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# Pooled Functionality Data of Revakinagene Taroretcel in Patients With Macular Telangiectasia Type 2

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### **Financial Disclosures**

- W. Lloyd Clark has the following disclosures:
  - Consultant (Amgen, Bayer, Cardinal Health, Genentech/Roche, Neurotech, Ocular Therapeutix, Regeneron); Grant Support (Bayer, Eyepoint, Genentech/Roche, Kodiak, Notal Vision, Ocular Therapeutix, Oculis, Outlook, Regeneron); Speakers Bureau (Genentech/Roche, Regeneron)
- These trials were funded by Neurotech Pharmaceuticals
- This study includes research conducted on human subjects. Institutional Review Board approval was obtained prior to study initiation

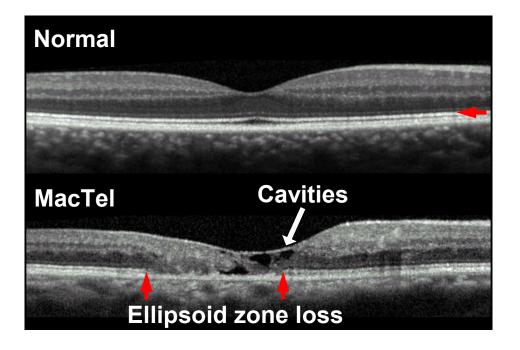
### **Take Home Points**

- NT-501 conferred both anatomic and visual function benefits across three randomized, sham-controlled studies
- Relative to sham, NT-501 demonstrated a:
  - preservation of anatomy
    - 36% reduction in photoreceptor loss
  - preservation of function
    - 68% reduction in reading speed loss
    - 35% reduction in retinal sensitivity loss<sup>a</sup>

# Macular Telangiectasia Type 2 (MacTel) Is a Neurodegenerative Disease That Leads to Vision Loss<sup>1,2</sup>

- MacTel is a bilateral, progressive retinal neurodegenerative disease
  - Leads to vision loss and functional impairment<sup>1,2</sup>
  - Associated with abnormalities in Müller glia, retinal pigment epithelium, and photoreceptors in the central retina<sup>3,4</sup>
  - Characterized by progressive loss of the ellipsoid zone on SD-OCT<sup>3</sup>

### **SD-OCT**



<sup>1.</sup> Charbel Issa P, et al. *Prog Retin Eye Res.* 2013;34:49-77. 2. Heeren TFC, et al. *Ophthalmology*. 2020;127:1539-48. 3. Heeren TFC, et al. *Retina*. 2018;38(suppl 1):S20-S26.

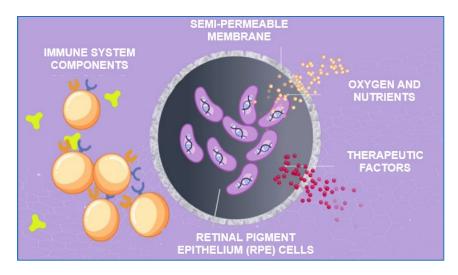
# **CNTF** Is a Potent Neuroprotectant<sup>1-3</sup>

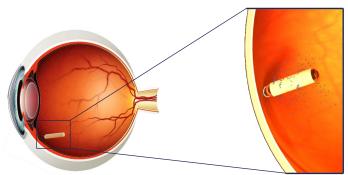
- In response to injury, Müller glial cells release the neuroprotective factor CNTF<sup>1</sup>
- CNTF protects and preserves photoreceptors<sup>2-4</sup>
- In preclinical models of retinal degeneration, photoreceptors can be rescued with intravitreal injection of CNTF<sup>2,4</sup>



