Continued Evaluation of Bemdaneprocel Following a Phase 1 Study for Parkinson's Disease: Outcomes Through 3 Years

Harini Sarva, MD[1]; Claire Henchcliffe, MD, DPhil[2]; Andres Lozano, MD, PhD[3,4]; Alfonso Fasano, MD, PhD[4–6]; Suneil Kalia, MD, PhD, FAANS, FRCSC[3,4]; Kenny Kwok Hei Yu, MBBS, PhD, FRCS[7]; Cameron Brennan, MD[7]; Melinda Louie-Gao, PhD[8]; Nicole Floro, MS[8]; Nauman Abid, MD[8]; Viviane Tabar, MD[7]

[1]Department of Neurology, Weill Cornell Medicine, New York, NY, USA; [2]Department of Neurology, University of California, Irvine, CA, USA; [3]Division of Neurosurgery, University of Toronto, Toronto, Ontario, Canada; [4]Krembil Brain Institute, Toronto, Ontario, Canada; [5]Division of Neurology, University of Toronto, Toronto, Ontario, Canada; [6]Edmond J Safra Program in Parkinson's Disease, Morton and Gloria Shulman Movement Disorders Clinic, Toronto Western Hospital, UHN, Toronto, Ontario, Canada; [7]Department of Neurosurgery and Center for Stem Cell Biology, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [8]BlueRock Therapeutics LP, Cambridge, MA, USA

exPDite
Continued-Evaluation Study

Introduction

- Current standard treatments for Parkinson's disease (PD) motor symptoms do not address the loss of dopaminergic neurons, an underlying cause of the disease; moreover, they do not specifically address, and may even worsen, some non-motor symptoms[1,2]
- Bemdaneprocel is an investigational therapy comprising dopaminergic neuron progenitors derived from human embryonic stem cells[3-5]
  - Preclinical studies in rodents support safety and proof-of-concept for bemdaneprocel[3,4]
- exPDite, a Phase 1 multicenter, multisite, open-label, nonrandomized study (NCT04802733), met the primary objective of safety and tolerability through 12 months post transplantation, and a trend toward improvement or stability in clinical assessments was observed through 2 years post transplantation[6,7]
  - Understanding the long-term safety, tolerability, and clinical effects of bemdaneprocel is necessary for further clinical development
  - All participants subsequently enrolled in a continued-evaluation study (NCT05897957) for ongoing assessment of safety and efficacy through 5 years post transplantation

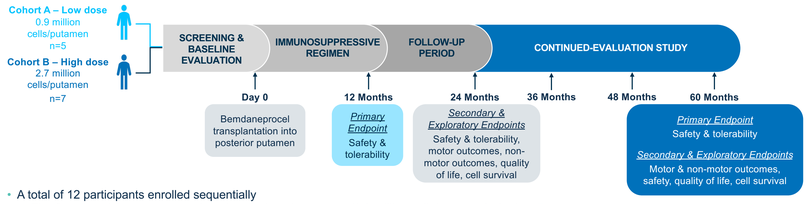
Objective

- To report the safety and clinical outcomes of bemdaneprocel in participants with PD through 3 years post transplantation

Methods

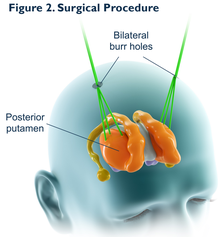
- Participants with PD, with motor symptoms inadequately controlled by standard treatments, and who were ≥50 to ≤78 years of age in Canada or ≥60 to ≤78 years of age in the United States were eligible to enroll in exPDite
  - Eligible participants had a diagnosis of idiopathic PD (based on modified UK Parkinson's Disease Society Brain Bank criteria) with ≥3 to ≤20 years since PD, levodopa response (defined as ≥30% improvement on Movement Disorders Society-Unified Parkinson's Disease Rating Scale [MDS-UPDRS] Part III), and a Hoehn and Yahr score of 0–3 in ON state (Canada only) or 0–2 in ON state and 3–4 in OFF state (US only)

Figure 1. Study Design



- A total of 12 participants enrolled sequentially
  - The first 5 participants were assigned to the low-dose group (0.9 million cells/putamen); the last 7 were assigned to the high-dose group (2.7 million cells/putamen)
- Bemdaneprocel was administered stereotactically into the posterior putamen bilaterally through a single burr hole on each side in a single session
  - A cannula was used to deliver a total of 9 cell deposits along 3 tracks per hemisphere
- Immunosuppression was initiated during transplantation and continued for 1 year post transplantation
  - **Basiliximab** (20 mg, IV) was administered intraoperatively and on postoperative day 4
  - **Methylprednisolone** (500 mg, IV) was initiated on day 0, tapered to **prednisone** (5 mg, PO), and continued at 5 mg QD for 1 year
  - **Tacrolimus** (PO, BID) was initiated on postoperative day 1 and adjusted to a target trough blood level of 4–7 ng/mL for 1 year
- Secondary and exploratory outcomes included intracranial magnetic resonance imaging (MRI), anti-PD medication use, MDS-UPDRS Part II scores, adjusted PD diary ON time without troublesome dyskinesia and OFF time, and MDS-UPDRS Part III ON and OFF at baseline and at 6, 12, 18, and 24 months post transplantation
- Participants will continue to be assessed for a total of 60 months (5 years) post transplantation

