

# 2019 Annual General Meeting

CEO Presentation – 2019 AGM, November 21 2019 Megan Baldwin PhD, CEO & Managing Director Investment in Opthea Limited ('Opthea') is subject to investment risk, including possible loss of income and capital invested. Neither Opthea nor any other member company of the Opthea Group guarantees any particular rate of return or performance, nor do they guarantee the repayment of capital.

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# **Business Snapshot**

Opthea Limited	<ul> <li>Public company listed on ASX (ASX:OPT) developing OPT-302 for wet AMD and Diabetic Macular Edema ("DME")</li> <li>Market cap A\$750m at 20 November 2019 and cash on hand of A\$30m at 31 October 2019</li> </ul>
OPT-302 has a novel mechanism of action	<ul> <li>OPT-302 (sVEGFR-3) is the first 'Trap' inhibitor of VEGF-C and VEGF-D designed specifically for the eye</li> <li>In combination with anti-VEGF-A therapies, shown to completely shut-down VEGFR-2 and VEGFR-3 activity</li> <li>Targets mechanisms of resistance and sub-optimal clinical response to existing therapies</li> </ul>
Strong and growing commercial potential	<ul> <li>Current and growing market opportunity of US\$10B+ worldwide</li> <li>OPT-302 being developed for use in combination with any of the existing anti-VEGF-A agents, biosimilars or novel therapies in development for wet AMD and DME</li> <li>A novel approach seeking to provide additional visual acuity benefit over standard of care</li> <li>Broad development opportunity in wet AMD, DME, Retinal Vein Occlusion ("RVO") and other retinal pathologies</li> </ul>
Primary endpoint met in Phase 2b study of OPT-302 in wet AMD	<ul> <li>OPT-302 combination therapy demonstrated superiority in visual acuity over ranibizumab (Lucentis<sup>®</sup>) at 24 weeks in an international, randomised, controlled, double-masked trial of 366 patients</li> <li>Secondary endpoint results also supportive of primary outcome</li> <li>Exploratory &amp; pre-specified sub-group analyses suggest greater activity of OPT-302 in lesion-types considered more difficult to treat with anti-VEGF-A therapy and highest unmet need</li> <li>Completed Phase 1/2a trial in 51 wet AMD patients</li> </ul>
Ph 2A trial of OPT-302 in persistent DME; Data anticipated in 2Q CY 2020	<ul> <li>Nearing completion of patient recruitment in Phase 2a trial of OPT-302 in combination with aflibercept (Eylea®) for the treatment of persistent centre-involving DME</li> <li>Completed Phase 1b dose-escalation trial in 9 persistent DME patients</li> <li>Dose-responsive improvements in visual acuity, reductions in retinal fluid and swelling</li> </ul>
Well tolerated safety profile of OPT-302	<ul> <li>Well tolerated safety profile of OPT-302 administered IVT in combination with ranibizumab and aflibercept</li> <li>Extensive global clinical dosing experience with repeated IVT administration in over 400 patients across three international clinical studies in two disease indications</li> </ul>



## **Corporate & Operational Achievements**

## Phase 2b wet AMD

- Reported top-line data from Phase 2b wet AMD trial several months ahead of schedule (Aug 2019)
- Met primary endpoint in Phase 2b trial:
  - OPT-302 combination therapy demonstrated <u>superiority</u> in visual acuity over Lucentis®
- Only novel mechanism of action currently in development that has demonstrated statistically significant clinical benefit in addition to standard of care therapy
- Exploratory & pre-specified sub-group analyses:
  - Suggest greater activity of OPT-302 in lesion-types considered more difficult to treat with anti-VEGF-A therapy and highest unmet need
  - Provide direction for Phase 3 clinical development program
- Results well-recognized by market and international ophthalmology community
- Up 408% over past 12 months

## **Corporate & Operational Achievements**

## Phase 2a DME Trial

- Nearing completion of patient recruitment in Phase 2a trial of OPT-302 in combination with aflibercept (Eylea®) for the treatment of persistent centre-involving DME
- Upcoming Phase 2a clinical data anticipated 2Q CY 2020

# Safety

• Continued demonstration of well tolerated safety profile in combination with Lucentis and Eylea following administration in ~400 patients (wet AMD and DME) across three international clinical studies in two disease indications

## Patents

- OPT-302 patent 'accepted for grant' or granted in multiple countries incl. EU & Japan
- Pending approval in other countries

## Publication

• Phase 1/2a wet AMD trial results with OPT-302 published in peer-reviewed journal\*



## Corporate

- Company fully-funded through:
  - Phase 2a DME clinical readout; and
  - Close-out activities for Phase 2b wAMD
  - Planning for Phase 3 program and regulatory engagement
- Received A\$14.6m R&D tax credit (Aust & O/S eligible expenditure)
- Added to S&P/ASX All Ordinaries Index (Mar 2019)
- Data presented at international conferences by management, clinical advisory board & investigators
  - OIS@American Academy Ophthalmology Conference (Oct '19)
  - EURetina, Retina Society
- Continued to raise company profile with local and international investors & global pharmaceutical companies



## **Financial Position** (Unaudited)

Key Financial Details	ASX: OPT
Ticker Symbol	ASX:OPT
Share Price (Nov 20 2019)	~A\$3.00
Total Ordinary Shares on Issue	250,289,839
Market Capitalisation (Nov 20 2019)	~A750.0m (~USD510m)
Trading Range (last 12 months)	A\$0.55 - 4.15
52-week Change	408%
Cash Balance (Oct 31 2019)	~A\$30m
Top 20 Shareholders Own	69%
Institutional Holders	84%



