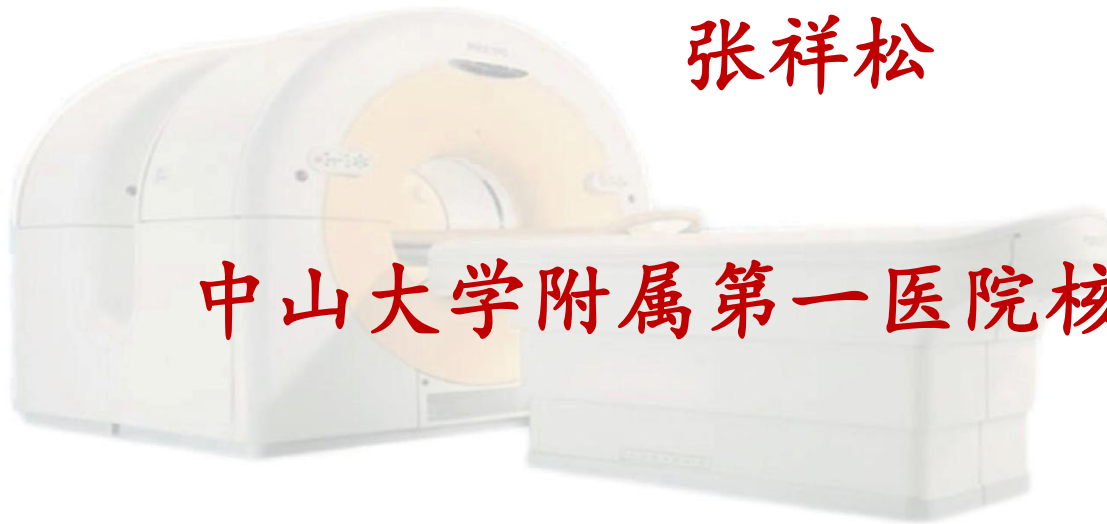


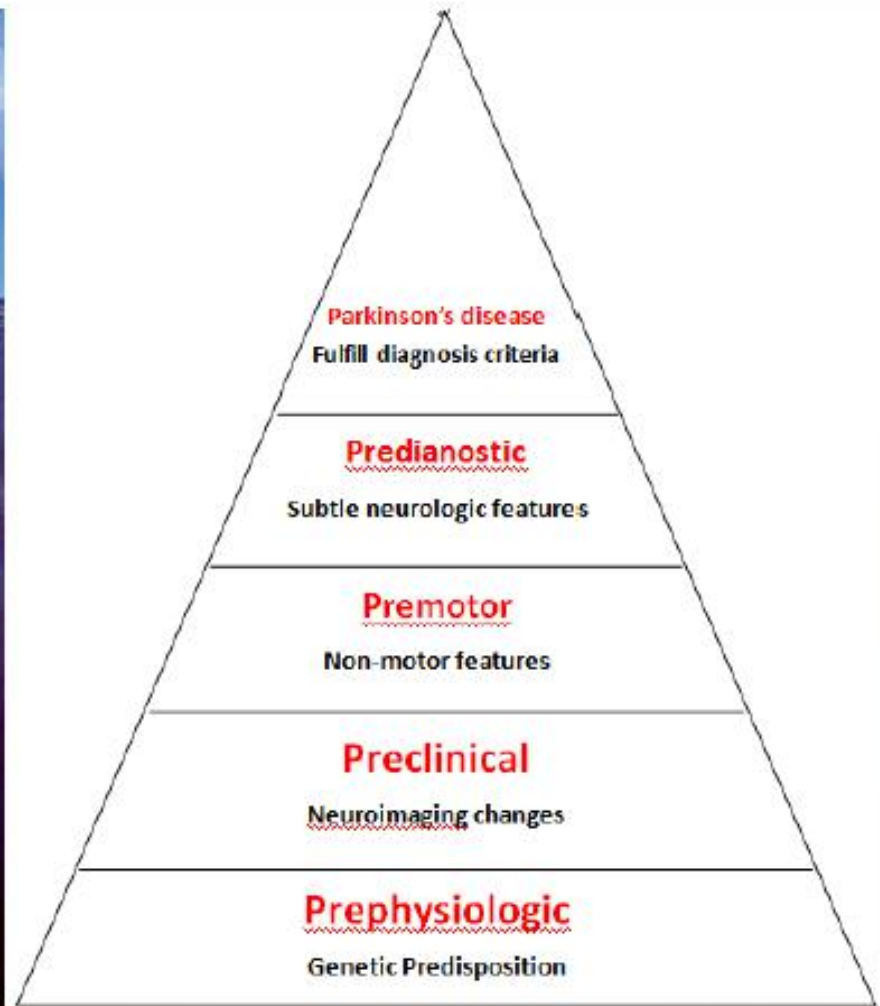
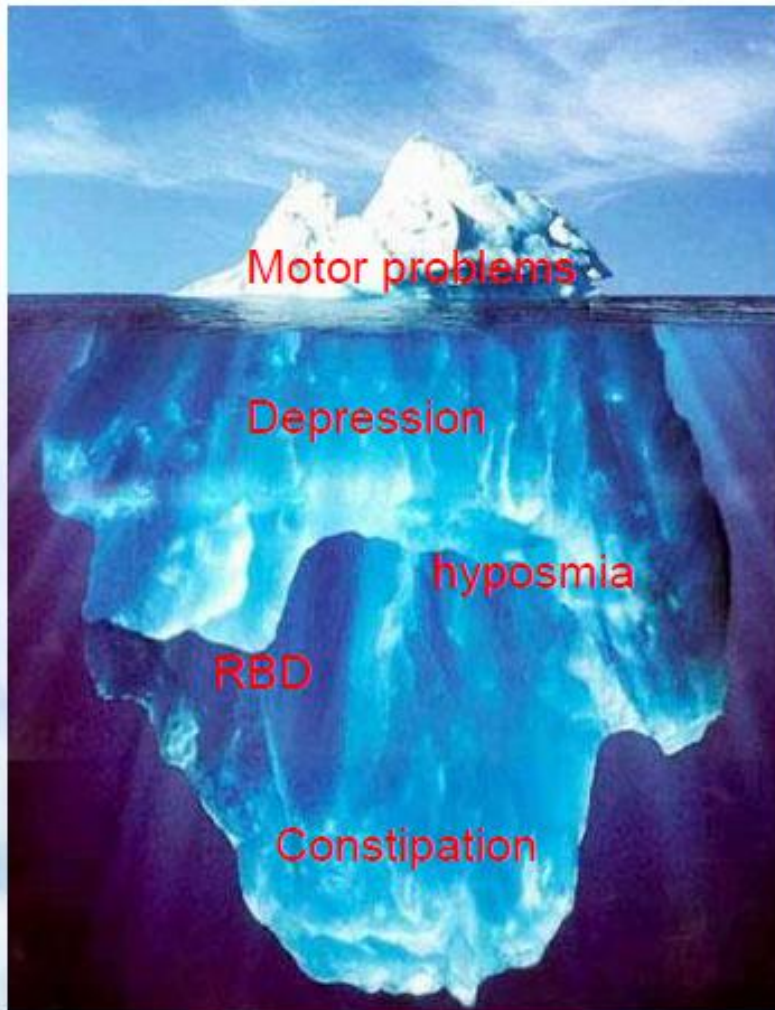
帕金森病的分子影像诊断