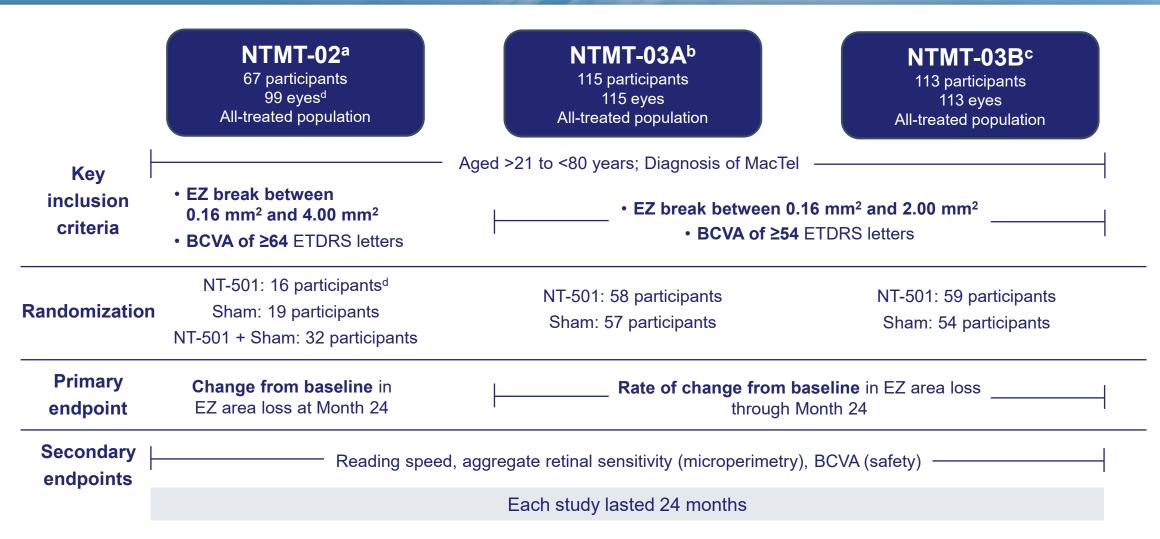
# **Encapsulated Cell Therapy Is Designed to Deliver Sustained Levels of CNTF**

- NT-501 is a first-in-class encapsulated cell therapy<sup>1-3</sup>
  - Houses NTC-201-6A cells<sup>1</sup>
  - Allogenic retinal pigment epithelial cells with a unique expression vector for CNTF release<sup>1</sup>
  - Surgically implanted into the vitreous cavity<sup>2</sup> and stably anchored to the sclera<sup>4</sup>
  - Developed to produce long-term sustained levels of CNTF<sup>2</sup>
  - The FDA has set a PDUFA date of March 18, 2025





# NT-501 Has Been Studied Across 3 Randomized, Sham-controlled Clinical Trials



BCVA, best-corrected visual acuity; ETDRS, Early Treatment Diabetic Retinopathy Study; EZ, ellipsoid zone; MacTel, macular telangiectasia type 2; NT-501. revakinagene taroretcel.

<sup>a</sup>NCT01949324. <sup>b</sup>NCT03316300. <sup>c</sup>NCT03319849. <sup>d</sup>Participants with one eligible eye (35 participants) received NT-501 (16 eyes) or sham (19 eyes). In participants with two eligible eyes (32 participants), one eye received NT-501 (32 eyes) and one eye received sham procedure (32 eyes). If both eyes were eligible, right eye was randomized 1:1 to sham or NT-501 and left eye received other surgery.

## Rationale for a Pooled Functionality Analysis

- Rare disease
- Inherent variability of outcome measures<sup>1-3</sup>
- Similar populations and study designs
- Increase the sample size



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#### Abstract

Purpose: Visual acuity(VA) is the prin indicates a lack of precision and redu enhance detection of VA signals, we d reduce variability of E-ETDRS testing (Be

the generative model of trial-by-trial p 1). The model comprises two parame size required to achieve a specific per rapidly VA behavior changes with inc distinct procedures were developed t testing:(1) A Bayesian Inference Proci hierarchical Bayesian model (HBM) th 2021a), and(3) A hierarchical Bayesian both E-ETDRS and qVA (Lesmes & Dor were applied to a VA dataset obtaine each of 4 Bangerter foil conditions wi We assessed TRV/1 96xtest-retest diff. derived from the repeated E-ETDRS tes

Results: Figure 2 displays the Blandfrom the original E-ETDRS procedure 0.17 for E-ETDRS, 0.19 for BIP, 0.14 fo TRV for BIP is comparable to that of E-E by 22% and 30%, respectively.