#### Share Price Performance (2017 - 2019)





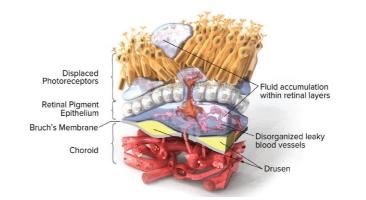


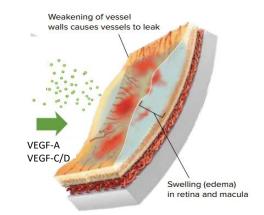


Chris Cooper



# Wet AMD and DME are Leading Causes of Vision Loss in the Elderly & Diabetic Populations Respectively



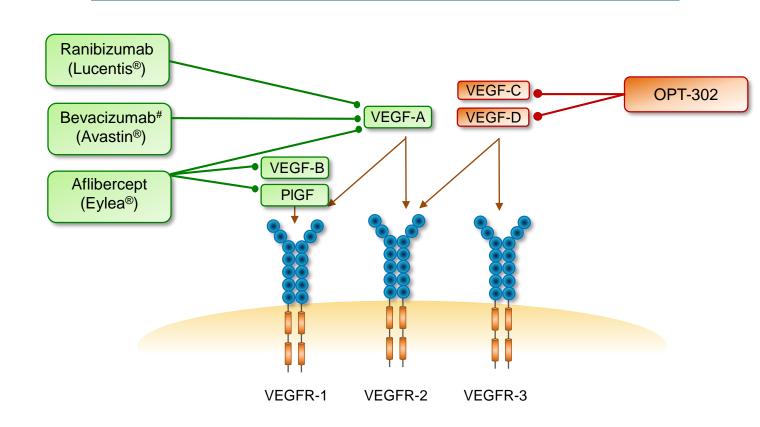


	Wet Age-Related Macular Degeneration	Central-involved Diabetic Macular Edema
Driver:	Ageing	Sustained hyperglycaemia
Prevalence:	<ul> <li>Increasing prevalence due to ageing population</li> </ul>	<ul> <li>Increasing due to diabetes epidemic</li> </ul>
	• ~3M people worldwide, including ~1.8M in the US	<ul> <li>DME with visual impairment affects ~1-3% diabetes patients</li> </ul>
		<ul> <li>~1.3M – 2M people worldwide, many undiagnosed</li> </ul>
Primary macular site of pathology:	• Choroid	Intra-retinal layers
Pathogenesis:	Changes in ageing eye	<ul> <li>Sustained hyperglycemia</li> </ul>
	• Upregulation VEGF-A, -C, -D and other cytokines	<ul> <li>Upregulation VEGF-A, -C, -D and inflammatory mediators</li> </ul>
	Choroidal Neovascularization (CNV)	Inflammation
	Sub-retinal, intra-retinal fluid accumulation	<ul> <li>Hyperpermeability and retinal swelling</li> </ul>



## **Existing Therapies Primarily Target VEGF-A**

OPT-302 inhibits VEGF-C/D



#### OPT-302: Rationale

- Long-term therapy with selective VEGF-A inhibitors is associated with sub-optimal responses
  - Sub-optimal improvements in visual acuity
  - Persistent retinal fluid
- Resistance to VEGF-A monotherapy may be related to other VEGF family members
- VEGF-C/D signal for angiogenesis and vascular permeability independently of VEGF-A; and
- VEGF-C/D are elevated when VEGF-A is inhibited
- OPT-302 combination therapy achieves a more complete suppression of the VEGF/VEGFR pathway
- OPT-302 targets incomplete response to VEGF-A inhibition

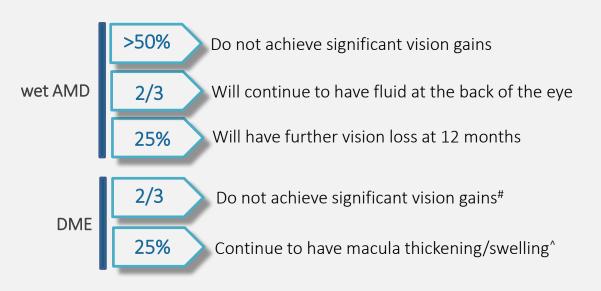
Used in combination with a VEGF-A inhibitor, completely blocks VEGFR-2 and VEGFR-3 signalling



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## A Currently Unmet Medical Need for wet AMD and DME

# Despite receiving a VEGF-A inhibitor (ranibizumab, aflibercept or bevacizumab)\*:



Opportunity: New Products that Improve Efficacy and Durability

#### Large and Growing Market Opportunity

- Wet AMD and DME are the leading causes of blindness in the elderly and diabetic populations respectively
- Prevalence is increasing
- Market opportunity is growing
- Approved VEGF-A inhibitors (ranibizumab and aflibercept) generated revenues >US\$10b in 2018
- Approximately 50% of wet AMD and DME patients worldwide receive bevacizumab as an off-label, less-costly treatment option

Opthea's strategy is to develop OPT-302 as a combination therapy to be administered with any of the approved a-VEGF-A therapies or new VEGF-A inhibitors in development



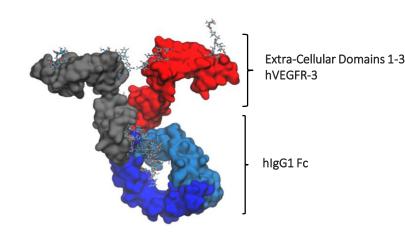
\* Based on randomised, controlled clinical trial data; # Fail to achieve  $\geq$  2 lines improvement in BCVA; ^ SD-OCT CST  $\geq$  300 µM or Time-Domain OCT CST  $\geq$  250 µM

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## **OPT-302:** A 'trap' inhibitor of VEGF-C and VEGF-D

### OPT-302: A soluble form of VEGFR-3

- Comprises the extracellular domains 1-3 of VEGFR-3 and the Fc fragment of human IgG1
- Potent inhibitor of VEGF-C (~5 pM) and VEGF-D (~0.5 nM)
- A 'trap' that blocks VEGF-C and VEGF-D binding to the receptors VEGFR-2 and VEGFR-3
- Targets a validated pathway involved in wet AMD progression
- Targets a mechanism of escape from existing therapies that is differentiated to VEGF-A therapies



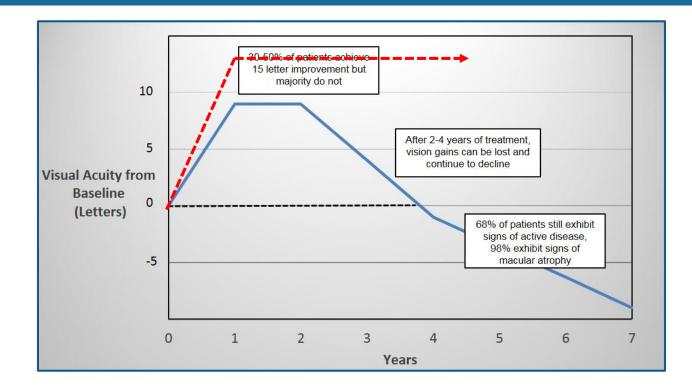
#### Strategy

- To develop OPT-302 for use in combination with inhibitors of VEGF-A to address the unmet medical need in wet AMD and DME
- To demonstrate <u>superior</u> gains in visual acuity in patients administered OPT-302 in combination with a VEGF-A inhibitor
- Currently administered as a sequential intravitreal injection every 4 weeks (q4w), with the potential to also:
  - investigate OPT-302 efficacy and durability in patients receiving less frequent doses (e.g. q8w, q12w), and
  - co-formulate with other agents
- Wet AMD and DME landscape includes only a limited number of novel combination therapies that may address the sub-optimal clinical responses that many patients experience on anti-VEGF-A therapies

