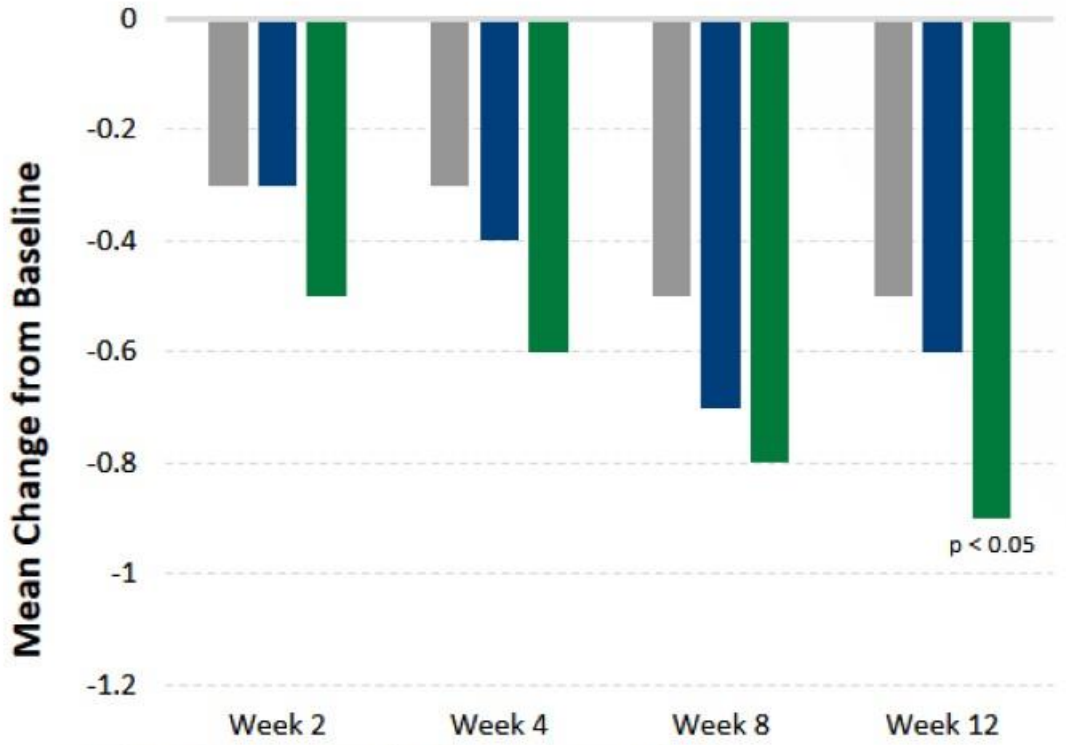
Drug Potency Supported by Ocular Dryness Improvement vs. Vehicle in Higher Baseline Patients

OD & 4-Symptom Questionnaire: Dryness (0-5)

Total Population (N=100|100|100)

ITT Population with Observed Data Only

Total Population Average Baseline Score = 3.1

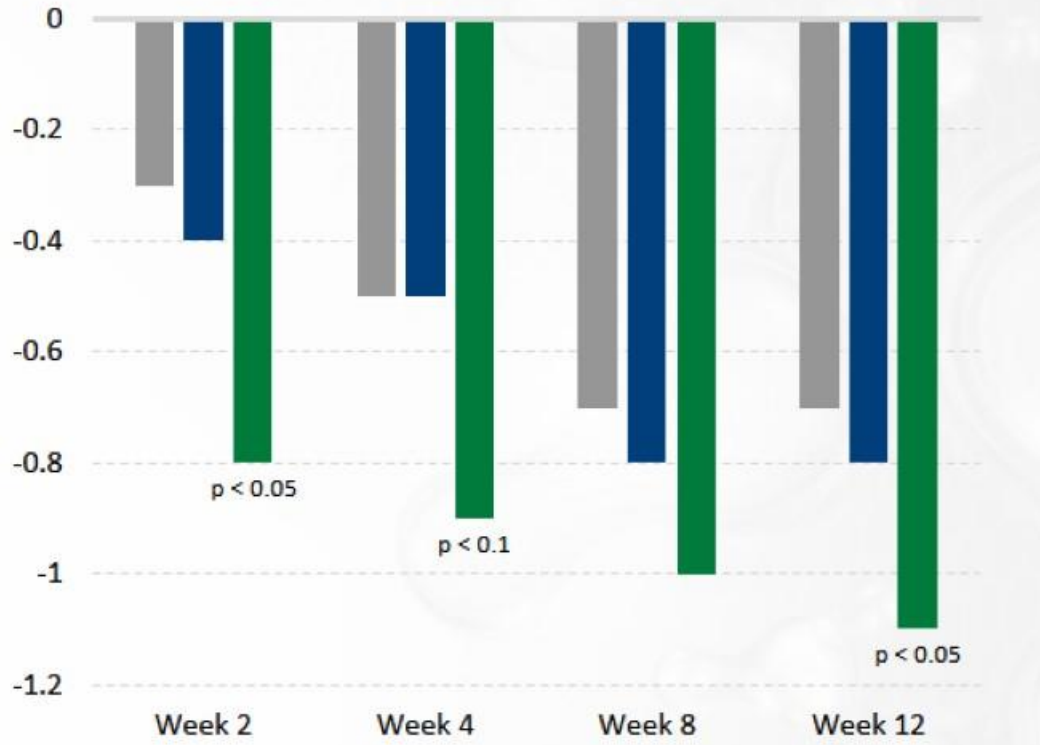


VS.

Above Median Baseline Population (N=79|69|69)

ITT Population with Observed Data Only

Above Median Population Average Baseline Score = 3.6



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

Vehicle ■ Reproxalap (0.1%) ■ Reproxalap (0.25%)

