Parkinsonin taudin uusien hoitojen kehityksen nykytilanne

Filip Scheperjans, neurologian erikoislääkäri, dosentti

Aava
HYKS Neurokeskus
Helsingin yliopisto
NeuroInnovation Oy

HUS

Aava

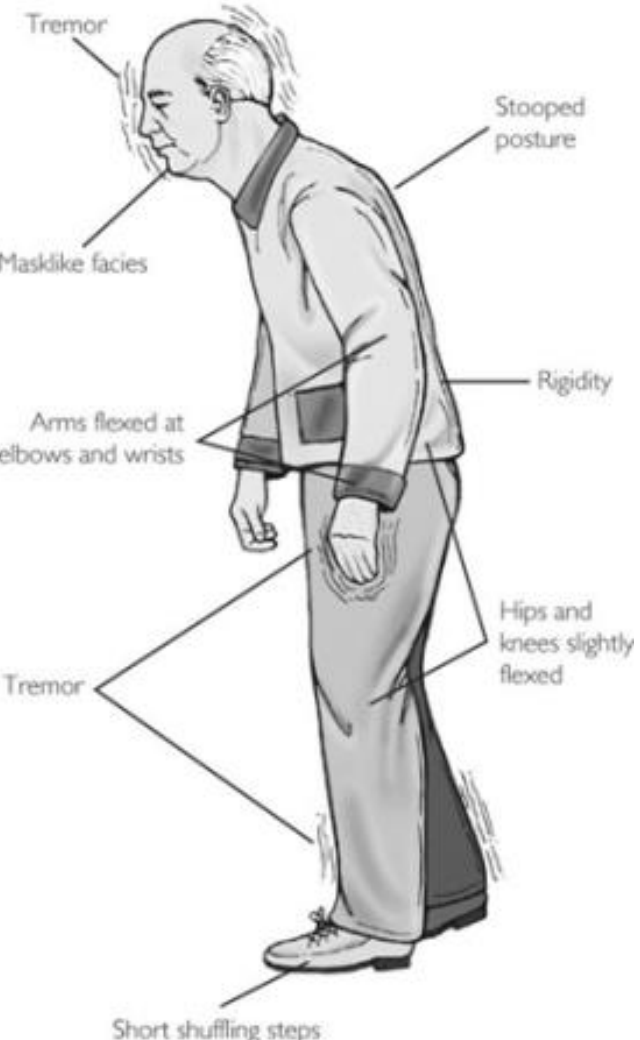
Parkinsonranneke
MITATTUA TIETOA PARKINSONIN HOIDON TUEKSI

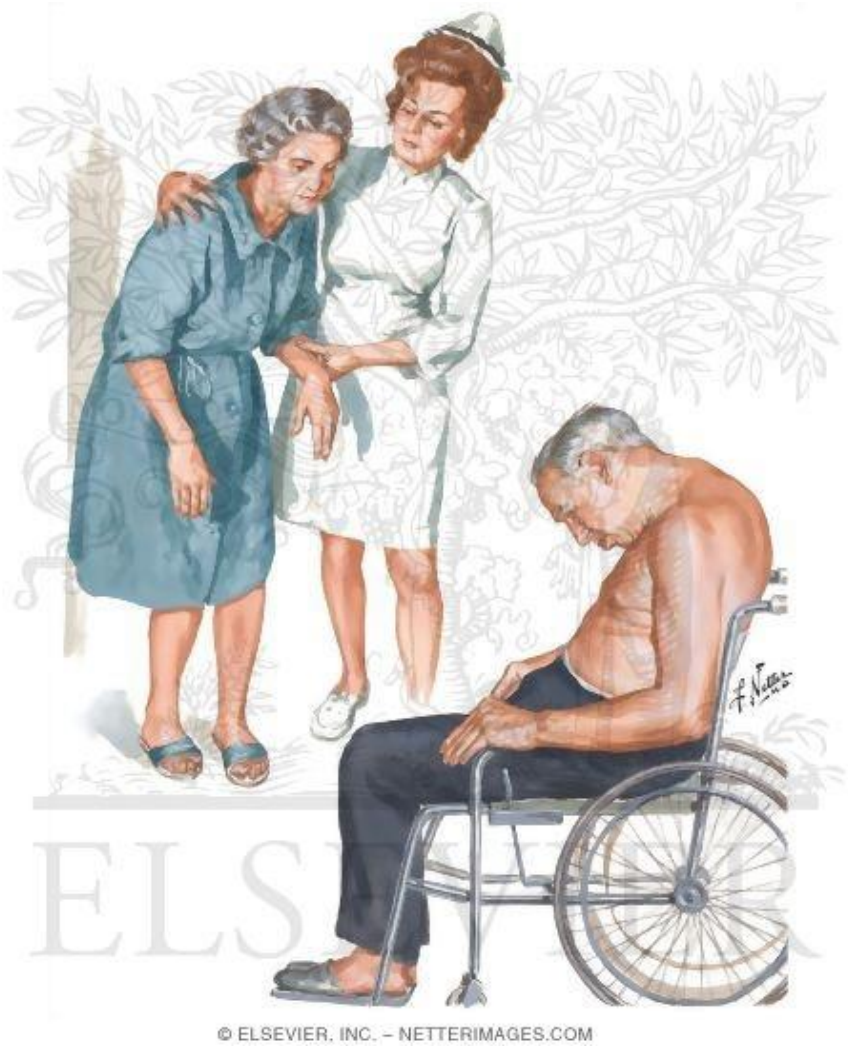
Sidonnaisuudet

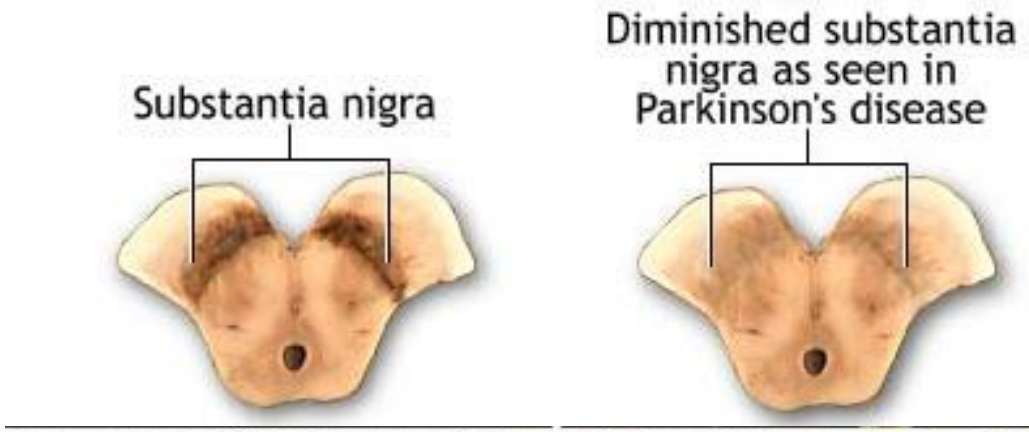
Travel Support	AbbVie, Herantis, Global Kinetics, UCB, NordicInfu Care, Medtronic, Zambon
Grants	Academy of Finland, The Michael J. Fox Foundation for Parkinson's Research, The Finnish Medical Foundation, The Finnish Parkinson Foundation Renishaw, Olvi Foundation, Stockmann Foundation, Aaltonen Foundation
Honoraria	AbbVie, Herantis, UCB, Zambon, LivaNova, Orion, GE Healthcare, Merck, Teva, Biogen, Bristol Myers Squibb, Sanofi
Other	Founder and CEO of NeuroInnovation Oy and Neurobiome Ltd., patents WO2015181449A1, US15314240, EP20150798909, FI20145492A Scientific advisory board of Axial Biotherapeutics & Abbvie.

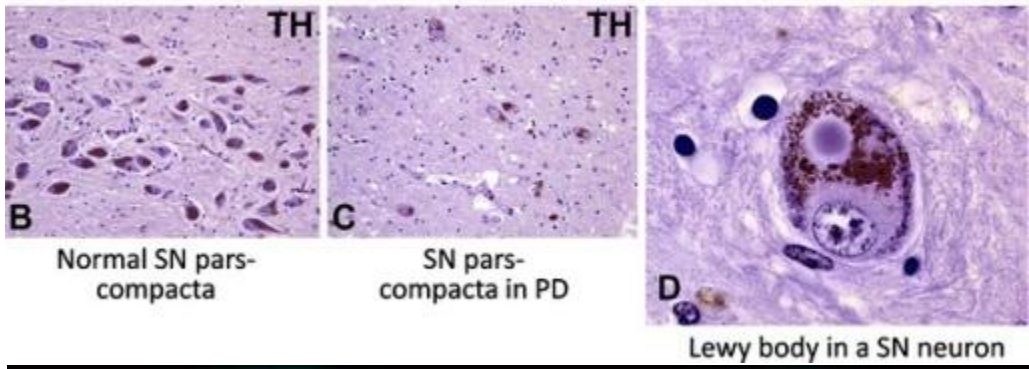
Aava

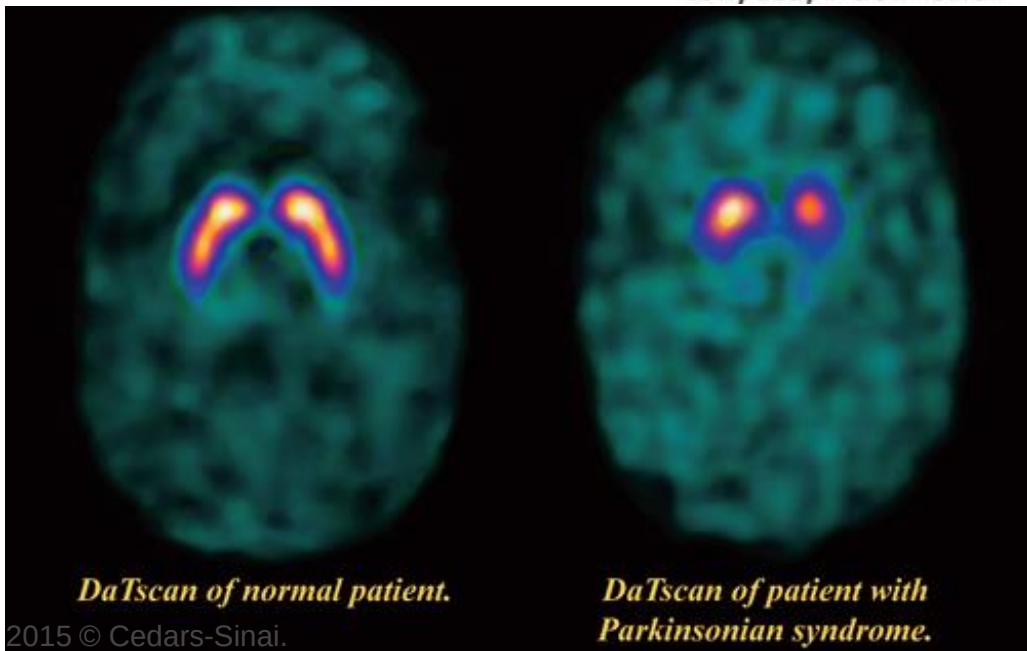
Parkinsonin tauti



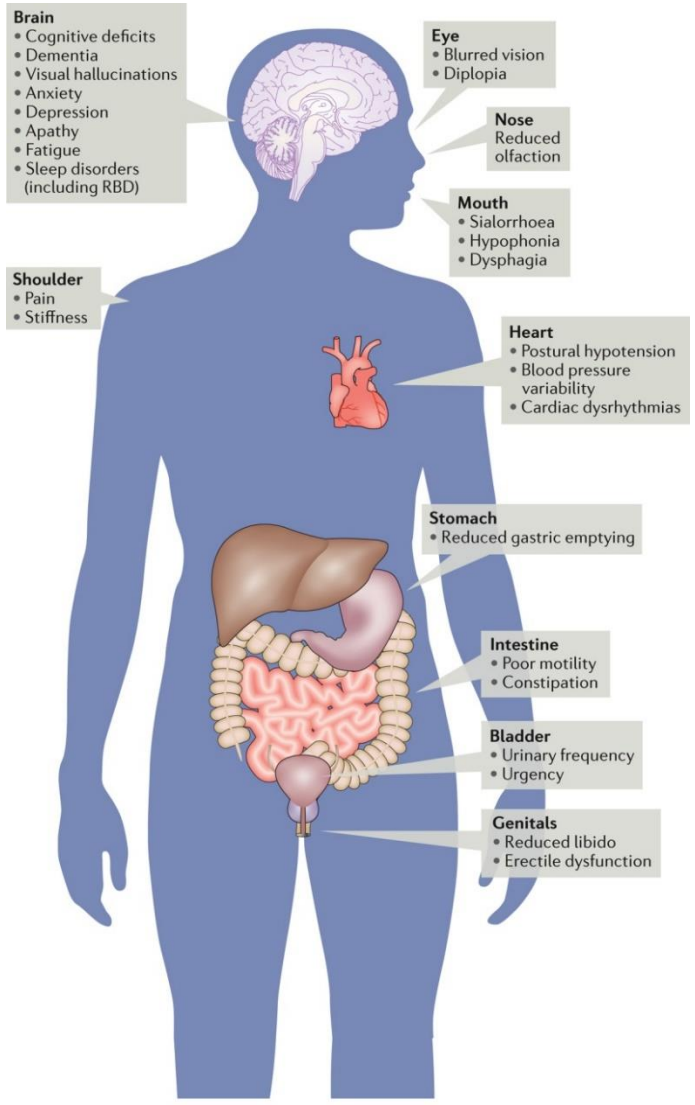








Potilaan kokonaisvaltainen arviointi



Parkinson-hyvinvointikartta
(Parkinson's Well-Being Map™)

Täydentääksesi Parkinson-hyvinvointikartan, etene edellisten sivujen kohtien 1-5 mukaisesti.

Päivämäärä (pvm./kk/vuosi)

Unihäiriöt
- ☐ Ei oireita
- ☐ Nukun levottomasti
- ☐ Minulla on nukahtamisvaikeuksia iltaisin
- ☐ Heräilen öisin
- ☐ Minun on vaikea nukahtaa uudelleen, jos herään
- ☐ Minulla on aamuväsymystä
- ☐ Minulla on päiväaikaista uupumusta
- ☐ Nukahtelen toistuvasti epäsopivissa tilanteissa
- ☐ Muuta:.....

Mieliala
- ☐ Ei oireita
- ☐ Olen menettänyt mielenkiinnon asioihin
- ☐ En nauti asioista, joista nautin ennen
- ☐ Tunnen olevani onneton
- ☐ Olen ahdistunut, pelokas tai hätääntynyt
- ☐ Olen masentunut
- ☐ Muuta:.....

Muut ei-motoriset oireet
- ☐ Ei oireita
- ☐ Tunnen pyörryttävää / huimaavaa oloa, kun nousen pystyasentoon
- ☐ Kaadun, koska minua huimaa/pyörryttää
- ☐ Olen havainnut muutoksia haju- ja makuaistissani
- ☐ Painoni on muuttunut (ei liity ruokavalion muutoksiin)
- ☐ Hikoilen runsaasti
- ☐ Näen tai kuulen asioita, jotka eivät ole todellisia
- ☐ Muuta:.....

Tarkkaavaisuus/muisti
- ☐ Ei oireita
- ☐ Kadotan ajatukseni johtolangan keskustelun aikana
- ☐ En pysty keskittymään toimintoihin
- ☐ Joudun etsimään sanoja
- ☐ Olen hajamielinen
- ☐ Minulla on vaikeuksia muistaa nimiä, numeroita, tapahtumia
- ☐ Muuta:.....

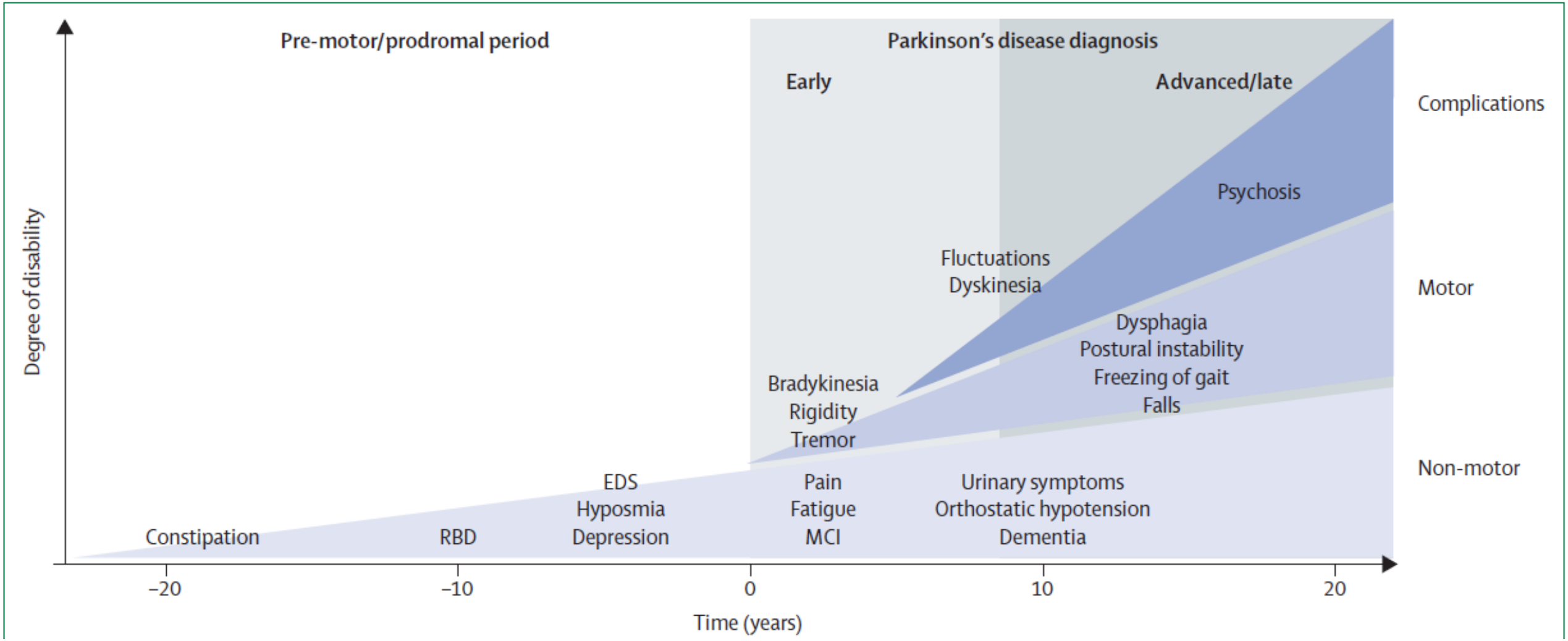
Virtsaaminen ja seksuaalisuus
- ☐ Ei oireita
- ☐ Tunnen pakottavaa virtsaustarvetta
- ☐ Joudun nousemaan öisin virtsaamaan
- ☐ Kiinnostukseni seksiä kohtaan on muuttunut
- ☐ Minulla on seksiin liittyviä vaikeuksia
- ☐ Muuta:.....

Suolen toiminta
- ☐ Ei oireita
- ☐ Minulla on nielemisvaikeuksia
- ☐ Minulla on syljen valumista (kuolaan)
- ☐ Minulla on pahoinvointi- tai oksennuskohtauksia
- ☐ Minulla on ummetusta
- ☐ Minulla on ripulia
- ☐ Minulla on vatsavaivoja
- ☐ Muuta:.....

