

Clinical Trials for Parkinson's Disease Drug Therapies: What Happened During Q4 2023?

Q4 2023 Trial Status Headlines (ref. dashboards 1-3)

What trials have . . .

Begun recruiting?

Recruiting began for five trials including several of particular interest:

- A large Phase 2 trial (n=189) of UCB and Neuropore's inhibitor of aSN misfolding (UCB0599)
- A Phase 2 trial of Cerevance's selective GPR6 inverse agonist (CVN424)
- A Phase 1 trial of ATH-399A a Nurr1 activator from NurrOn Pharmaceuticals and HanAll BioPharma

Two other trials were newly listed but not yet recruiting at quarter end including a Phase 1-2 cell therapy trial in China (human dopaminergic progenitor cells from iRegene Therapeutics).

Completed enrollment?

Five trials completed enrollment including two Phase 3 trials: A study of rivastigmine (cholinesterase inhibitor currently used for PD dementia) to prevent falls, and a study with the apomorphine sub-cutaneous pump from Supernus in early PD.

Also completing enrollment was the very large (n=506) Phase 2 early PD study with K0706 a Bcr/Abl kinase inhibitor from Sun Pharma/SPARC.

Reached clinical completion?

Another four trials were noted as now clinically complete including a Phase 3 trial of solifenacin (antimuscarinic bladder relaxant from Astellas Pharma) for urinary symptoms in PD, and a Phase 1 trial of HER-096 a peptidomimetic for CDFN from Herantis.

Been delayed (or accelerated)?

Delays in completion date were disclosed for 11 studies (for 3 the previous completion date had already passed suggesting the sponsor was behind on updating clinicaltrials.gov) with most of the delays being at least 5 months. Most notable were Phase 1 studies of BIIB094 an antisense oligomer to LRRK2 from Biogen/Ionis (12-month delay) and VY-AADC02 an AADC gene therapy from Neurocrine and Voyager Therapeutics (11-month delay).

Only 2 studies had an accelerated completion date disclosed including the Phase 3 rivastigmine study for fall prevention (4-month acceleration).

Completion projected within the next six-months?

Twenty-three trials are projected to complete by Q2 2024 with 14 to complete in Q1 2024. This group has many interesting studies of agents with novel mechanisms of action (relative to approved medicines for PD) including:

- Phase 3 trials of exenatide (GLP-1 agonist), and tavapadon (D1/5 partial agonist)
- Phase 2 trials of K0706 (Bcr/Abl kinase inhibitor), UCB0599 (inhibitor of aSN misfolding), suvecaltamide (selective modulator of t-type calcium channels), and SAGE-718 (NMDA receptor modulator)
- Phase 1-2 trials of A9-DPC (embryonic stem cell-derived dopamine progenitor cell therapy), and AAV-GAD (GAD gene therapy)
- Phase 1 studies of PDM608 (GM-CSF fusion protein), ATH-399A (Nurr1 activator), NM-101 (Anti-TLR2 antibody), and two c-Abl kinase inhibitors (risvodetinib and radotinib)

Q4 2023 Trial Results Headlines (ref. dashboard 4)

What trials . . .

Have had results disclosed for the first time?

Results for just three trials were disclosed for the first time in Q4. Results for all three trials were viewed as supporting further development of the agents studied. Only one trial (ATH-1017 Phase 2 trial in PD or Lewy body dementia) had a primary efficacy endpoint, and this was negative although secondary efficacy endpoints showed favorable trends. For the other trials the primary endpoints were safety related.

The most notable results disclosure was from a trial of a high dose (3000 mg per day) of nicotinamide riboside for which the safety results were deemed to support dosing up to this level in future Phase 2 trials. Note that there is an ongoing Phase 2 trial with this agent at lower doses.

Have had additional detail on results disclosed?

Additional results were disclosed for eleven trials for which at least top-line results had been previously reported. Notable were:

- A peer-reviewed manuscript on the Phase 3 long-term safety study with IPX203 (novel extended-release formulation of LD/CD likely to be approved and launched in 2024) showing favorable safety and tolerability and sustained efficacy through to the end of the one-year study.
- A peer-reviewed manuscript on the Phase 2 study with NLY-01 (pegylated exenatide) which was not shown to be effective in the overall population but in the subgroup of younger patients a possibility for motor benefit was reported.
- A peer-reviewed manuscript on a small Phase 2 study with CNM-Au8 (gold nanoparticles) for which the results demonstrated brain target engagement and direct modulation of brain energy metabolism.
- A conference abstract on a Phase 2 study with short-term use of cannabidiol (CBD) that failed to show any efficacy (cognition and sleep may have worsened) although the treatment was tolerated.