OD = Ocular Discomfort

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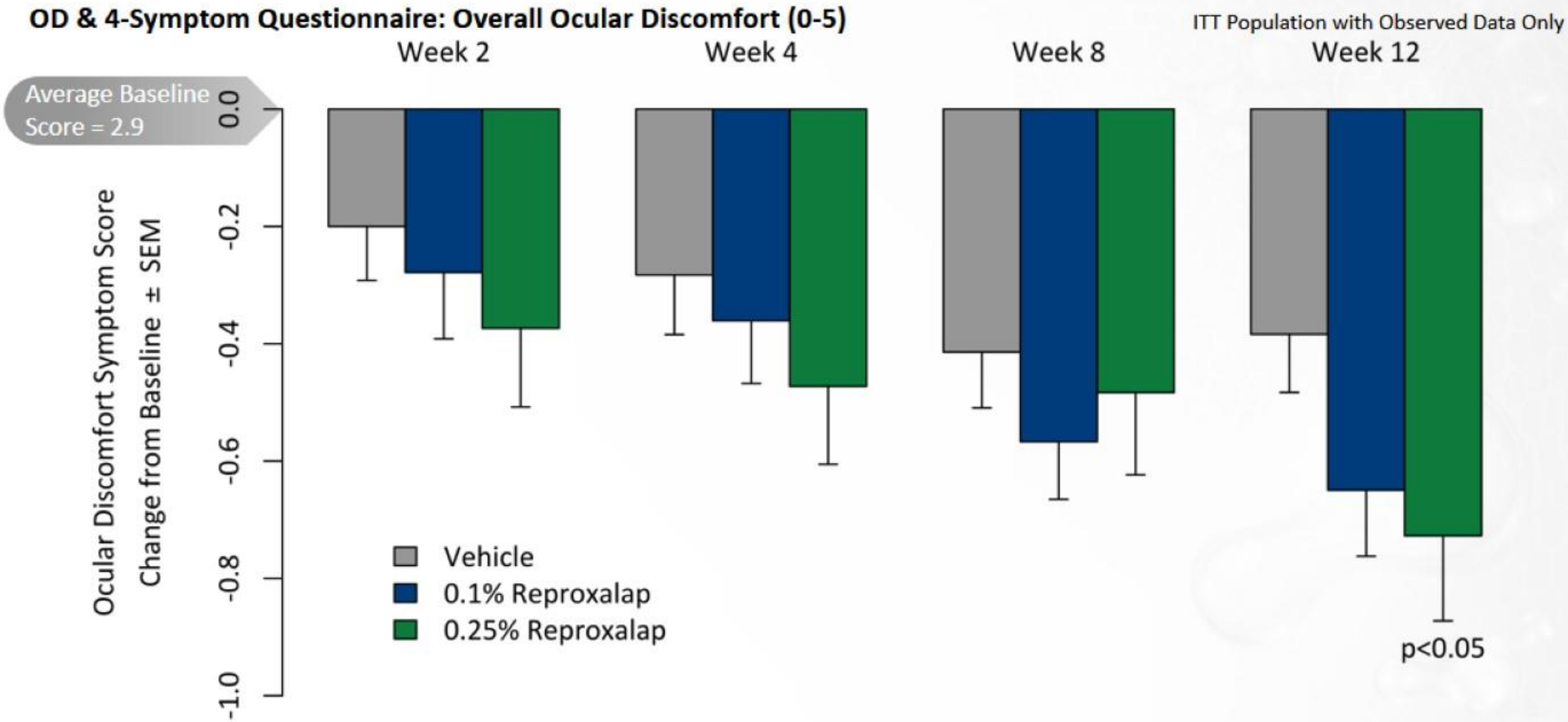
Ocular Discomfort Symptom Results Support Observed Improvement in Ocular Dryness Score



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

OD = Ocular Discomfort

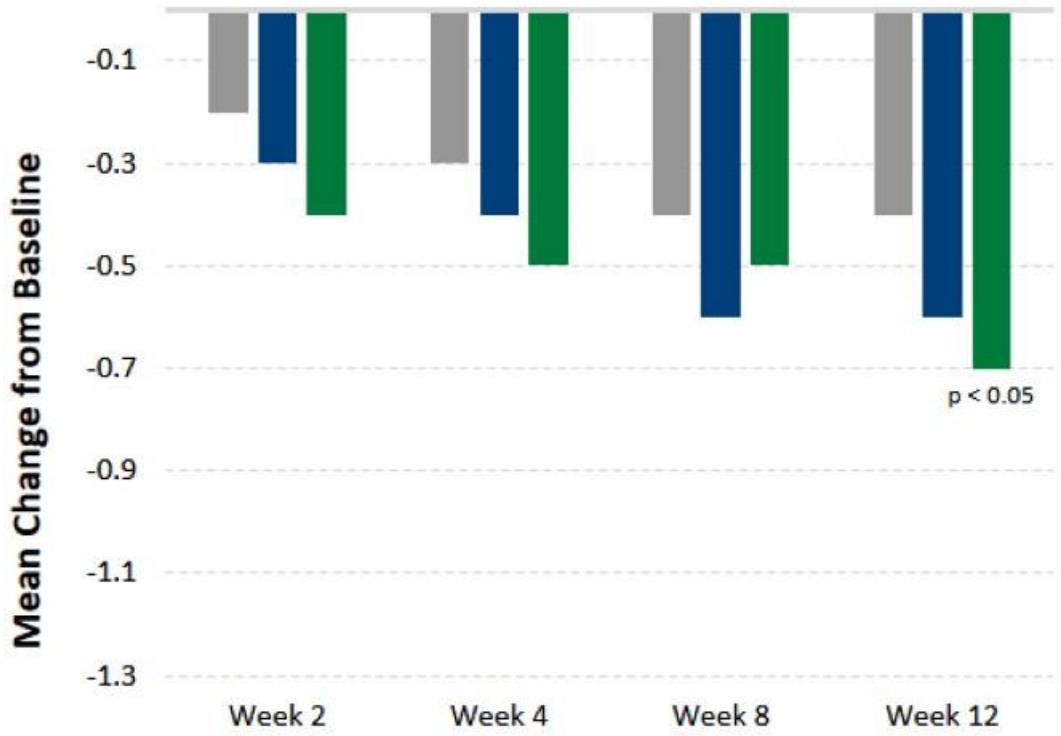
Drug Potency Supported by Ocular Discomfort Improvement vs. Vehicle in Higher Baseline Patients

OD & 4-Symptom Questionnaire: Overall Ocular Discomfort (0-5)

Total Population (N=100|100|100)

ITT Population with Observed Data Only

Total Population Average Baseline Score = 2.9

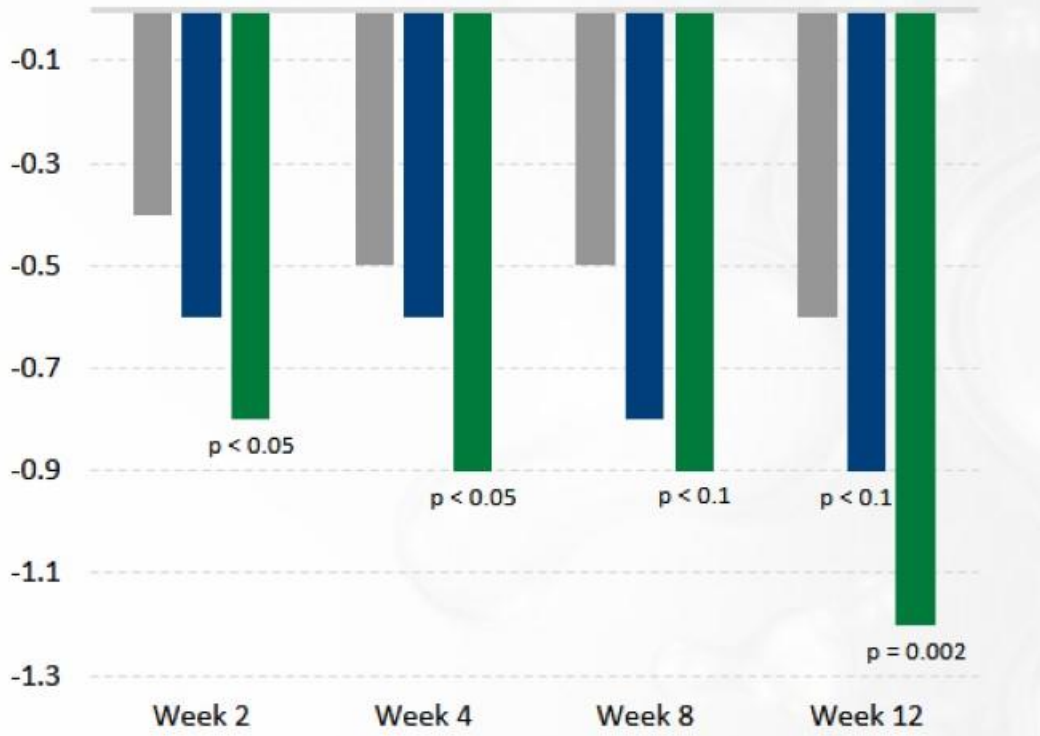


VS.