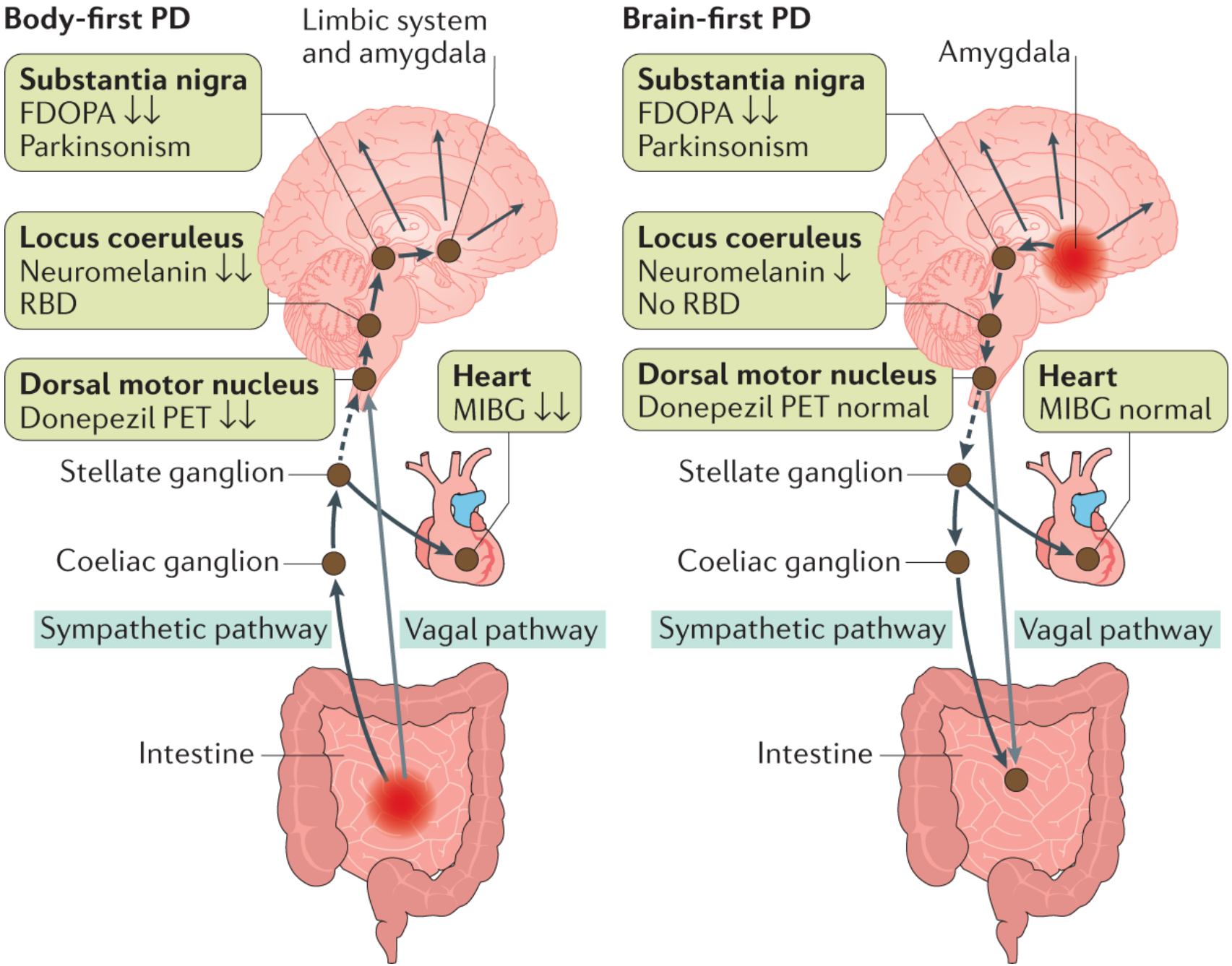
Liikkuminen
- ☐ Ei oireita
- ☐ Tuntuu kuin jalkani juuttuisivat lattiaan / minulla on vaikeuksia lähteä liikkeelle
- ☐ Liikkeeni tuntuvat jäykiltä (rigideiltä) etenkin aikaisin aamulla heräämisen jälkeen
- ☐ Minulla on jäykkyyttä (rigiditeetti) koko päivän
- ☐ Minulla on vapinaa (tremor)
- ☐ Minulla on liikkeiden hitautta (bradykinesia)
- ☐ Liikkumiskykyni päivän aikana on toisinaan alentunut
- ☐ Minulla on tahattomia liikkeitä (dyskinesia)
- ☐ Minulla on tasapainoni kanssa hankaluuksia
- ☐ Kaatuilen
- ☐ Asentoni kallistuu eteenpäin tai sivulle
- ☐ Minulla on puhevaikeuksia
- ☐ Käsialani on pienentynyt (mikrografia)
- ☐ Muuta:.....

Kipu
- ☐ Ei oireita
- ☐ Minulla on aikaisen aamun kivuliaita lihaskouristuksia (dystonia)
- ☐ Raajani ovat päivällä kipeät ja jäykät
- ☐ Raajani ovat yöllä kipeät ja jäykät
- ☐ Minulla on sähköiskun kaltaista vihlovaa kipua raajojeni tyviosissa
- ☐ Minulla on kivuliaita tahattomia liikkeitä (dyskinesia)
- ☐ Minulla on ankaraa päänsärkyä
- ☐ Muuta:.....

Schapira et al. Nat Rev Neurosci. 2017 Aug;18(8):509.



Kalia and Lang, Lancet. 2015 Aug 29;386(9996):896-912.



Berg et al. Nat Rev Neurol. 2021;doi: 10.1038/s41582-021-00486-9

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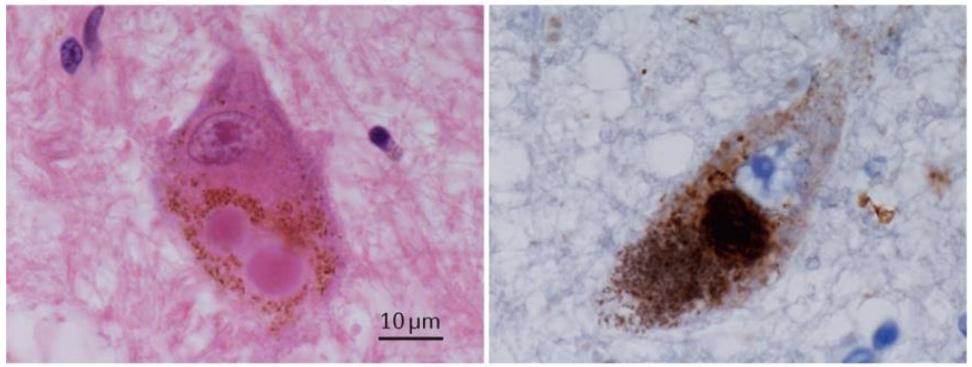

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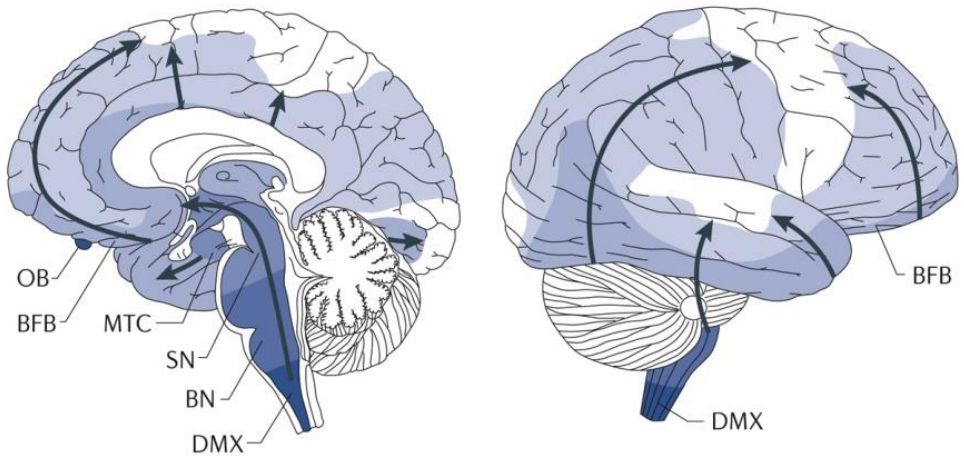


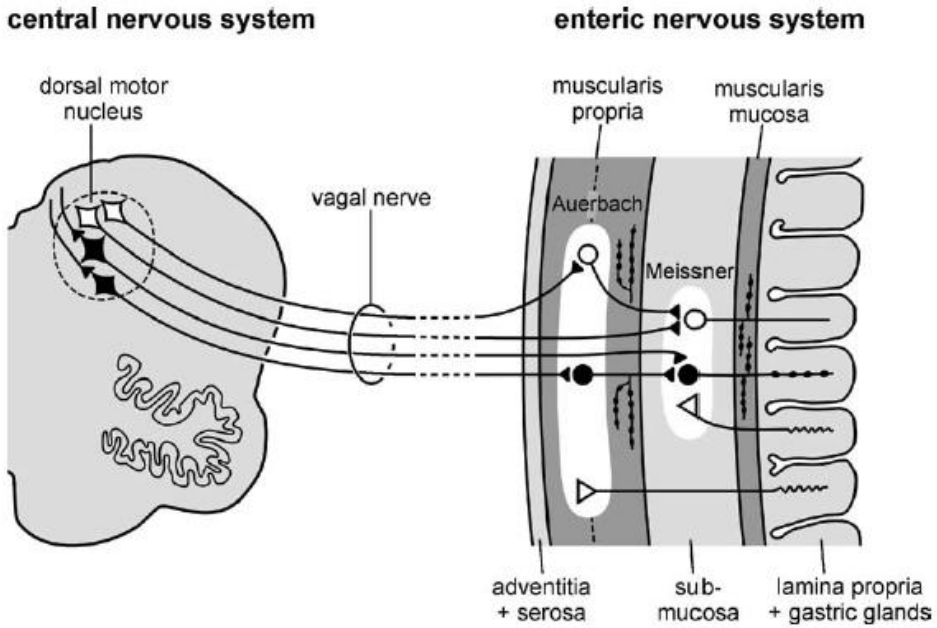
Nature Reviews | Neuroscience

Gastric α-synuclein immunoreactive inclusions in Meissner's and Auerbach's plexuses in cases staged for Parkinson's disease-related brain pathology

Heiko Braak [a,*], Rob A.I. de Vos [b], Jürgen Bohl [c], Kelly Del Tredici [a]

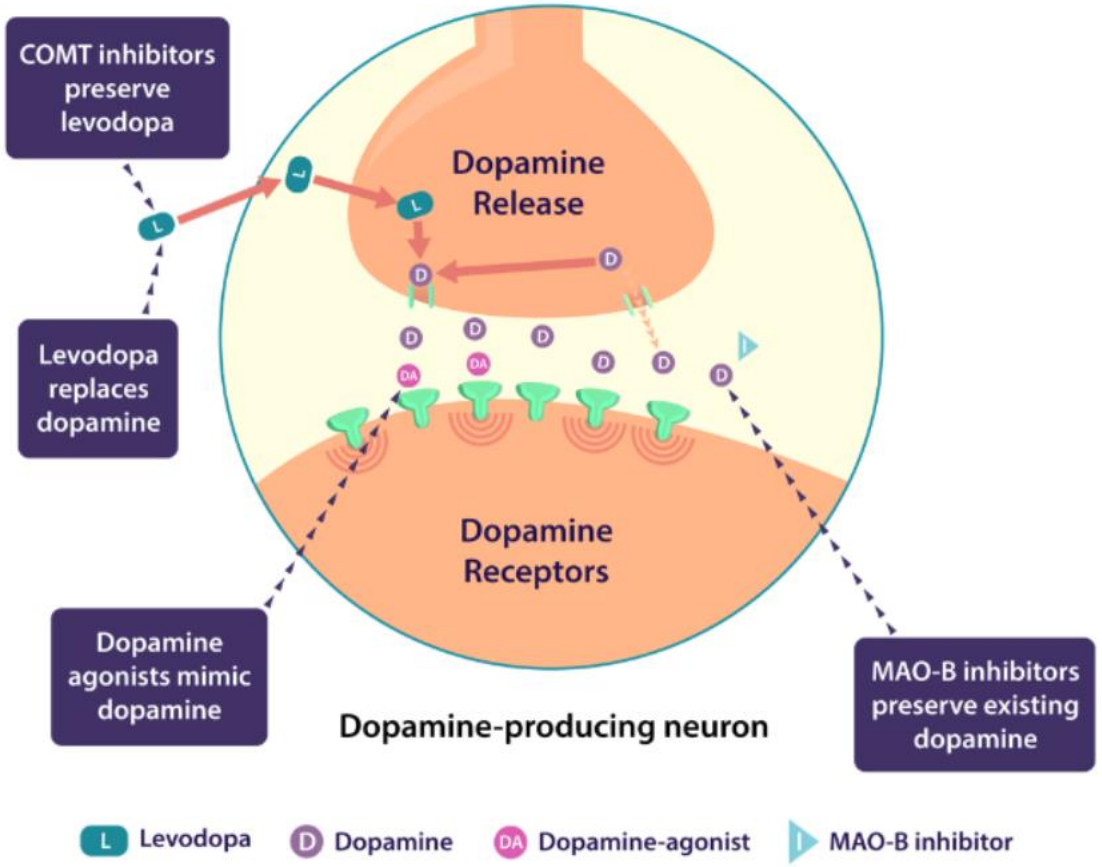
[a] *Institute for Clinical Neuroanatomy, J.W. Goethe University Clinic, Theodor Stern Kai 7, 60590 Frankfurt/Main, Germany*
[b] *Laboratorium Pathologie Oost Nederland, Burg Edo Bergmalaan 1, AD 7512 Enschede, The Netherlands*
[c] *Department of Neuropathology, Johannes Gutenberg University, Langenbeckstrasse 1, Mainz, Germany*

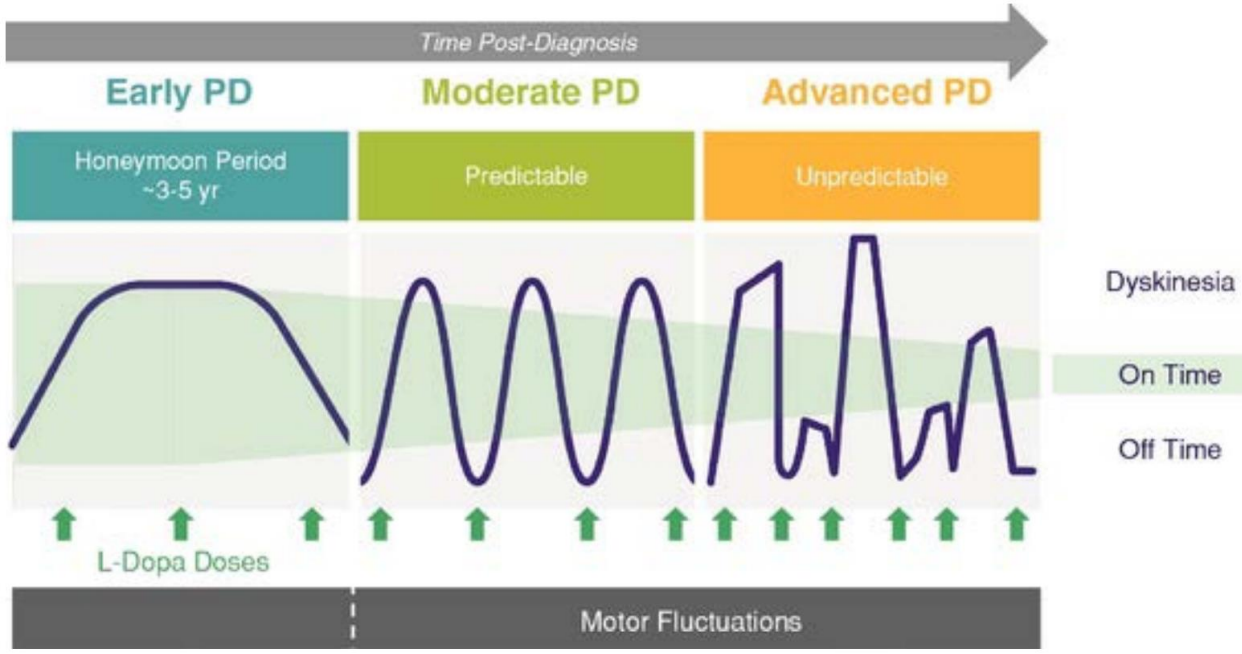
Received 25 August 2005; received in revised form 23 October 2005; accepted 4 November 2005



Schapira, A., Chaudhuri, K. & Jenner, P. Non-motor features of Parkinson disease. Nat Rev Neurosci 18, 435–450 (2017).

THE CURRENT CONCEPT AND TREATMENT OF PD

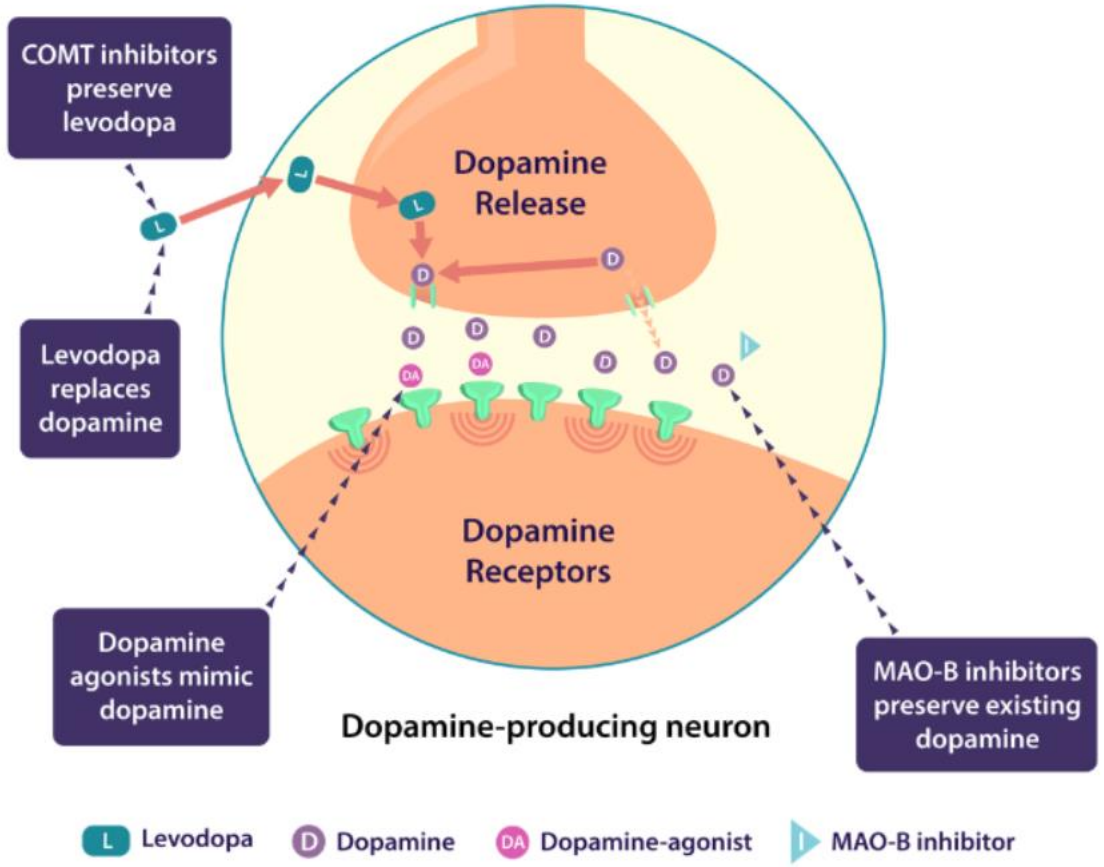


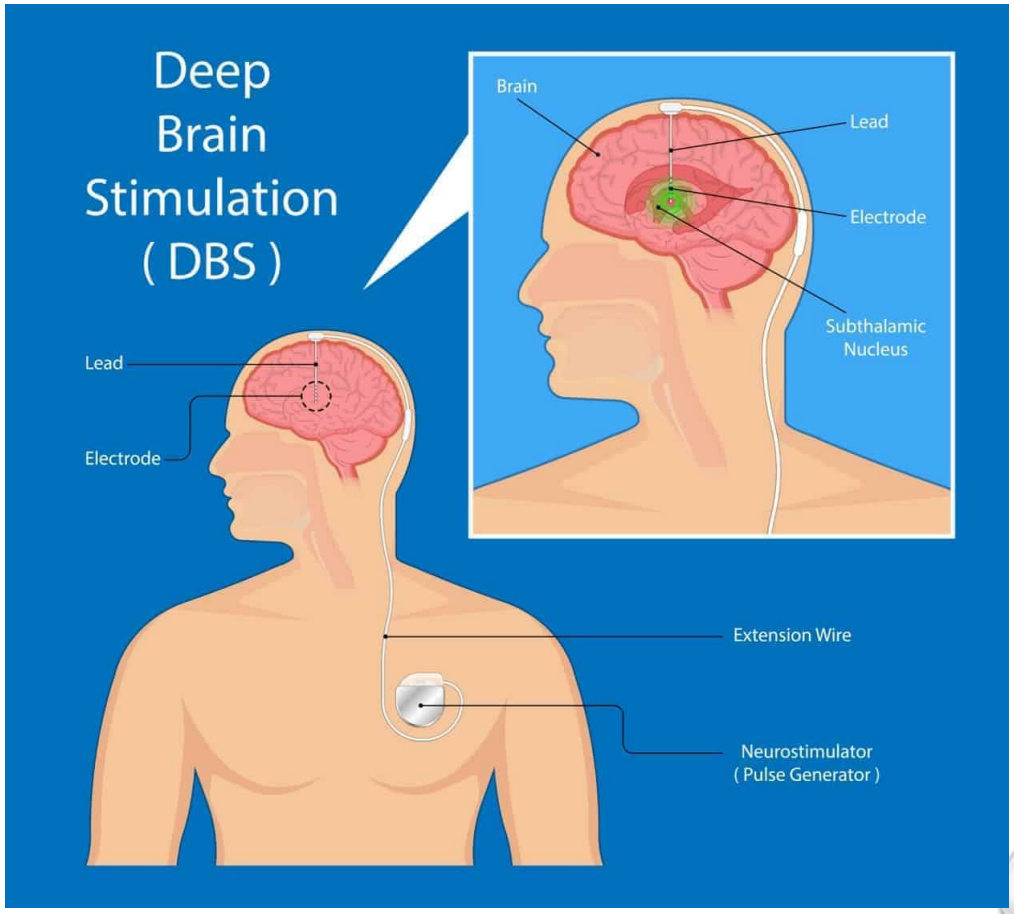


https://parkinsonsdisease.net/medications

medscape

THE CURRENT CONCEPT AND TREATMENT OF PD





https://parkinsonsdisease.net/medications

https://www.clancymedicalgroup.com/parkinsons-dis

Table 1. Treatment of non-motor symptoms of Parkinson's disease.