Conclusions : By integrating information the E-ETDRS tests. Integrating inform tests, the HBIM exhibited the greater post-hoc procedures can be employ

Test-Retest Variability of Reading Performance Metrics Using MNREAD in Patients with Age-Related Macular Degeneration

Praveen J. Patel, Fred K. Chen, 1,2 Lyndon I.

PURPOSE. To determine the test-retest variability of reaability using the MNREAD charts in patients with stable ag-related macular degeneration (AMD).

Microsos. In this prospective study, reading ability was me sured at two visits in 124 nontreated eyes of 124 patients with AMD, who were enrolled in an ongoing clinical trial using standardized MNREAD protocol. Only patients with stabl AMD who could perform the reading test at 40 cm at both visit were included in the analysis. Different scoring rules were applied to calculate critical print size and maximum rea

RESULTS, Data from the 59 patients with a mean (SD) age of (%) years who met the study criteria were analyzed at a me (SD) interval of 43 (6) days between measurements. The 9 coefficient of repeatability (CR) was 0.30 logMAR for read acuity. The CR for critical print size and maximum re speed varied depending on the analysis method applied CONCLUSIONS. This is a report of estimates of the intersessio test-retest variability of reading performance metrics in p tients with stable AMD. The results are helpful both in definin end points in clinical trials for AMD and in distinguish clinical change from measurement variability in clin practice. (Invest Obbtbalmol Vis Sci. 2011;52:3854-3859) DO 10.1167/joys.106601

Visual acutty is the most want, function in clinical trials and clinical practice. However, function in clinical trials and clinical practice. reading ability is an important component of vision functio Reading difficulty diminishes quality of life, 1,2 and improv ment in reading performance is one of the main objectives elderly low-vision patients.3 The MNREAD charts, developed the Minnesota Laboratory for Low-Vision Research, are a c

From the 'National Institutes of Health Research (NHRO) Blome in Research Centre for Ophthalmology (Moorfields by Hospital and U.C. Institute of Ophthalmology, Hosofields and Control Institute of Ophthalmology, Hosofields, Teles of Rangings, and the Control Institutes of Moorfields by Hospital National Science, University of Westor Australia, Perth, Australia. Supported by the Special Trustees of Moorfields by Hospital Trustees of Moorfields by Hospital Trustees of Moorfields by Hospital Postarios of Search Centre for Ophthalmological Research Centre for Ophth

nology at Moorfields Eye Hospital and UCL Institute of Opht ogy. The views expressed in the publication are those of the aut and not necessarily those of the Department of Health. Submitted for publication September 19, 2010; revised Januar

and February 21, 2011; accepted February 25, 2011 Disclosure: P.I. Patel. None: F.K. Chen. None: L. Da Cruz. N G.S. Rubin, None; A. Tufail, None No reprints will be available.

Corresponding author: Praveen J. Patel, Medical Retina Servici Moorfields Eye Hospital, 162 City Road, London ECIV 2PD, UI

International Journal of Retina and Vitreous

#### **ORIGINAL ARTICLE**

#### Test-retest variability of microperimetry in geographic atrophy

Jay S. Duker<sup>1</sup> and Nadia K. Waheed<sup>3</sup>

monly employed as a clinical trial endpoint. Test-retest reliability is important when evaluating treatment effects in patients with geographic atrophy (GA). This study aimed to determine the test-retest variability of MP in patients with