张祥松

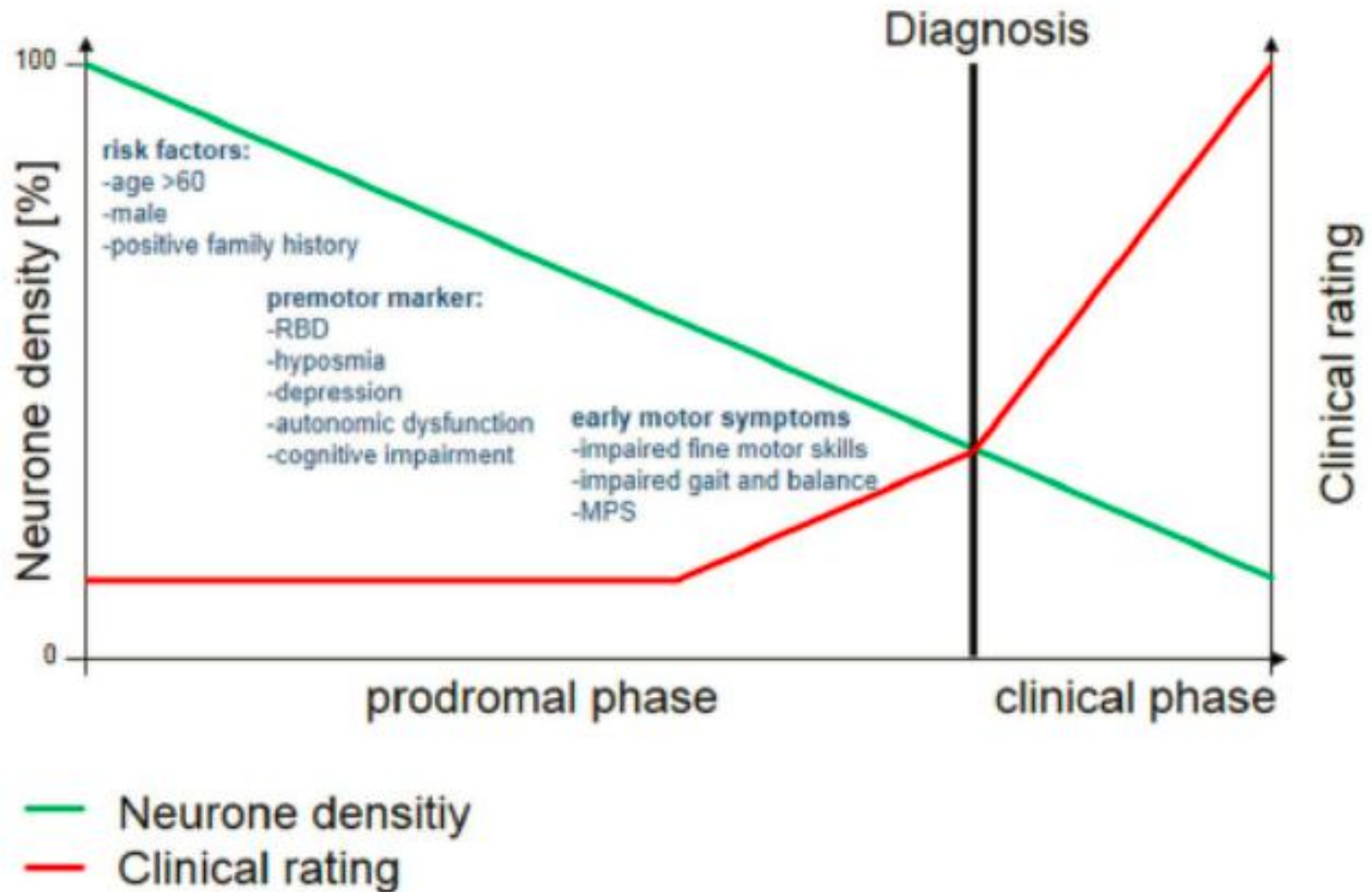
中山大学附属第一医院核医学科



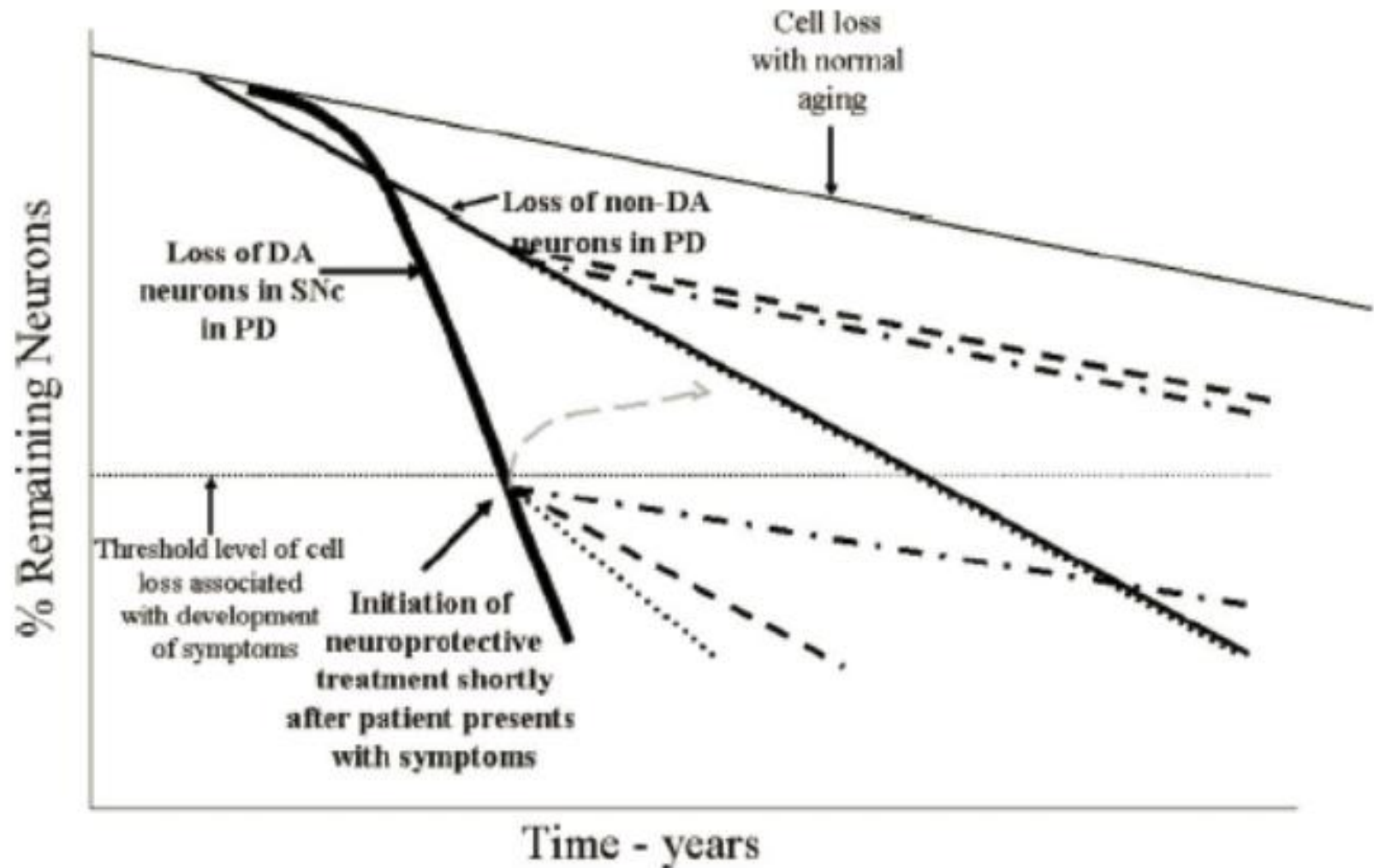
PD临床前症状