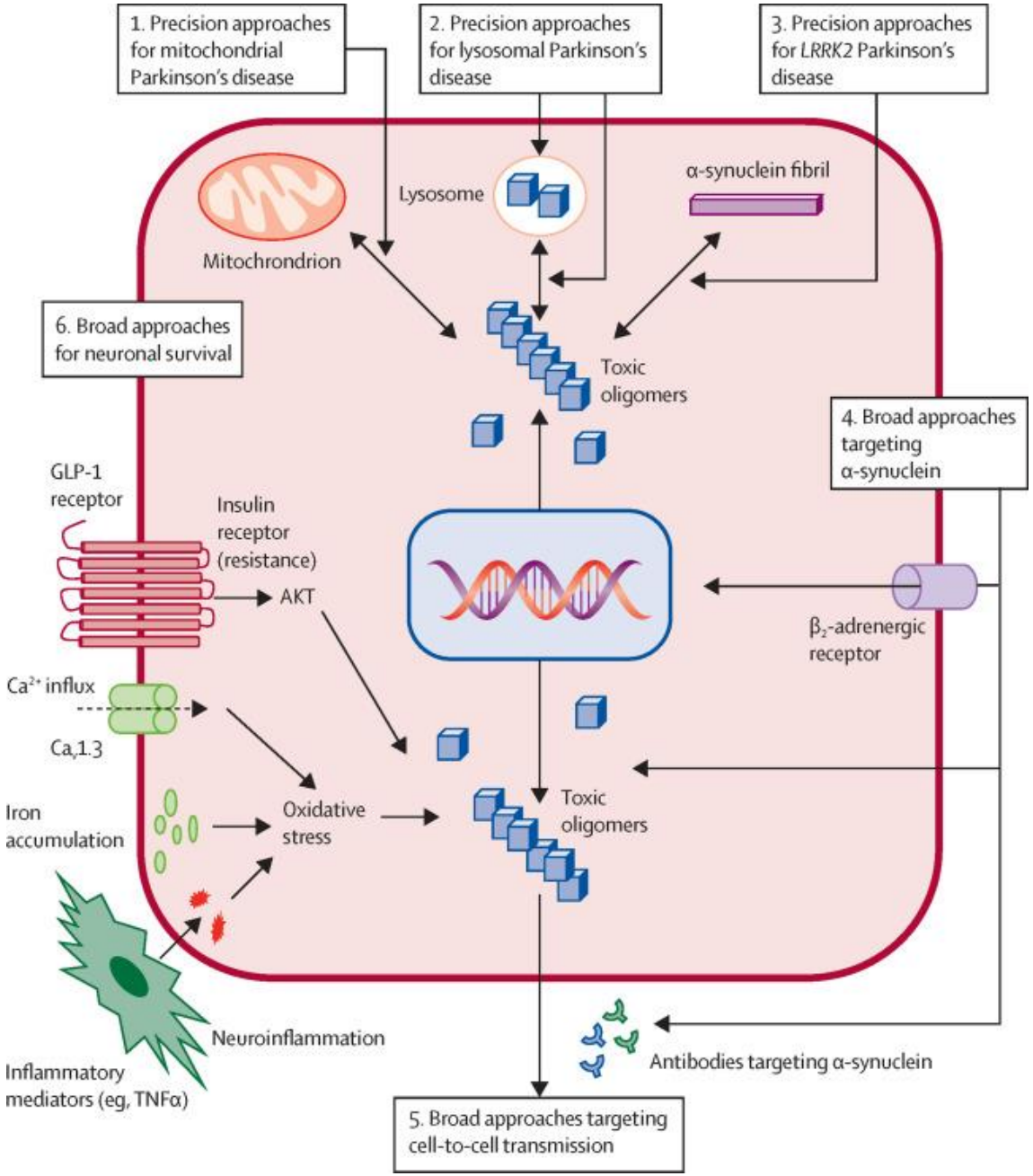
Symptoms	Treatment
Depression	• Norepinephrine antidepressants such as: Amitriptyline, imipramine, nortriptyline, and desipramine • SSRI's such as fluoxetine and nefazodone • Second generation non-ergot agonists, for example, Pramipexole and ropinirole • Psychotherapy
Anxiety	• Buspirone and SSRI • Cognitive Behavioral Therapy
Apathy	• Piribedil • Dopamine enhancing medication, for example, Pramipexole and ropinirole
Dementia	• Rivastigmine
Front Executive Dysfunction	• Cholinesterase inhibitors
EDS	• Correct timing of medication • CNS stimulants: Modafinil, Ritalin • Avoid benzodiazepine
MCI	• Cholinesterase inhibitors
RBD	• Clonazepam • Donepezil • Melatonin • Pramipexole
Incontinence	• Anticholinergic drugs • α-Blockers • Pelvic floor muscle therapy • Lifestyle changes
Hyperhidrosis	• Dopamine agonist therapy • Apomorphine
Drooling	• Anti-Parkinson's drug therapy • Speech and language therapy • Chewing gum • Trihexyphenidyl • Amitriptyline
Sexual dysfunction	• ED: Phosphodiesterase inhibitors, for example, Sildenafil • Hypersexuality: Pergolide mesylate with L-DOPA • Counseling
Postural hypotension	• Fludrocortisone
Non-motor symptom fluctuation	• COMT inhibitors • IMAOB • Apomorphine infusion • Subthalamic deep brain stimulation • Amatine • Free salt intake • Increased fluid intake
Pain	• Musculoskeletal pain: NSAIDS, physical therapy and exercise program • Dystonic pain: deep brain stimulation, trihexyphenidyl • Pain from akathisia: managed with dopaminergic treatments • Central pain: analgesics, opiates, and atypical neuroleptics
Speech dysfunction	• Behavioral speech therapy • LSVT LOUD
Constipation	• Diet of high fiber foods and fluids • Exercise • Reduction of anticholinergic medication
Dysphagia	• Macrogol • Milk of magnesia • Psyllium • Polyethylene glycol • Laxatives and enemas as a last resort
	• Softening solid food and thickening liquids before consumption • Gastrostomy
Ocular dysfunction	• Artificial tears • Bifocal and progressive lenses
RLS	• Pramipexole, ropinirole • Pregabalin • Simplify psychoactive medications with atypical neuroleptics, for example, clozapine • Gabapentin enacarbil to treat PLMS • Oxycodone with naloxone

EDS: Excessive day time sleepiness; MCI: Mild cognitive impairment; PLMS: Periodic limb movements of sleep; RBD: REM behavioral disorder; RLS: Restless leg syndrome.

Table 1. Treatment of non-motor symptoms of Parkinson's disease (cont.).

EDS: Excessive day time sleepiness; MCI: Mild cognitive impairment; PLMS: Periodic limb movements of sleep; RBD: REM behavioral disorder; RLS: Restless leg syndrome.

Rana et al. Expert Rev Neurother. 2015 May;15(5):549-6



Vijiaratnam et al. Lancet Neurol . 2021 Jul;20(7):559-572.

HIFU

Tiede

Kullervo Hynysen keksintö saattaa mullistaa syövän, Alzheimerin ja Parkinsonin taudin hoidon – fyysikon löytöjä on verrattu penisilliinin ja röntgenkuvauksen keksimiseen

Suomalaislähtöinen fyysikko on kehittänyt ultraäänelle sovelluksia, joita on verrattu röntgenkuvauksen ja penisilliinin keksimiseen.

Luetuimmat

1 **HS Vantaa** | Valtiolla on Vantaalla vieraskartano, jonka ruokasaliin kaikki arvovieraat eivät suostu astumaan – Syynä on yllättävä yksityiskohta kartanon sisustuksessa
TILAAJILLE

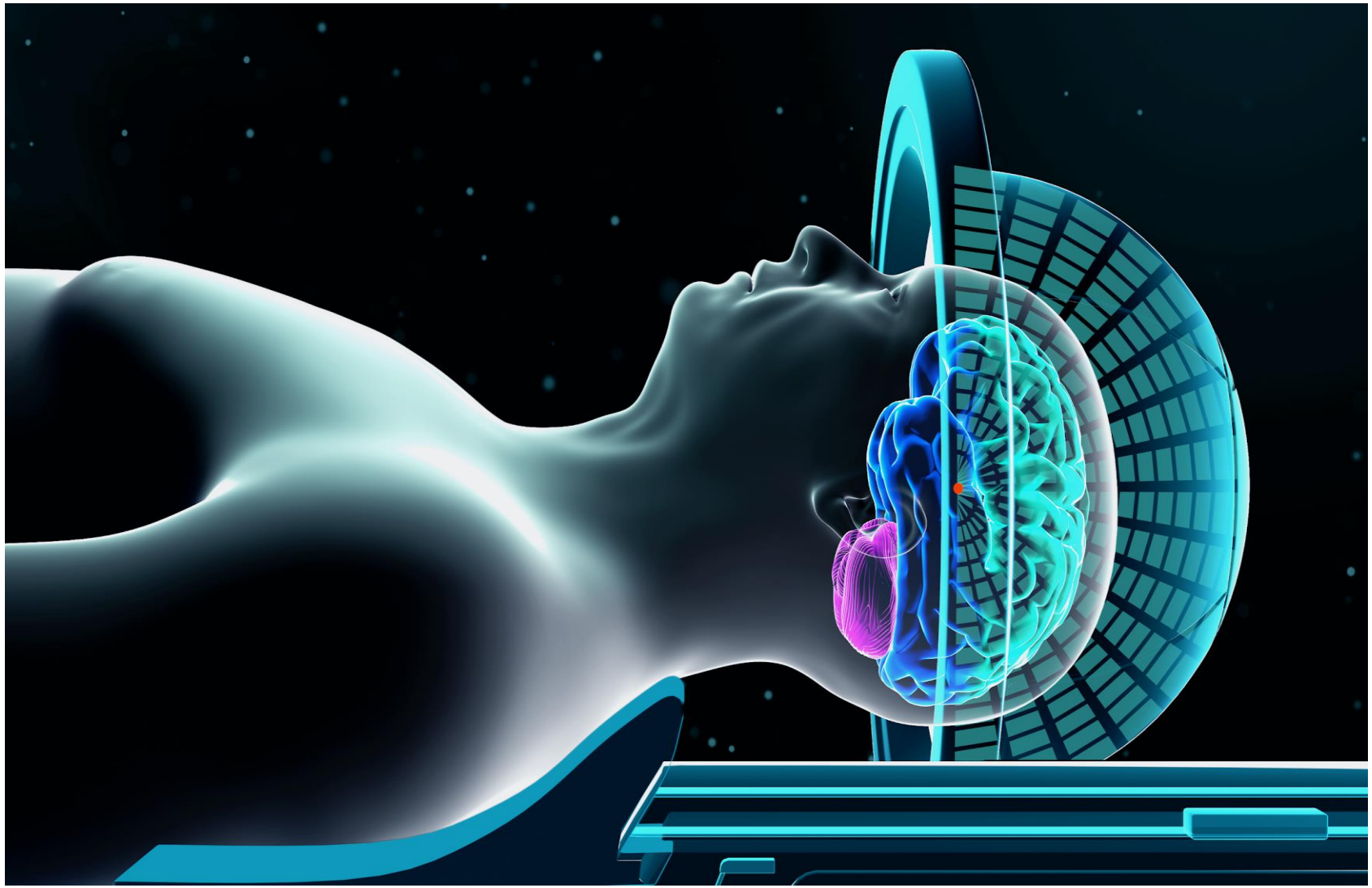
2 **Purjehdus** | Miekkavalaat hyökkäsivät suomalaisnaisiston purjeveneen kimppuun Atlantilla: "Nyt jo naurattaa, mutta maanantain vastaisena yönä oli leikki kaukana"

3 **Rajoitukset** | Pääministeri Marinin mukaan koronarajoituksia ei ole purettu liian nopeasti: "Emme voi pitää yhteiskuntaa suljettuna vain sen vuoksi, että osa ihmisistä ei ole rokotetta halunnut ottaa"

4 **Koronavirus** | THL ohjeistaa, ettei Modernan rokotetta annettaisi alle 30-vuotiaille pojille ja miehille

5 **Terveydenhoito** | Matti Bergendahl valittiin Husin uudeksi toimitusjohtajaksi

6 **Asuntomarkkinat** | Ennuste: Asunnot kallistuvat Helsingissä seuraavan vuoden aikana yli neljä prosenttia – Näillä alueilla hintojen nousu on hurjinta



UNIVERSITY OF TURKU

HIFU

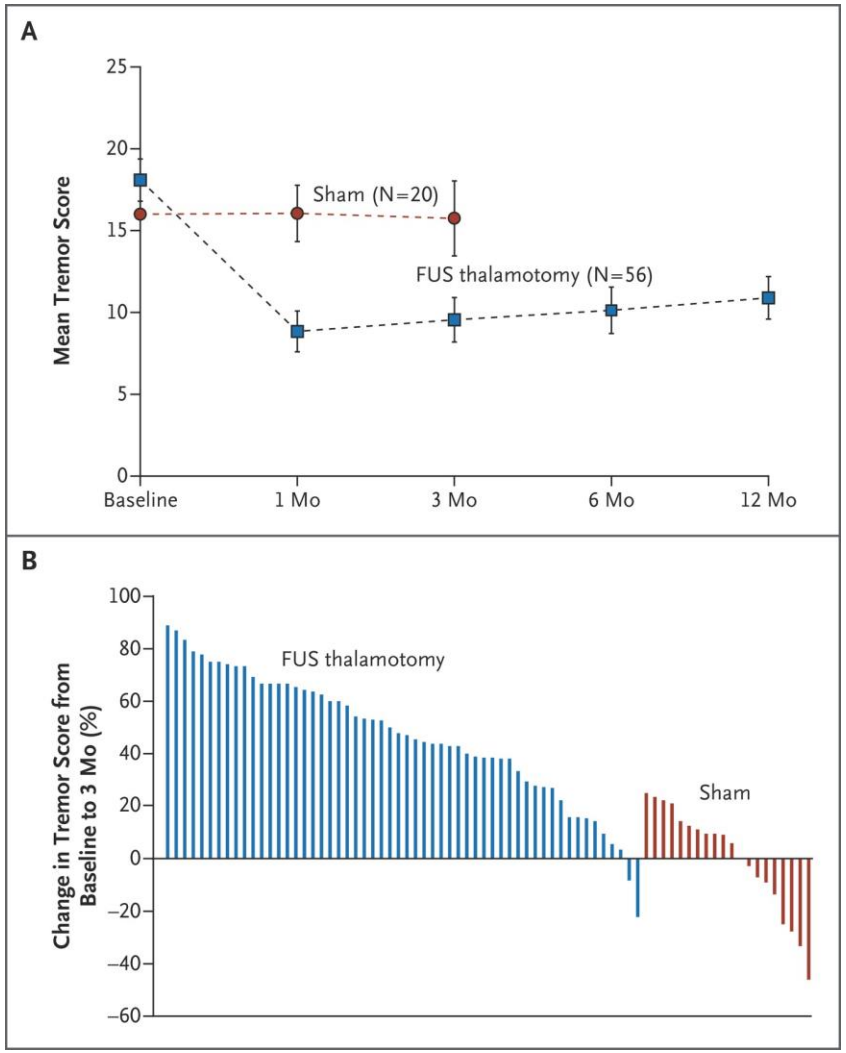
- HIFU = High Intensity Focused Ultrasound
- Aivojen kohdennettu ultraäänihoito
- Kajoamatonta neurokirurgiaa
- Voidaan hoitaa vain aivojen toinen puoli
- Hoidettavat sairaudet tällä hetkellä:
  - Essentiaalinen vapina
  - Parkinsonin taudin vapina