Methods: In this prospective study, patients with a confirmed diagnosis of foveal-involving GA were enrolled. Participants performed three MP assessments of a selected eye over two visits with the Macular Integrity Assessment (MAIA) 2 instrument (Centervue, Padova, Italy) utilizing a wide 30° grid, consisting of 93 stimuli (Goldmann III) using a 4-2 epresentation strategy, encompassing the entire area of GA and beyond. Mean retinal sensitivity (MS) was expresse as an average threshold value (dB) for the entire field tested. Coefficients of Repeatability at a 95% level (CoR<sub>95</sub>) were calculated for Point Wise Sensitivity (PWS). Fixation stability (FS) was assessed by evaluating the area of an elliptical representation encompassing 95% of the cloud of fixation points (CFP) dataset generated by the MAIA MP, known a the bivariate contour ellipse area (BCEA).

Results: A total of 8 subjects were enrolled (21 tests), with six subjects completing 3 MP assessments. BCVA in these patients ranged from 20/100 to 20/800. The mean area of GA was 18.7 ± 12.3 mm<sup>2</sup>. The average time to complete one MP assessment was 13 min 9 s and mean BCEA@95% was 38.5 ± 19.3°2. The MS was 14.3 ± 4.5 dB. No significan increase in MS was noted between testing pairs 182 and 283. The preferred retinal locus was maintained in the same quadrant on successive tests. The mean CoR95 for PW5 were similar for testing pairs 1&2 (±3.50 dB) and 2&3 (±3.40).

Conclusion: Microperimetry using a wide grid can be reliably performed in a reasonable amount of time in patients with moderate and severe vision loss secondary to GA. There was no learning effect seen between sequential assessments when analyzing MS or PWS. A change of approximately 4 dB in PWS provides a threshold for considering a true change in this patient cohort.

Microperimetry (MP) is a several-decades old technology designed to test retinal sensitivity at different points in been a resurgence in development of new microperimthe macula. First developed in the 1980s, MP was initially etry systems, beginning with the Nidek MP-1 and condeployed as part of a scanning laser ophthalmoscope

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system. In its early forms, MP systems were relatively difficult to use. In the last two decades, however, there has tinuing more recently with the Nidek MP-3 and Macular Integrity Assessment (MAIA) 2 systems, which are more user friendly with the addition of features such as eve

With newer improvements, microperimetry (MP) has gained more widespread adoption as a means of



# Changes From Baseline in EZ Area Loss, Reading Speed, Retinal Sensitivity, and BCVA Were Assessed

#### **Assessments**

- Change from baseline assessments in the all-treated population in the Phase 3 and Phase 2 studies:
  - Anatomical:
    - Area of photoreceptor (ie, EZ area) loss (primary endpoint)
  - Functional:
    - Monocular reading speed
    - Aggregate retinal sensitivity (microperimetry)
  - Safety:
    - BCVA

# Baseline Demographic Characteristics, by Participanta

	Phase 2		Phase 3 (Study A)		Phase 3 (Study B)		
By participant	NT-501 (n=16)	Sham (n=19)	NT-501 + Sham (n=32)	NT-501 (n=58)	Sham (n=57)	NT-501 (n=59)	Sham (n=54)
Female, n (%)	9 (56)	11 (58)	21 (66)	39 (67)	40 (70)	46 (78)	36 (67)
Mean age, years (SD)	60.1 (10.7)	59.4 (7.6)	63.4 (8.4)	61.1 (8.0)	60.2 (8.4)	58.5 (7.6)	58.7 (8.9)
Race, n (%) White Asian Black or African American American Indian or Alaska Native Other	12 (75) 0 0 0 0 4 (25)	16 (84) 1 (5) 0 0 2 (11)	30 (94) 0 1 (3) 0 1 (3)	50 (86) 2 (3) 1 (2) 0 5 (9)	48 (84) 3 (5) 2 (4) 1 (2) 3 (5)	55 (93) 3 (5) 0 0 1 (2)	47 (87) 1 (2) 0 0 6 (11)
Ethnicity, n (%) Hispanic or Latino	1 (6)	0	1 (3)	1 (2)	5 (9)	4 (7)	4 (7)

