Researchers evaluate a pipeline of clinical trials targeting Parkinson's disease

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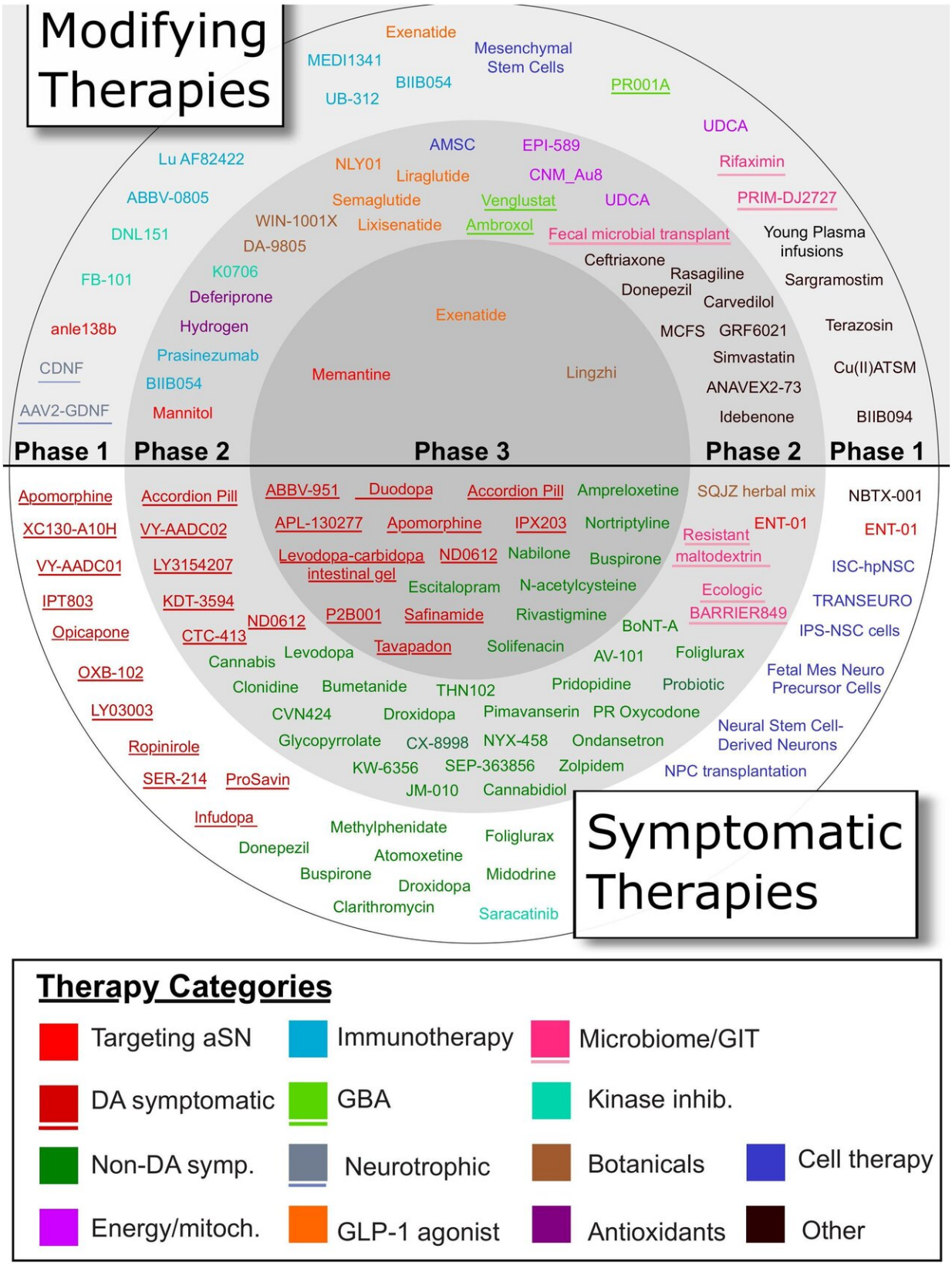
Modifying Therapies
Exenatide
MEDI1341
Mesenchymal Stem Cells
BIIB054
PR001A
UB-312
UDCA
AMSC
EPI-589
Lu AF82422
NLY01
Rifaximin
Liraglutide
CNM_Au8
ABBV-0805
Semaglutide
Venglustat
UDCA
PRIM-DJ2727
WIN-1001X
Lixisenatide
Ambroxol
DNL151
Fecal microbial transplant
Young Plasma infusions
DA-9805
Ceftriaxone
K0706
Rasagiline
Sargramostim
FB-101
Donepezil
Deferiprone
Carvedilol
Exenatide
anle138b
Hydrogen
MCFS
GRF6021
Terazosin
Prasinezumab
Simvastatin
CDNF
Memantine
Lingzhi
Cu(II)ATSM
BIIB054
ANAVEX2-73
AAV2-GDNF
Mannitol
Idebenone
BIIB094
Phase 1
Phase 2
Phase 3
Phase 2
Phase 1
Apomorphine
Accordion Pill
ABBV-951
Duodopa
Accordion Pill
Ampreloxetine
SQJZ herbal mix
NBTX-001
XC130-A10H
VY-AADC02
APL-130277
Apomorphine
IPX203
Nortriptyline
ENT-01
ENT-01
Resistant maltodextrin