Above Median Baseline Population (N=69|65|64)

ITT Population with Observed Data Only

Above Median Population Average Baseline Score = 3.4



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

Vehicle | Reproxalap (0.1%) | Reproxalap (0.25%)

OD = Ocular Discomfort

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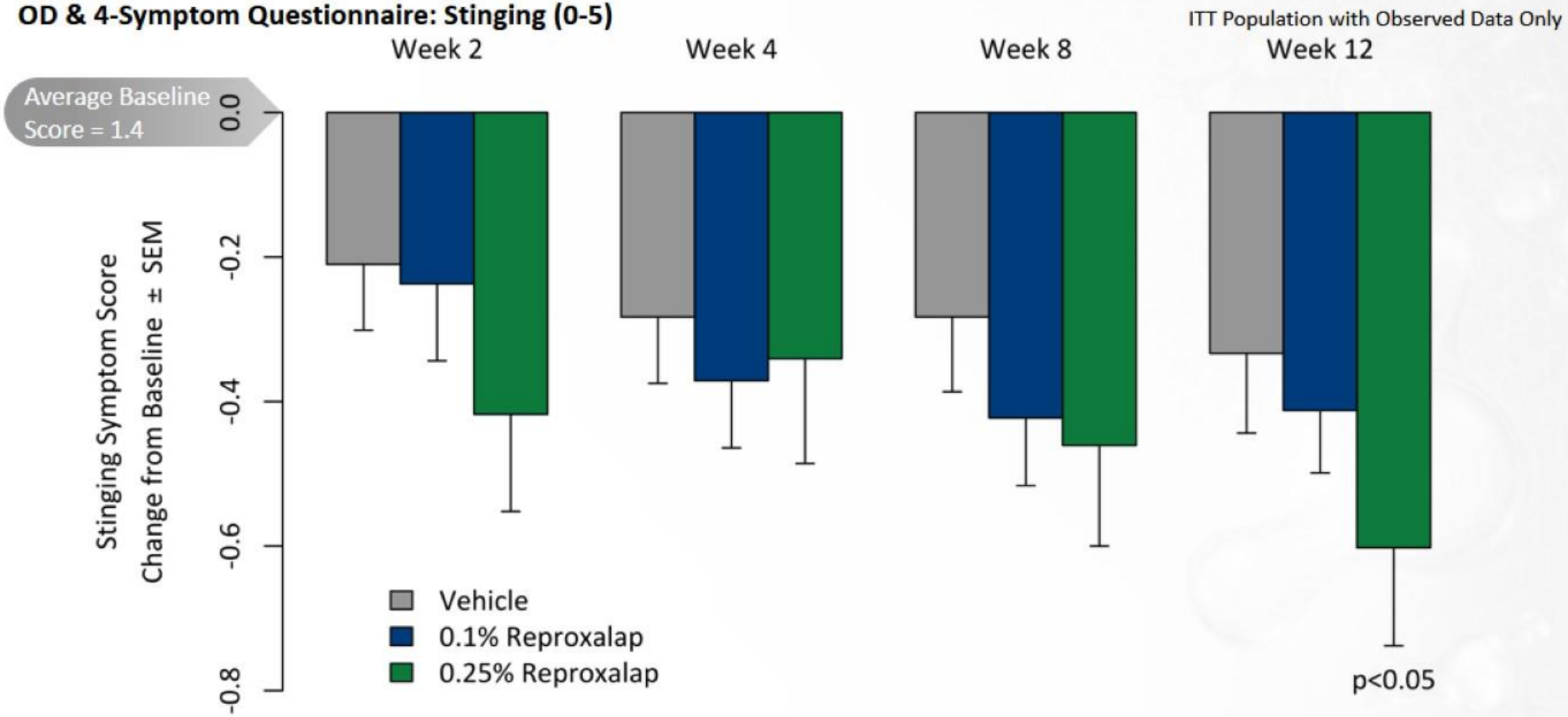
Ocular Stinging Symptom Results Support Observed Improvement in Ocular Dryness Score



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

OD = Ocular Discomfort

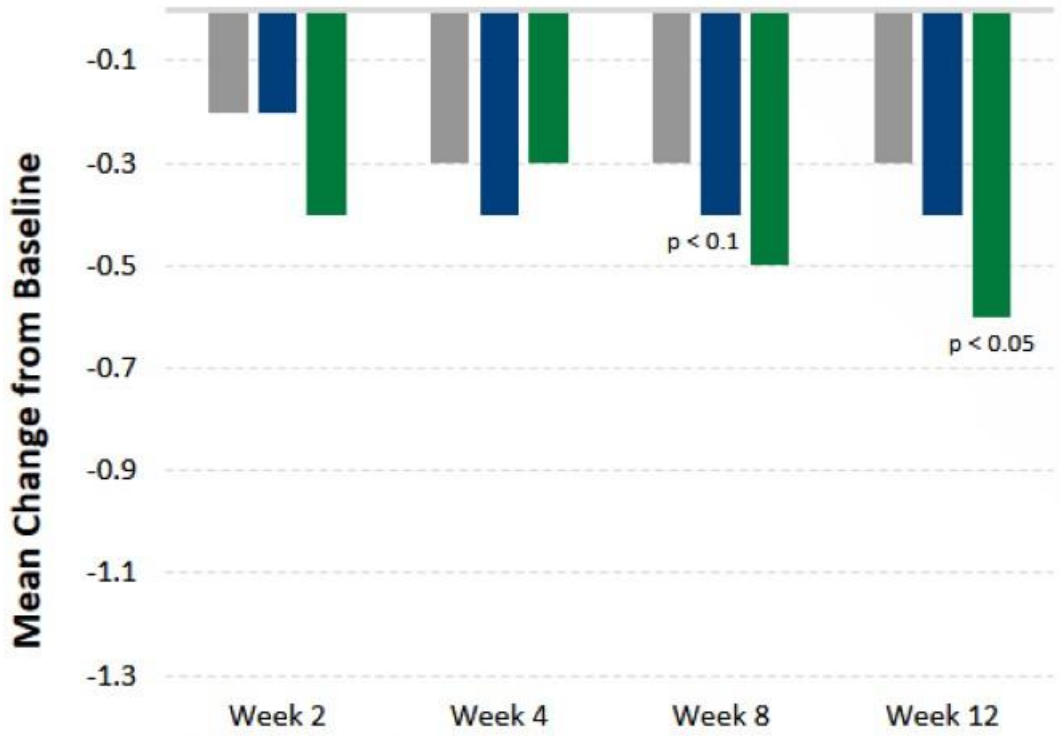
Drug Potency Supported by Ocular Stinging Improvement vs. Vehicle in Higher Baseline Patients

OD & 4-Symptom Questionnaire: Stinging (0-5)