Baseline demographic characteristics were well balanced across studies and treatment arms

# Baseline Ocular Characteristics, by Eyea

	Phase 2		Phase 3 (Study A)		Phase 3 (Study B)	
By eye	NT-501	Sham	NT-501	Sham	NT-501	Sham
	(n=48)	(n=51)	(n=58)	(n=57)	(n=59)	(n=54)
<b>EZ area loss</b> (mm²), n	48	51	58	57	59	54
Mean (SD)	0.70 (0.42)	0.77 (0.55)	0.51 (0.48)	0.49 (0.36)	0.52 (0.31)	0.48 (0.29)
<b>EZ area category</b> , n (%) <0.5 mm <sup>2</sup> ≥0.5 mm <sup>2</sup>	18 (37.5)	20 (39.2)	41 (70.7)	40 (70.2)	31 (52.5)	33 (61.1)
	30 (62.5)	31 (60.8)	17 (29.3)	17 (29.8)	28 (47.5)	21 (38.9)
Mean BCVA, ETDRS letter (SD)	77.0 (5.6)	76.2 (6.9)	70.8 (9.11)	73.3 (8.64)	74.4 (7.76)	73.6 (9.23)
Snellen equivalent	20/32	20/32	20/40	20/40	20/32	20/32
Reading speed (wpm), n	47	49	57	56	59	53
Mean (SD)	94.29 (46.13)	107.26 (43.17)	92.09 (43.72)	96.01 (54.01)	96.49 (47.31)	94.09 (42.81)
<b>Retinal sensitivity</b> <sup>b</sup> , n	40	45	53	54	52	49
Mean (SD)	89.15 (76.15)	107.96 (106.77)	62.14 (77.58)	59.02 (62.63)	57.92 (56.94)	50.48 (58.36)

### Participants in the Phase 2 trial had greater baseline EZ area loss compared with the Phase 3 studies

BCVA, best-corrected visual acuity; ETDRS, Early Treatment Diabetic Retinopathy Study; EZ, ellipsoid zone; NT-501, revakinagene taroretcel; SD, standard deviation;

<sup>&</sup>lt;sup>a</sup>Results reported for the all-treated population, unless otherwise noted. Not available in full pool. <sup>b</sup>Results reported for the per-protocol population.

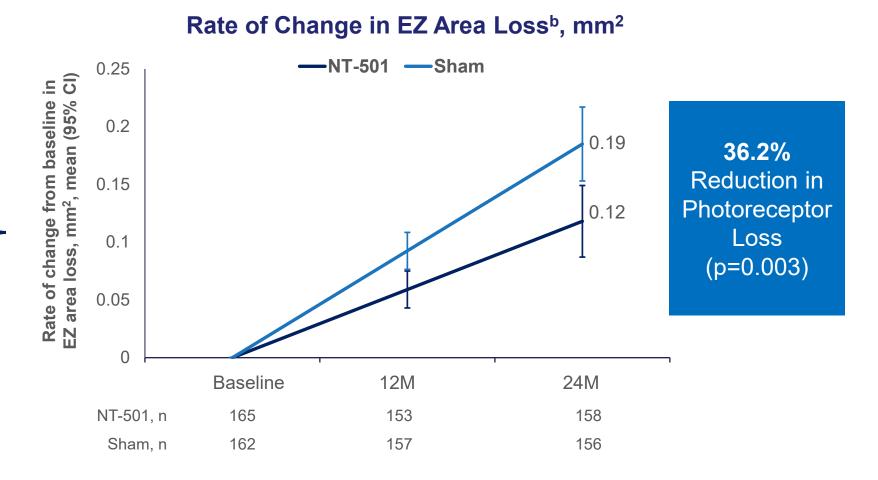
# Baseline Demographic and Ocular Characteristics in Pooled Sample<sup>a</sup>