OPT-302 has comparable ocular biodistribution and PK profile to aflibercept, with low systemic exposure



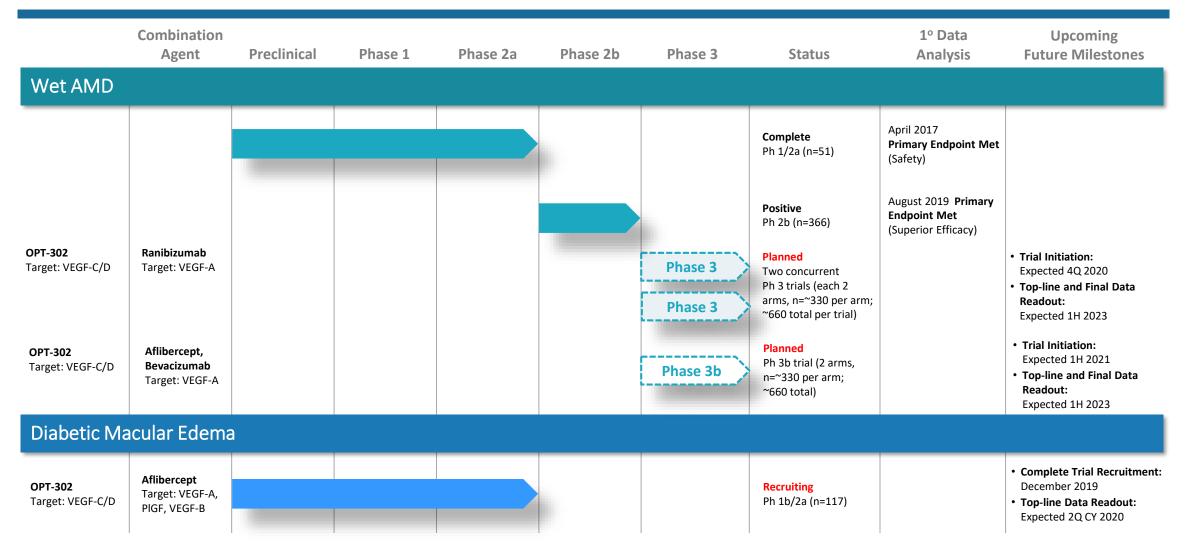
## The Opportunity for OPT-302



- To increase the number of patients who experience a significant gain in vision
- To increase the magnitude of the vision gain
- To prolong response to therapy and prevent visual decline
- Potential to reduce dosing frequency



# **OPT-302 Clinical Program**





# **OPT-302:**

## Phase 2b wet AMD

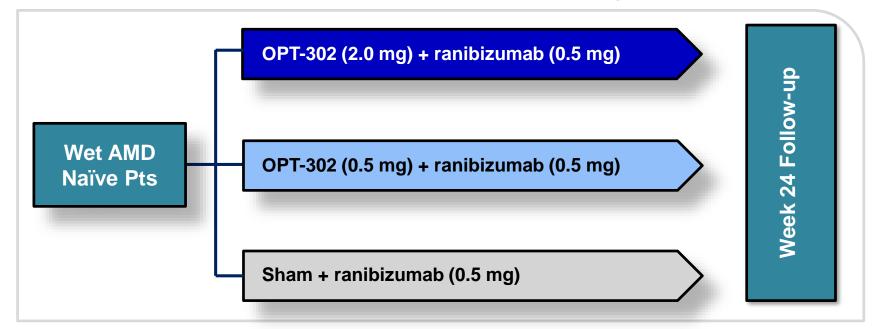
A dose-ranging study of intravitreal OPT-302 in combination with ranibizumab, compared with ranibizumab alone, in participants with wet AMD

(OPT-302-1002; NCT ClinicalTrials.gov Identifier: NCT03345082 113 sites across 10 countries including US, EU, Israel)



## **OPT-302** Phase 2b wAMD

Randomised 1:1:1 to treatment arms : intravitreal dosing every 4 weeks (x 6)



Primary Outcome:

• Mean change from Baseline in ETDRS best corrected visual acuity at Week 24

Key Secondary Outcomes at Week 24:

- Patients gaining ≥15 or more ETDRS letters
- Patients losing ≥15 or more ETDRS letters
- Change in central subfield thickness (SD-OCT)
- Change in subretinal fluid and intraretinal fluid (SD-OCT)

Key Exploratory Outcomes at Week 24:

• Change in total lesion area and choroidal neovascularisation (CNV) area (FA)

Key Safety Outcome:

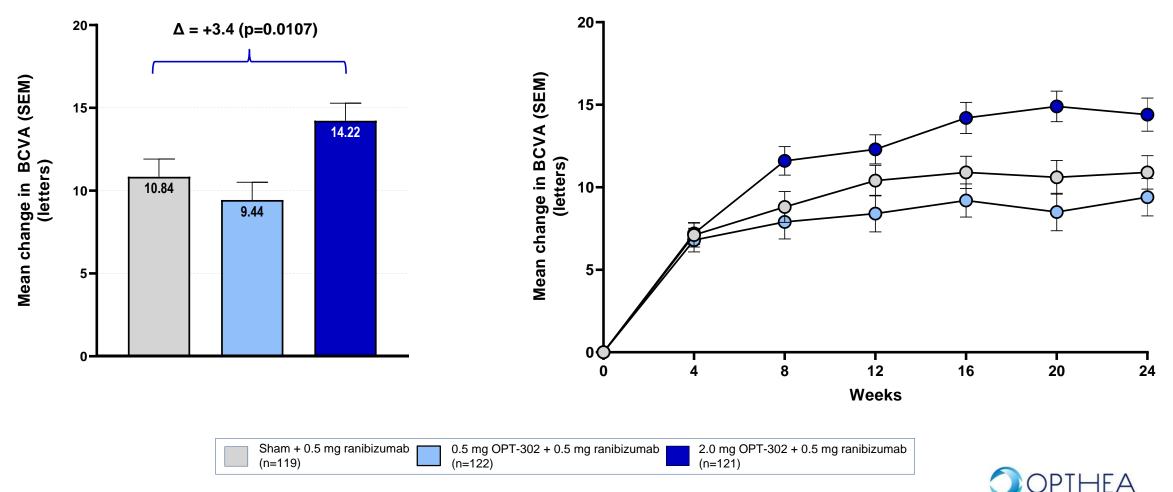
Safety and tolerability



## Primary Analysis – Mean Change in BCVA Baseline to Week 24

Primary endpoint achieved

**OPT-302 (2.0 mg) Combination Therapy Demonstrated Superiority in Visual Acuity over Ranibizumab** 



mITT; BCVA – best corrected visual acuity

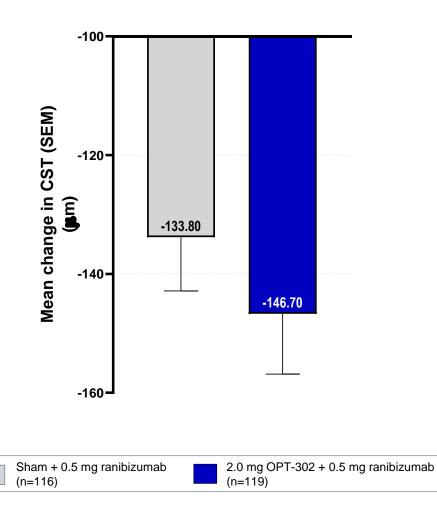
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Left: Difference in Least Square Means, using Model for Repeated Measures (MRM) analysis. Right: Graph represents "as observed" data and SEM

## **Central Subfield Thickness**

Reduction in CST in OPT-302 combination group compared to sham + ranibizumab

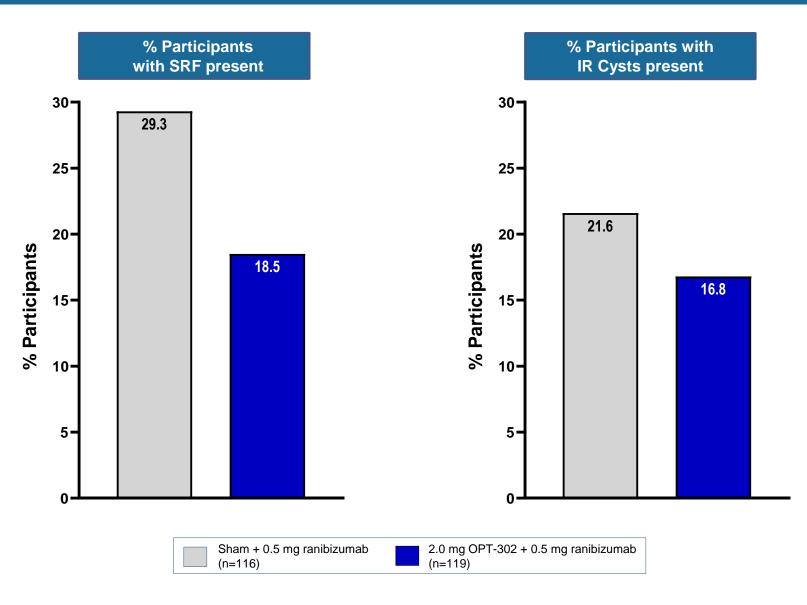
Mean Change in CST – Baseline to Week 24





## **Sub-retinal Fluid and Intra-retinal Cysts at Week 24**

Fewer participants with retinal fluid present in OPT-302 combination group compared to sham + ranibizumab

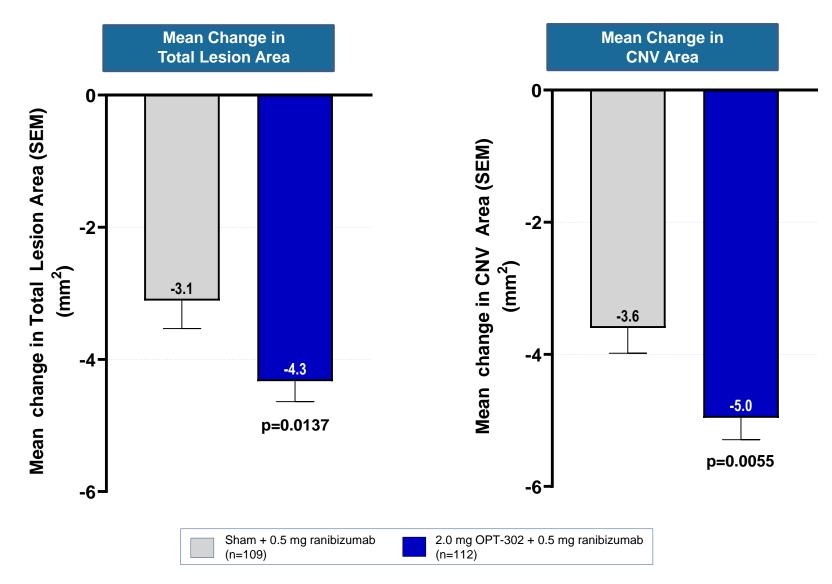




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## **Total Lesion Area and CNV Area – Baseline to Week 24**

Greater reduction in Total Lesion and CNV Area in OPT-302 combination group compared to sham + ranibizumab





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# Phase 2b

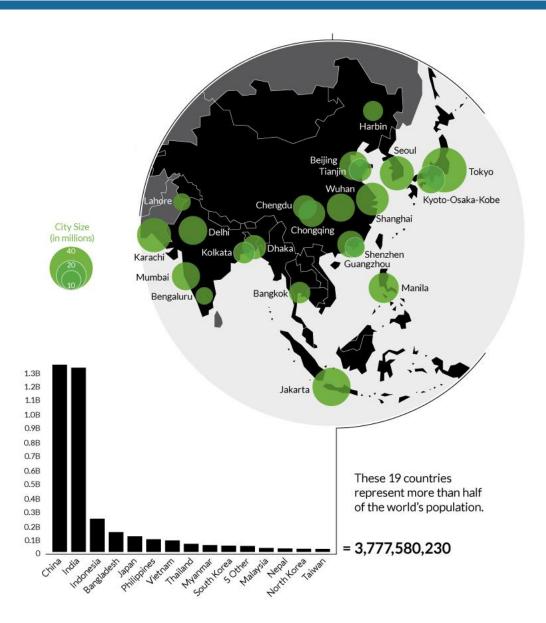
A multicenter, randomized, double-masked, sham controlled study of intravitreal OPT-302 in combination with ranibizumab, in participants with neovascular (wet) AMD