Figure 2. Surgical Procedure



Results

Table 1. Participant Demographics and Baseline Characteristics

	Low Dose (n=5)	High Dose (n=7)	Total (N=12)
Age, years			
Mean (standard deviation)	66.8 (6.8)	66.7 (4.8)	66.8 (5.4)
Sex, n (%)			
Male	4 (80.0)	5 (71.4)	9 (75.0)
Female	1 (20.0)	2 (28.6)	3 (25.0)
Race, n (%)			
Asian	0	1 (14.3)	1 (8.3)
White	3 (60.0)	5 (71.4)	8 (66.7)
Other	1 (20.0)	1 (14.3)	2 (16.7)
Multiple	1 (20.0)	0	1 (8.3)
Time since Parkinson's disease diagnosis, years			
Mean (standard deviation)	11.0 (3.7)	7.8 (2.2)	9.1 (3.2)
Hoehn and Yahr Stage (OFF state), n (%)			
2	1 (20.0)	0	1 (8.3)
3	4 (80.0)	7 (100.0)	11 (91.7)
Hoehn and Yahr Stage (ON state), n (%)			
2	5 (100.0)	7 (100.0)	12 (100.0)

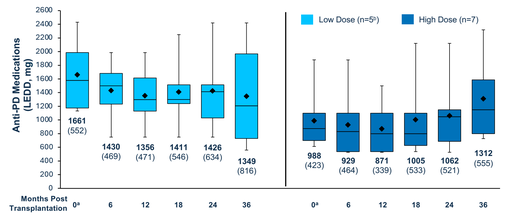
Table 2. Summary of TEAEs and SAEs Through 36 Months Post Transplantation

	Low Dose (n=5)	High Dose (n=7)	Total (N=12)
Participants reporting, n (%) [number of events]			
TEAEs by maximum CTCAE grade[a]	5 (100.0) [57]	7 (100.0) [55]	12 (100.0) [112]
Mild	1 (20.0) [31]	2 (28.6) [43]	3 (25.0) [74]
Moderate	2 (40.0) [19]	3 (42.9) [8]	5 (41.7) [27]
Severe	2 (40.0) [7]	2 (28.6) [4]	4 (33.3) [11]
TEAEs[b]			
Related to cannula	1 (20.0) [1]	0	1 (8.3) [1]
Related to surgery	0	3 (42.9) [3]	3 (25.0) [3]
Related to immunosuppressive drugs	3 (60.0) [16]	5 (71.4) [12]	8 (66.7) [28]
Related to disease	3 (60.0) [10]	3 (42.9) [5]	6 (50.0) [15]
TESAEs[b]	2 (40.0) [4][c]	3 (42.9) [4][d]	5 (41.7) [8]
Related to surgery	0	1 (14.3) [1]	1 (8.3) [1]
Deaths	0	0	0
Study discontinuations	0	0	0

[a]There were no life-threatening TEAEs, or deaths related to adverse events. [b]There were no TEAEs or TESAEs related to syringe, transplanted cells, ^{18}F-DOPA scan, or MRI. [c]One SAE of COVID-19; 2 SAEs of hip fracture; 1 SAE of femur fracture. [d]One SAE of gastrointestinal hemorrhage; 1 SAE of seizure; 1 SAE of atrial fibrillation; 1 SAE of left ventricular failure. CTCAE, Common Terminology Criteria for Adverse Events; ^{18}F-DOPA, ^{18}F-fluorodopa; MRI, magnetic resonance imaging; SAE, serious adverse event; TEAE, treatment-emergent adverse event; TESAE, treatment-emergent serious adverse event.