多巴胺能神经元丢失与PD临床症状



PD多巴胺能神经选择性丢失

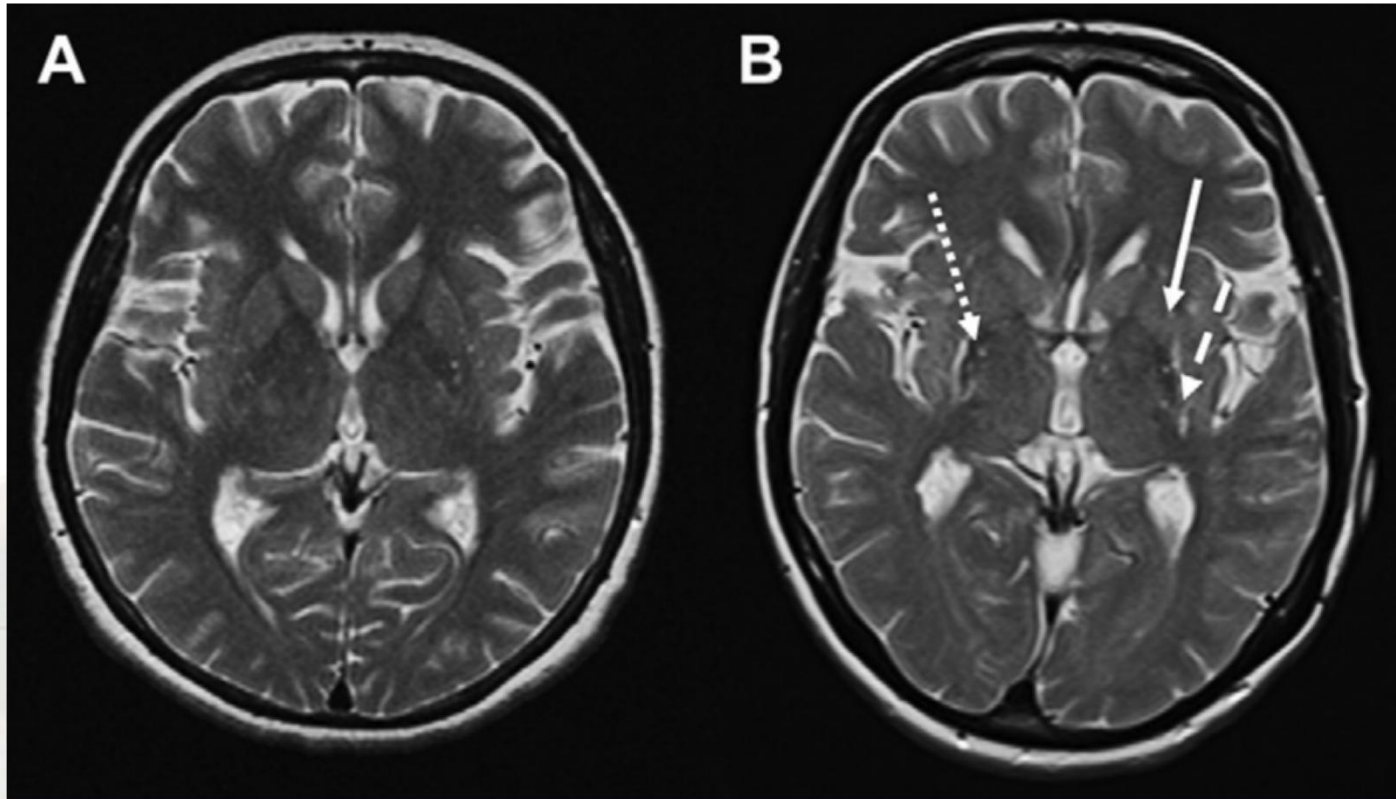


MR诊断PD

- 结构MRI
- 铁沉积MR成像