# **Pre-Specified Subgroup Analyses**

OPT-302-1002; NCT ClinicalTrials.gov Identifier: NCT03345082



## 60% of the World's Population is Asian



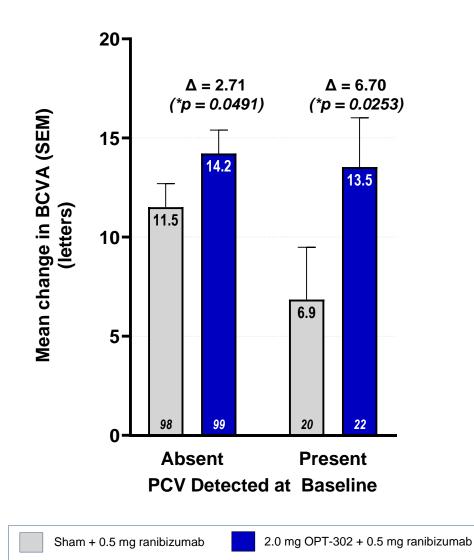
## Polypoidal Choroidal Vasculopathy (PCV)

- Most common sub-type of neovascular (wet) AMD in Asian populations
- Estimated to be the most prevalent form of wet AMD world-wide
- PCV lesions typically less responsive to anti-VEGF-A therapy



## **Polypoidal Choroidal Vasculopathy**

Mean change in BCVA to Week 24 in participants with and without PCV at baseline





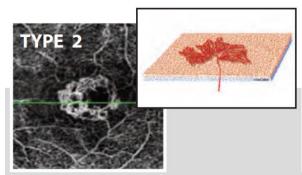
22 *mITT;* PCV – polypoidal choroidal vasculopathy;

Least square means determined using Model for Repeated Measures (MRM) analysis (adjusted for baseline vision and lesion type (randomisation) as covariates). PCV determination by SD-OCT, FA and fundus photography

# **Neovascular (wet) AMD Lesion Types**

Differ in vessel location, leakiness and responsiveness to VEGF-A inhibitors

#### **Predominantly Classic**



*Type 2 (Classic) CNV: Choroidal neovascular membranes located above the pigment epithelium, penetrating the retina. Note the dark halo around the new vessels.* 

- >50% of vessels are above the RPE
- Highly responsive to a-VEGF-A



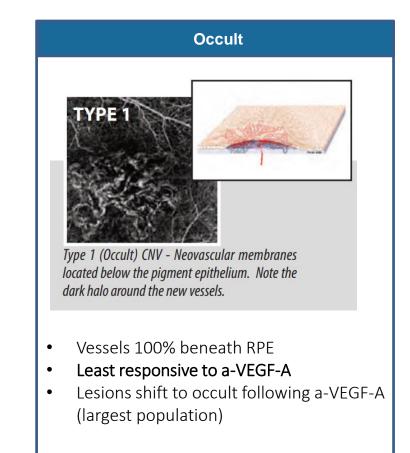
# TYPE 4

**Minimally Classic** 

*Type 4 CNV: mixed CNV (Type 1+Type 2) located below the pigment epithelium (occult) and above the pigment epithelium (classic). Note the dark halo around the new vessels.* 

- <50% of vessels are above the RPE
- Occult vessels may be present
- Moderately responsive to a-VEGF-A