Are due to have results disclosed soon?

A new analysis looks at trials that completed at least six months ago (end of Q2 2023) but for which results were not disclosed by the end of Q4 2023. These trials are likely to have results disclosed soon. The four trials in this group include two Phase 3 academic trials with available agents (nortriptyline & escitalopram for depression in PD and buspirone for dyskinesia) and two industry trials:

- A Phase 2 trial with TAK-071 (M1 positive allosteric modulator) from Takeda.
- A Phase 1 trial with MT101-5 (herbal formula said to block aggregated aSN) from Mthera Pharma.

Methodology

- Trial data for Parkinson's disease Phase 1, 2, and 3 trials downloaded from clinicaltrials.gov on first and last days of quarter.
- "Status" parameter compared at beginning and end of quarter to identify trials that: Were registered, started or completed recruitment, or were completed or withdrawn during the quarter. "Primary completion date" parameter compared at beginning and end of quarter to determine trials with a change in expected primary completion date. Trials with "Primary completion date" within 6 months were also identified.
- Dashboards limited to Phase 1 to Phase 3 trials evaluating pharmaceuticals, including biologics, cell and gene therapies. The "Parkinson's Disease Drug Therapies in the Clinical Trial Pipeline" reports for 2020, 2021, 2022 and The Hope List were references in identifying the "agent description" and "company/sponsor" fields.
- Note that not all trials are registered on clinicaltrials.gov. For example, if trials don't have any US sites, sponsors may choose to register them only in similar databases in the regions or countries involved in the trial. Furthermore, the accuracy of the data in clinicaltrials.gov is dependent on sponsors updating trial status and other information in a timely manner. As a result, for about 10% of the trials matching the specifications for this analysis the status is "unknown" or the completion date has passed and yet the status indicates the trial is still underway.
- Dashboards on Trial Results based on alerts from PubMed.gov, review of conference abstract books, daily emails from Parkinson's News Today, the Science of Parkinson's Disease blog, pre-print servers, and the Parkinson's Research Interest Group on Facebook. It is challenging to capture all results disclosures, so if anything is missing, please let us know at PDTrialTracker@outlook.com.

Clinical Trials of Parkinson’s Disease Drug Therapies
Trial Change in Status* Dashboard: Q4 2023
 *Registered, Started or Finished Recruiting, Completed
 posted on ClinicalTrials.gov between October 1, 2023, and December 31, 2023

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Prior Status	New Status
NCT02864004	Apomorphine (pump)	Supernus/ US Worldmeds	Apomorphine infusion	Phase 3	Apomorphine Pump in Early Stage of Parkinson's Disease (EARLY-PUMP)	134	Recruiting	Active, not recruiting
NCT03655236	K0706/SCC - 138	Sun Pharma/ SPARC	Bcr/Abl kinase inhibitor	Phase 2	PROSEK: A Phase 2 Study In Early Parkinson's Disease Patients Evaluating The Safety And Efficacy Of Abl Tyrosine Kinase Inhibition Using K0706	506	Recruiting	Active, not recruiting
NCT04226248	Rivastigmine	Bristol University	Cholinesterase inhibitor	Phase 3	CHIEF PD (CHolinesterase Inhibitor to prEvent Falls in Parkinson's Disease)	600	Recruiting	Active, not recruiting
NCT04976127	Talineuren	Innomedica	GM1 in liposomes	Phase 1	Safety Evaluation of Intravenous Talineuren (TLN) in Parkinson's Disease-affected Patients	22	Recruiting	Active, not recruiting
NCT06141317	Pluripotent Adipose-Derived Stem Cells (PASCs)	ClusterXStem-Costa Rica	Pluripotent Adipose-Derived Stem Cells (PASCs)	Phase 1 Phase 2	Randomized Clinical Trial in Parkinson's Disease Patients Using Pluripotent Adipose Stem Cells (PASCs)	40	Not in CT.GOV	Active, not recruiting
NCT03149809	Solifenacin	Astellas Pharma	Antimuscarinic bladder relaxant	Phase 3	Behavioral or Solifenacin Therapy for Urinary Symptoms in Parkinson Disease	77	Active, not recruiting	Completed
NCT05915247	HER-096	Herantis	Peptidomimetic for cerebral dopamine neurotrophic factor	Phase 1	Single Ascending Doses of HER-096 in Healthy Subjects	60	Recruiting	Completed
NCT06004180	Lu AF28996	Lundbeck	D1/D2 agonist	Phase 1	A Trial Investigating Lu AF28996 in Adult Japanese Participants With Parkinson's Disease (PD)	6	Not yet recruiting	Completed
NCT06037590	Levodopa Cyclops	PureIMS, B.V.	Inhaled levodopa	Phase 1	A Pilot Comparative Bioavailability Study of Levodopa Administered Via Levodopa Cyclops Relative to INBRIJA	26	Active, not recruiting	Completed
NCT06099886	Lithium	Buffalo University	Protein kinase C inhibitor (treatment for bipolar disorder)	Phase 1	Repurposing Lithium for Parkinson's Disease	15	Not in CT.GOV	Enrolling by invitation