- 神经褐色素MR成像
- 功能MRI（fMRI）



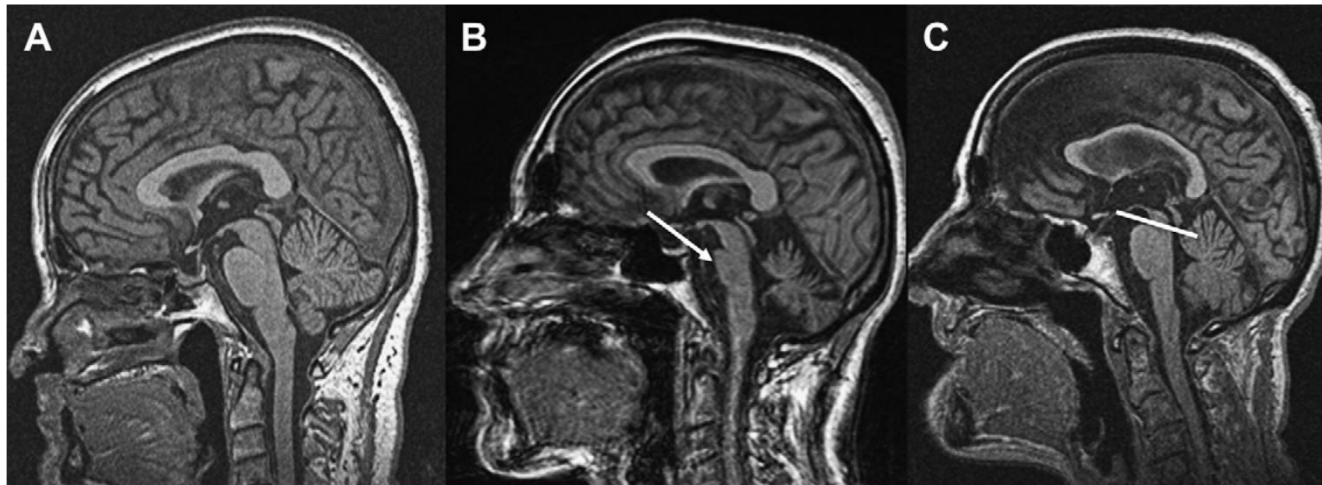
结构MRI



PD

MSA-P型

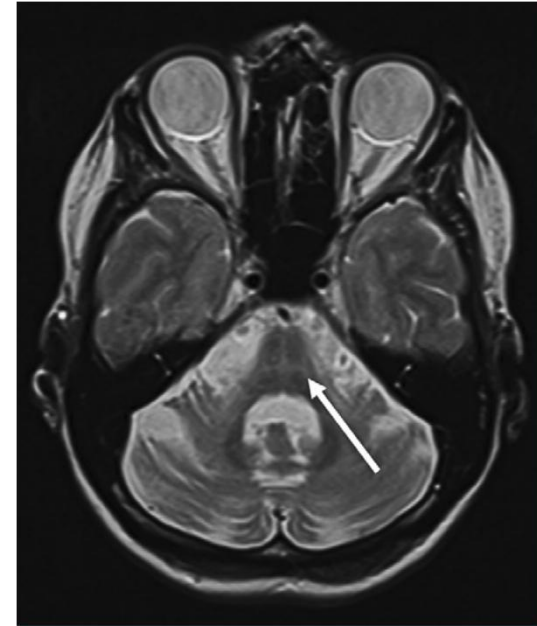