VY-AADC01
LY3154207
Levodopa-carbidopa intestinal gel
ND0612
Nabilone
Buspirone
ISC-hpNSC
Escitalopram
N-acetylcysteine
Ecologic
IPT803
KDT-3594
TRANSEURO
ND0612
P2B001
Safinamide
Rivastigmine
BARRIER849
Opicapone
CTC-413
BoNT-A
IPS-NSC cells
Tavapadon
Solifenacin
Cannabis
Levodopa
AV-101
Foliglurax
OXB-102
Fetal Mes Neuro Precursor Cells
Clonidine
Bumetanide
THN102
Pridopidine
Probiotic
LY03003
CVN424
Droxidopa
Pimavanserin
PR Oxycodone
Neural Stem Cell-Derived Neurons
Glycopyrrolate
CX-8998
NYX-458
Ondansetron
Ropinirole
KW-6356
SEP-363856
Zolpidem
NPC transplantation
SER-214
ProSavin
JM-010
Cannabidiol
Infudopa
Methylphenidate
Foliglurax
Donepezil
Atomoxetine
Buspirone
Droxidopa
Midodrine
Clarithromycin
Saracatinib
Symptomatic Therapies
Therapy Categories
Targeting aSN
Immunotherapy
Microbiome/GIT
DA symptomatic
GBA
Kinase inhib.
Non-DA symp.
Neurotrophic
Botanicals
Cell therapy
Energy/mitoch.
GLP-1 agonist
Antioxidants
Other