Total Population (N=100|100|100)

ITT Population with Observed Data Only

Total Population Average Baseline Score = 1.4

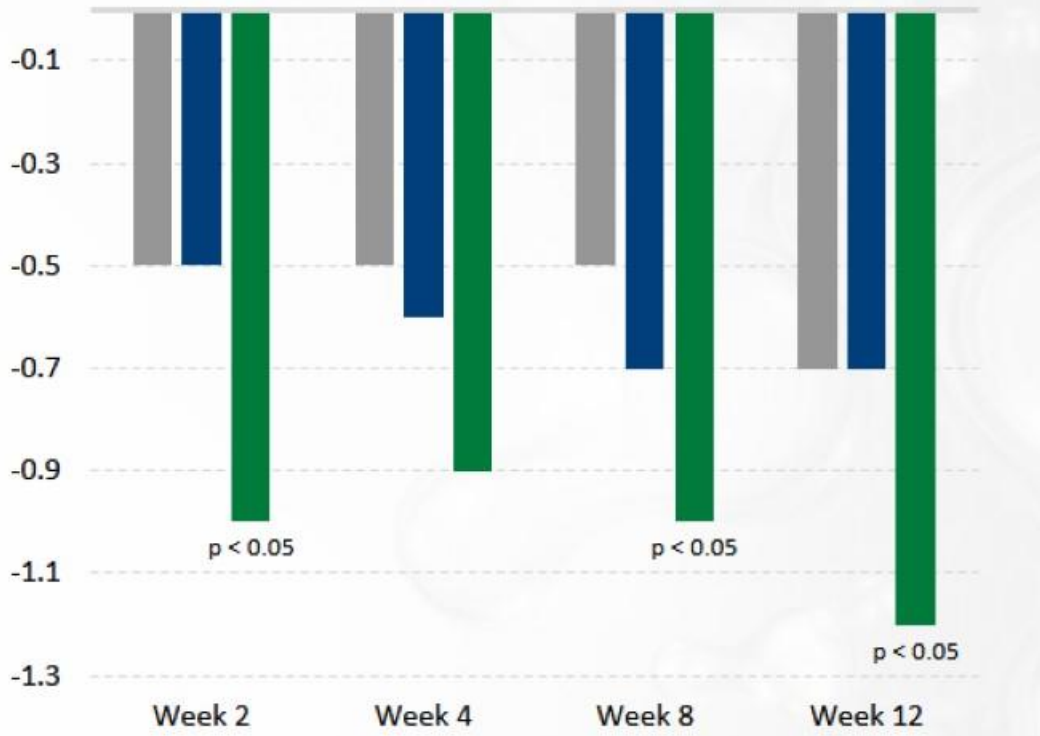


VS.

Above Median Baseline Population (N=66|56|67)

ITT Population with Observed Data Only

Above Median Population Average Baseline Score = 2.2



p values subject to change based on quality control analysis

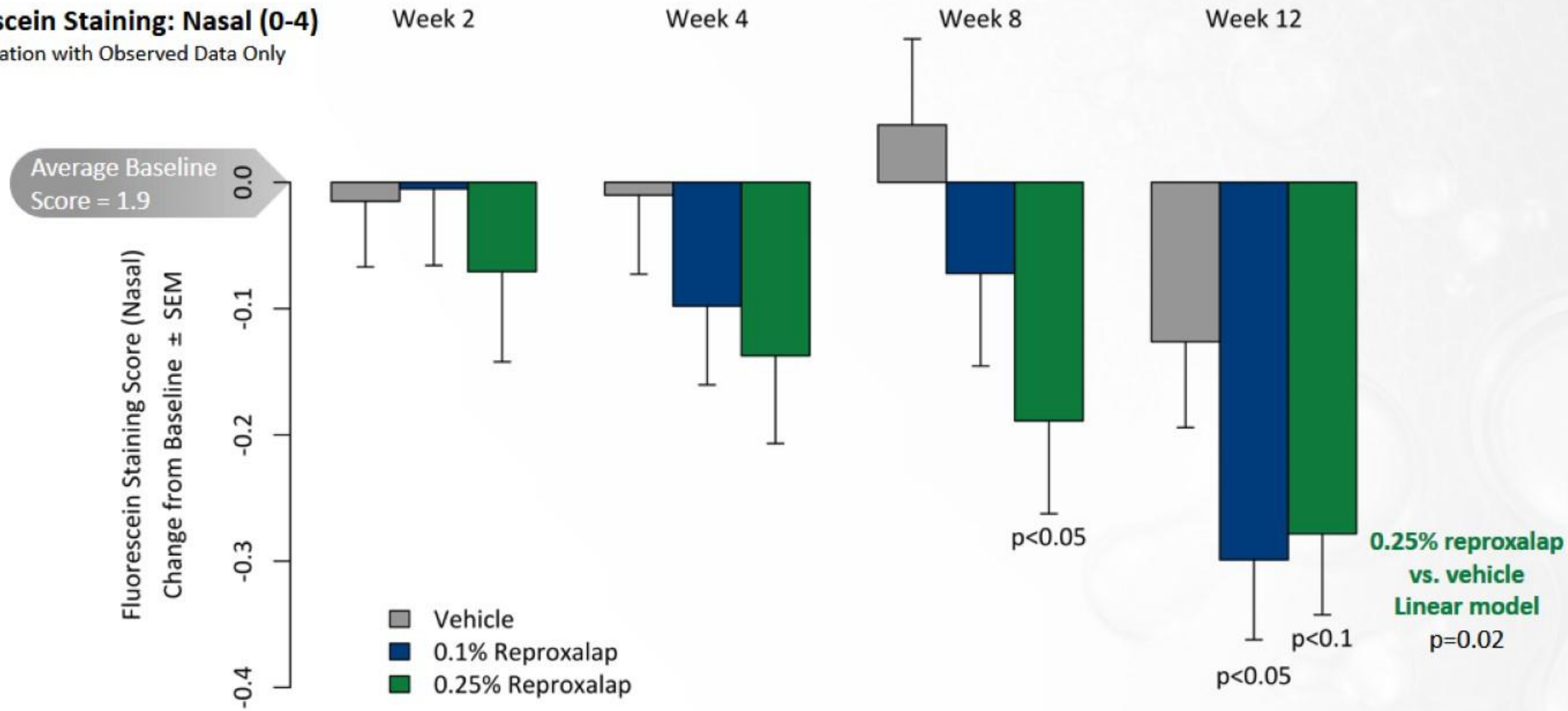
Source: Reproxalap DED Phase 2b clinical trial results

Vehicle | Reproxalap (0.1%) | Reproxalap (0.25%)

OD = Ocular Discomfort

Proposed Co-Primary Endpoint: Reproxalap Improved Ocular Staining vs. Vehicle

Fluorescein Staining: Nasal (0-4)
ITT Population with Observed Data Only



p values subject to change based on quality control analysis
Source: Reproxalap DED Phase 2b clinical trial results

Drug Potency Supported by Ocular Staining Improvement vs. Vehicle in Higher Baseline Patients

Fluorescein Staining: Nasal (0-4)

Total Population (N=100|100|100)