HIFU-laite

HIFU-kypärä

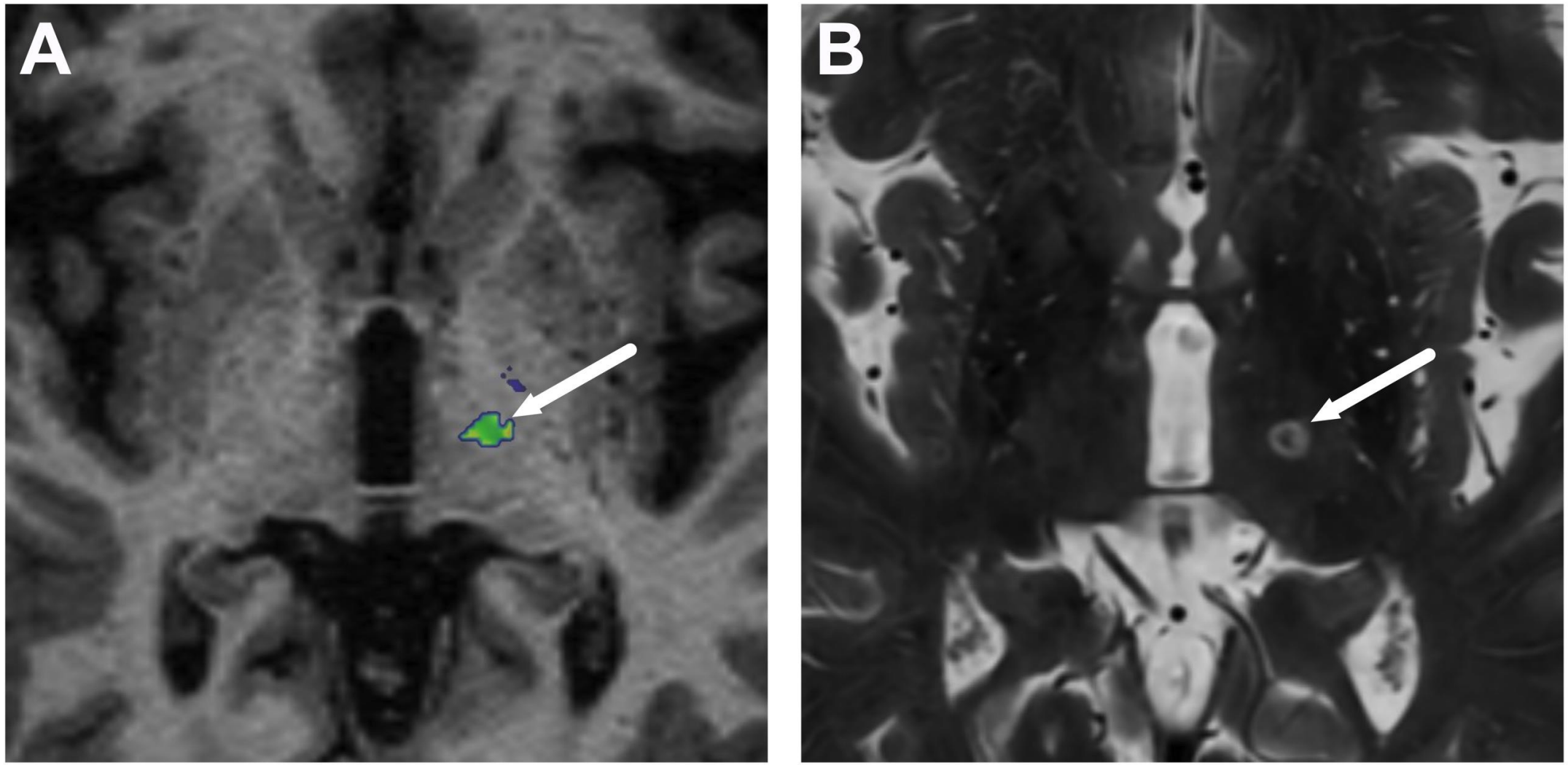
Yli tuhat UÄ-elementtiä

Magneettikuvaus = hoidon “silmä”



Varoituksen sana

- Elias et al. –tutkimuksissa HIFU aiheutti jnkverran sivuvaikutuksia
- Kävelyvaikeuksia 9%:lle 12 kk kohdalla
- Tuntohäiriöitä 14%:lle 12 kk kohdalla
- Tyypillisesti lieviä ja ohittuvia



HIFU

Vasta-aiheet

- Potilaalle ei voi tehdä MRI tutkimusta (vierasesine, joka estää magneettikuvauksen, ahtaan paikan kammo, reaktio varjoaineelle)
- Aivoissa shuntti, aneurysmaklipsi, elektrodi tai muu vierasesine
- Tiedossa oleva aivokasvain, aneurysma tai verisuoniepämuodostuma
- Vuoden sisään sairastettu aivoinfarkti, aivoverenvuoto tai kouristus
- Verenvuototaipumus tai verenohennuslääke, jota ei voi tauottaa
- Skull density ratio (SDR) liian matala

Apomorfiini kielen alle (tulossa)

Apomorphine sublingual film for off episodes in Parkinson's disease: a randomised, double-blind, placebo-controlled phase 3 study

C Warren Olanow, Stewart A Factor, Alberto J Espay, Robert A Hauser, Holly A Shill, Stuart Isaacson, Rajesh Pahwa, Mika Leinonen, Parul Bhargava, Ken Sciarappa, Bradford Navia*, David Blum, for the CTH-300 Study investigators†*

Summary

Background Many patients with Parkinson's disease have potentially disabling off episodes that are not predictably responsive to levodopa. In this study, we assessed the safety and efficacy of apomorphine sublingual film as an on

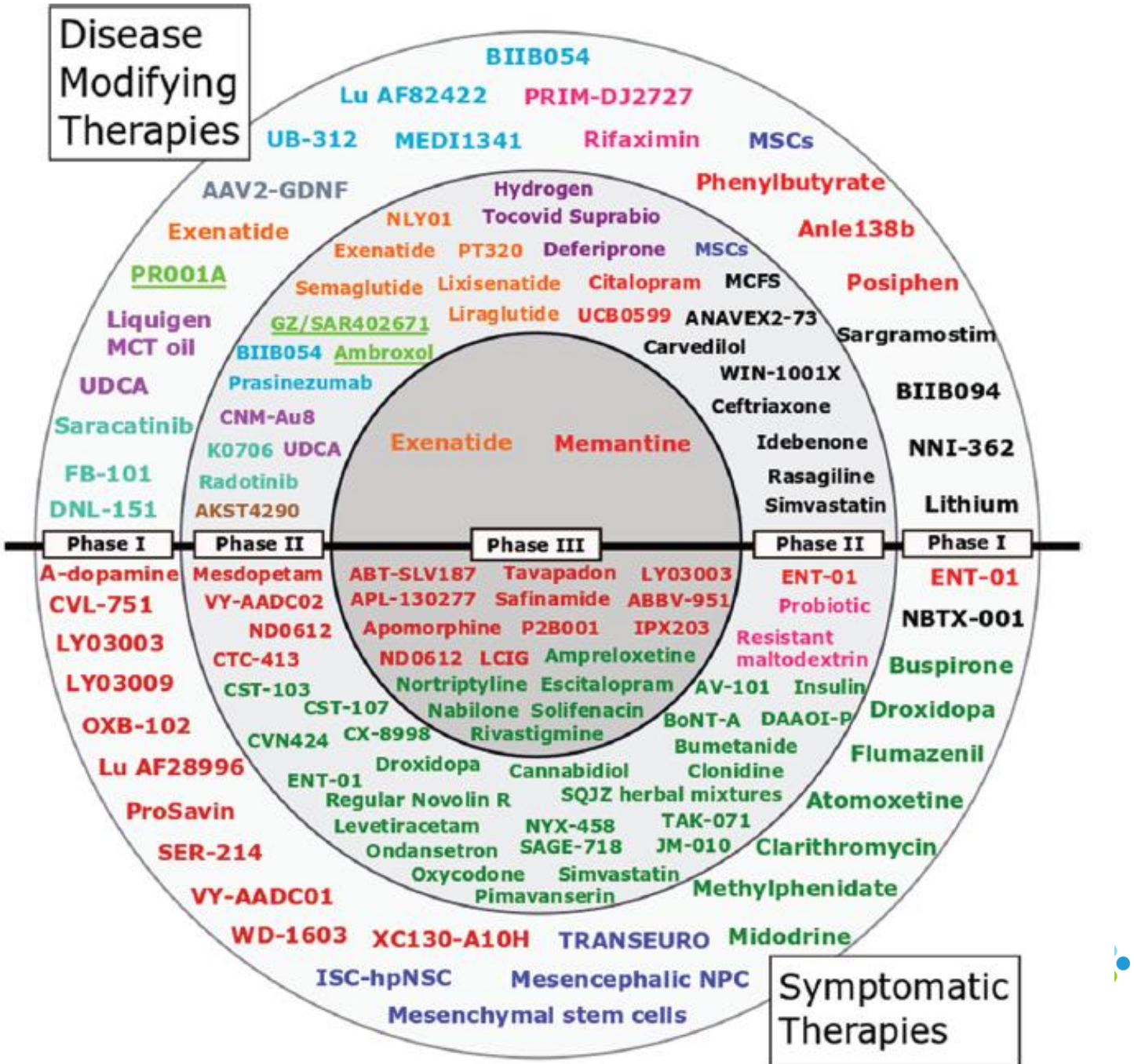
Lancet Neurol 2020; 19: 135–44

Olanow et al. Lancet Neurol 2020

Kliinisten tutkimusten määrä nyt

- Tällä hetkellä värvääviä Parkinson-tutkimuksia
  - Maailma: 569 tutkimusta
  - Eurooppa: 203 tutkimusta
  - (Lähde: ClinicalTrials.gov 22.09.2022)

Parkinsonin taudin kliiniset hoitotutkimukset



McFarthing et al. 2021

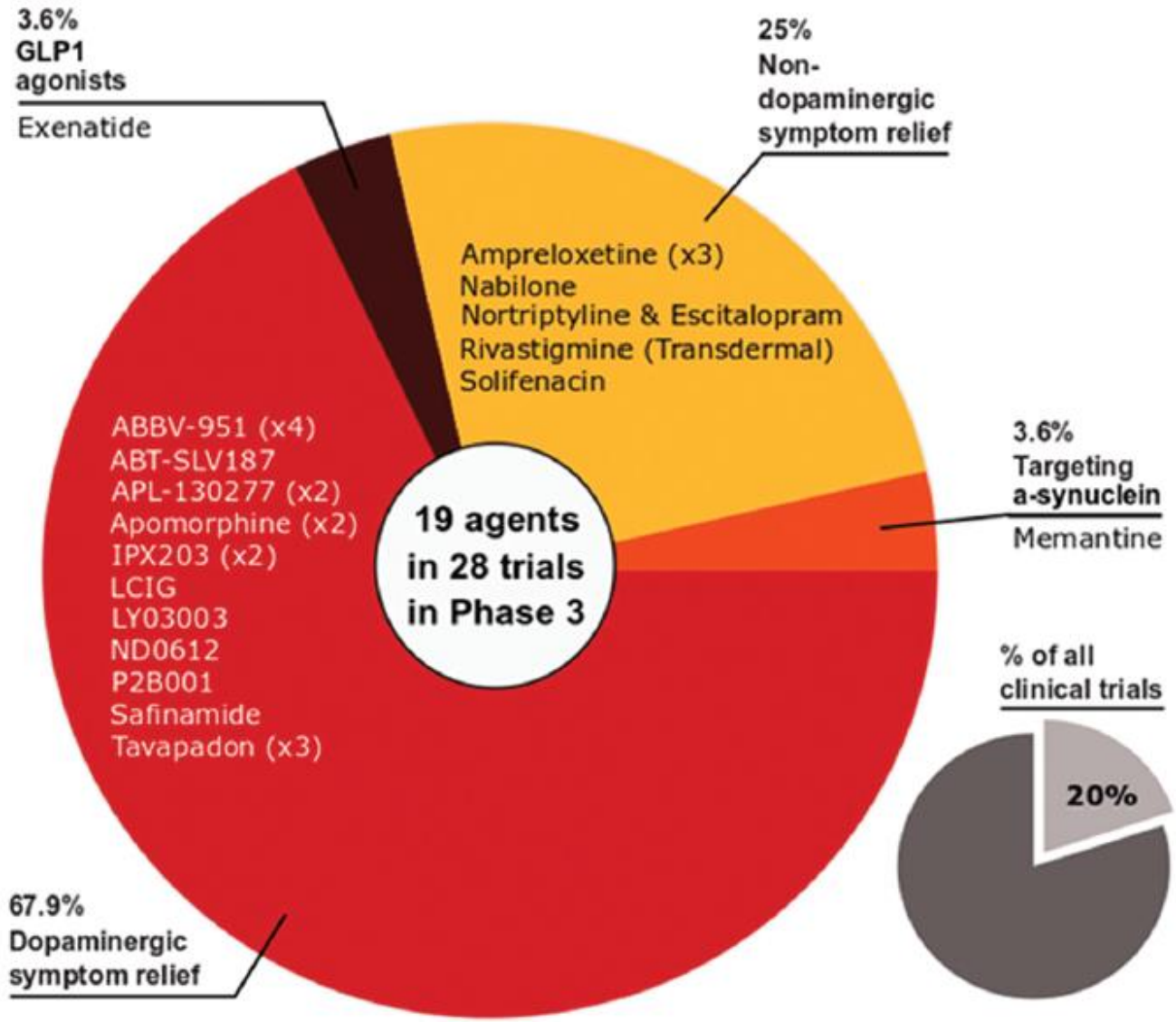


Fig. 4. A schematic of the agents in active phase 3 trials for PD, registered on clinicaltrials.gov as of February 18th 2021.

Uusia hoitoja: Levodopa ihon alle

PHARMA

AbbVie's Parkinson's pump hits goal in phase 3, setting stage for approval filings

By **Nick Paul Taylor** · Nov 1, 2021 12:42pm

Parkinson's disease | subcutaneous drug delivery | AbbVie

AbbVie's data landed before results on NeuroDerm's rival subcutaneous Parkinson's prospect. (AbbVie)

AbbVie's bid to cannibalize its own Parkinson's disease business has advanced, with the phase 3 success of subcutaneous, pump-delivered levodopa-carbidopa formulation ABBV-951 providing the backbone of planned approval filings.

View History Bookmarks Window Help — 100 % — Tue 14 May 11.39

abbvie.com

ABBV-951 | AbbVie — AddThis - Email a Friend

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Back to Pipeline

ABBV-951

ABBV-951 is subcutaneous delivery of Levodopa/Carbidopa being investigated for the treatment of Parkinson's disease.

Type of Molecule	Target	Product Type
Small Molecule	Dopamine Receptor	New Indication

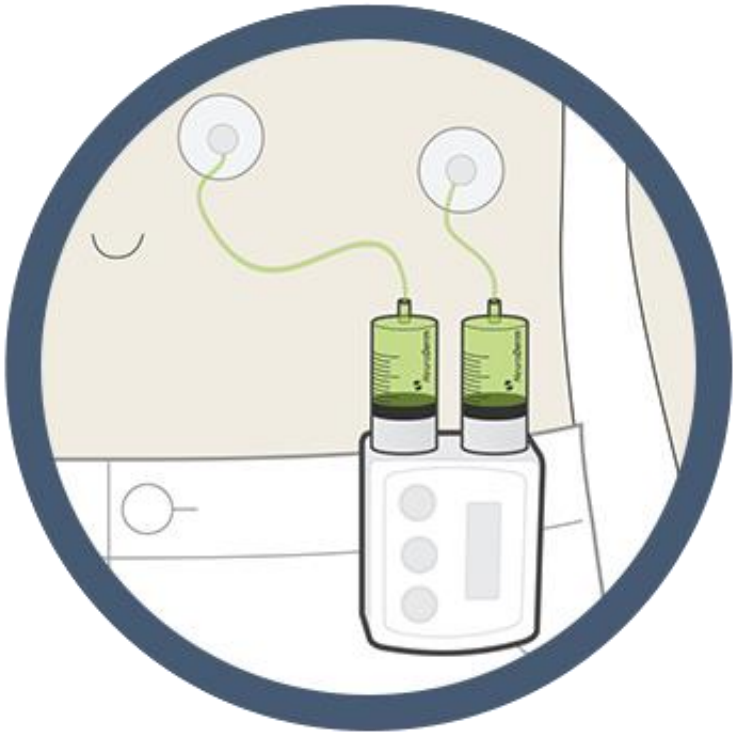
(High Quality Voices) American English

Subcutaneous Levodopa Infusion for Parkinson's Disease: 1-Year Data from the Open-Label BeyoND Study

Werner Poewe, MD,[1*] Fabrizio Stocchi, MD, PhD,[2] David Arkadir, MD, PhD,[3] Georg Ebersbach, MD,[4] Aaron L. Ellenbogen, MD,[5] Nir Giladi, MD,[6] Stuart H. Isaacson, MD,[7] Karl Kieburtz, MD,[8] Peter LeWitt, MD,[9] C. Warren Olanow, MD,[8] Tanya Simuni, MD,[10] Astrid Thomas, MD, PhD,[11] Abraham Zlotogorski, MD,[12] Liat Adar, PhD,[13] Ryan Case, PhD,[13] Sheila Oren, MD,[13] Shir Fuchs Orenbach, MD,[13] Olivia Rosenfeld, MD,[13] Nissim Sasson, MSc,[13] Tami Yardeni, MSc,[13] Alberto J. Espay, MD,[14] and for the BeyoND study group

[1]*Department of Neurology, Medical University Innsbruck, Innsbruck, Austria* [2]*University and Institute for Research and Medical Care IRCCS San Raffaele, Rome, Italy* [3]*Department of Neurology, The Faculty of Medicine, Hadassah Medical Center,*

Poewe et al. Mov Disord 2021

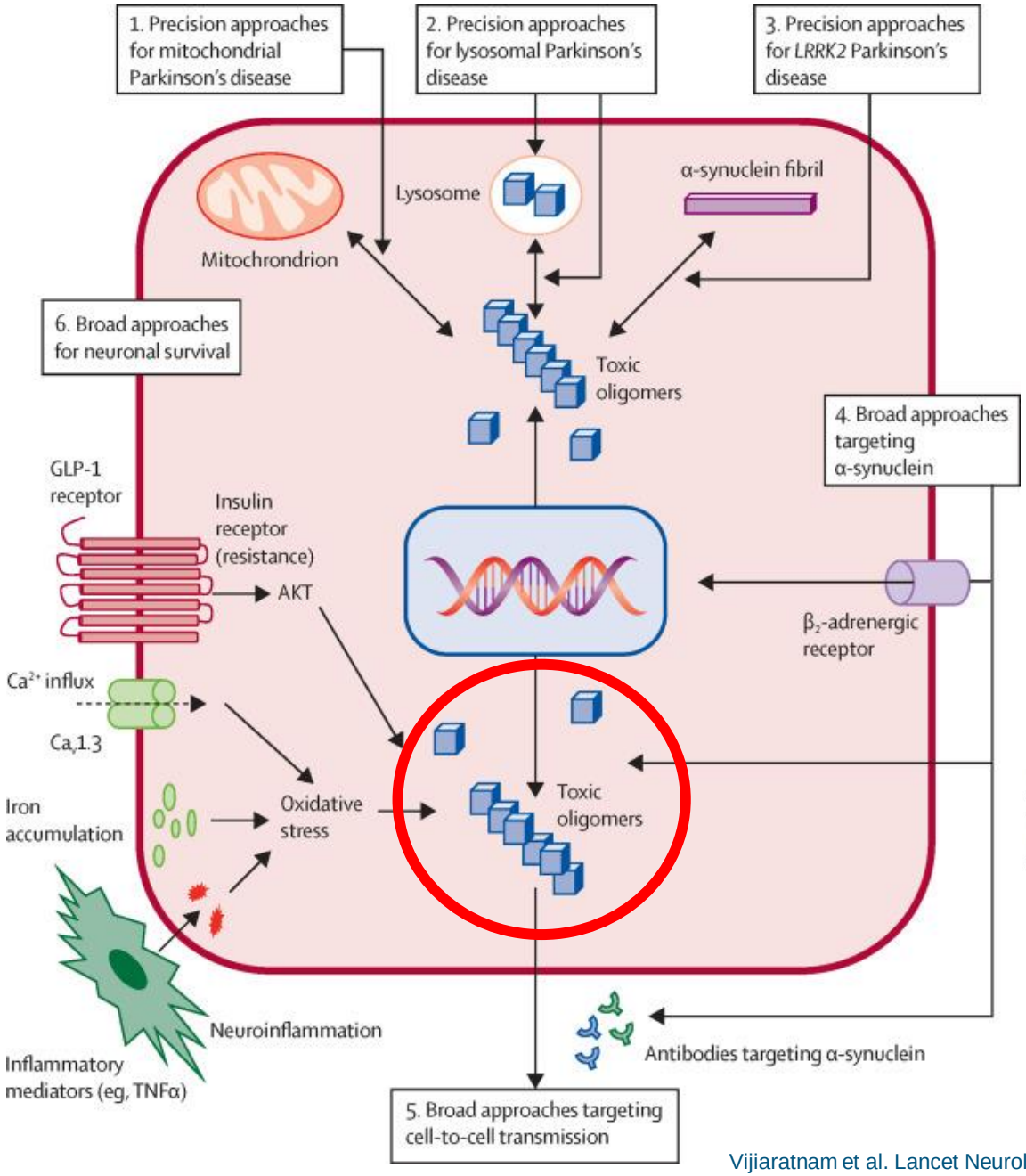


ND0612 belt pump

A simple, daily, convenient drug pump that delivers LD/CD to treat severe Parkinson's disease patients.