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Prior Status	New Status
NCT06167681	NouvNeu001	iRegene Therapeutics Co., Ltd.	Human Dopaminergic Progenitor Cells	Phase 1 Phase 2	The Safety, Tolerability and Efficacy of NouvNeu001 for Parkinson's Disease	40	Not in CT.GOV	Not yet recruiting
NCT06175767	MT101-5	Mthera Pharma	Herbal formula that blocks aggregated aSN neurotoxicity	Phase 2	A Study to Evaluate the Safety, Tolerability and Efficacy of MT101-5 in Subjects With Early Parkinson's Disease	120	Not in CT.GOV	Not yet recruiting
NCT06006247	CVN424	Cerevance	Selective GPR6 Inverse Agonist	Phase 2	Early Parkinson's Disease Monotherapy With CVN424	60	Not yet recruiting	Recruiting
NCT06055985	UCB0599	UCB and Neuropore (NPT 200-11)	Inhibitor of aSN misfolding	Phase 2	A Study to Evaluate the Efficacy, Safety, Tolerability, and Pharmacokinetics of UCB0022 in Study Participants With Advanced Parkinson's Disease	189	Not yet recruiting	Recruiting
NCT06068465	Pimavanserin	Strasbourg University Hospital	Inverse agonist/antagonist of 5HT2a receptors	Phase 3	A Study of the Safety and Efficacy of Pimavanserin in Patients With Parkinson's Disease Psychosis	248	Not in CT.GOV	Recruiting
NCT06088784	ATH-399A (HL192)	HanAll BioPharma Co., Ltd. NurrOn Pharmaceuticals, Inc.	Nurr1 activator	Phase 1	A Study Assessing the Safety of Oral ATH-399A in Healthy Adult Participants	76	Not in CT.GOV	Recruiting
NCT06113640	Montelukast	Generics available	Leukotriene inhibitor	Phase 2 Phase 3	Montelukast in Parkinson Disease	60	Not in CT.GOV	Recruiting
NCT05446168	Tributyryn	University of Michigan	Probiotic Short-chain fatty acid (SCFA) prodrug	Phase 1	Brain Small Chain Fatty Acid Metabolism in Parkinson Disease: Tributyrin Supplementation	18	Recruiting	Terminated
NCT05778695	KetoneAid	University of Michigan	Ketone ester (KE) dietary supplement	Not Applicable	Brain Small Chain Fatty Acid Metabolism in Parkinson Disease: Ketones	16	Recruiting	Terminated
NCT03550183	Mesenchymal stem cells	Jordan University	Mesenchymal stem cells	Phase 1	Umbilical Cord Derived Mesenchymal Stem Cells Therapy in Parkinson's Disease	20	Enrolling by invitation	Unknown status
NCT03639064	CanniMed Oil	CanniMed	Three formulations of Δ-9THC and CBD	Phase 2	Cannabis Oil for Pain in Parkinson's Disease	15	Recruiting	Unknown status

Clinical Trials of Parkinson’s Disease Drug Therapies
Change in Completion Date Dashboard: Q4 2023
 posted on ClinicalTrials.gov between October 1, 2023, and December 31, 2023