结构MRI



PD

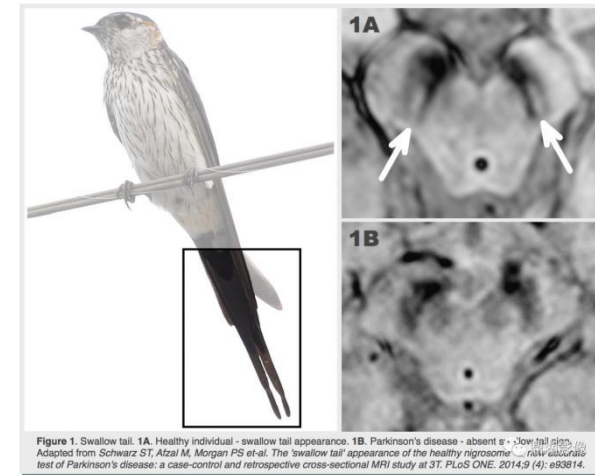
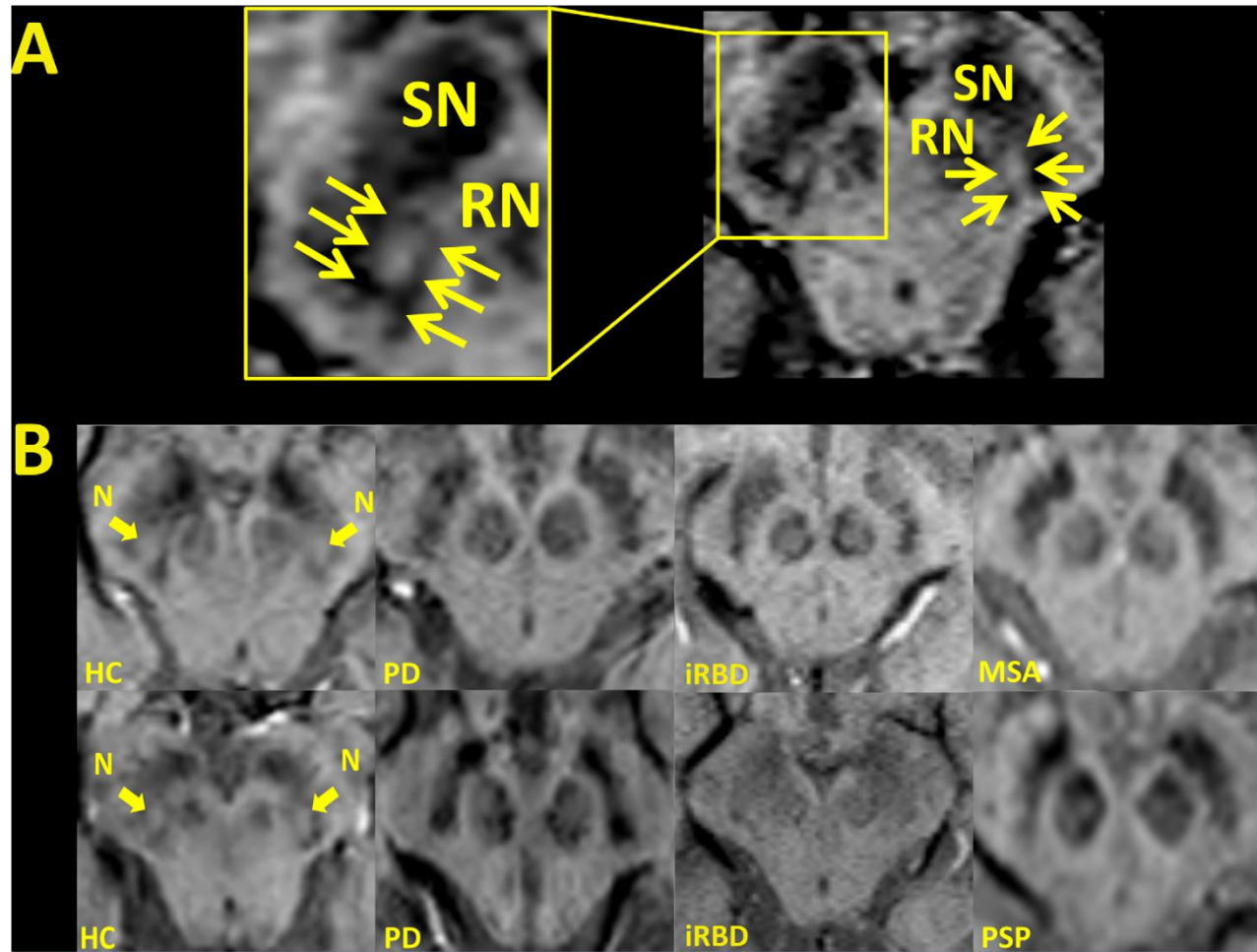
MSA