NeuroDerm™
A Mitsubishi Tanabe Pharma Group Company

Aava



The NEW ENGLAND JOURNAL of MEDICINE

RESEARCH SUMMARY

Trial of Prasinezumab in Early-Stage Parkinson's Disease

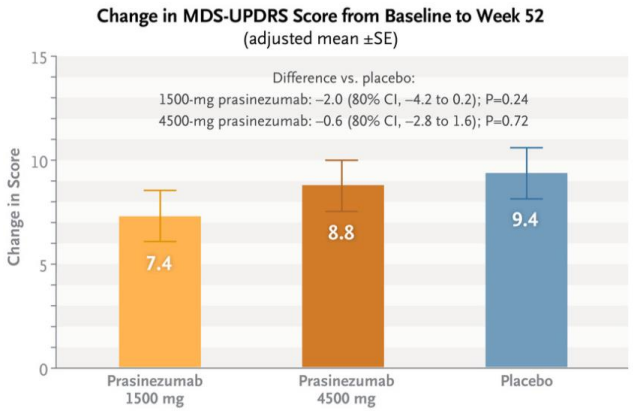
Pagano G et al. DOI: 10.1056/NEJMoa2202867

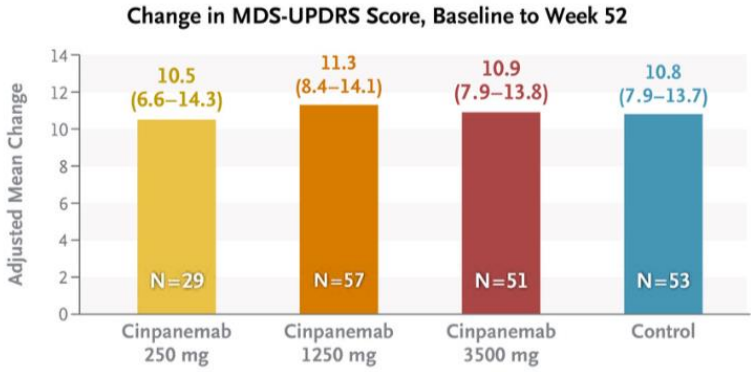
The NEW ENGLAND JOURNAL of MEDICINE

RESEARCH SUMMARY

Trial of Cinpanemab in Early Parkinson's Disease

Lang AE et al. DOI: 10.1056/NEJMoa2203395





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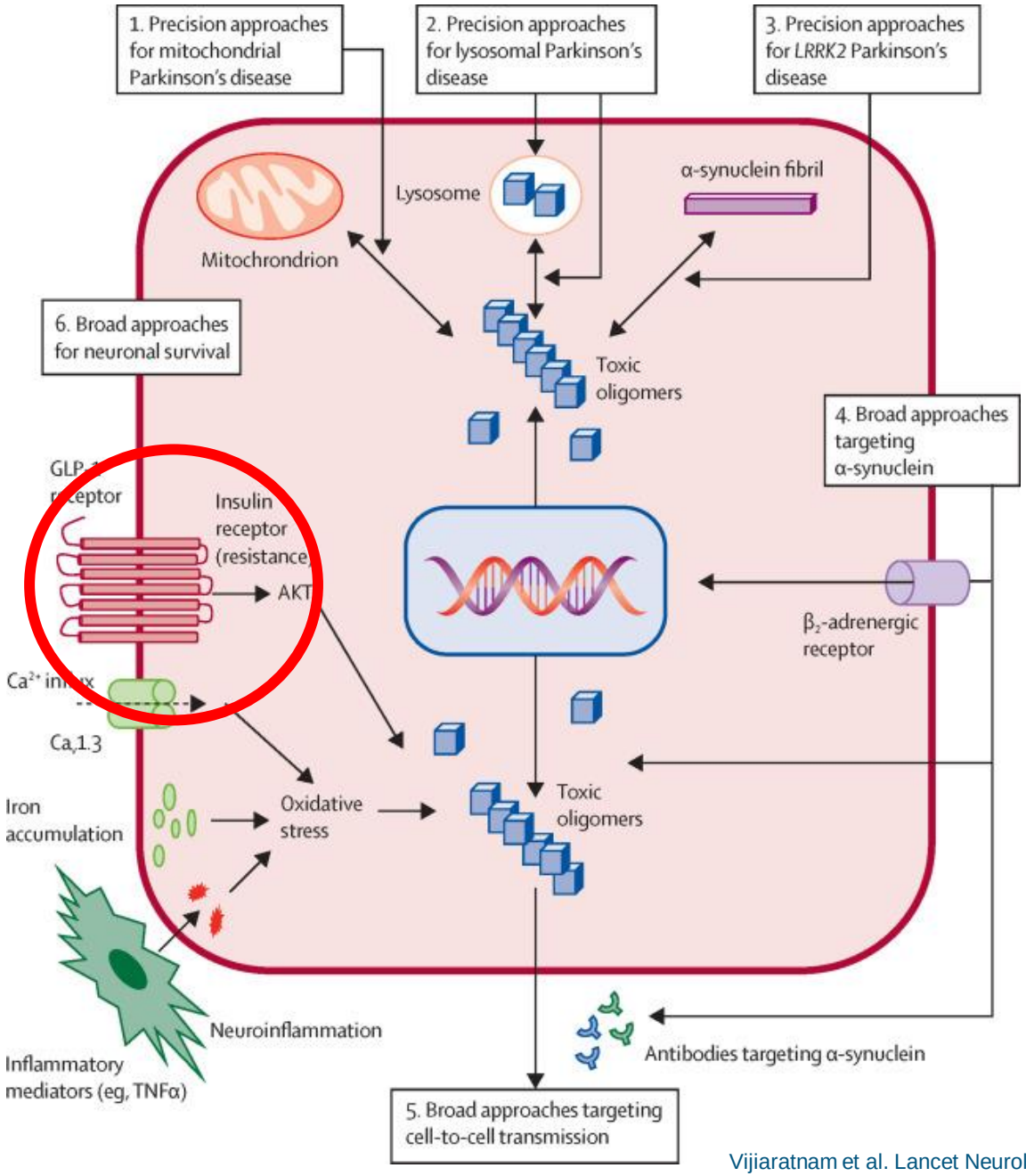
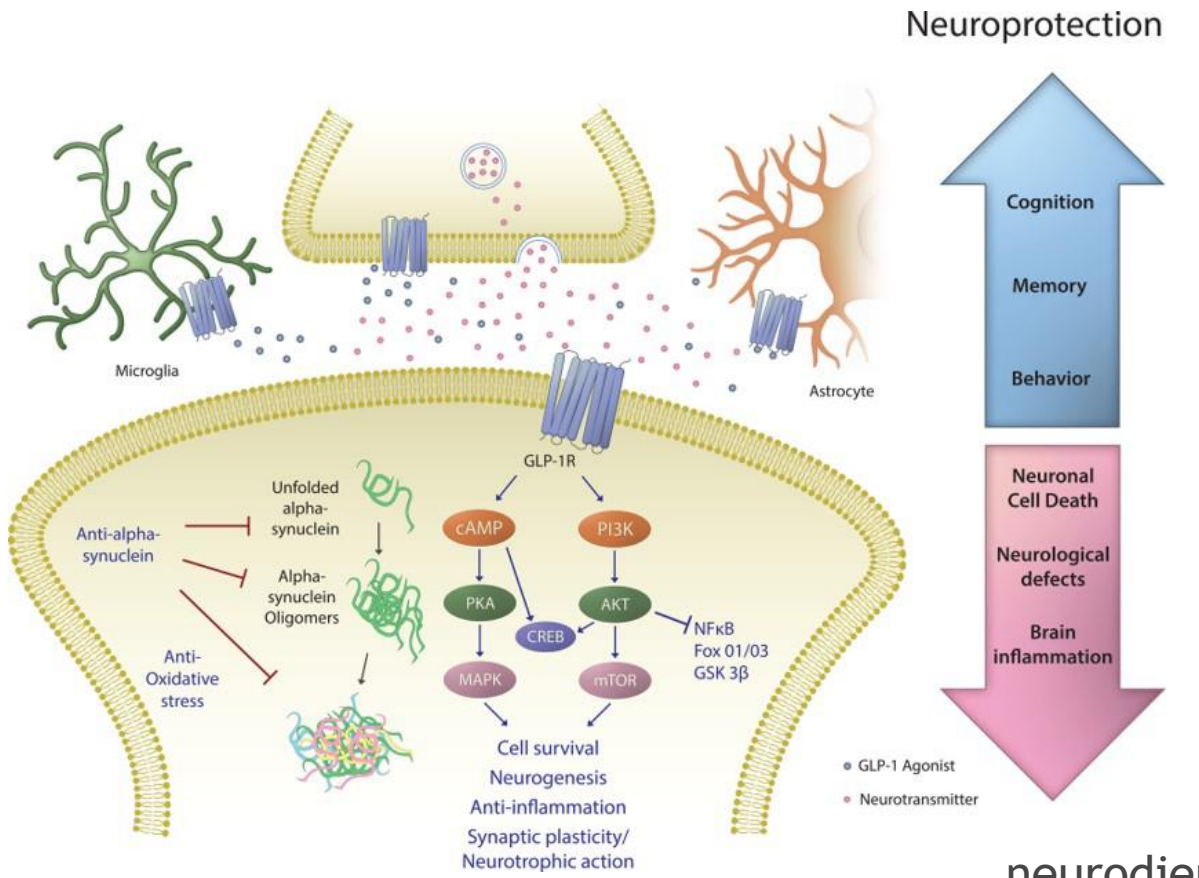
Vijiaratnam et al. Lancet Neurol . 2021 Jul;20(7):559-572.





neurodiem

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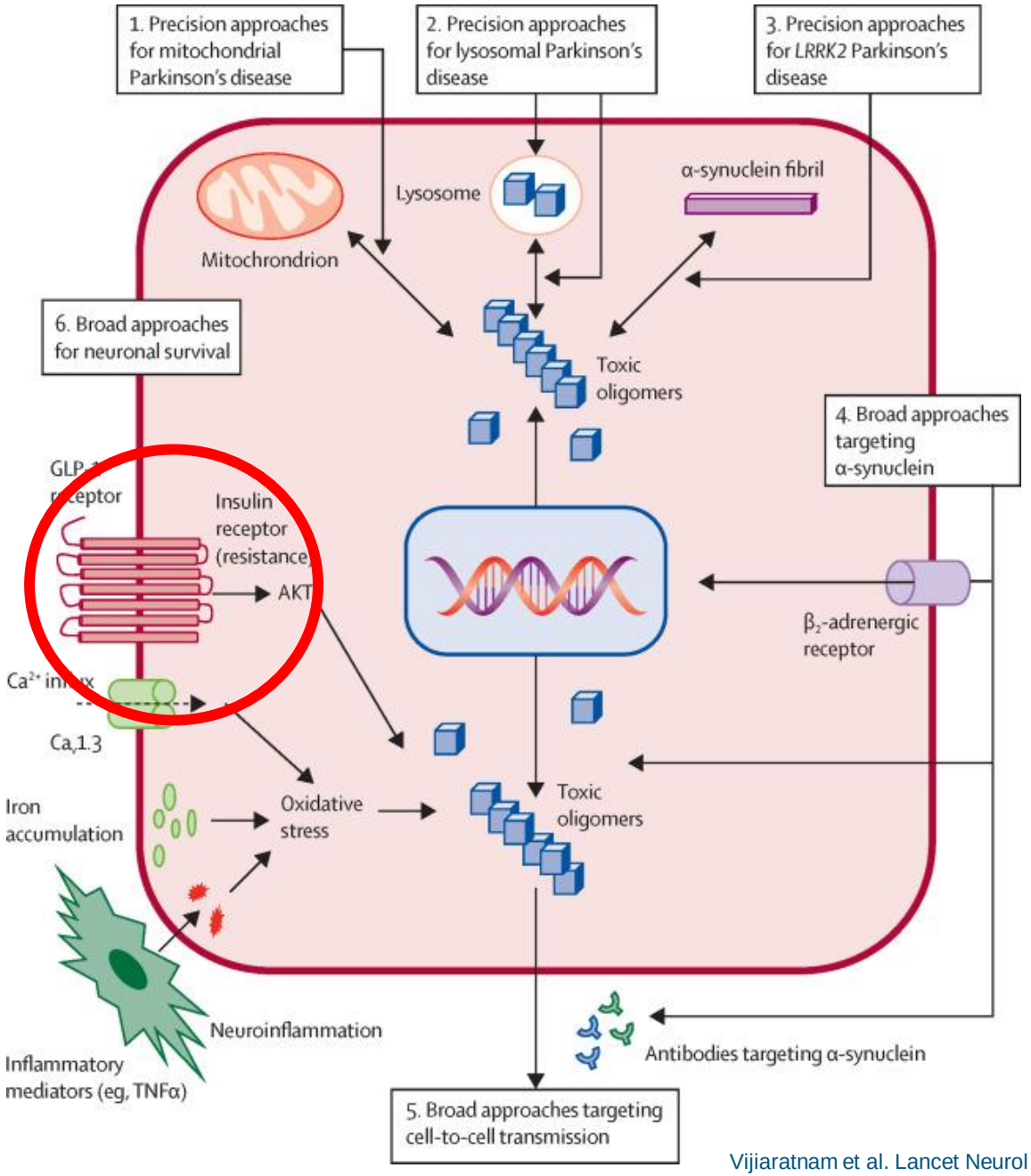


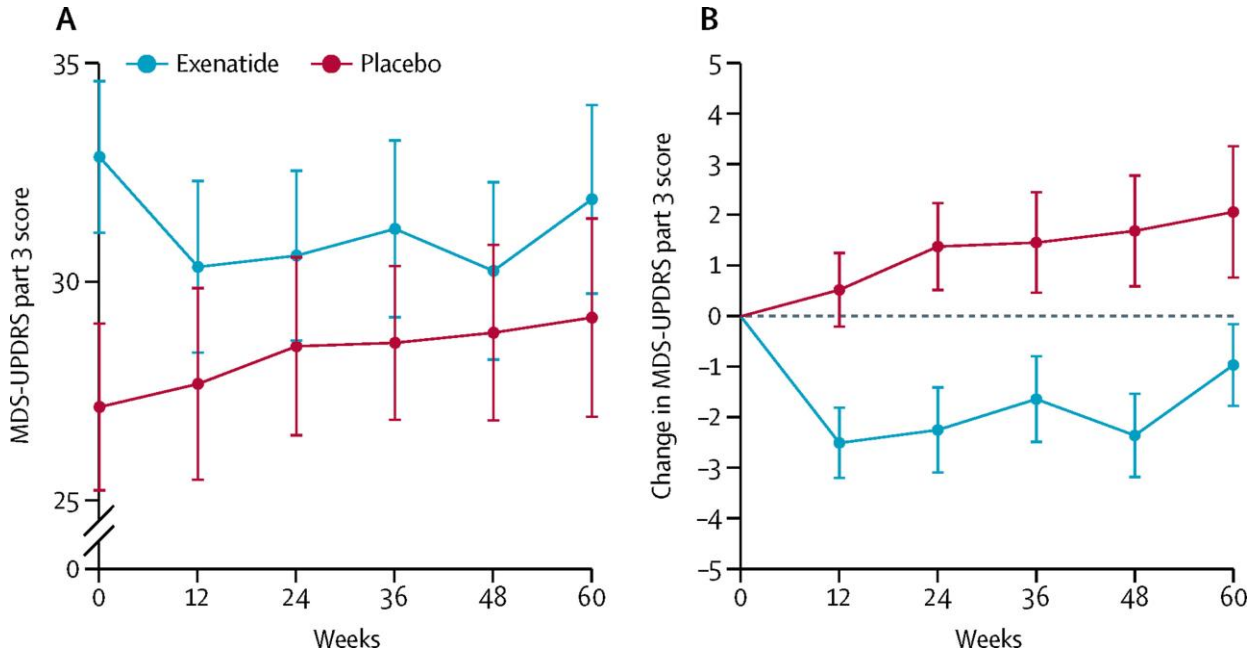
THE LANCET

Volume 390, Issue 10103, 7–13 October 2017, Pages 1664-1675

Articles

Exenatide once weekly versus placebo in Parkinson's disease: a randomised, double-blind, placebo-controlled trial

Dilan Athauda MRCP [a], Kate Maclagan PhD [b], Simon S Skene PhD [b], Martha Bajwa-Joseph PhD [b], Dawn Letchford [b], Kashfia Chowdhury MSc [b], Steve Hibbert MBA [b], Natalia Budnik Vrach [c], Luca Zampedri MSc [c], John Dickson PhD [d], Yazhou Li PhD [e], Iciar Aviles-Olmos PhD [a], Prof Thomas T Warner FRCP [f], Prof Patricia Limousin MD [a], Prof Andrew J Lees FRCP [a], Nigel H Greig PhD [e], Susan Tebbs MSc [b], Prof Thomas Foltynie PhD [a]



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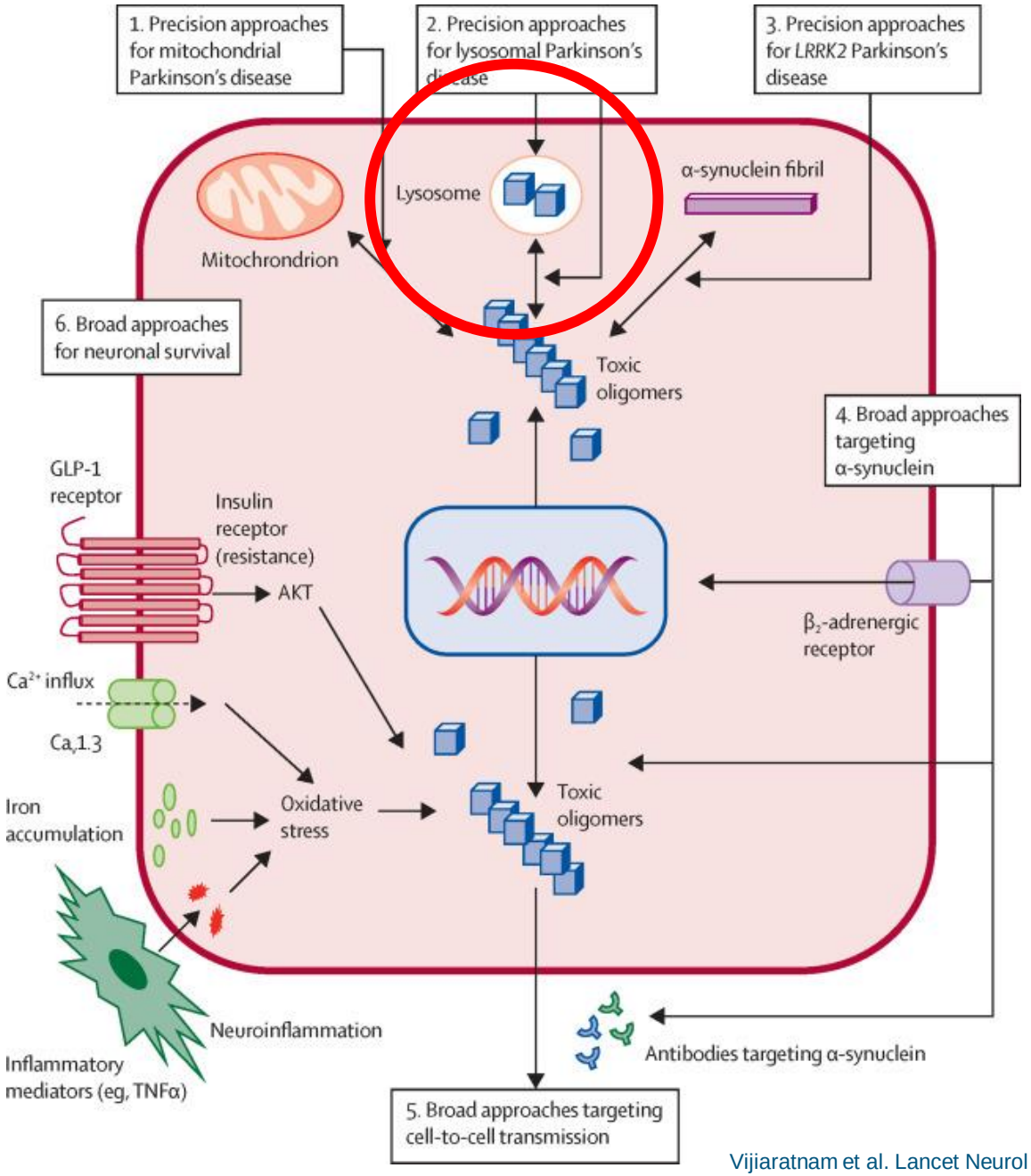