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Prior Primary Completion Date	New Primary Completion Date	Change (Days)
NCT03413384	Ceftriaxone	Brainx	Ceftriaxone	Phase 2	To Assess the Efficacy and Safety of Ceftriaxone in Patients With Mild to Moderate Parkinson's Disease Dementia	106	30-Jun-2023	31-Dec-2024	550
NCT03976349	BIIB094	Biogen/Ionis	Antisense oligo to LRRK2	Phase 1	A Study to Evaluate the Safety, Tolerability, and Pharmacokinetics of BIIB094 in Adults With Parkinson's Disease	82	2-Dec-2023	26-Dec-2024	390
NCT03683225	CTC-413	Chase Therapeutics	Extended-release pramipexole	Phase 2	A Study to Evaluate in Patients With Parkinsonian Type Disorders	24	30-Dec-2023	30-Dec-2024	366
NCT03790670	Leukine (sargramostim)	Nebraska University	Recombinant GM-CSF	Phase 1	Biomarker Assessments of Leukine During Treatment of Parkinson's Disease	7	30-Oct-2023	30-Oct-2024	366
NCT03562494	VY-AADC02	Neurocrine Biosciences Voyager Therapeutics	AADC gene therapy	Phase 1	VY-AADC02 for Parkinson's Disease With Motor Fluctuations (RESTORE-1)	14	1-Dec-2023	1-Nov-2024	336
NCT05318937	SAGE-718	Sage Therapeutics	NMDA receptor modulator	Phase 2	A Study to Evaluate the Effects of SAGE-718 in Participants With Parkinson's Disease Cognitive Impairment	76	1-Sep-2023	1-Jun-2024	274
NCT05104463	CST-103 and CST-107	CuraSen Therapeutics	Restores brain homeostasis	Phase 2	A Study of CST-2032 and CST-107 in Subjects With Mild Cognitive Impairment or Mild Dementia Due to Parkinson's or Alzheimer's Disease	60	1-Jun-2023	1-Nov-2023	153
NCT04251585	Nasal insulin	Multiple development programs	Intra-nasal insulin	Phase 2	Intranasal Insulin in Parkinson's Disease	30	1-Oct-2023	1-Mar-2024	152
NCT05766813	ITI-214 (lenrispodun)	Intra-cellular Therapies	PDE-1 inhibitor	Phase 2	Lenrispodun as Adjunctive Therapy in the Treatment of Patients With Motor Fluctuations Due to Parkinson's Disease	132	1-Nov-2024	1-Feb-2025	92
NCT04976127	Talineuren	Innomedica	GM1 in liposomes	Phase 1	Safety Evaluation of Intravenous Talineuren (TLN) in Parkinson's Disease-affected Patients	22	1-Jun-2024	1-Aug-2024	61

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Prior Primary Completion Date	New Primary Completion Date	Change (Days)
NCT06055985	UCB0599	UCB and Neuropore (NPT 200-11)	Inhibitor of aSN misfolding	Phase 2	A Study to Evaluate the Efficacy, Safety, Tolerability, and Pharmacokinetics of UCB0022 in Study Participants With Advanced Parkinson's Disease	189	4-Nov-2024	9-Dec-2024	35
NCT04379050	Foslevodopa/foscarbidopa (ABBV-951)	Abbvie	Sub-cutaneous L-DOPA/Carbidopa prodrug	Phase 3	Extension Study To Evaluate Safety And Tolerability Of 24-Hour Daily Exposure Of Continuous Subcutaneous Infusion of ABBV-951 In Adult Participants With Parkinson's Disease	130	27-Jun-2025	19-Jun-2025	-8
NCT04226248	Rivastigmine	Bristol University	Cholinesterase inhibitor	Phase 3	CHIEF PD (CHolinesterase Inhibitor to prEvent Falls in Parkinson's Disease)	600	30-Aug-2023	26-Apr-2023	-126