~44%

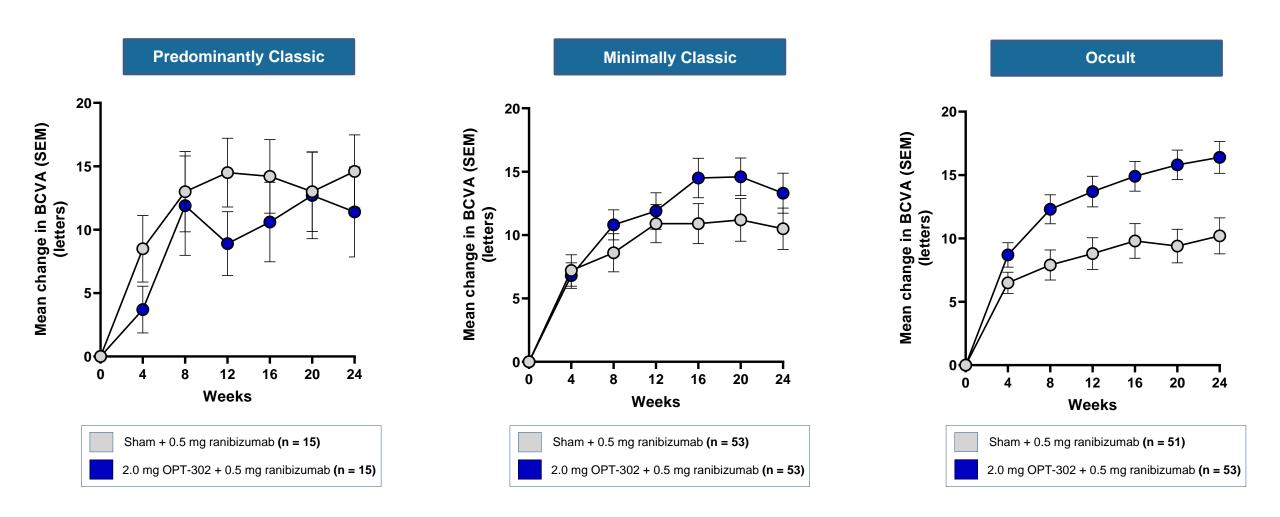






## Mean Change in BCVA Over Time by Lesion Type

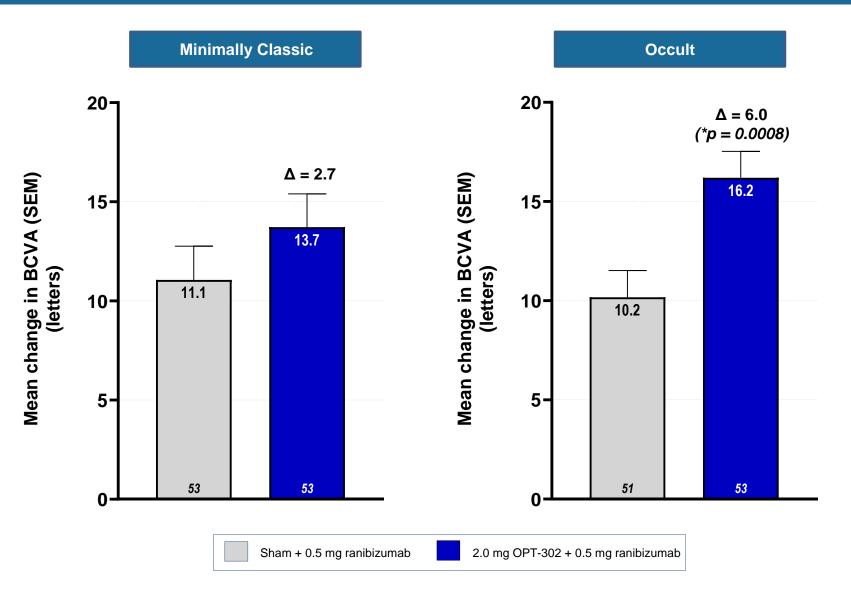
Small number of predominantly classic patients





## Mean Change in BCVA at Week 24 by Lesion Type

Greater vision gains at Week 24 in OPT-302 2.0 mg group in minimally classic and occult lesions

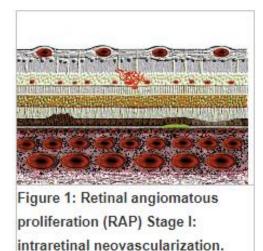




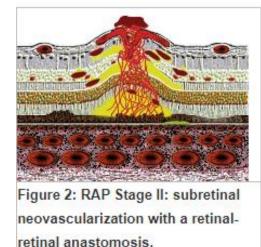
mITT; Least square means determined using Model for Repeated Measures (MRM) analysis (adjusted for baseline vision and lesion type (randomisation) as covariates).

# **Retinal Angiomatous Proliferation (RAP) Lesions**

Have a distinct biology and vessel proliferation occurs within the retina (not the choroid)



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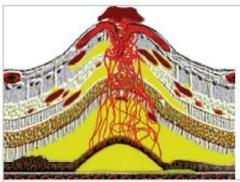


Figure 3: RAP Stage II: subretinal neovascularization with a serous pigment epithelial detachment.



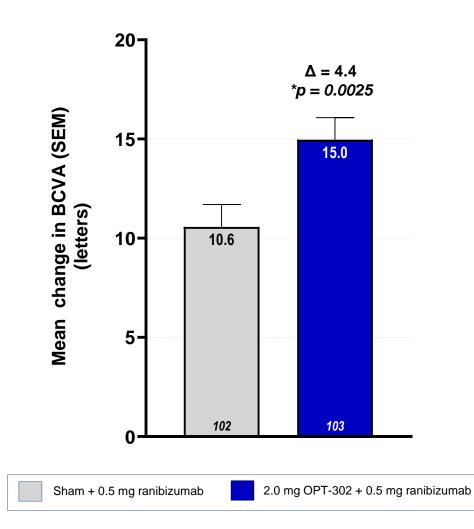
Figure 4: RAP Stage III: Choroidal neovascularization with a vascularized pigment epithelial detachment and a retinal-retinal anastomosis.

- No consensus of which treatment is optimal for RAP lesions\*
- Favorable short-term results with anti-VEGF-A treatments but long-term results are conflicting



## **Retinal Angiomatous Proliferation (RAP) Lesions**

Mean change in BCVA to Week 24 in participants without RAP at baseline





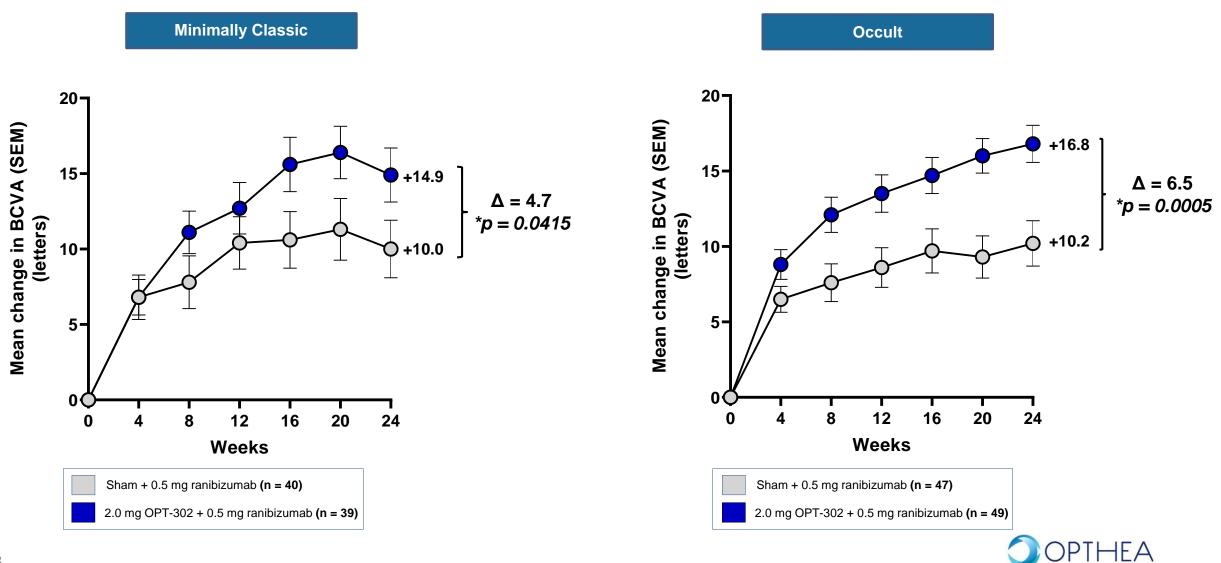
mITT; RAP – retinal angiomatous proliferation;

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Least square means (LSM) determined using Model for Repeated Measures (MRM) analysis (adjusted for baseline vision and lesion type as used in the randomisation as covariates).

## Mean Change in BCVA Over Time by Lesion Type, RAP Absent

In RAP absent participants, +4.7 letter gain in minimally classic and +6.5 letter gain in occult participants treated with OPT-302 combination therapy compared to sham + ranibizumab



*mITT*, as observed,  $\Delta$  based on least square means determined using Model for Repeated Measures (MRM) analysis (adjusted for baseline vision and lesion type (randomisation) as covariates).