Safety, Pharmacokinetics, and Pharmacodynamics of Oral Venglustat in Patients with Parkinson's Disease and a GBA Mutation: Results from Part 1 of the Randomized, Double-Blinded, Placebo-Controlled MOVES-PD Trial

M Judith Peterschmitt [1], Hidemoto Saiki [2], Taku Hatano [3], Thomas Gasser [4], Stuart H Isaacson [5], Sebastiaan J M Gaemers [6], Pascal Minini [7], Stéphane Saubadu [7], Jyoti Sharma [8], Samantha Walbillic [7], Roy N Alcalay [9], Gary Cutter [10], Nobutaka Hattori [3], Günter U Höglinger [11 12], Kenneth Marek [13], Anthony H V Schapira [14], Clemens R Scherzer [15], Tanya Simuni [16], Nir Giladi [17], Sergio Pablo Sardi [1], Tanya Z Fischer [1], MOVES-PD Investigators

FIERCE Biotech Research Biotech Medtech CRO Special Reports Trending Topics Podcasts

BIOTECH

Sanofi flunks phase 2 Parkinson's test, culls clutch of programs

By **Nick Paul Taylor** • Feb 5, 2021 06:55am

central nervous system | failed trials | monoclonal antibody | Parkinson's disease

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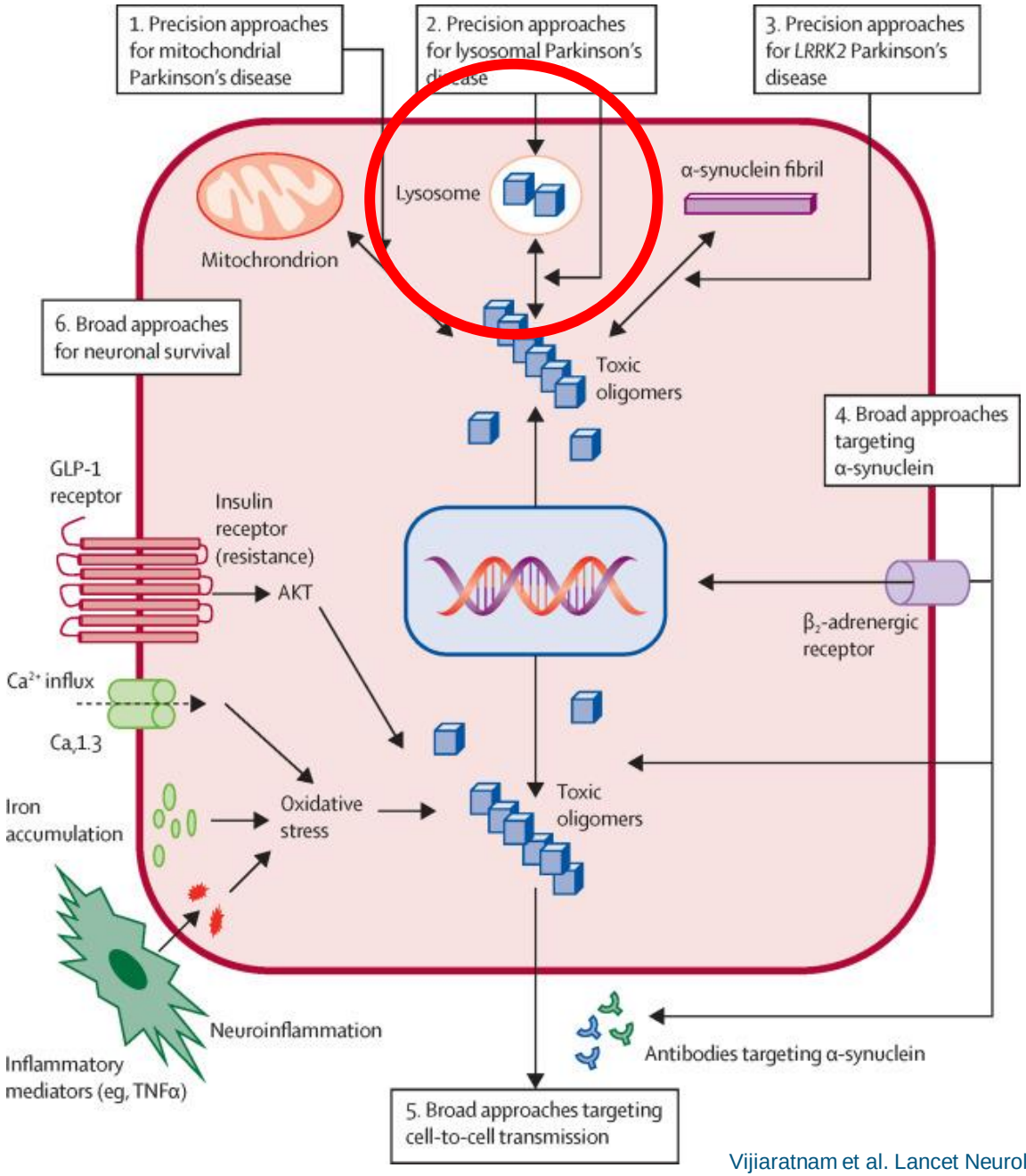
Vijiaratnam et al. Lancet Neurol . 2021 Jul;20(7):559-572.



Original Investigation

January 13, 2020

Ambroxol for the Treatment of Patients With Parkinson Disease With and Without Glucocerebrosidase Gene Mutations

A Nonrandomized, Noncontrolled Trial

Stephen Mullin, PhD, MRCP[1,2]; Laura Smith, MSc[1]; Katherine Lee, MRes[1]; et al

» Author Affiliations | Article Information

JAMA Neurol. 2020;77(4):427-434. doi:10.1001/jamaneurol.2019.4611

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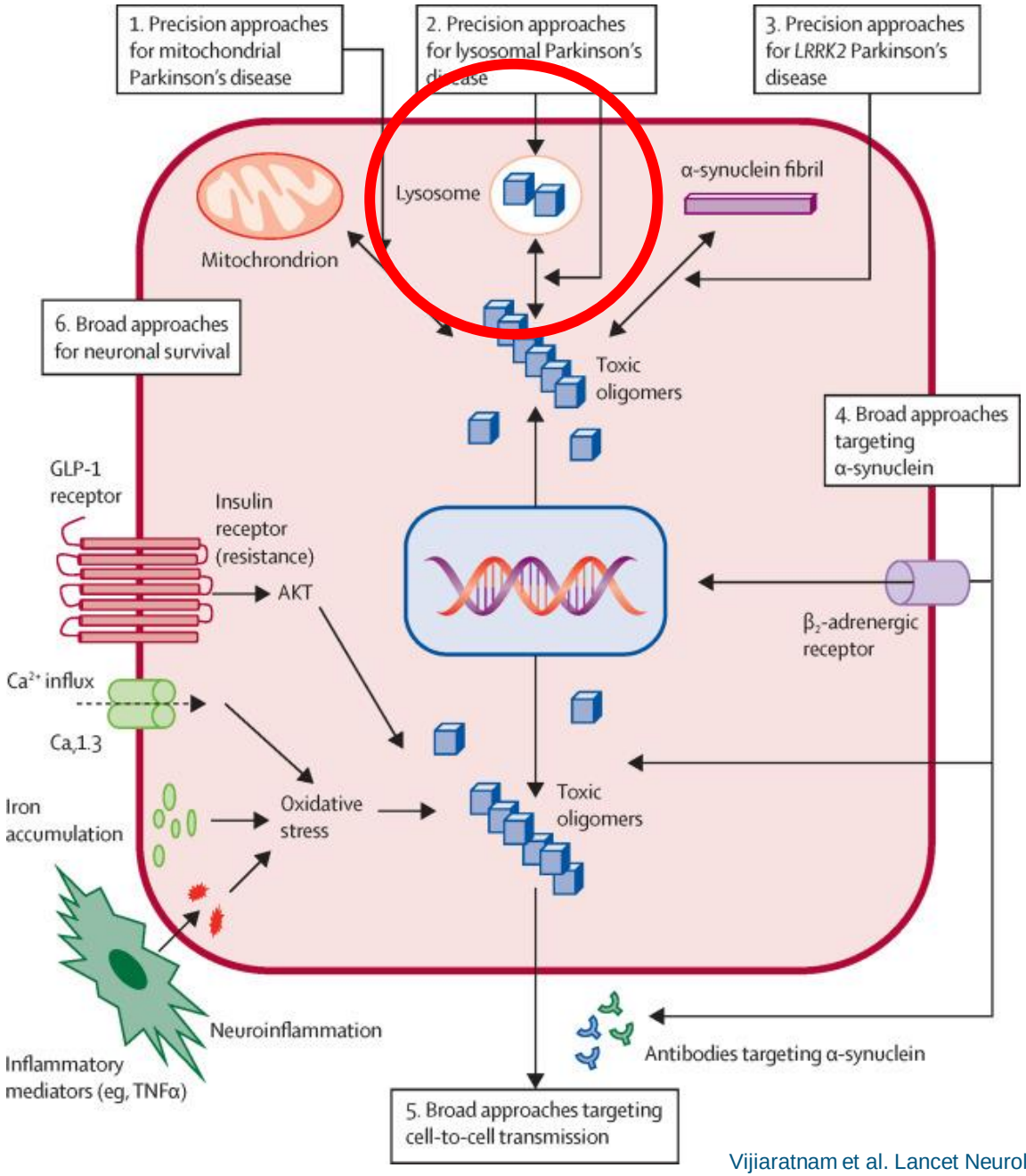

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Findings In this open-label clinical trial of 17 patients with Parkinson disease, ambroxol crossed the blood-brain barrier and bound to the β-glucocerebrosidase enzyme, and it increased β-glucocerebrosidase enzyme protein levels and cerebrospinal fluid α-synuclein levels in patients both with and without glucocerebrosidase gene mutations.

Meaning Ambroxol therapy has potential for study as a neuroprotective compound for the treatment of patients with Parkinson disease both with and without glucocerebrosidase gene mutations.

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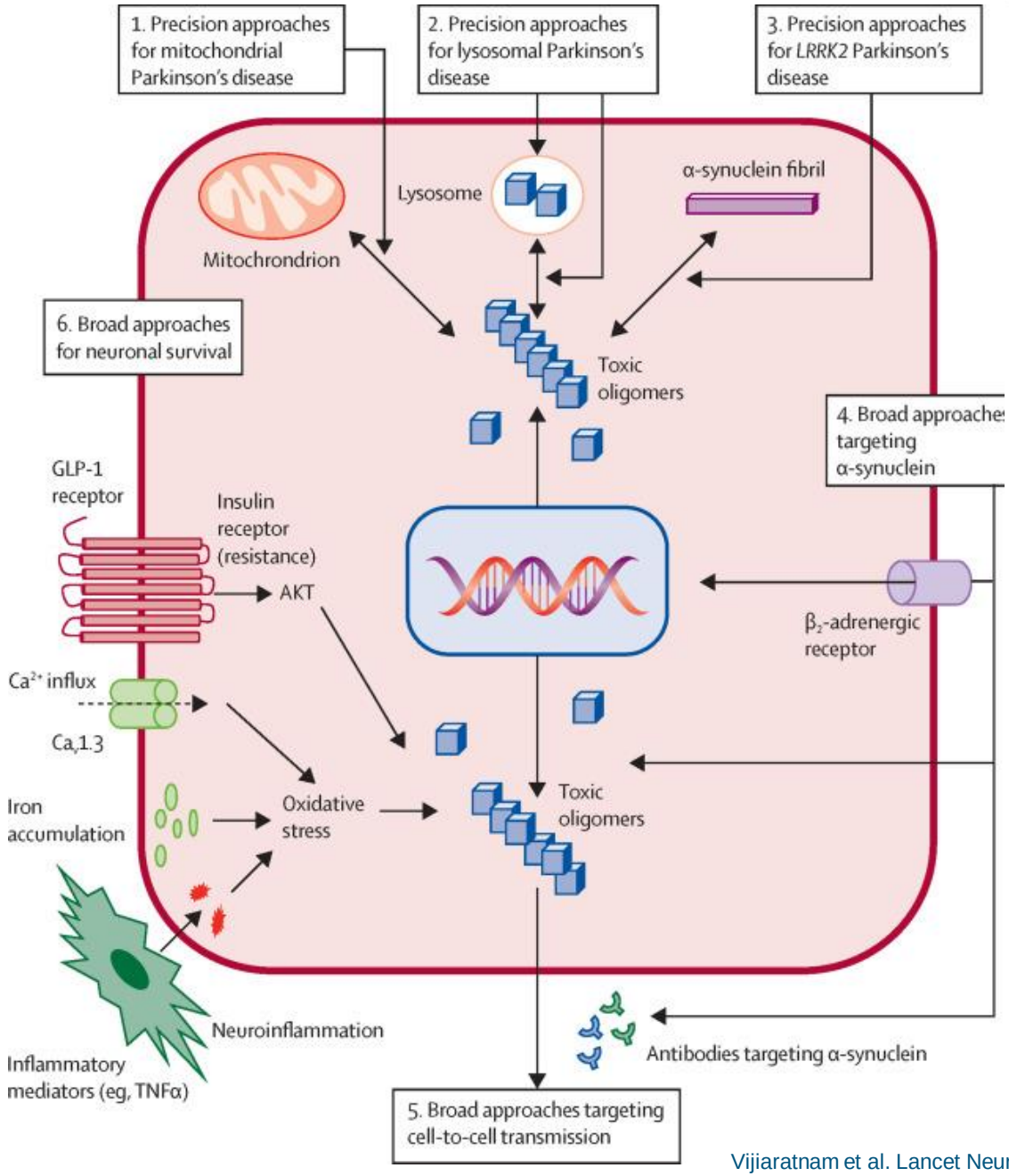

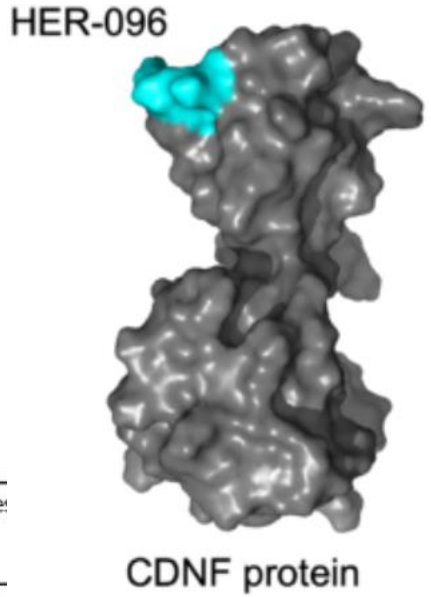

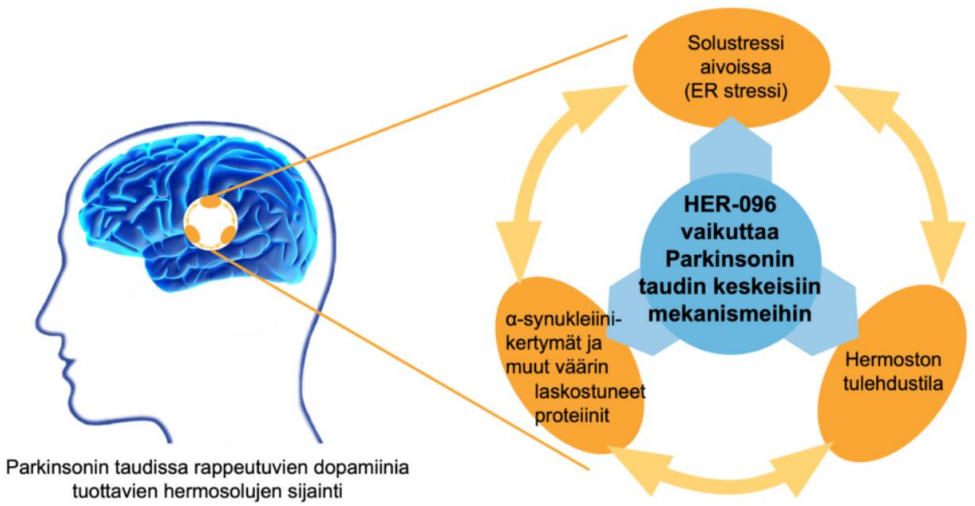

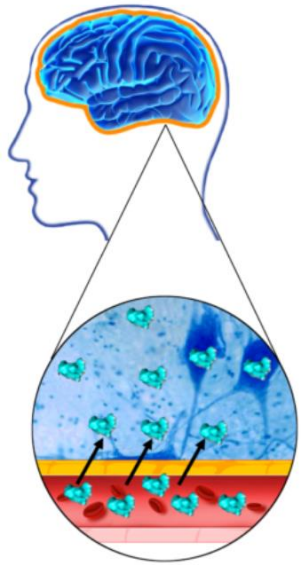

HER-096:n vapaa pitoisuus terveiden rottien aivoissa on

>20%

pitoisuudesta veressä yhden ihonalaisen injektion jälkeen, mikä selvästi ylittää terapeuttisen pitoisuuden

HERANTIS PHARMA

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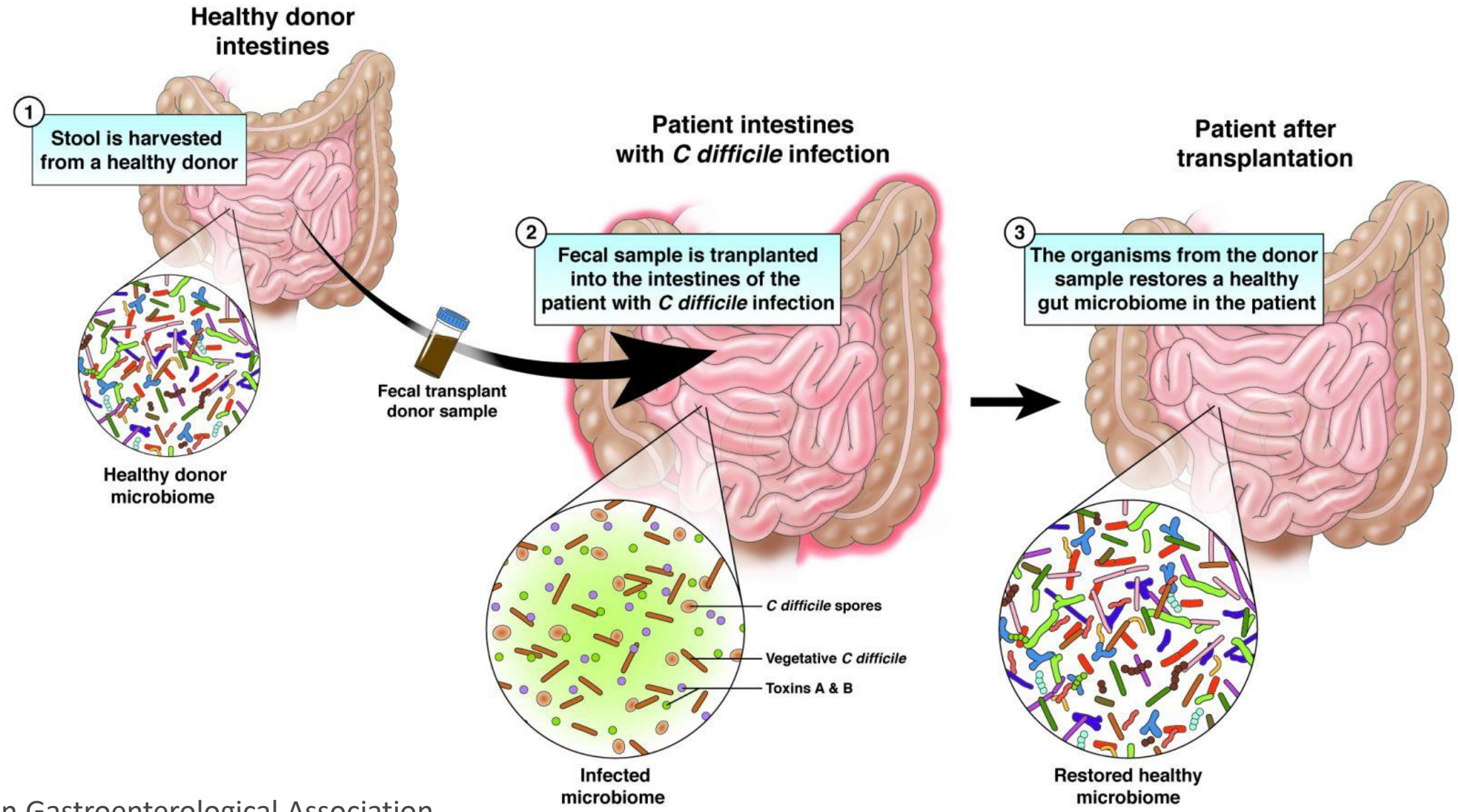
Vijiaratnam et al. Lancet Neurol . 2021 Jul;20(7):559-572.