ITT Population with Observed Data Only

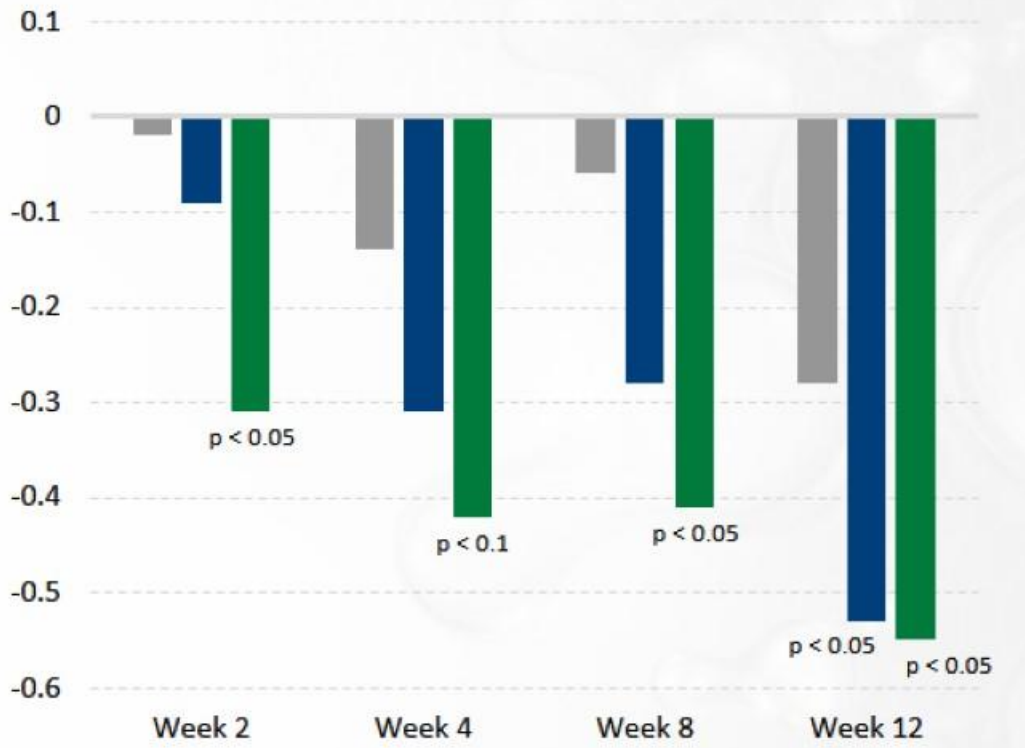
Total Population Average Baseline Score = 1.9

VS.

Above Median Baseline Population (N=59|56|62)

ITT Population with Observed Data Only

Above Median Population Average Baseline Score = 2.3



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

Vehicle ■ Reproxalap (0.1%) ■ Reproxalap (0.25%)

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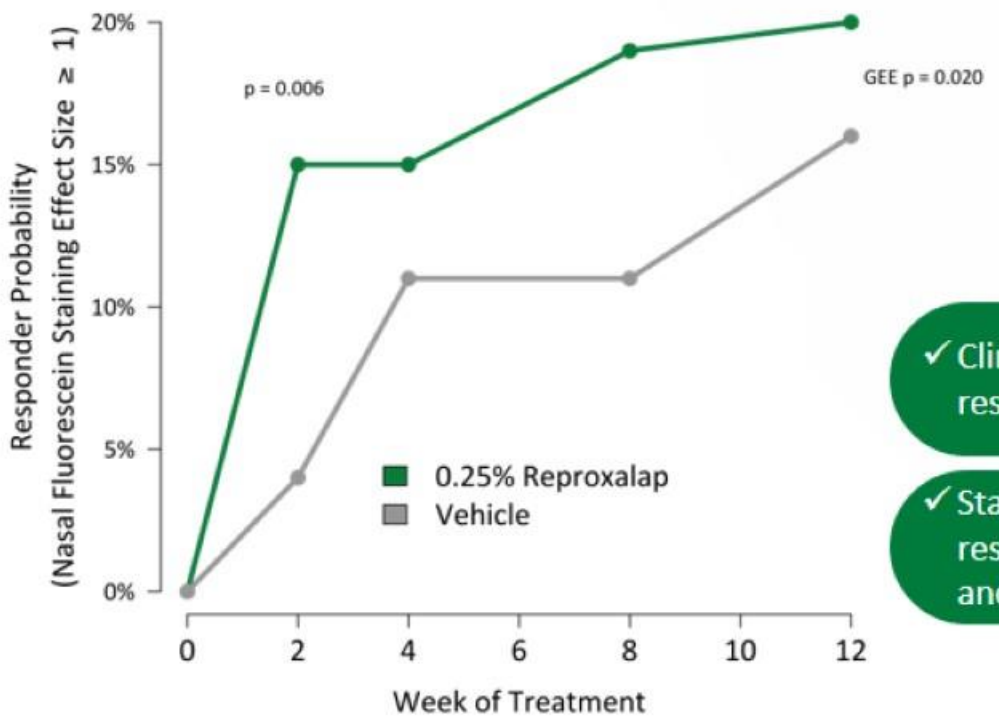
Ocular Staining Responder Analyses Demonstrate Statistical Superiority of Reproxalap Over Vehicle

Fluorescein Staining (Nasal)
ITT Population with Observed Data Only

Probability of Response for Staining

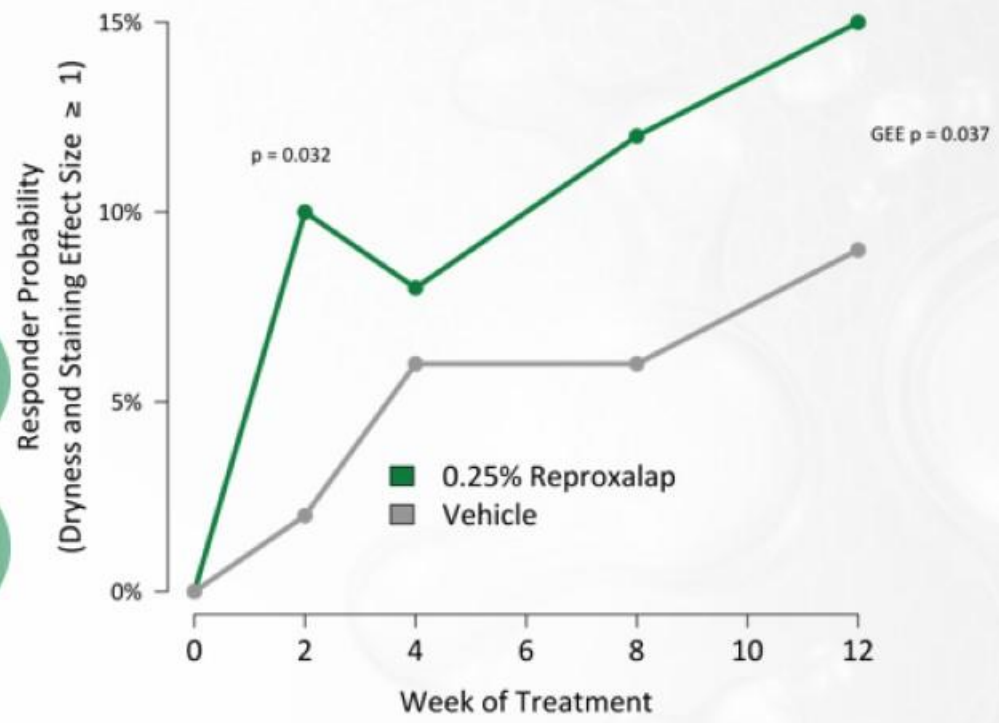


✓ Clinically significant response in 2 weeks

✓ Statistically significant response in symptom and sign vs. vehicle

OD&4S: Ocular Dryness and Fluorescein Staining (Nasal)
ITT Population with Observed Data Only