**Clinical Trials of Parkinson’s Disease Drug Therapies
with Primary Completion Date within 6 months of 31-December-2023**

trial data: ClinicalTrials.gov

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Primary Completion Date	Completion Date
NCT04167813	Ondansetron	University College London	Treatment for hallucinations	Phase 2	Trial of Ondansetron as a Parkinson's HALLucinations Treatment	306	1-Jan-2024	14-Jan-2025
NCT04978597	Opicapone	Neurocrine	Catechol-O-methyltransferase (COMT) inhibitor	Phase 3	Early ParkinSon with L-DOPA/DDCI and OpicapoNe (EPSILON Study)	410	1-Jan-2024	1-Jan-2024
NCT05887466	A9-DPC	S.Biomedics Co., Ltd. Yonsei University	ESC-derived Dopamine Progenitor Cell Therapy	Phase 1 Phase 2	Study to Evaluate the Safety and Efficacy of ESC-derived Dopamine Progenitor Cell Therapy in PD Patients	12	1-Jan-2024	1-Jan-2026
NCT05603715	Pyridostigmine	University of Vermont	Cholinesterase inhibitor	Phase 2	Pyridostigmine for the Treatment of Constipation in Parkinson Disease	16	1-Feb-2024	1-Dec-2024
NCT05677633	Leukine (sargramostim)	Nebraska University	Recombinant GM-CSF	Phase 1	Biomarker Validation Following Sargramostim Treatment in Parkinson's Disease	11	1-Feb-2024	1-May-2024
NCT05979415	AZ-009 (inhaled apomorphine)	Alexza Pharmaceuticals	Inhaled apomorphine	Phase 2	Study to Evaluate the Efficacy and Safety of Staccato Apomorphine (AZ-009) in Patients With Parkinson's Disease Experiencing OFF Episodes	50	1-Feb-2024	1-Mar-2024
NCT04232969	Exenatide	Florida University	GLP-1 agonist	Phase 3	Exenatide Once Weekly Over 2 Years as a Potential Disease Modifying Treatment for Parkinson's Disease	194	24-Feb-2024	31-Jul-2024
NCT02897063	Droxidopa	Loma Linda University/Lundbeck	L-threo-dihydroxyphenylserine	Phase 1	Effects of Midodrine and Droxidopa on Splanchnic Capacitance in Autonomic Failure	34	1-Mar-2024	1-Aug-2024
NCT03655236	K0706/SCC - 138	Sun Pharma/SPARC	Bcr/Abl kinase inhibitor	Phase 2	PROSEEK: A Phase 2 Study In Early Parkinson's Disease Patients Evaluating The Safety And Efficacy Of Abl Tyrosine Kinase Inhibition Using K0706	506	1-Mar-2024	1-Mar-2024
NCT04251585	Nasal insulin	Multiple development programs	Intra-nasal insulin	Phase 2	Intranasal Insulin in Parkinson's Disease	30	1-Mar-2024	1-May-2024

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Primary Completion Date	Completion Date
NCT04542499	Tavapadon (PF-06649751)	Cerevel	Dopamine D1/5 partial agonist	Phase 3	Flexible-Dose, Adjunctive Therapy Trial in Adults With Parkinson's Disease With Motor Fluctuations	500	1-Mar-2024	1-Apr-2024
NCT05603312	AAV-GAD	MeiraGTx	Gene therapy	Phase 1 Phase 2	A Double-blind Study to Evaluate the Safety of Glutamic Acid Decarboxylase Gene Transfer in Parkinson's Participants	14	1-Mar-2024	1-Mar-2024
NCT05781711	Metformin	Tanta University	Biguanide antidiabetic (increases insulin sensitivity)	Phase 2	Clinical Study to Evaluate the Possible Efficacy of Metformin in Patients With Parkinson's Disease	60	20-Mar-2024	20-Mar-2025
NCT05950906	PDM608	Calibir (Scripps Research)	GM-CSF fusion protein	Phase 1	Study to Assess PDM608 in Healthy Adult Subjects	88	26-Mar-2024	30-Apr-2024
NCT04658186	UCB0599	UCB and Neuropore (NPT 200-11)	Inhibitor of aSN misfolding	Phase 2	A 18-month Study to Evaluate the Efficacy, Safety, Tolerability and Pharmacokinetics of Oral UCB0599 in Study Participants With Early-stage Parkinson's Disease	450	11-Apr-2024	30-Oct-2024
NCT06088784	ATH-399A (HL192)	HanAll BioPharma Co., Ltd. NurrOn Pharmaceuticals, Inc.	Nurr1 activator	Phase 1	A Study Assessing the Safety of Oral ATH-399A in Healthy Adult Participants	76	24-Apr-2024	24-Apr-2024
NCT04459052	N-acetyl cysteine	Thomas Jefferson University	Glutathione precursor	Phase 2	FDOPA PET and Nutritional Support in Parkinson's Disease	50	1-May-2024	1-May-2024
NCT05642442	Suvecaltamide	Jazz Pharmaceuticals	Selective modulator of T-type calcium channels	Phase 2	A Study of Suvecaltamide in Adults With Moderate to Severe Residual Tremor in Parkinson's Disease	160	1-May-2024	1-May-2024
NCT05790382	NM-101	Neuramedy Co. Ltd.	Anti-TLR2 antibody	Phase 1	Single and Multiple Ascending Dose Study to Assess Safety, Tolerability and Pharmacokinetics of NM-101	56	30-May-2024	14-Jun-2024
NCT05318937	SAGE-718	Sage Therapeutics	NMDA receptor modulator	Phase 2	A Study to Evaluate the Effects of SAGE-718 in Participants With Parkinson's Disease Cognitive Impairment	76	1-Jun-2024	1-Jun-2024
NCT05576818	Synbiotic	Tanta University	Lactobacillus acidophilus and prebiotic fibers	Phase 3	Effect of Synbiotic as an Adjuvant Therapy in the Treatment of Parkinson's Disease	66	1-Jun-2024	1-Jun-2025