	Phase 2 and Phase 3 Pool <sup>b</sup>		
	NT-501 (n=165)	Sham (n=162)	
Demographic characteristics (by participant)			
Female, n (%)	115 (69.7)	108 (66.7)	
Mean age, years (SD)	60.5 (8.4)	60.3 (8.6)	
Race, n (%)			
White	147 (89)	141 (87)	
Asian	5 (3)	5 (3)	
Black or African American	2 (1)	3 (2)	
American Indian or Alaska Native	Ò	1 (1)	
Other	11 (7)	12 (7)	
Ethnicity, n (%)			
Hispanic or Latino	7 (4)	10 (6)	
Ocular characteristics (by eye)			
EZ area loss (mm²), n	165	162	
Mean (SD)	0.57 (0.41)	0.57 (0.43)	
EZ area category, n (%)			
<0.5 mm <sup>2</sup>	90 (54.5)	93 (57.4)	
≥0.5 mm <sup>2</sup>	75 (45.5)	69 (42.6)	
Mean BCVA, ETDRS letter (SD)	73.8 (8.2)	74.2 (8.5)	
Snellen equivalent	20/40	20/32	
Reading speed (wpm), n	163	158	
Mean (SD)	94.32 (45.50)	98.86 (47.24)	
Retinal sensitivity <sup>c</sup> , n			
Mean (SD)	-	-	

BCVA, best-corrected visual acuity; ETDRS, Early Treatment Diabetic Retinopathy Study; EZ, ellipsoid zone; NT-501, revakinagene taroretcel; SD, standard deviation; wpm, words per minute. aResults reported for the all-treated population, unless otherwise noted. Not available in full pool. Per the NTMT-02 study design, participants with two eligible study eyes received NT-501 in one eye and sham in the other eye. These 32 participants are included in both columns for the pooled summary. Results reported for the per-protocol population.

# NT-501 Demonstrated Greater Preservation of EZ Area Over 2 Years Compared With Sham in All Treated Participants<sup>a</sup>

- A 19.3% reduction in photoreceptor loss with NT-501 compared with sham in Phase 2
- A 54.8% reduction in photoreceptor loss with NT-501 compared with sham in Phase 3, Study A
- A 30.6% reduction in photoreceptor loss with NT-501 compared with sham in Phase 3, Study B



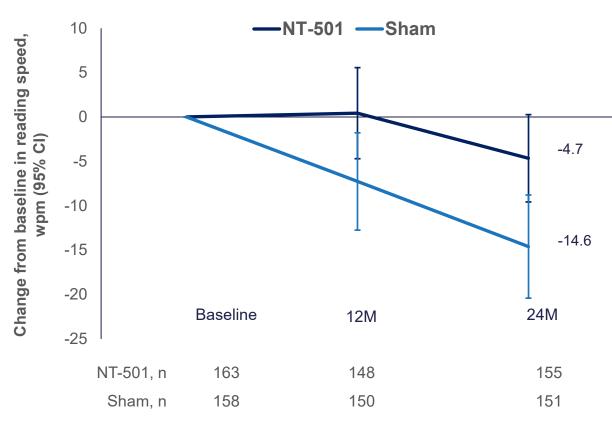
CI, confidence interval; EZ, ellipsoid zone; M, month; NT-501, revakinagene taroretcel

<sup>a</sup>Per the NTMT-02 study design, participants with two eligible study eyes received NT-501 in one eye and sham in the other eye. These 32 participants are included in both groups for the pooled analysis, by study eye. Bate of EZ change, difference, and CIs from a repeated measures model. The outcome variable is EZ area assessed longitudinally at baseline, Months 12, 16 (Phase 3 only), 18 (Phase 2 only), 20 (Phase 3 only), and 24. At baseline, EZ area is calculated as the mean area across two independent readers. The model includes treatment group, time (continuous), treatment\*time interaction, and participant-specific random intercepts. The difference between treatment groups in rate of EZ change is estimated at Month 12 and Month 24 based on the treatment\*time interaction term.