Probability of Response for both Ocular Dryness and Staining



p values subject to change based on quality control analysis
Source: Reproxalap DED Phase 2b clinical trial results

OD&4S = Ocular Discomfort & 4 Symptom
Effect Size = Change from Baseline / Standard Deviation at Baseline

GEE = Generalized Estimating Equations

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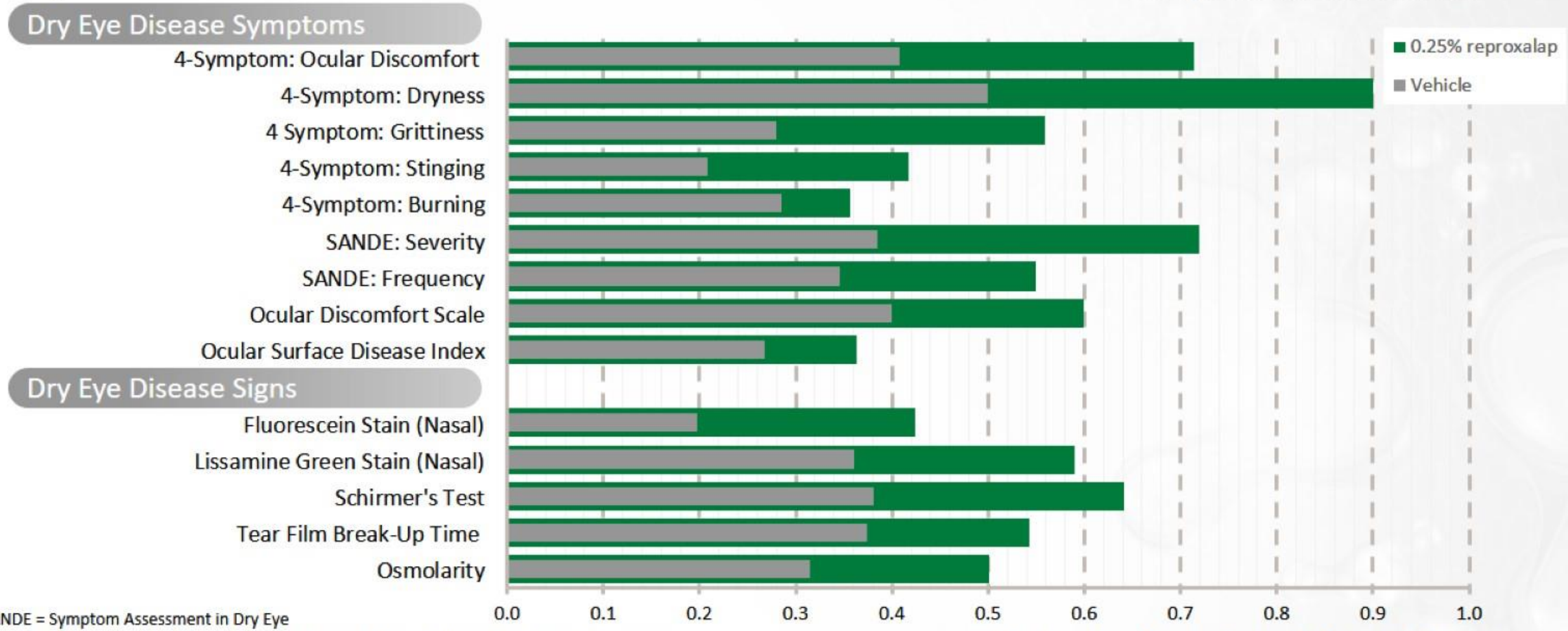
Broad Pattern of Drug Activity Across Dry Eye Disease Symptoms and Signs Supports Differentiated Product Profile

Improvement Effect Size at Week 12

ITT Population with Observed Data Only



SANDE = Symptom Assessment in Dry Eye

Average improvement effect size across both eyes for tear quality and tear quantity measures (Schirmer's Test, Tear Film Break-Up Time, and Osmolarity)

Improvement Effect size = Change from Baseline / Standard Deviation at Baseline

Source: Reproxalap DED Phase 2b clinical trial results

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Reproxalap: No Observed Safety Concerns and Generally Well Tolerated

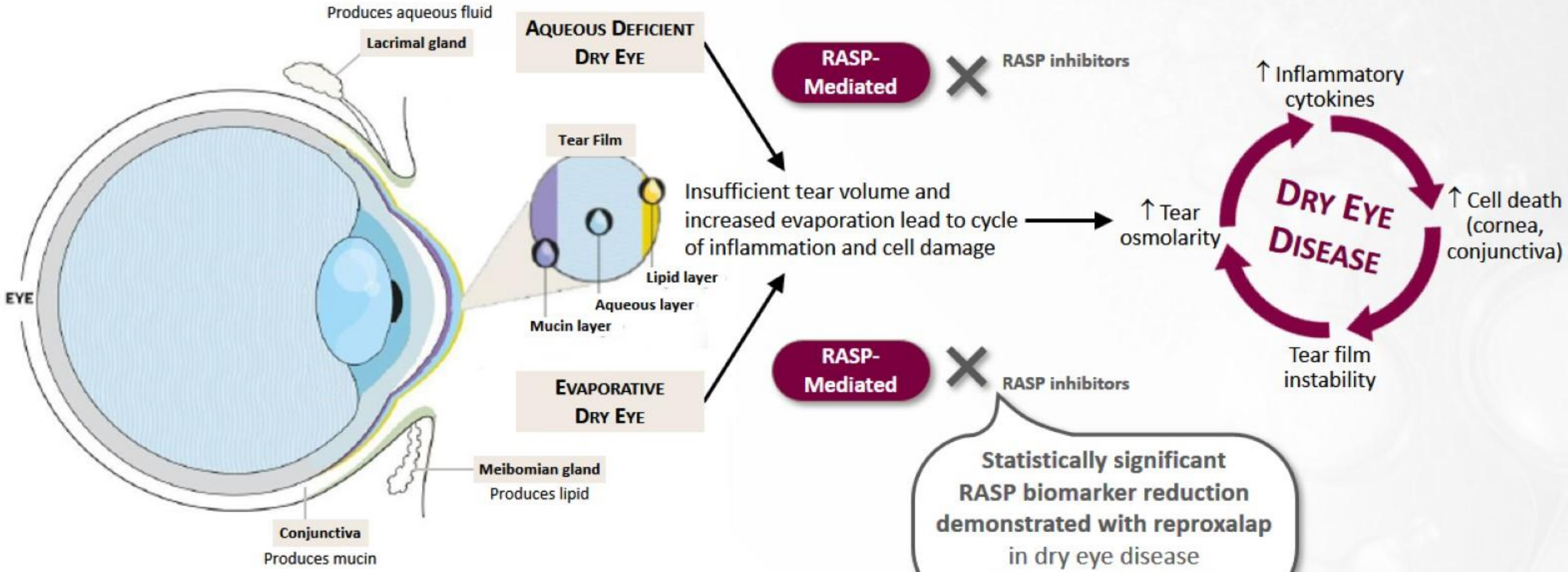
- Consistent with prior topical reproxalap clinical experience in over 500 patients, no observed safety concerns, and predominantly mild instillation site irritation reported