Agents in active PD drug trials, as of January 21, 2020 on ClinicalTrials.gov (by phase, DMT/ST and therapy category). Credit: IOS Press

A review of currently registered clinical trials of agents targeting Parkinson's disease (PD) reveals that there is a broad pipeline of both symptomatic and potentially disease-modifying therapies currently being evaluated. Investigators report that the outlook for patients is encouraging, given the wide range of therapeutics being clinically tested. They emphasize the importance of engaging the Parkinson's community in the research. Their analysis and results are published in the *Journal of Parkinson's Disease*.

PD is a neurodegenerative condition for which there is currently no cure. The incidence of PD is increasing, with the number of cases expected to double worldwide by 2040. The majority of current pharmacological treatments for PD were approved for clinical use in the second half of the last century, and they only provide symptomatic relief. Derivatives of these therapies continue to be explored in clinical trials, together with potentially disease-modifying therapies that may slow, stop, or reverse the condition.

"With the discovery of the first genetic risk factors for PD at the turn of this century, researchers have begun to develop a better understanding of the possible biological pathways that may be governing/influencing the progressive neurodegeneration associated with PD," explained senior author Simon Stott, Ph.D., Deputy Director of Research, The Cure Parkinson's Trust, London, UK. "These discoveries have led to a growing number of clinical trials targeting an increasing number of potentially disease-relevant mechanisms of action. It is important for the

research and Parkinson's communities to stay abreast of the extensive, ever-changing landscape in order to highlight trends and better manage expectations."

This analysis provides the first broad overview of currently registered clinical trials of agents targeting PD. It demonstrates that there is currently a tremendous amount of clinical research being conducted on therapeutic agents for PD that is exploring a wide range of agents that have different mechanisms of action and therapeutic targets.

"The outlook is encouraging for the clinical trial field, given the broad range of therapeutics being clinically evaluated," commented Richard Wyse, MD, Director of Research and Development, The Cure Parkinson's Trust, London, UK. "Development of Parkinson's biomarkers and new approaches to trial design, along with increasing levels of open data/open science and publishing of results for all trials will help hasten progress in bringing new Parkinson's treatments forward."

The investigators conducted a review of clinical trials of drug therapies for PD using trial data obtained from the ClinicalTrials.gov international database and performed a breakdown analysis of studies that were active as of January 21, 2020. They identified 145 registered and ongoing clinical trials for therapeutics targeting PD, of which 51 (35%) are Phase 1, 66 (46%) are Phase 2, and 28 (19%) are Phase 3. There are 57 trials (39%) focusing on long-term disease modifying therapies, with the remaining 88 trials (61%) investigating therapies for short-term, daily symptomatic relief. A total of 50 (34%) trials are testing repurposed therapies.

Parkinson's research advocates were the driving force behind this study.

As co-author Susan Buff, a Parkinson's care partner, research advocate,

and publisher of www.PDTrialTracker.info, noted, "The patient community brings a combination of the lived experience of the disease, a sense of urgency, and an array of career backgrounds and skill sets that can all contribute immensely to the research process. Hopefully, having a clearer view of the trial pipeline will enable greater awareness around opportunities for researcher/patient collaboration."

Co-author Kevin McFarthing, Ph.D., a patient advocate and expert in innovation management who maintains The Hope List (bit.ly/ParkinsonsHopeList) and contributes to the *Journal of Parkinson's Disease* Clinical Trials Highlights section, added, "As patients and carers, we have a vested interest in the success of clinical trials, and we hope that a greater awareness of the pipeline will increase the chances of more therapies reaching patients in the near future. The number of clinical trials under way is encouraging for the Parkinson's community, especially the high proportion of repurposed initiatives that increase the chances of a new therapy becoming available more quickly. The breadth of targets for both symptomatic and disease-modifying therapies shows the value of primary research over many years.

Gary Rafaloff, Ph.D., a patient advocate and co-author of this study, has been involved in Parkinson's research since his diagnosis eight years ago, initially as a trial volunteer and more recently as a member of a research study team. "My hope is that this research review will make it easier for those who conduct research, those who fund research, and most importantly, those who volunteer to participate in research, to collaborate more efficiently with the ultimate goal of discovering more effective therapies, and possibly a cure, for the disease," he said.

"It is important not only for the research community to be aware of this clinical trial landscape, but also for the Parkinson's patient community from whom the pool of brave volunteers to participate in the trials is gathered. It is extremely important for the patient and carer community

to become more engaged with the research, providing valuable insights into how different aspects of the clinical trial process could potentially be improved," concluded Dr. Stott.

More information: Kevin McFarthing et al. Parkinson's Disease Drug Therapies in the Clinical Trial Pipeline: 2020, *Journal of Parkinson's Disease* (2020). DOI: 10.3233/JPD-202128

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