PSP



十字征

铁沉积 (SWI)

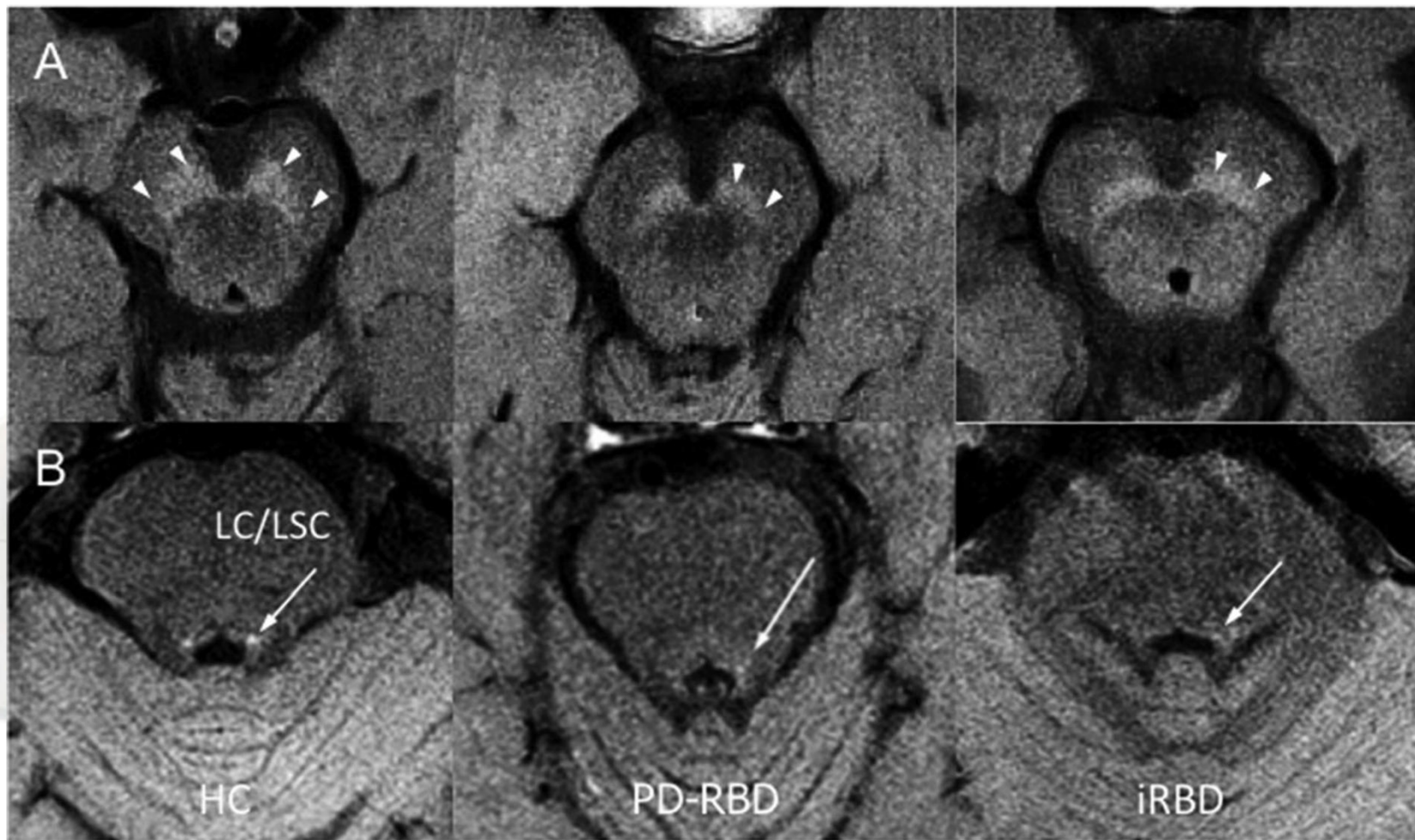


燕尾征

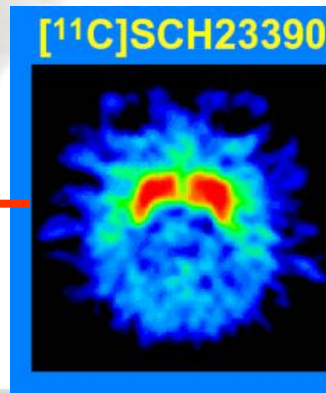
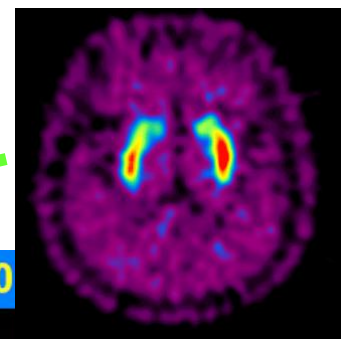