# NT-501 Preserved Reading Speed Over 2 Years Compared With Sham in All Treated Participants<sup>a</sup>

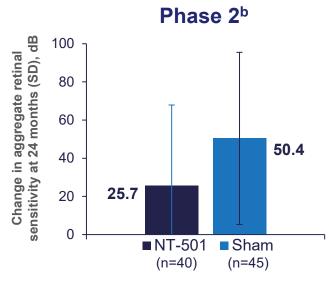
- A 90.7% reduction in reading speed loss with NT-501 compared with sham in Phase 2
- A 49.3% reduction in reading speed loss with NT-501 compared with sham in Phase 3, Study A
- A 69.1% reduction in reading speed loss with NT-501 compared with sham in Phase 3, Study B



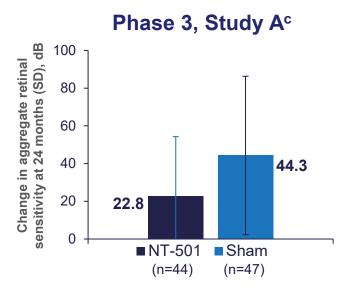


68.1% Reduction in Reading **Speed Loss** (p=0.0104)

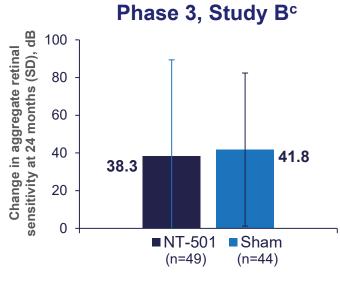
# NT-501 Preserved Aggregate Retinal Sensitivity (Microperimetry) Over 2 Years Compared With Shama



A **49.0%** reduction in aggregate retinal sensitivity loss with NT-501 compared with sham in Phase 2



A 48.5% reduction in aggregate retinal sensitivity loss with NT-501 compared with sham in Phase 3, Study A



An 8.4% reduction in aggregate retinal sensitivity loss with NT-501 compared with sham in Phase 3, Study B

#### **34.8%** Reduction in Aggregate Retinal Sensitivity Loss Across the 3 Studies<sup>d</sup>

dB, decibel; MAIA, Macular Integrity Assessment; NT-501, revakinagene taroretcel; SD, standard deviation. aRetinal sensitivity was measured via MAIA microperimetry. In the Phase 2 study, retinal sensitivity is reported for the per-protocol population, which included all treated subjects who had no major protocol infractions (defined prior to unmasking of the study). Per the NTMT-02 study design, participants with two eligible study eyes received NT-501 in one eye and sham in the other eye. These 32 participants are included in both groups for the pooled analysis by study eye. In the Phase 3 studies, the retinal sensitivity per-protocol population is reported, including all treated subjects who had a baseline and Month 24 microperimetry collected according to study protocol. dResults per study in the respective per-protocol populations were weighted by the proportion of treated eyes with non-missing data in each study and combined descriptively.

## **BCVA Remained Stable for NT-501 and Sham Treatment Arms**

#### Mean Change in BCVA, (SD)<sup>a</sup>

Phase 2	NT-501	Sham
Baseline	77.0 (5.61)	76.2 (6.85)
12M	-0.9 (4.87)	-1.6 (3.81)
24M	-1.9 (5.85)	-2.0 (4.28)