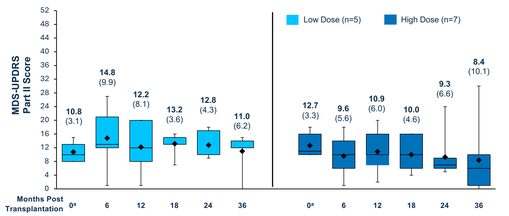
- None of the 8 treatment-emergent serious adverse events were related to transplanted cells or immunosuppression
- There were no graft-induced dyskinesias, no intracerebral hemorrhages, and no mass lesions observed; no treatment-emergent adverse events (TEAEs) were related to transplanted cells
- TEAEs in Nervous system disorders and Infections and infestations System Organ Classes were reported for 9/12 (75.0%) participants each
  - The most frequently reported TEAEs in the Infections and infestations System Organ Class (n=9, 75.0%) were COVID-19 (n=4, 33.3%), pneumonia (n=2, 16.7%), and urinary tract infection (n=2, 16.7%)
  - The most frequently reported TEAEs in the Nervous system disorders System Organ Class (n=9, 75.0%) were dyskinesia (n=4, 33.3%), on and off phenomenon (n=3, 25.0%), headache (n=2, 16.7%), and tremor (n=2, 16.7%)

Figure 3. Anti-Parkinson's Disease Medication Use



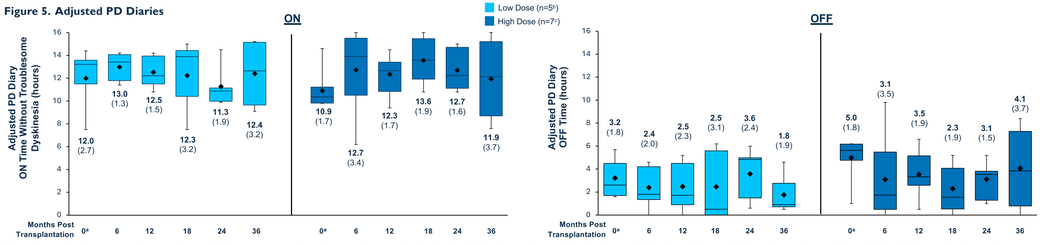
Horizontal lines, median; diamonds, mean; boxes, quartiles 1 and 3; whiskers, extreme values. Annotations on graphs are **mean** (standard deviation). [a]The baseline value (0 months post transplantation) is defined as the last recorded value before the first dose of immunosuppressive drugs or cell transplant surgery. [b]Except for 36 months post transplantation, where n=4. LEDD, levodopa equivalent daily dose; PD, Parkinson's disease.

Figure 4. Movement Disorders Society Unified Parkinson's Disease Rating Scale (MDS-UPDRS) Part II



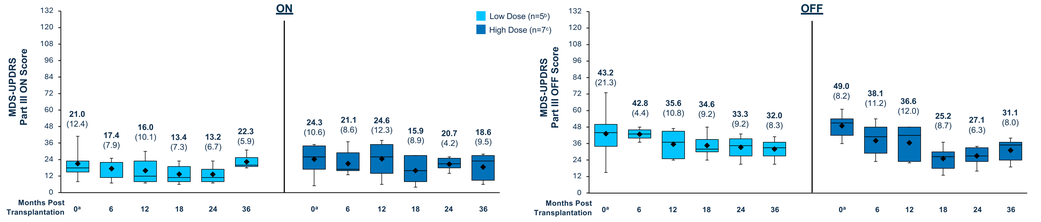
Horizontal lines, median; diamonds, mean; boxes, quartiles 1 and 3; whiskers, extreme values. Annotations on graphs are **mean** (standard deviation). The MDS-UPDRS Part II score contains 13 items. Each item is rated on a scale of 0 (normal) to 4 (severe), with a total possible score of 52; higher scores represent more severe symptoms.[a]The baseline value (0 months post transplantation) is defined as the last recorded value before the first dose of immunosuppressive drugs or cell transplant surgery. MDS-UPDRS, Movement Disorders Society-Unified Parkinson's Disease Rating Scale.

Figure 5. Adjusted PD Diaries



Horizontal lines, median; diamonds, mean; boxes, quartiles 1 and 3; whiskers, extreme values. Annotations on graphs are **mean** (standard deviation). ON time without troublesome dyskinesia is the sum of ON time without dyskinesia and ON time with non-troublesome dyskinesia. PD diary time[a] is adjusted for 16-hour waking days. [a]The baseline value (0 months post transplantation) is defined as the last recorded value before the first dose of immunosuppressive drugs or cell transplant surgery. [b]Except for ON and OFF time at 36 months post transplantation, where n=4. [c]Except for ON and OFF time at 36 months post transplantation, where n=5. PD, Parkinson's disease.

Figure 6. Movement Disorders Society Unified Parkinson's Disease Rating Scale (MDS-UPDRS) Part III



Horizontal lines, median; diamonds, mean; boxes, quartiles 1 and 3; whiskers, extreme values. Annotations on graphs are **mean** (standard deviation). MDS-UPDRS Part III contains 18 items with a subscore range of 0–132 points; higher scores indicate more severe motor symptoms.[70] [a]The baseline value (0 months post transplantation) is defined as the last recorded value before the first dose of immunosuppressive drugs or cell transplant surgery. [b]Except for Part III OFF at 24 months post transplantation, where n=4; except for Part III ON and OFF at 36 months post transplantation, where n=4. [c]Except for Part III OFF at 18 months post transplantation, where n=6. MDS-UPDRS, Movement Disorders Society-Unified Parkinson's Disease Rating Scale.