	0.1% reproxalap	0.25% reproxalap	Vehicle
Discontinuations	3/100 (3%)	12/100 (12%)	1/100 (1%)

- Rates consistent with recent Phase 2 dry eye disease clinical trials

Source: Reproxalap DED Phase 2b clinical trial results

Reproxalap's Novel Mechanism of Action has the Potential to Address the Two Major Forms of Dry Eye Disease



RASP = Reactive Aldehyde Species;
Image adapted from Alisdair Macdonald as cited in J Wolffsohn and J Craig, The Pharmaceutical Journal (2017);
RASP activity as shown based on published literature and Aldeyra data on file.

Reproxalap:
A Novel Drug Candidate for the Treatment of Dry Eye Disease

Positive Phase 2b Clinical Trial Results

- **Primary objective achieved:**
  Endpoint selection and sample size powering confirmed for Phase 3 clinical trials
- Reproxalap demonstrated **statistically significant improvements** versus vehicle across multiple symptom and sign measures, consistent with novel and broad mechanism of action
- **Pathway to registration trials confirmed** with ocular dryness symptom score, ocular staining score, and 0.25% reproxalap dose
- **Improvements in symptoms and signs observed as early as two weeks**, consistent with prior reproxalap clinical trial results and supportive of differentiated product profile
- Aldeyra plans to discuss results with regulatory authorities, and expects to **initiate Phase 3 clinical trials in 2019**
- Rigorous clinical data demonstrate the efficacy and safety of reproxalap in **dry eye disease and allergic conjunctivitis**, two medical conditions with considerable overlap

Reproxalap Planned Phase 3 Dry Eye Disease Program

- Two Phase 3 clinical trials expected to be initiated in 2019, following discussion with regulatory authorities
- First Phase 3 clinical trial is an adaptive two-stage design; expected initiation in 2019
  - Stage 1: Protocol optimization and sample size confirmation (12 weeks)
  - Stage 2: Randomized, double masked, two-arm, parallel-group design, reproxalap vs vehicle (12 weeks)
- Primary endpoints: Ocular dryness score and ocular staining
- Secondary endpoints include ocular itch, based on positive reproxalap allergic conjunctivitis program results and high comorbidity of allergic conjunctivitis in dry eye disease patients
- Estimated sample size of 400-500 per arm with approximately 90% statistical power
- Second Phase 3 clinical trial expected to initiate in 2019

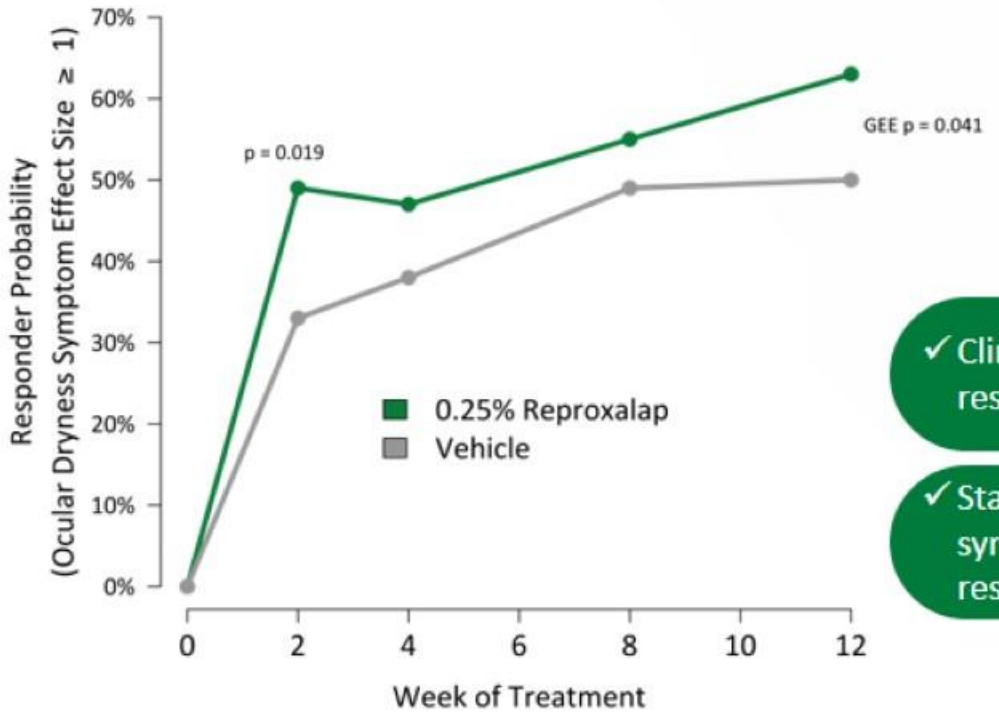
Contingent on funding, regulatory review, and other factors.

Reproxalap's Differentiated Product Profile Evidenced by Responder Analyses – Rapid and Symptom-Free (Ocular Dryness)

OD & 4-Symptom Questionnaire: Dryness

ITT Population with Observed Data Only

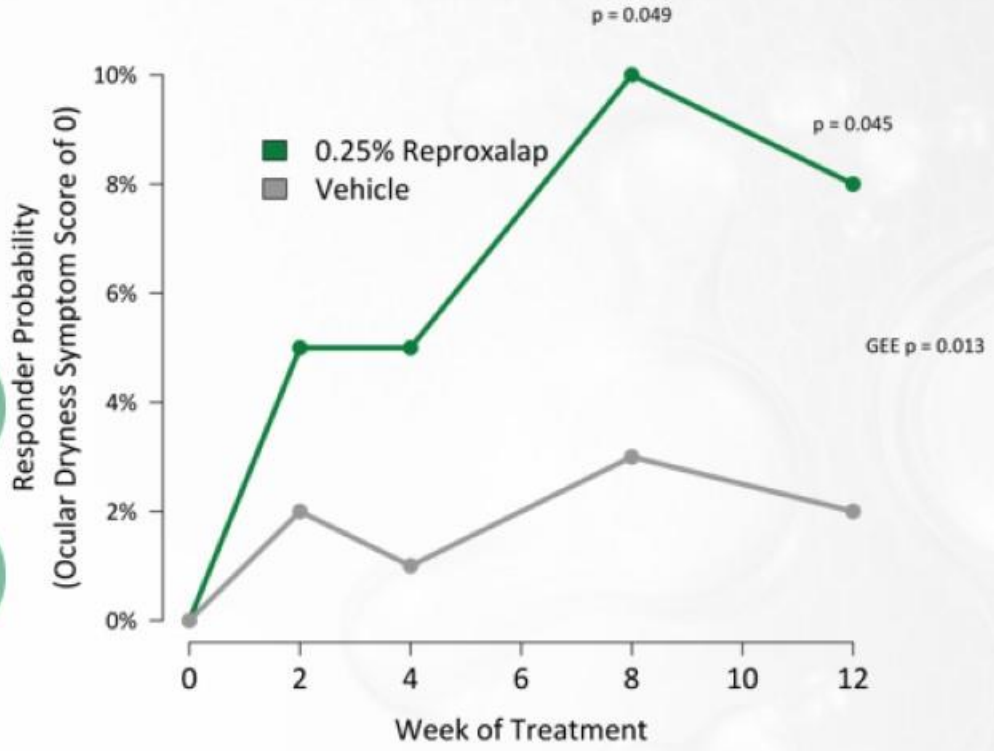
Probability of Response (Improvement Effect Size ≥1)



