In format provided by Poewe, W. *et al.* (doi:10.1038/nrdp.2017.13)

Supplementary table 1: Imaging biomarkers for used to study Parkinson disease

Target (technique and/or marker)	Findings in Parkinson disease	Diagnostic potential	Research setting
Presynaptic nigrostriatal neuron integrity (different PET and SPECT tracers, which asses DDC activity (for example, ^{18}F-DOPA PET), DAT availability (for example, ^{123}I-ioflupane SPECT, ^{99m}Tc-TRODAT SPECT, ^{18}F-CFT PET, ^{11}C-MP PET) or VMAT‑2 activity (for example, ^{11}C-DTBZ PET))	Decreased (affecting caudal more than rostral striatum) due to nigrostriatal dopaminergic denervation	Early and differential diagnosis (for example, non-degenerative parkinsonism or tremor, which is not associated with Parkinson disease)	Sensitive to disease progression and a marker for prodromal disease (for example, RBD and asymptomatic *LRRK2* carriers)
Striatal dopamine D2/D3 receptors (different PET and SPECT tracers: for example, ^{123}I-IBZM SPECT, ^{18}F-fallypride PET, ^{11}C-raclopride PET)	Binding increased in putamen in untreated patients with normalisation or slight decrease on dopaminergic treatment	Reduced binding in atypical parkinsonism, but suboptimal diagnostic accuracy	Receptor occupancy studies with dopaminergics
Myocardial postganglionic sympathetic innervation (different tracers: for example ^{123}I-metaiodobenzylguanidine szintigraphy, ^{11}C-metahydroxyephedrine PET, ^{18}F-dopamine PET)	Decreased cardiac uptake, but normal cardiac sympathetic innervation in early stages of Parkinson disease may occur	Differential diagnosis (for example, atypical parkinsonism or non-degenerative parkinsonism); results may be confounded by cardiac co-morbidity and several drugs	Marker for prodromal Parkinson disease (for example RBD)
Glucose metabolism (FDG-PET)	(Relative) hypermetabolism in putamen and pallidum and, possibly, thalamus and cerebellum	Early and differential diagnosis (for example, essential tremor or atypical parkinsonism)	Global functional level spatial covariance analysis reveals a specific Parkinson disease-related spatial covariance pattern (PDRP) of metabolic alterations, which is progression marker, marker for prodromal disease and surrogate marker for treatment effects
Nigral echogenicity (transcranial brain parenchyma sonography)	Hyperechogenicity in the area of the substantia nigra (can be found in up to 23% of healthy controls)	Early and differential diagnosis (for example, atypical parkinsonism or non-degenerative parkinsonism)	Risk marker for developing Parkinson disease and marker for prodromal Parkinson diseae (for example, RBD and asymptomatic *LRRK2* carriers)
Brain structure (routine sequences of MRI)	No disease-specific changes in PD, especially in the early disease stages, but mild cortical atrophy involving hippocampal and frontal structures as disease progresses	Diagnosis of symptomatic parkinsonism due to underlying central nervous system pathologies and support differential diagnosis vs. atypical parkinsonism	Characterisation of subtypes and progression of Parkinson disesae (for example, grey matter volume analysis, cortical thickness measurements, cortical gyrification)
Dorsolateral nigral hyperintensity (DNH) (specific iron-sensitive sequences)	Loss of DNH, which is suggested to reflect degeneration of nigrosome 1 (also called “swallow tail”-sign)	Early diagnosis (investigational)	Diagnostic marker for Parkinson disease and marker for prodromal Parkinson disease (for example, RBD and asymptomatic *LRRK2* carriers)
Iron accumulation (specific iron-sensitive sequences)	Increased nigral iron content	Differential diagnosis (increased putaminal iron content can help to discriminate atypical parkinsonism vs. Parkinson disease)	Potential diagnostic marker for Parkinson disease

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Nigral neuromelanin content (neuromelanin-sensitive MR sequences)	Reduced size, volume and signal intensity of the substantia nigra	Early diagnosis (investigational)	Diagnostic and progression marker for Parkinson disease
Diffusion metrics (diffusion imaging)	Abnormal nigral diffusion metrics	Differential diagnosis vs. atypical parkinsonism (abnormal diffusivity in putamen and/or infratentorial structures)	Diagnostic and progression marker for Parkinson disease
Complementary brain tissue changes (multimodal MRI) [b]	Abnormal nigral diffusion metrics and abnormal nigral iron content	Currently not established	Diagnostic marker for Parkinson disease
Connectivity (structural with tractography and functional with resting state functional MRI)	Reduced structural connectivity of the substantia nigra with the basal ganglia and decreased coupling in different nigral and striatal brain networks	Currently not established	Diagnostic marker and characterisation of subtypes of Parkinson disease

CFT= 2β-carbomethoxy-3β-(4-fluorophenyl)tropane; DAT= dopamine transporter; DDC= dopa decarboxylase; DTBZ=dihydrotetrabenazine; IBZM=iodobenzamide; MP= d-threo-methylphenidate; RBD=REM sleep behaviour disorder; TRODAT=2[[2-[[[3-(4-chlorophenyl)-8-methyl-8-azabicyclo[3,2,1]-oct-2-yl]-methyl](2-mercaptoethyl) amino]ethyl]amino]ethane-thiolato(3-)-N2,N2',S2,S2]oxo-[1R-(exo-exo); VMAT-2= vesicular monoamine transporter 2