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Primary Completion Date	Completion Date
NCT04691661	Radotinib	Il Yang	c-Abl kinase inhibitor	Phase 2	Safety, Tolerability, Pharmacokinetics and Efficacy Study of Radotinib in Parkinson's Disease	40	30-Jun-2024	31-May-2025
NCT05424276	Risvodetinib (IKT-148009)	Inhibikase Therapeutics	c-Abl kinase inhibitor	Phase 2	A Randomized, Double-Blind, Placebo-Controlled Trial of IKT-148009 in Untreated Parkinson's Disease	120	30-Jun-2024	1-Jan-2025

Results Dashboard: Q3 2023

Clinical Trials of Parkinson's Disease Drug Therapies with Results Newly Disclosed Between 1-October-2023 and 31-December-2023

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Type of Disclosure	Primary Efficacy Endpoint	Secondary Efficacy Endpoints	Safety	Conclusions	Reference
NCT05424276	Risvodetinib (IKT-148009)	Inhibikase Therapeutics	c-Abl kinase inhibitor	Phase 2	A Randomized, Double-Blind, Placebo-Controlled Trial of IKT-148009 in Untreated Parkinson's Disease	120	Press Release / Corporate Communications	NA	Favorable	Nothing clinically significant	Encouraging results from 11 patients withdrawn from trial following FDA's temporary clinical hold	https://www.globenewswire.com/news-release/2023/10/16/2760510/0/en/Inhibikase-Therapeutics-Highlights-Unblinded-Functional-Analysis-from-the-201-Trial-of-Risvodetinib-in-Untreated-Parkinson-s-Disease-and-Provides-Update-on-Ongoing-Enrollment.html
NCT05344404	Nicotinamide riboside	Haukeland University Hospital	Nicotinamide riboside	Not Applicable	NR-SAFE: Safety of High-dose Nicotinamide Riboside (NR) in Parkinson's Disease	20	Peer-reviewed Manuscript	NA	Favorable	Well tolerated	Results support extending dose range of NR in phase 2 trials to 3000 mg per day	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10684646/
NCT04831281	ATH-1017	Athira Pharma	Enhances Hepatocyte Growth Factor activity	Phase 2	ATH-1017 Treatment in Subjects With Parkinson's Disease Dementia or Dementia With Lewy Bodies (SHAPE Trial)	28	Press Release / Corporate Communications	Negative	Favorable	Injection site reactions	Positive effects in cognitive measures support potential as broadly applicable strategy for treating neurodegenerative diseases	https://investors.athira.com/news-releases/news-release-details/athira-pharma-announces-encouraging-results-shape-phase-2

Note that clinical trial results are often disclosed for the first time via company press releases and/or investor presentations. For public companies this is often driven by requirements for timely disclosure of material events deemed likely to inform investment decisions. These corporate disclosures typically include only the key top-line results. More detailed trial results may be disclosed via posters or presentations at scientific conferences. Eventually comprehensive trial results are generally published in medical journals sometimes as a "pre-print" (that has not yet been reviewed by experts not involved in the trial) and ultimately as a final peer-reviewed manuscript. Trial results can also be posted by sponsors in the ClinicalTrials.gov database.