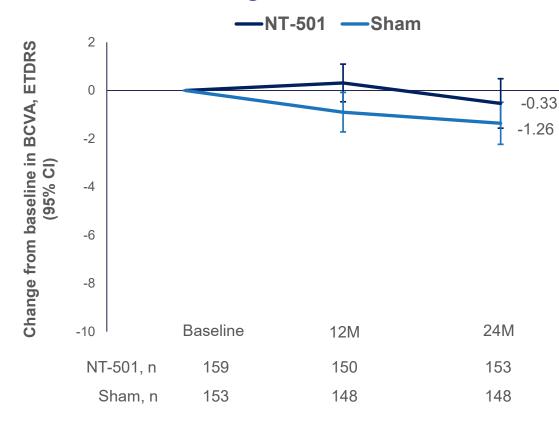
#### Mean Change in BCVA, (SD)

Phase 3, Study A	NT-501	Sham
Baseline	70.8 (9.11)	73.3 (8.64)
12M	1.0 (4.68)	-0.3 (5.36)
24M	0.2 (7.55)	-0.6 (6.30)

#### Mean Change in BCVA. (SD)

Phase 3, Study B	NT-501	Sham	
Baseline	74.4 (7.76)	73.6 (9.23)	
12M	0.6 (5.12)	-0.9 (5.81)	
24M	-0.3 (6.01)	-1.7 (4.99)	

### Change in BCVA, ETDRS



### **Take Home Points**

- NT-501 conferred both anatomic and visual function benefits across three randomized, sham-controlled studies
- Relative to sham, NT-501 demonstrated a:
  - preservation of anatomy
    - 36% reduction in photoreceptor loss
  - preservation of function
    - 68% reduction in reading speed loss
    - 35% reduction in retinal sensitivity loss<sup>a</sup>

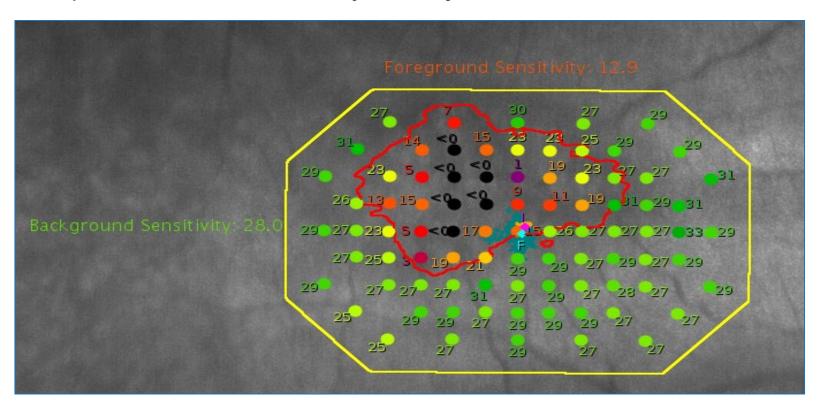
# **Acknowledgements**

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# **Appendix**

# Aggregate Retinal Sensitivity Explained

The boundary in yellow denotes the FOV of the Microperimetry sensitivity map. All calculations are limited to the FOV only, since any extrapolation outside FOV may be subject to error<sup>1</sup>



#### **Calculation Overview<sup>2</sup>**

- Aggregate retinal sensitivity is calculated by summing and averaging test point values on microperimetry outside of the scotoma (considered the background retinal sensitivity)
- 2. Levels of retinal sensitivity within the scotoma are subtracted from this mean
- The sum of these differences results in the value known as aggregate sensitivity

## **MacTel Patient Impact**

### Visual Symptoms<sup>1,2</sup>

- Patients can experience<sup>1</sup>:
  - Blurred vision
  - Distorted vision
  - Expanding Paracentral blind spots
  - Loss of central vision
- Late disease stage defined by a BCVA of 20/200 or worse<sup>3</sup>
- Visual acuity is a suboptimal measure of disease burden

### Impact on Activities of Daily Living<sup>2-6</sup>

- Reduced reading capabilities
  - Baseline reading speed for Phase 3 studies was reduced by 50% of normal
- Limitations on driving
- Loss of depth perception impacting mobility

These microperimetry images demonstrate progression of a new scotoma in a MacTel patient over 4 years