# Safety – Adverse Events (AEs)

N Participants (%)	Sham + ranibizumab N=121	0.5 mg OPT-302 + ranibizumab N=120	2.0 mg OPT-302 + ranibizumab N=124
Treatment emergent AEs	84 (69.4%)	87 (72.5%)	93 (75.0%)
Ocular AEs - Study Eye – related to study product(s) <sup>1</sup>	17 (14.0%)	17 (14.2%)	19 (15.3%)
Ocular AEs - Study Eye – Severe <sup>2</sup>	1 (0.8%)	2 (1.7%)	1 (0.8%)
Serious AEs	10 (8.3%)	16 (13.3%)	7 (5.6%)
Ocular SAEs in Study Eye	0 (0.0%)	2 <sup>3</sup> (1.7%)	0 (0.0%)
Intraocular inflammation <sup>4</sup> – Study Eye	0 (0.0%)	2 <sup>3</sup> (1.7%)	1 <sup>5</sup> (0.8%)
Participants with AEs leading to study IP discontinuation only	2 (1.7%)	3 (2.5%)	0 (0.0%)
Participants with AEs leading to study discontinuation	1 <sup>6</sup> (0.8%)	0 (0.0%)	0 (0.0%)
Any APTC event	0 (0.0%)	17 (0.8%)	0 (0.0%)
Deaths	2 <sup>8</sup> (1.7%)	0 (0.0%)	0 (0.0%)

Safety population analysed according to medication received

<sup>1</sup> Assessed by investigator to be "possibly related", "probably related" or "definitely related" to administration of study drug(s)

<sup>2</sup> Assessed by Investigator to be National Institutes of Health (NIH) Common Terminology Criteria for Adverse Events (CTCAE) grade 3 or above, or, if CTCAE grade is unavailable, an AE assessed as "causing an inability to perform normal daily activities"

<sup>4</sup> AEs considered to be indicative of intraocular inflammation, defined prior to database lock as: Endophthalmitis, iritis, vitritis, iridocyclitis, uveitis, hypopyon, viral iritis, or anterior chamber inflammation

<sup>5</sup> Anterior chamber cell (trace 1-4 cells)

<sup>6</sup> Squamous cell carcinoma of the lung diagnosed shortly after Baseline visit

29 <sup>7</sup>Non-fatal myocardial infarction



<sup>8</sup> Pneumonia (n=1), infective endocarditis (n=1)

<sup>&</sup>lt;sup>3</sup> SAE of endophthalmitis, with AEs of hypopyon and anterior chamber cell (n=1), SAE of vitritis (n=1)

## Study Outcomes - OPT-302 Phase 2b wet AMD Trial

## Phase 2b trial met primary endpoint

- OPT-302 (2.0mg) combination therapy demonstrated superiority in visual acuity over ranibizumab + sham
- Vision gain of +3.4 letters
- Statistically significant (p=0.0107)
- High ranibizumab control arm

## Secondary outcomes were supportive of the primary endpoint

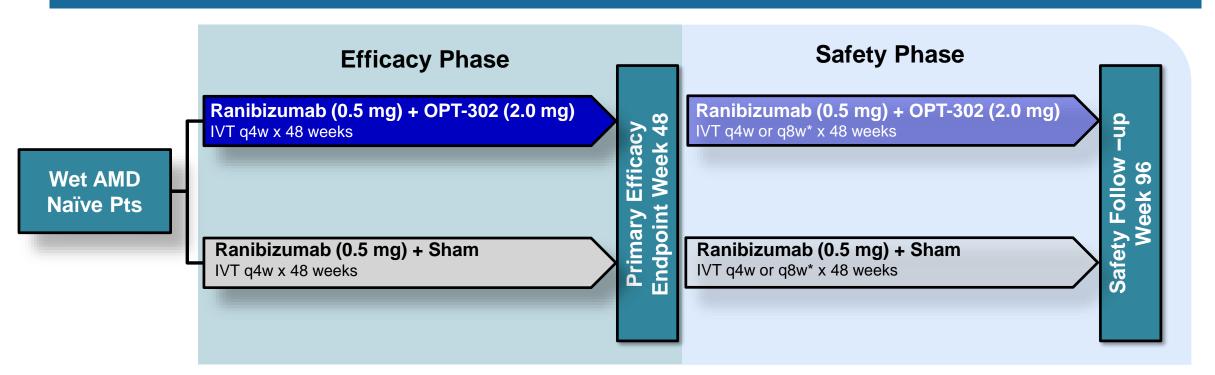
- Vision
  - More patients gained  $\geq$  15 letters of vision
  - Fewer patients lost  $\geq$  15 letters of vision
- Retinal anatomical improvements
  - Reductions in central subfield thickness (CST), sub-retinal and intra-retinal fluid
  - Greater decreases in total lesion area and choroidal neovascularisation (CNV) Area

## Exploratory and pre-specified subgroup analyses

- Suggest greater activity of OPT-302 in lesion-types considered more difficult to treat with anti-VGEF-A therapy and highest unmet need
- Promising evidence of activity in polypoidal AMD (PCV) and minimally classic/occult lesions that are less responsive to VEGF-A inhibitors

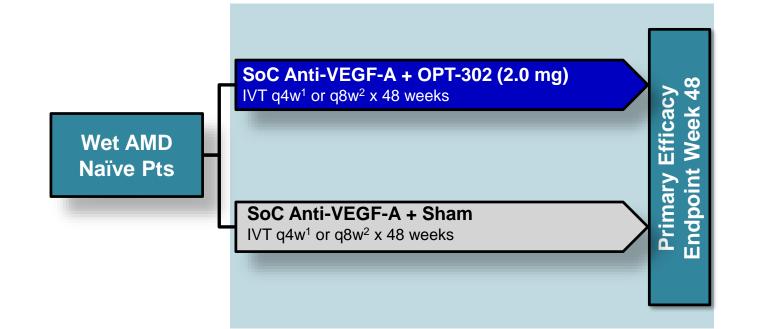


## Planned: OPT-302 Pivotal Phase 3 Program



- Two studies of similar design: Multi-centre, double-masked, randomised (1:1), sham controlled
- Regulatory quality: 90% power, 5% type I error rate
- Sample size: 330 patients per arm, 660 per study (1,320 patients across the two studies)
- Primary Objective: Mean change from Baseline in BCVA (visual acuity) (ETDRS) at Week 48
- Trial Initiation: 4Q 2020
- Top-line Data Readout: 1H 2023
- Full Data Readout: 1H 2023
- \* Dosing every 4 or 8 weeks based on clinical signs of disease progression

Note: The final design of the phase 3 trials is to be confirmed following receipt of regulatory advice and confirmation of the design of the phase 3 clinical program.