Clinical Trials of Parkinson's Disease Drug Therapies with Additional Results Disclosed Between 1-October-2023 and 31-December-2023

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Type of Disclosure	Primary Efficacy Endpoint	Secondary Efficacy Endpoints	Safety	Conclusions	Reference
NCT02939391	KW6356	Kyowa Kirin	A2a receptor antagonist	Phase 2	A Study of KW-6356 in Subjects With Early Parkinson's Disease	175	Peer-reviewed Manuscript	Positive trend	Favorable	Constipation & naso-pharyngitis	Well tolerated & more effective than placebo in patients with early, untreated PD	https://www.prd-journal.com/article/S1353-8020(23)00986-0/fulltext
NCT04524351	Butanetap (ANVS-401, posiphen)	Annovis (was QR Pharma)	aSN (+tau +APP) aggregation inhibitor	Phase 1 Phase 2	Posiphen Dose-Finding, Biomarker Study in Early Alzheimer's and Parkinson's Patients	75	Press Release / Corporate Communications	NA	Not reported	Not reported	Support unique MOA of reducing over-expression of multiple neurotoxic proteins, therefore, reducing inflammation & neuronal damage & preserving neuronal function	https://www.businesswire.com/news/home/20231102728977/en/Annovis-Bio-Measures-Novel-Biomarkers-in-Plasma-of-Parkinson's-Patients
NCT03815916	CNM-Au8 (Gold Nanocrystals)	Clene Nanoscience	Gold nano-particles	Phase 2	31P-MRS Imaging to Assess the Effects of CNM-Au8 on Impaired Neuronal Redox State in Parkinson's Disease	13	Peer-reviewed Manuscript	NA	Mix of neutral & favorable	Sinusitis, naso-pharyngitis & paresthesia	Demonstrate brain target engagement as direct modulator of brain energy metabolism & support further investigation	https://jnanobiotechnology.biomedcentral.com/articles/10.1186/s12951-023-02236-z
NCT04154072	NLY-01 (pegylated exenatide)	Neuraly/ Johns Hopkins	GLP-1 agonist	Phase 2	A Clinical Study of NLY01 in Patient's With Early Parkinson's Disease	255	Conference Abstract or Presentation	Negative	Not reported	Safe and well tolerated	Efficacy endpoints not met, but subgroup analysis raised possibility of motor benefit in younger participants. Further study needed	https://parkinson-study-group.org/future-of-parkinsons-disease-conference/poster-abstracts/entry/7368/?gvid=26954
NCT03582137	Cannabidiol (CBD)	Colorado University, Denver	Cannabidiol	Phase 2	A Study of Tolerability and Efficacy of Cannabidiol on Motor Symptoms in Parkinson's Disease	74	Conference Abstract or Presentation	Negative	Negative	Dizziness, relaxation, fatigue, etc.	Short-term use tolerated but not beneficial & may have worsened cognition & sleep	https://parkinson-study-group.org/future-of-parkinsons-disease-conference/poster-abstracts/entry/7727/?gvid=26954
NCT02726386	ND0612	Mitsubishi Tanabe/ Neuroderm	Sub-cutaneous L-DOPA	Phase 2	A Long Term Safety Study of ND0612 Administered as a Continuous SC Infusion in Advanced Parkinson's Disease	214	Conference Abstract or Presentation	NA	Favorable	Not reported	Provides preliminary support for 12-month efficacy in improving quality of life and global clinical status	https://parkinson-study-group.org/future-of-parkinsons-disease-conference/poster-abstracts/entry/8068/?gvid=26954&pagenum=2