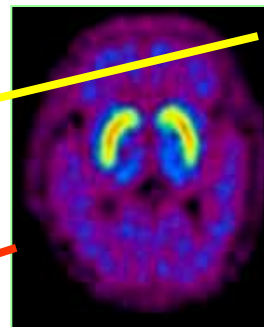
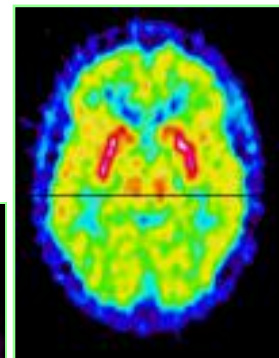
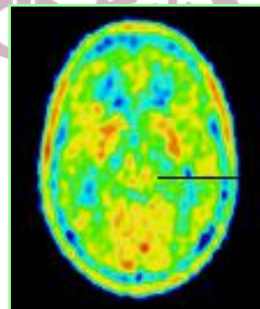
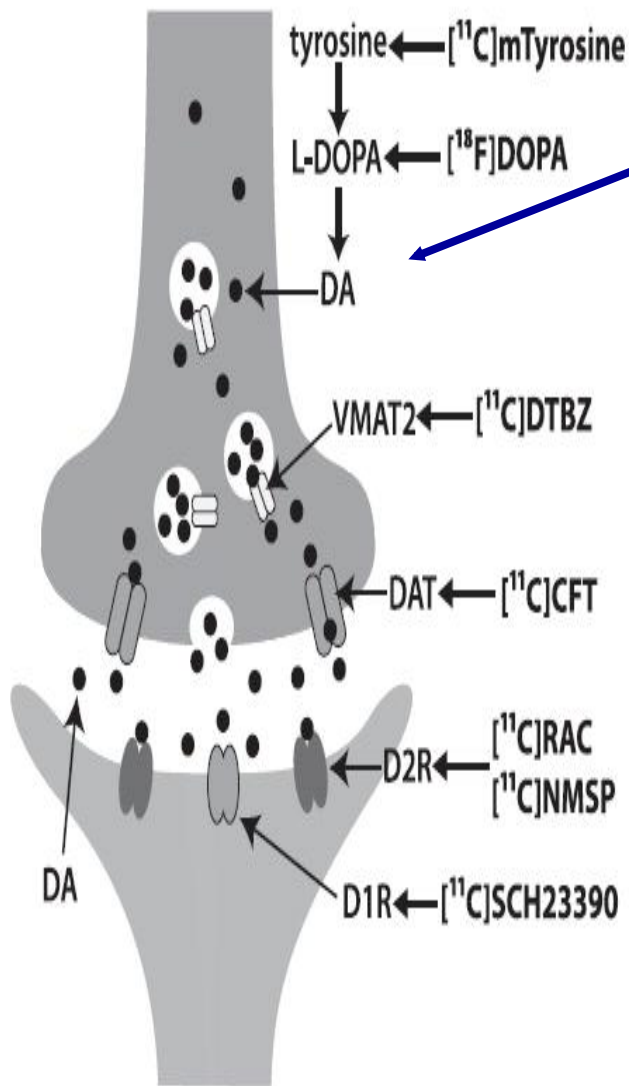
神经褐色素MRI