Ulosteensiirto

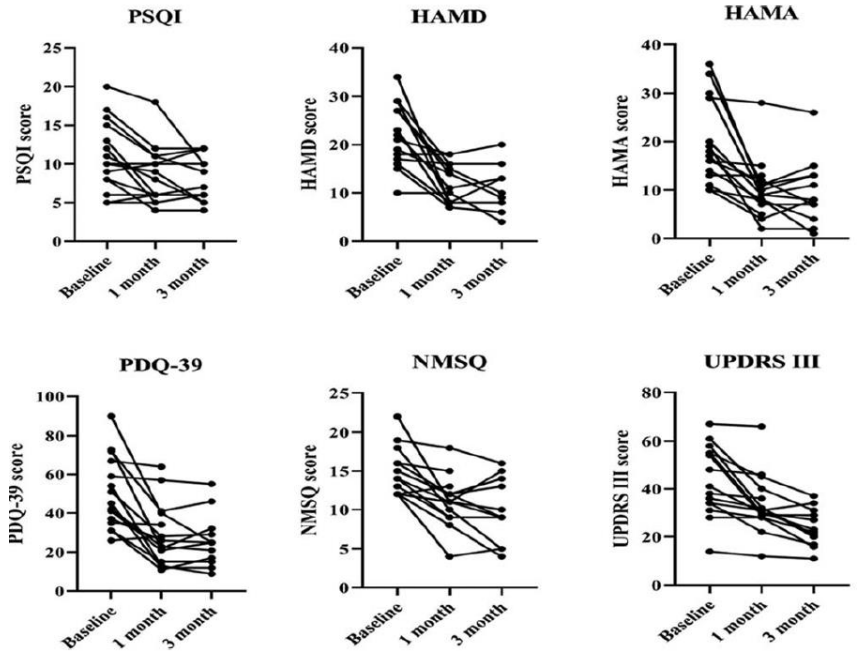


American Gastroenterological Association

Ulosteensiirto Parkinsonin taudissa

Xue et al., 2020, Medicine

- Uncontrolled
- 10 via colonoscopy, 5 via NJT



Kuai et al., 2021, Microb Cell Fact

- constipated patients, uncontrolled
- 11 via NJT

Table 2 Outcome measures in the participants

	Before FMTa	6 weeks After FMT	12 weeks After FMT	p-value
BMI (mm/kg^2)	22.01 ± 1.73	23.52 ± 1.65	24.65 ± 1.09	
H-Y Grade**	2.27 ± 0.75	1.45 ± 0.82	1.09 ± 0.83	*0.0023*
UPDRSII Score**	11.36 ± 4.7	6.18 ± 3.6	4.90 ± 3.33	*0.0036*
NMSS**	22.36 ± 7.05	12.55 ± 5.54	10.36 ± 4.54	*0.003*
PAC-QOL score**	102.55 ± 5.05	51.27 ± 6.71	43.45 ± 5.34	< 0.0001
Wexner constipation score*	11.63 ± 3.22	8.16 ± 2.62	6.22 ± 1.03	*0.0231*
HCY (μmol/L)**	15.85 ± 2.89	12.74 ± 2.05	11.22 ± 1.85	0.002
Alb (g/L)	38.49 ± 3.92	40.38 ± 4.35	41.62 ± 4.26	
UA (μmol/L)	306.13 ± 75.94	282.09 ± 65.31	274.91 ± 55.73	
OCTT (min)**	150.91 ± 12.21	NA	105.45 ± 20.18	< 0.0001

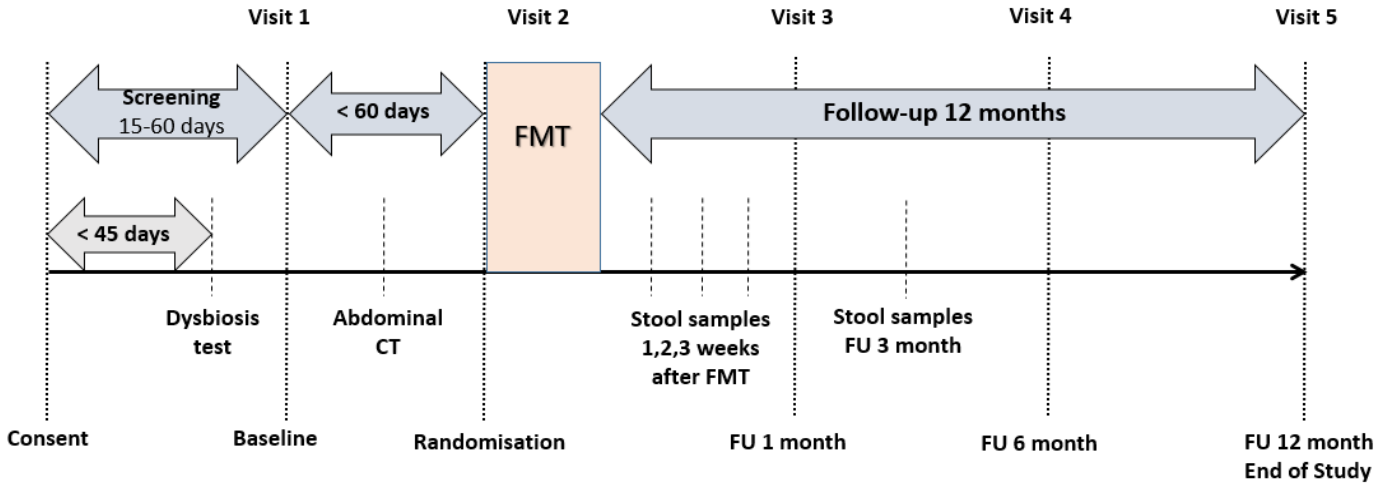
H-Y Grade: Hoehn-Yahr Grade, UPDRS II Score: Unified Parkinson's Disease Rating Scale II Score. NMSS: non-motor symptom questionnaire, BMI: body mass index (mm/kg^2), HCY: homocysteine, Alb: albumen, UA: uric acid

* $p < 0.05$ Before FMTvs 12 weeks After FMT in the same patient

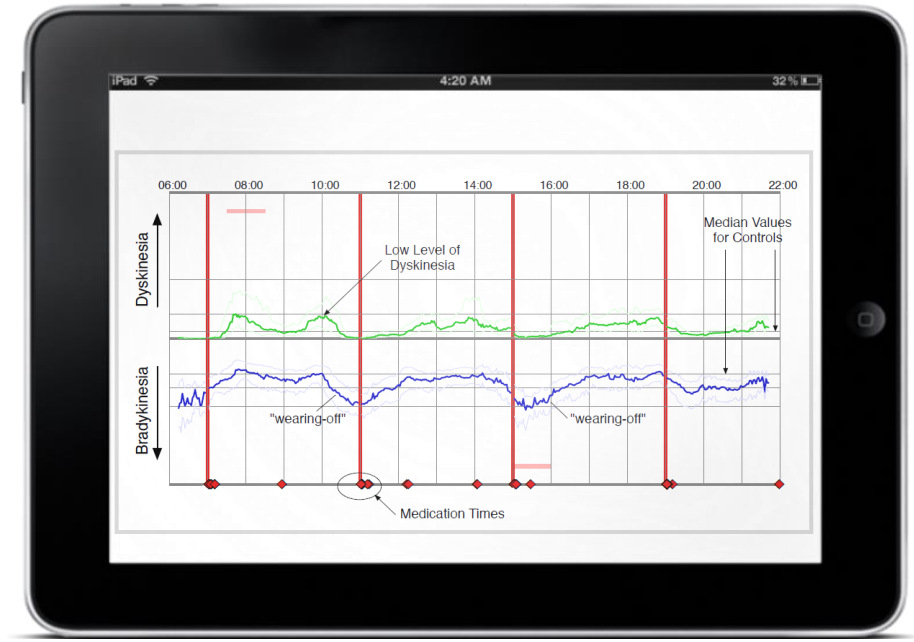
** $p < 0.01$ Before FMTvs 12 weeks After FMT in the same patient

STUDY DESIGN

- Randomized, double blind, biomarker-gated multicenter trial
- 48 patients randomized in 2:1 ratio to active FMT or placebo via colonoscopy
- Patients need to be positive in fecal PD-dysbiosis test
- Primary outcome measure is the change from baseline to 6-month post FMT of the sum of MDS-UPDRS I-III (part III in OFF-state).
  - Even when assuming a placebo effect of 28%, this trial is powered to detect a difference of 12.8 points between the two groups.
- Extensive secondary outcome measures related to motor and non-motor symptoms
- Extensive target engagement studies
  - Microbiota composition
  - Metabolomics
  - Gut permeability
  - Transit time
  - Biopsies
  - …



PKG™ - Menetelmä Parkinsonin taudin motoristen oireiden objektiiviseen mittaamiseen potilaan kotona



PKG™-rekisteröinnillä saadaan tietoa:

- Bradykinesian ja dyskinesian määrästä ja vaikeusasteesta
- Tilanvaihteluiden vaikeusasteesta
- Levodopan lääkevasteesta
- Vapinasta
- Päiväaikaisesta nukahtelutaipumuksesta
- Pakko-oireilusta
- Lääkitysmuutosten vaikutuksista
- Kajoaviin hoitoihin siirtymisen ajoittamisen tueksi.

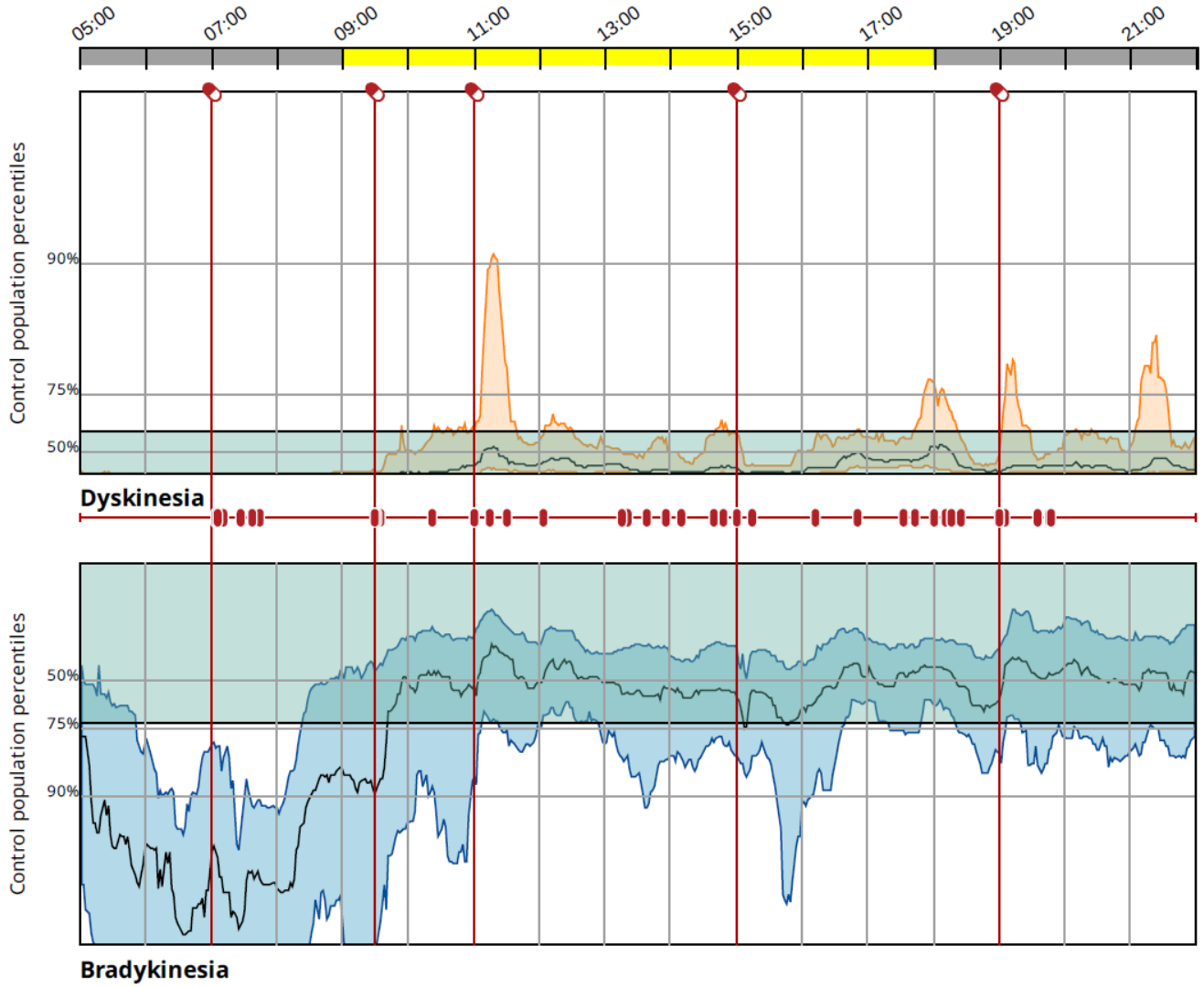
Parkinsonranneke
MITATTUA TIETOA PARKINSONIN HOIDON TUEKSI

GLOBAL KINETICS CORPORATION

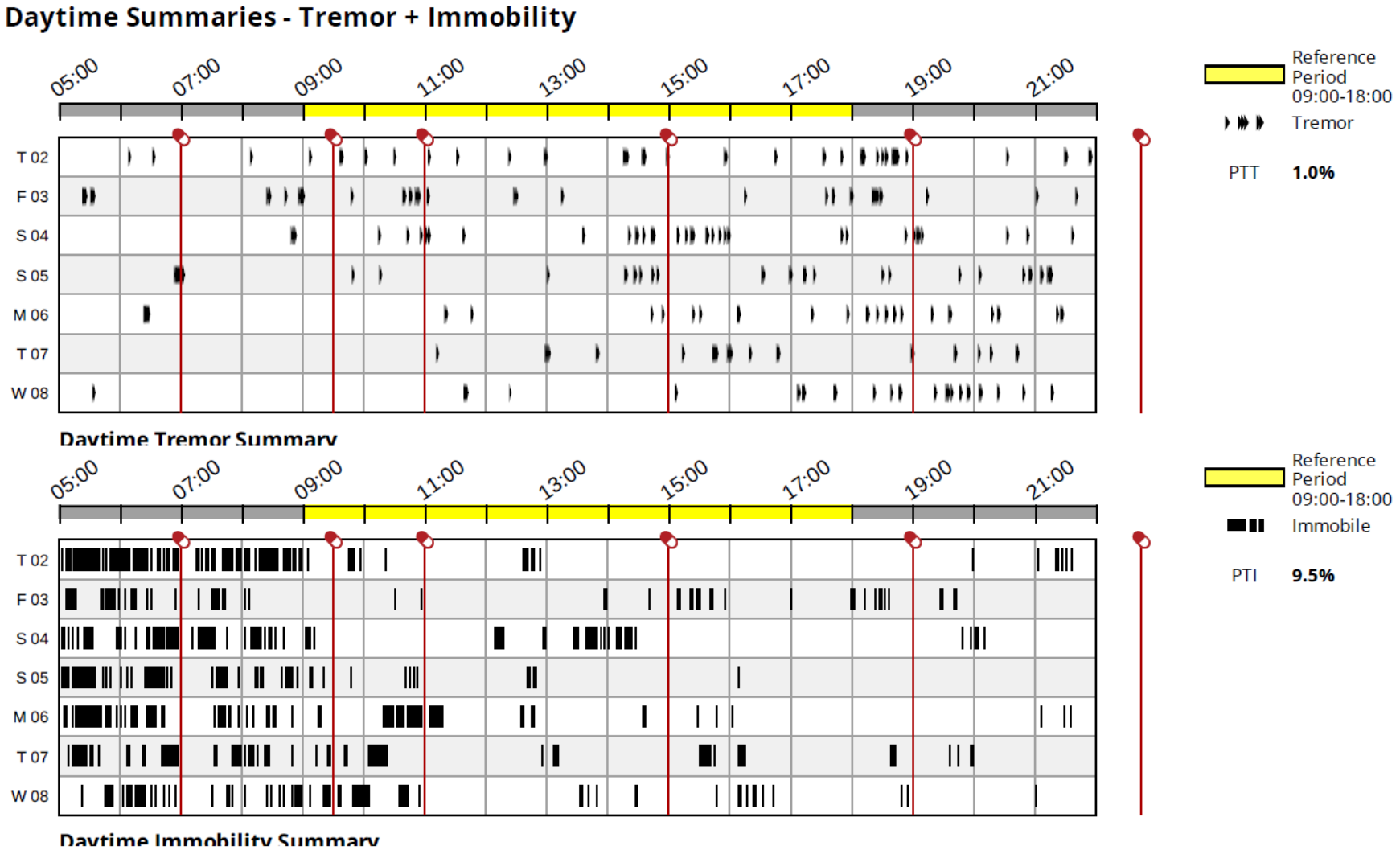
Make measurable change to Parkinson's.