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Type of Disclosure	Primary Efficacy Endpoint	Secondary Efficacy Endpoints	Safety	Conclusions	Reference
NCT04154072	NLY-01 (pegylated exenatide)	Neuraly/ Johns Hopkins	GLP-1 agonist	Phase 2	A Clinical Study of NLY01 in Patient's With Early Parkinson's Disease	255	Peer-reviewed Manuscript	Negative	Not reported	Nausea	Efficacy endpoints not met, but subgroup analysis raised possibility of motor benefit in younger participants. Further study needed	https://pubmed.ncbi.nlm.nih.gov/38101901/
NCT03781167	Foslevodopa/ foscarbidopa (ABBV-951)	Abbvie	Sub-cutaneous L-DOPA/ Carbidopa prodrug	Phase 3	A Study to Evaluate the Safety and Tolerability of ABBV-951 in Subjects With PD	244	CT.GOV	NA	Favorable	Infusion site reactions	Forty percent discontinued over 1 year (20% due to AEs). Improved on time (3.5 hrs per day) & multiple symptom domains (e.g., sleep & QoL) vs. baseline	https://classic.clinicaltrials.gov/ct2/show/results/NCT03781167?term=NCT03781167&draw=2&rank=1
NCT02542696	APL-130277 (Kynmobi)	Sunovion (part of Sumitomo Dainippon)	Sublingual apomorphine	Phase 3	Open-Label Phase 3 Study to Examine the Long-Term Safety, Tolerability and Efficacy of APL-130277 for the Acute Treatment of "OFF" Episodes in Patients With Parkinson's Disease	496	CT.GOV	NA	Favorable	Nausea, dizziness, somnolence & yawning	Fifty-five percent either discontinued due to AE (20%) or chose to withdraw (35%); 80-90% full ON response within 30 minutes	https://classic.clinicaltrials.gov/ct2/show/results/NCT02542696?term=NCT02542696&draw=2&rank=1
NCT03047629	ENT-01 (Kenterin)	Enterin	Displaces aSN aggregates	Phase 1 Phase 2	Evaluation of Safety and Tolerability of ENT-01 for the Treatment of Parkinson's Disease Related Constipation	50	CT.GOV	NA	Not reported	Nausea & diarrhea	Eighty percent completed study despite frequent non-serious GI adverse events	https://classic.clinicaltrials.gov/ct2/show/results/NCT03047629?term=NCT03047629&draw=2&rank=1
NCT03781791	ENT-01 (Kenterin)	Enterin	Displaces aSN aggregates	Phase 2	Orally Administered ENT-01 for Parkinson's Disease-Related Constipation (KARMET)	151	CT.GOV	Positive	Favorable	Nausea & diarrhea	Increased BM frequency vs. placebo (2.8 vs 1.3 weekly increase); 40% had dose-limiting (but non serious) GI AEs	https://classic.clinicaltrials.gov/ct2/show/results/NCT03781791?term=NCT03781791&draw=2&rank=1
NCT03877510	IPX203	Amneal (was Impax Pharma)	L-DOPA/ carbidopa extended release	Phase 3	Open Label Extension (OLE) Study of the Safety and Clinical Utility of IPX203 in Parkinson's Disease (PD) Participants With Motor Fluctuations	419	Peer-reviewed Manuscript	NA	Favorable	Dyskinesia, nausea	Favorable safety & tolerability profile; Sustained efficacy of comparable magnitude to end of double-blind study	https://movementdisorders.onlinelibrary.wiley.com/doi/10.1002/mds.29685

Clinical Trials of Parkinson's Disease Drug Therapies Completed Before 1-July-2023 But Without Results Disclosed by 31-December-2023

ClinicalTrials.gov identifier (NCT)	Agent	Company / Sponsor	Agent Description	Phase	Trial Title	Enrollment	Primary Completion Date	Completion Date
NCT03652870	Nortriptyline/Escitalopram	University College London	Antidepressants	Phase 3	Antidepressants Trial in Parkinson's Disease	52	23-Jan-2023	30-Apr-2023
NCT05844787	MT101-5	Mthera Pharma	Herbal formula that blocks aggregated aSN neurotoxicity	Phase 1	A Study to Evaluate the Safety, Tolerability and Pharmacokinetics Profile of MT101-5 in Healthy Volunteers	48	23-Feb-2023	23-Feb-2023
NCT04334317	TAK-071	Takeda	M1 positive allosteric modulator	Phase 2	A Study of TAK-071 in People With Parkinson Disease	64	27-Feb-2023	27-Feb-2023
NCT02617017	Buspirone	Oregon Health & Science University	Serotonin 1A agonist + amantidine	Phase 3	Buspirone Treatment of Iatrogenic Dyskinesias in Advanced Parkinson' Disease	99	23-Mar-2023	23-Mar-2023

Note that this analysis includes only trials with primary completion after 1-January-2023 as this analyst did not systematically track trial result disclosures until Q4 2022. It is challenging to capture all results disclosures, so if results from any of these trials have actually been disclosed, please let us know at PDTrialTracker@outlook.com.