Conclusions

- Through 3 years post transplantation, bemdaneprocel had a favorable safety profile; additionally, there were no deaths, study discontinuations, graft-induced dyskinesias, intracerebral hemorrhages, or mass lesions
  - None of the treatment-emergent serious adverse events were related to transplanted cells or immunosuppression
- Participants who received bemdaneprocel, particularly those in the high-dose cohort, trended toward improvement or stability across most motor outcomes through 3 years post transplantation, 2 years post discontinuation of immunosuppression
- These results support the continued development of high-dose bemdaneprocel for the treatment of people with PD
  - Enrollment in exPDite-2,[11] a Phase 3 randomized, sham-controlled, double-blind trial (NCT06944522) to evaluate the efficacy and safety of bemdaneprocel is ongoing

References: **1**. Debove I, et al. *Mov Disord.* 2024;39(2):235-48. **2**. Khan TS. *Cleve Clin J Med.* 2012;79 Suppl 2:S8-13. **3**. Kim TW, et al. *Cell Stem Cell.* 2021;28(2):343-55.e5. **4**. Piao J, et al. *Cell Stem Cell.* 2021;28(2):217-29.e7. **5**. Kriks S, et al. *Nature.* 2011;480(7378):547-51. **6**. Tabar V, et al. *Nature.* 2025;641(8064):978-983. **7**. Henchcliffe C, et al. Presented at: International Congress of Parkinson's Disease and Movement Disorders; September 27-October 1, 2024; Philadelphia, PA. **8**. Goetz CG, et al. *Mov Disord.* 2008;23(16):2398-403. **9**. Hauser RA, et al. *Clin Neuropharmacol.* 2000;23(2):75-81. **10**. Goetz CG, et al. MDS-UPDRS. *The MDS-Sponsored Revision of the Unified Parkinson's Disease Rating Scale.* Milwaukee, WI: International Parkinson and Movement Disorder Society; 2008. **11**. Abid N et al Presented at: World Congress on Parkinson's Disease and Related Disorders; May 7-10, 2025; New York, NY.

Disclosures: **N Abid, N Floro,** and **M Louie-Gao** are full-time employees of BlueRock Therapeutics, LP. **C Henchcliffe** has received honoraria for consulting from AskBio and Certara; stock options for scientific advisory board participation from Axent Biosciences; honoraria for scientific advisory board participation from Bayer AG, Canary Health Technologies, and ProJenX; honoraria for data safety monitoring board meetings from MeiraGTx; research support from BlueRock Therapeutics and Weston Brain Institute; and honoraria for presentations from the American Academy of Neurology, ASGCT, and the Parkinson Study Group. **H Sarva** has done consulting work for BlueRock Therapeutics, Neurocrine, Neuroderm, and Novo Nordisk; and has received clinical trial support from Biogen, BlueRock Therapeutics, Covance, Genentech, Insightec, National Institutes of Health (NIH), Neuroderm, and Prevail Therapeutics. **A Lozano** has nothing to disclose. **A Fasano** has stock ownership in InBrain Pharma; has received payments as consultant and/or speaker from Abbott, AbbVie, Boston Scientific, CereGate, Dompé Farmaceutici, InBrain Neuroelectronics, Iota, Ipsen, Medtronic, Merz, Paladin Labs, Sunovion, Syneos Health, and UCB; has received research support from AbbVie, BlueRock Therapeutics, Boston Scientific, ES, Medtronic, and Praxis; and receives royalties from Springer. **S Kalia** has received consultant and/or speaker honoraria from Abbott, Boston Scientific, Medtronic, and Novo Nordisk. **K Yu** has nothing to disclose. **C Brennan** has nothing to disclose. **V Tabar** is a scientific advisor for BlueRock Therapeutics.

Support and Acknowledgments: This study was supported by BlueRock Therapeutics, LP. The authors thank Whitney Stemple, Antoine Lampron, Marcus Yountz, and Ahmed Enayetallah, former employees of BlueRock Therapeutics, for their contributions to this study. Under the direction of the authors, Rebecca Lane, PhD, of Peloton Advantage, LLC, an OPEN Health company, provided medical writing and editorial support for this poster, which was funded by BlueRock Therapeutics, LP. Bemdaneprocel is investigational and has not been approved for treatment by any health authority.

Presented at the 2025 International Congress of Parkinson's Disease and Movement Disorders®; October 5–9, 2025; Honolulu, Hawaii, USA