Parkinson's KinetiGraph™

PKG raportti



PKG raportti



TREATING TO TARGET

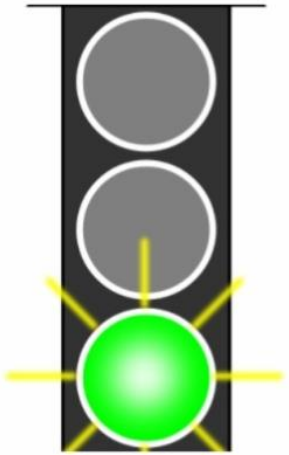
npj | Parkinson's Disease

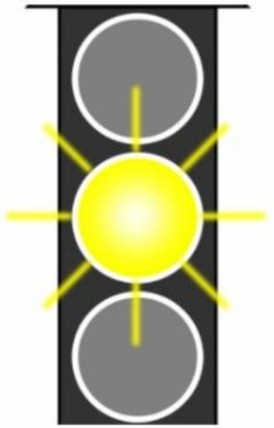
www.nature.com/npjparkd

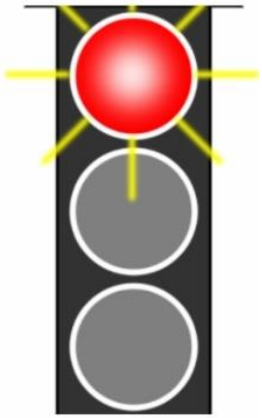
REVIEW ARTICLE OPEN

Viewpoint and practical recommendations from a movement disorder specialist panel on objective measurement in the clinical management of Parkinson's disease

Per Odin[1,2], K. Ray Chaudhuri[3,4], Jens Volkmann[5], Angelo Antonini[6], Alexander Storch[7], Espen Dietrichs[8], Zvezdan Pirtošek[9], Tove Henriksen[10], Malcolm Horne[11,12], David Devos[13] and Filip Bergquist[14]







	Optimaalinen	Hyväksyttävä	Kontrolloimaton
Bradykinesia (BKS)	BKS<23	BKS 23-25	BKS>25
Dyskinesia (DKS)	DKS<7	DKS 7-9	DKS>9
Tilanvaihtelut (FDS)	FDS<10,8	FDS 10,8-12,9	FDS>12,9

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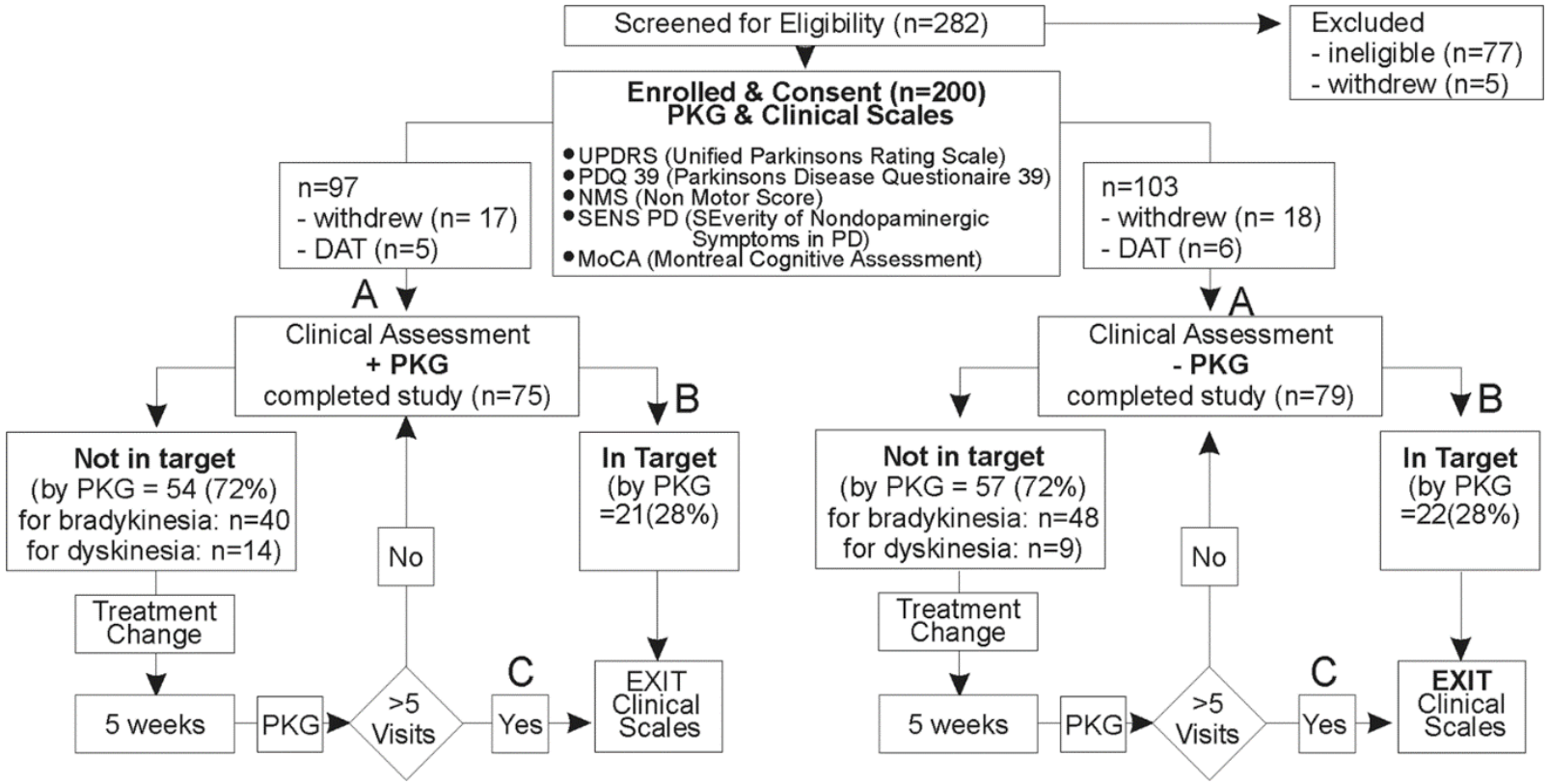
ARTICLE OPEN

Check for updates

A blinded, controlled trial of objective measurement in Parkinson's disease

Holly Woodrow[1,2,17], Malcolm K. Horne[1,2,3,17]✉, Chathurini V. Fernando[1], Katya E. Kotschet[3] and Treat to Target Study Group*



- Väh. 4 vuotta diagnoosista
- Väh 4 annosta levodopaa/vrk
- Ikä 59-75v

EI

- Laiteavusteiset hoidot
- MoCa <22
- Ortostatismi tai psykoosi
- Aiempi PKG

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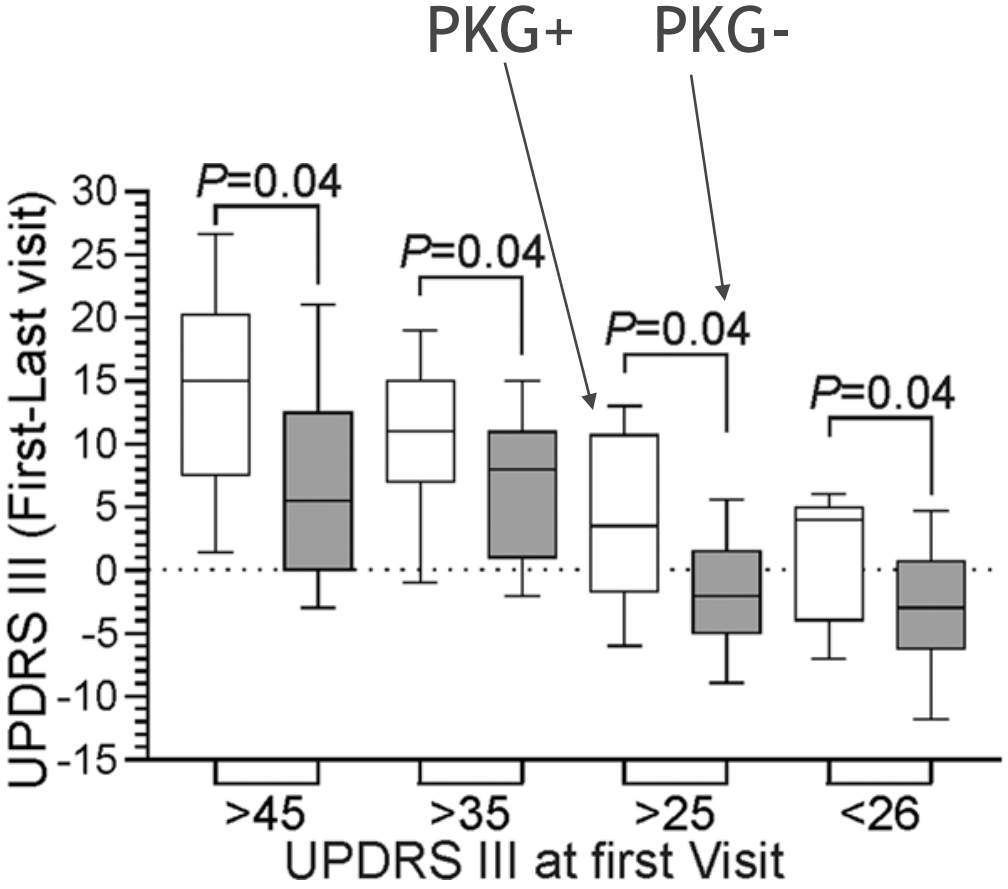
ARTICLE OPEN

Check for updates

A blinded, controlled trial of objective measurement in Parkinson's disease

Holly Woodrow[1,2,17], Malcolm K. Horne[1,2,3,17]✉, Chathurini V. Fernando[1], Katya E. Kotschet[3] and Treat to Target Study Group*

	PKG+ (mean ± SD)	PKG− (mean ± SD)	*P* val
All participants' final scores. PKG+ vs PKG−			
UPDRS[a] Total	51.1 ± 14.8	57.4 ± 17.5	0.02*
UPDRS III	28.6 ± 8.0	33.2 ± 10.0	0.002*
PDQ39[b]	22.2 ± 13.6	25.6 ± 18.8	0.21
SENS PD[c]	9.9 ± 4.6	11.4 ± 4.9	0.055
All participants. PKG+ (1st–last visit) vs PKG− (1st–final visit)			
UPDRS Total	8.1 ± 13.6	3.8 ± 10.2	0.07
UPDRS III	5.6 ± 8.2	1.5 ± 9.6	0.01*
PDQ39	5.1 ± 10.6	4.6 ± 9.2	0.85
SENS PD	1.1 ± 4.2	0.6 ± 9.3	0.49
Out of target at 1st visit. PKG+ (1st–last visit) vs PKG− (1st– last visit)			
UPDRS Total	10.4 ± 12.7	3.1 ± 9.9	0.0019*
UPDRS III	7.1 ± 7.0	1.8 ± 9.9	0.0004*
PDQ39	6.1 ± 9.8	4.0 ± 8.5	0.335
SENS PD	1.7 ± 4.2	0.8 ± 9.1	0.26
Bradykinesia at 1st visit. PKG+ (1st– last visit) vs PKG− (1st–last visit)			
UPDRS Total	12.7 ± 12.2	4.8 ± 10.3	0.0027*
UPDRS III	8.6 ± 8.3	2.6 ± 9.8	0.0008*
PDQ39	6.8 ± 11.2	2.9 ± 8.8	0.065
SENS PD	2.2 ± 4.5	0.4 ± 9.6	0.052



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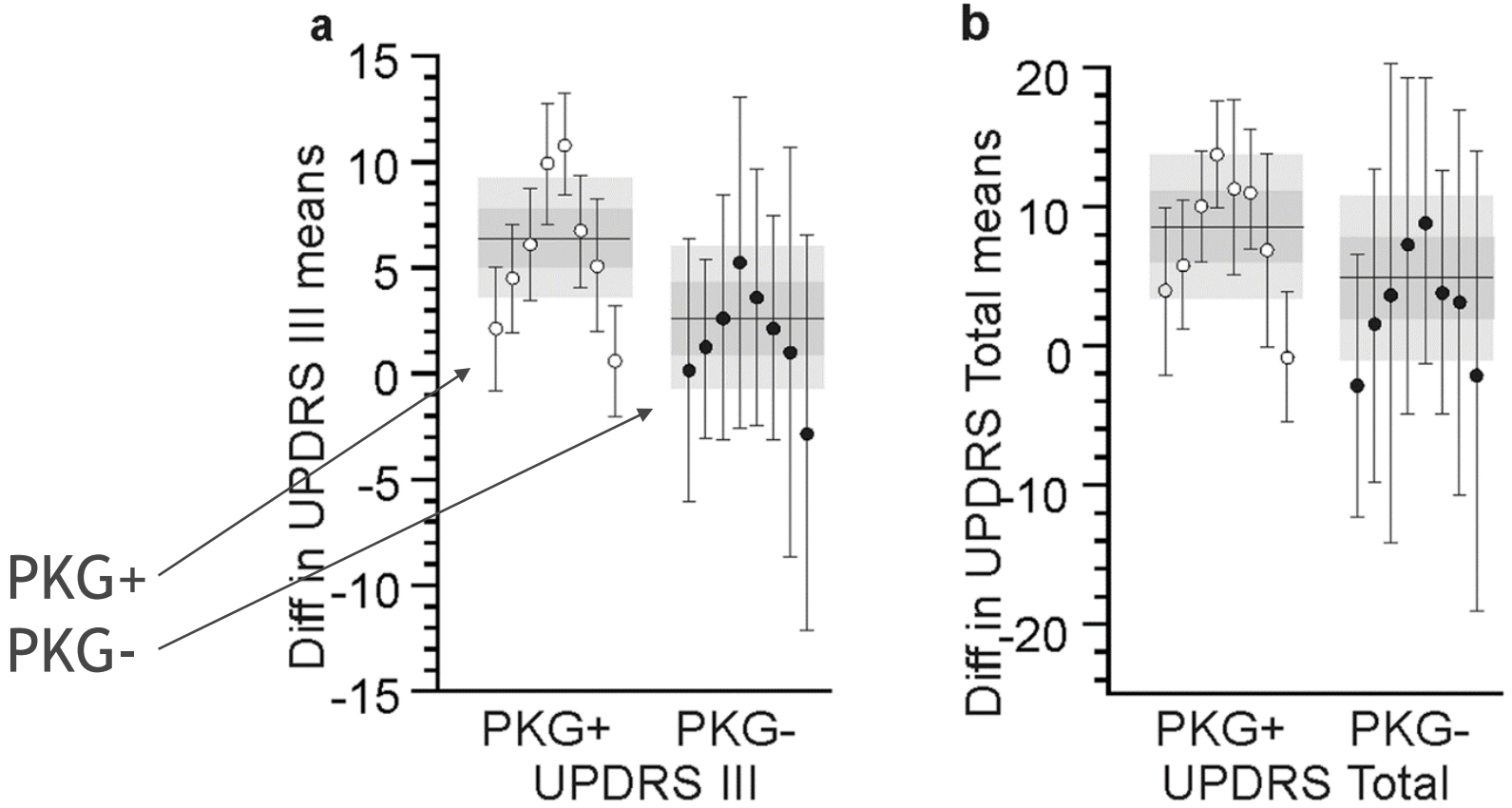
ARTICLE OPEN

Check for updates

A blinded, controlled trial of objective measurement in Parkinson's disease

Holly Woodrow[1,2,17], Malcolm K. Horne[1,2,3,17]✉, Chathurini V. Fernando[1], Katya E. Kotschet[3] and Treat to Target Study Group*

UPDRS muutokset eriteltyinä lääkärin mukaan



Contents lists available at ScienceDirect

Parkinsonism and Related Disorders

journal homepage: www.elsevier.com/locate/parkreldis

Comparing subjective and objective response to medications in Parkinson's disease patients using the Personal KinetiGraph™

Erik Krause, Jaskaren Randhawa, Raja Mehanna *

UT MOVE, University of Texas Health Science Center at Houston Mc Govern Medical School, Houston, TX, USA

Results: 170 PKG results were reviewed. PKG complemented patient input in 82.9%(141/170) and led to medication changes in 71%(100/141) of the complemented inputs. PKG contributed the least to correcting or complementing patients' input when patients self-reported as undertreated (22%) and the most when patient were unable to answer all questions regarding motor response to individual doses (100%) (Fisher, $p < 0.0001$). The majority of patient undergoing 3 or 4 PKG encounters did not reach a controlled state as defined by PKG until the 3rd or 4th encounter, suggesting that repeated use of the PKG might be needed to help optimize motor control as therapy changes done after one encounter might not be enough.

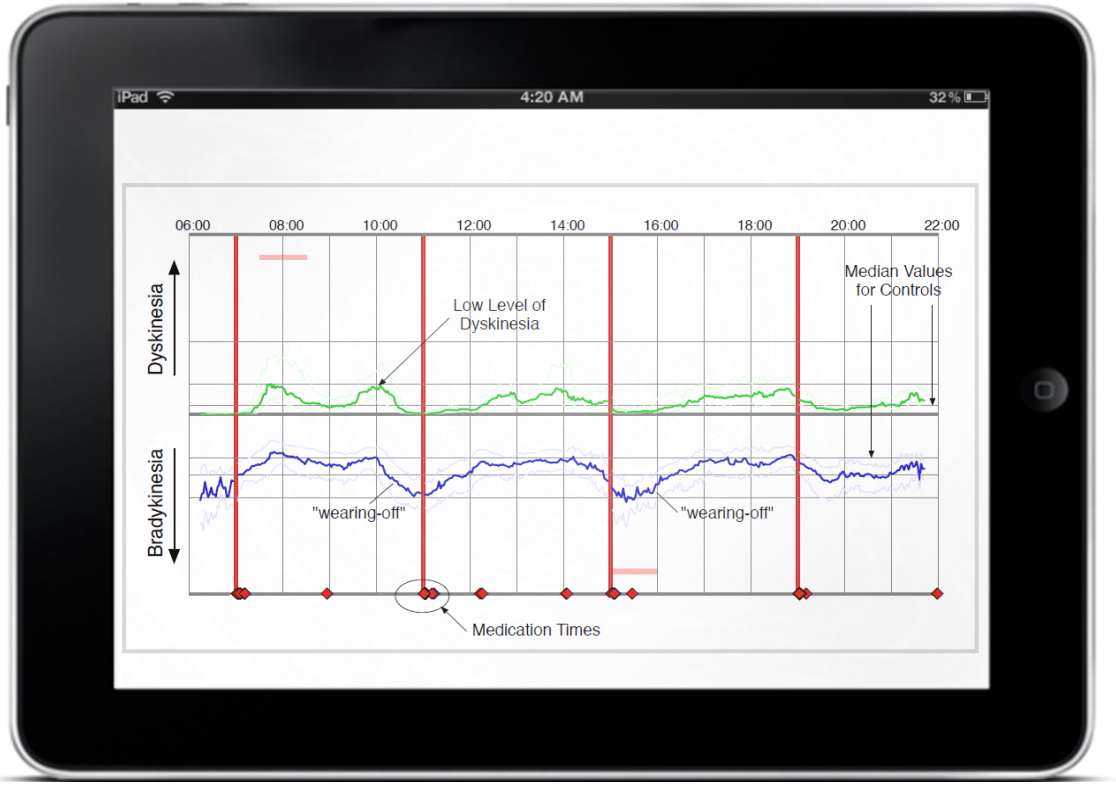
Conclusions: PKG might be useful in supplementing patient-provided information for accurate assessment and treatment plan.

1 Patient was unable to give all characteristics of response to individual doses of medication (latency from medication intake to initial therapeutic effect, percentage of improvement in the ON phase, duration of benefit/wearing off before the next dose, presence, timing and severity of dyskinesia).
2 Patient did not feel any response to medication individual doses but overall felt better.
3 Patient felt no response at all to medication, i.e. considered him/herself undertreated.
4 Patient was able to give all characteristics of response to individual doses of medication.

Impact of PKG results on assessment and management.

Category	Number of PKG encounters	PKG modified	Treatment changed after PKG (%)
		patient input	
1	46	46 (100%)	25 (54%)
2	28	24 (86%)	19 (79%)
3	18	4 (22%)	0 (as these patient felt uncontrolled but were found to be adequately controlled on PKG and thus did not require medication change)
4	78	67 (86%)	56 (including 4 DBS programming) (84%)
Total	170	141 (83%)	100 (71%)

PKG - Menetelmä Parkinsonin taudin motoristen oireiden objektiiviseen mittaamiseen potilaan kotona



PKG™-menetelmän etuja:

- Helpottaa keskustelua potilaan kanssa ja päätöksentekoa.
- Objektiivista tietoa pitkältä aikajaksolta.
- Riippumaton henkilökohtaisista tulkinnoista.
- Vastaanotolla jää enemmän aikaa keskittyä Parkinsonin taudin kokonaisvaltaiseen hoitoon.
- Oikea hoito oikeaan aikaan.
- Parempi hoitotasapaino parantaa elämänlaatua ja vähentää uusintakäyntejä.

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