✓ Clinically significant response in 2 weeks

✓ Statistically significant symptom-free response vs. vehicle

Probability of Symptom-Free (Ocular Dryness Score = 0)



p values subject to change based on quality control analysis

Source: Reproxalap DED Phase 2b clinical trial results

OD = Ocular Discomfort

Effect Size = Change from Baseline / Standard Deviation at Baseline

GEE = Generalized Estimating Equations

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Reproxalap: A Unique and Novel Product Candidate for Dry Eye Disease

Patients & Physicians Not Satisfied

Current prescription options **may take up to six weeks or longer** to have an effect

Up to 75%

of patients with DED **are not satisfied with current prescription options**

Up to 50%

of patients **treated for DED** with current therapies **fail and discontinue** according to prescribing physicians

A Unique Opportunity

Reproxalap

Early and consistent symptom improvements in Phase 2b clinical trial

Broad symptom and sign improvements in Phase 2b clinical trial

Novel mechanism of action and differentiated approach to treat DED

Sources: Aldeyra primary patient market research, primary physician market research, secondary market research, and estimates; Clin Ophthalmol. 2009; 3: 405–412.

Reproxalap: Late-Stage Development for Dry Eye Disease and Allergic Conjunctivitis – Two Medical Conditions with Significant Overlap

Dry Eye Disease

- Initiated reproxalap **Phase 2b clinical trial in dry eye disease January 2018**
- **Positive** reproxalap dry eye disease **Phase 2b clinical trial results September 2018**

Anticipated Milestones*

- New — Reproxalap dry eye disease **Phase 3 clinical trial program initiation 2019**
  - *Ocular itch endpoint to be included (as secondary)*

Allergic Conjunctivitis

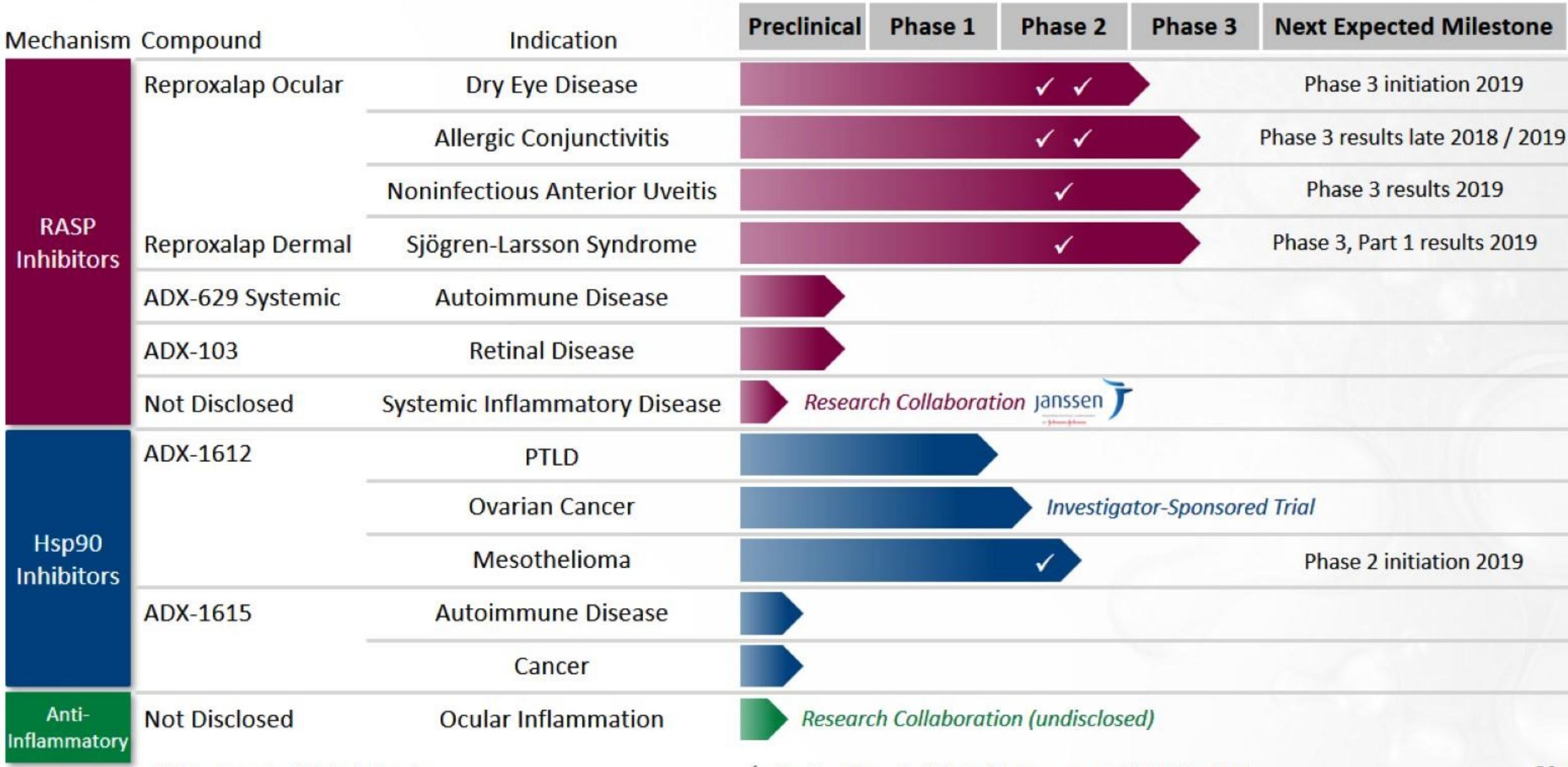
- Initiated reproxalap **ALLEVIATE Phase 3 clinical trial in allergic conjunctivitis April 2018**

Anticipated Milestones*

- Reproxalap allergic conjunctivitis ALLEVIATE Phase 3 trial **results late 2018/early 2019**

*Contingent on funding, regulatory review, and other factors.

Deep and Innovative Pipeline



RASP = Reactive Aldehyde Species
PTLD = Post-Transplant Lymphoproliferative Disorder

✓ = Positive Phase 2 clinical trial data reported in 2016 – 2018

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Two

Mechanisms of action in development

Seven

Successful Phase 2 Clinical Trials 2016-2018

Four

Phase 3 Clinical Trials Ongoing or Expected to Initiate

Phase 2 count includes mesothelioma investigator-sponsored trial; Phase 3 trials contingent on funding, regulatory review, and other factors.