- Similar design to Phase 3: Multi-centre, double-masked, randomised (1:1), sham controlled
- Standard of Care (SoC) Anti-VEGF-A: Standard of Care anti-VEGF-A therapy: 0.5 mg ranibizumab<sup>1</sup>,
   2.0 mg aflibercept<sup>2</sup>, or 1.25 mg bevacizumab<sup>1</sup>
- **Regulatory quality:** 90% power, 5% type I error rate
- Sample size: 330 patients per arm, 660 per study, stratified for anti-VEGF-A therapy
- Primary Objective: Mean change from Baseline in BCVA (visual acuity) (ETDRS) at Week 48

<sup>1</sup> Dosing schedule: IVT every 4 weeks for 48 weeks

<sup>2</sup> Dosing schedule: IVT every 4 weeks for 12 weeks, then IVT every 8 weeks for 36 weeks



Note: The final design of the phase 3 trials is to be confirmed following receipt of regulatory advice and confirmation of the design of the phase 3 clinical program.

# **Ongoing Clinical Trials**

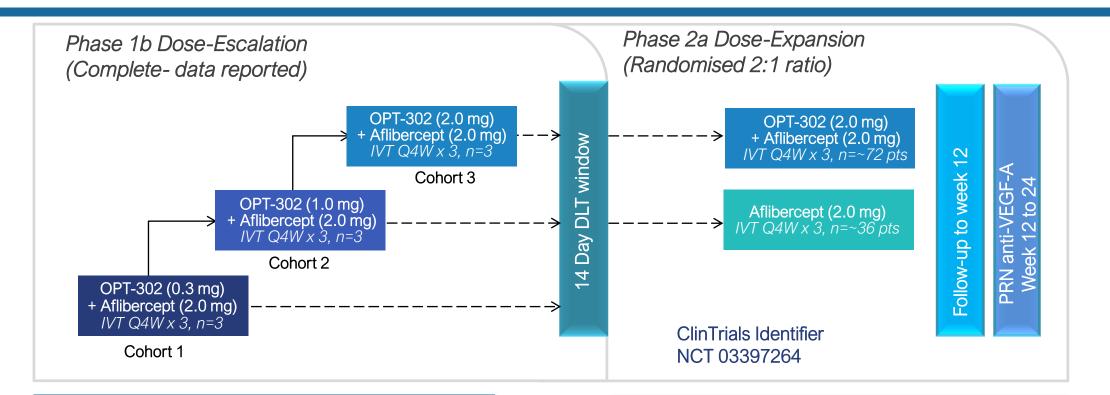
## Phase 1b/2a DME

Phase 1b/2a study of OPT-302 in combination with aflibercept for persistent central-involved diabetic macular edema

Topline data expected 2Q CY 2019



## Phase 1b Dose Escalation study of OPT-302 + Aflibercept in DME



## Key Inclusion Criteria

- Age ≥ 18 years; centre-involving DME
- CST ≥ 335 µm\*
- BCVA 73 24 ETDRS letters (20/40 20/320 Snellen)
- Prior exposure to anti-VEGF-A therapy with sub-optimal

## therapeutic response

- ≥ 3 intravitreal injections
- Last injection  $\leq$  6 wks prior to study day 1
- Prior bevacizumab only allowed if switched to IVT aflibercept or ranibizumab prior to study

 $^{*}$ CST as measured by Spectralis (Heidelberg) at screening, ≥ 320 µm for Cirrus.

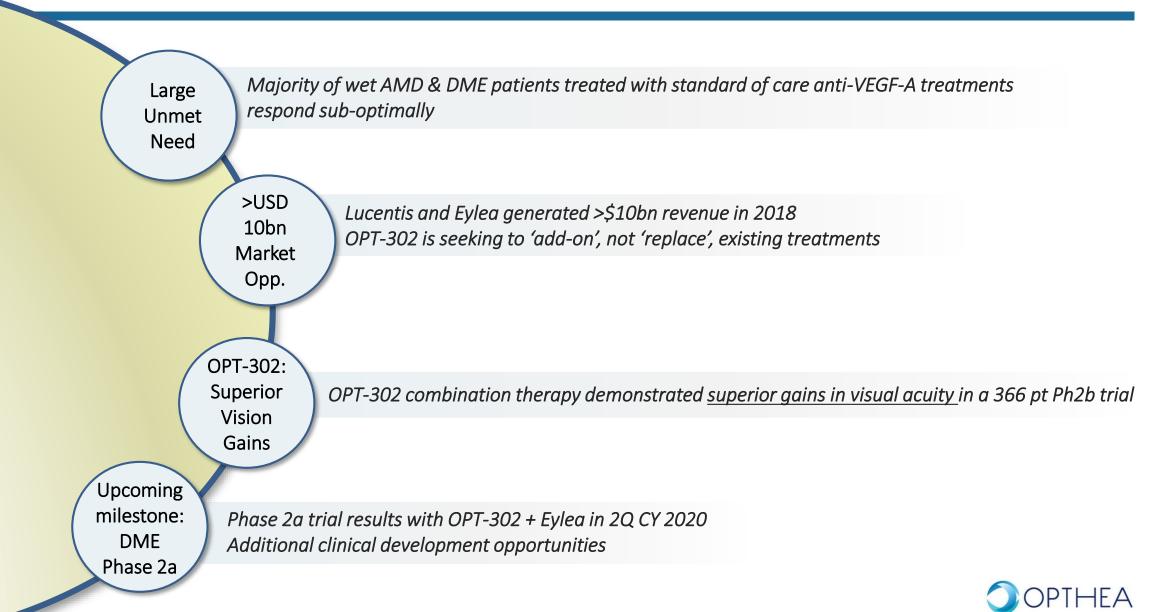
## Key Exclusion Criteria

- HbA1c ≥ 12%
- Uncontrolled hypertension ≥ 180 mmHg systolic or ≥ 110 mmHg diastolic
- Eyes needing PRP within 3 months of screening
- Concurrent / prior use of intravitreal injections of steroids within 4 months of study start
- Concurrent / prior use of dexamethasone or fluocinolone implant in study eye



## **OPT-302**:

## An asset with strategic flexibility looking to enter the retinal disease market





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