黑质

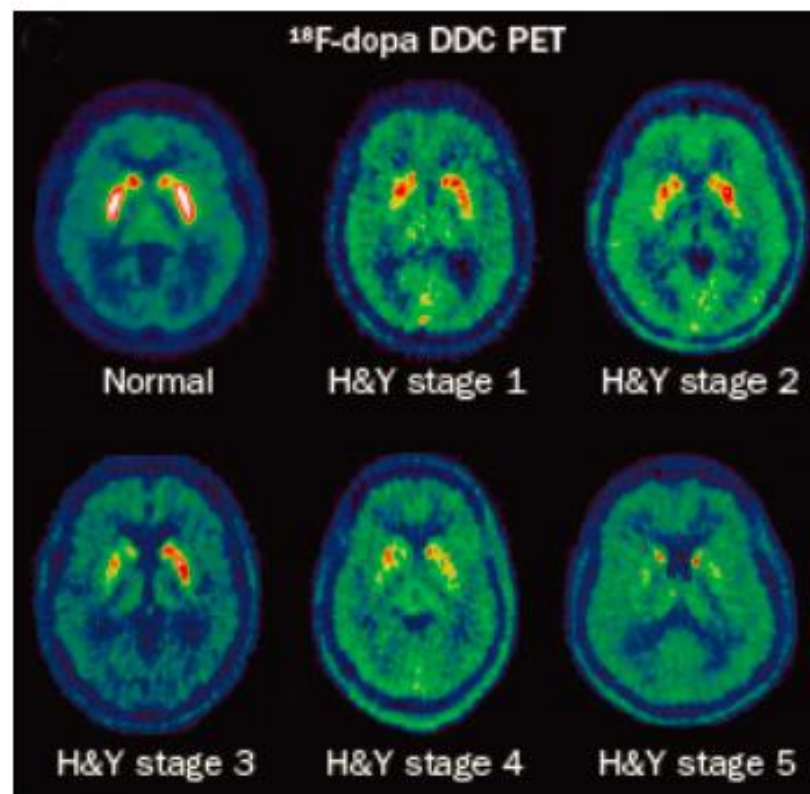
蓝斑

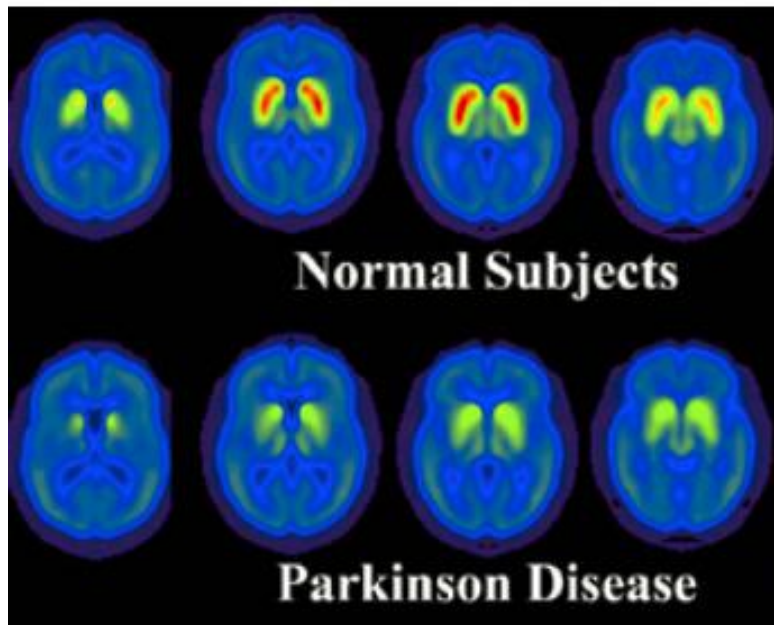


多巴胺能神经PET显像

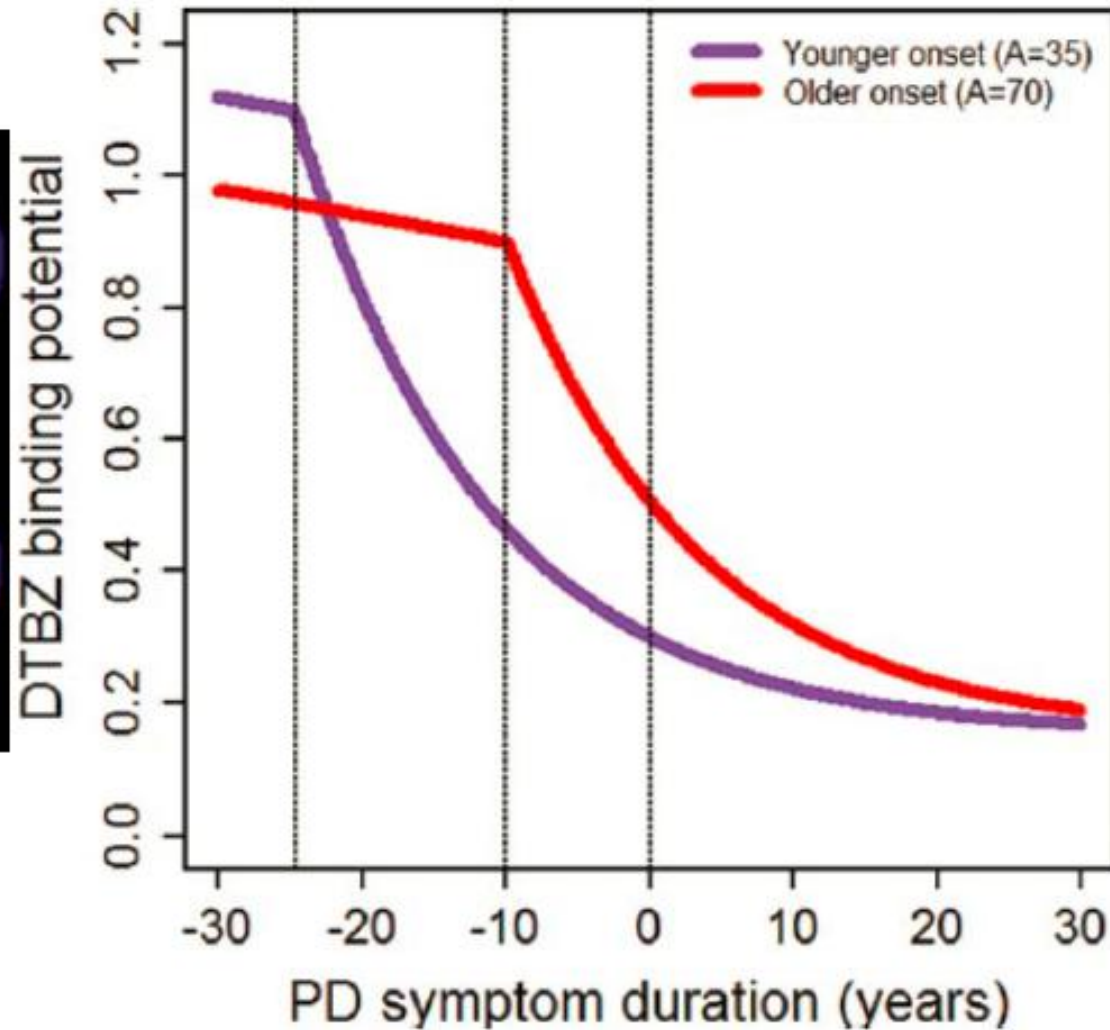


- F-DOPA:
 - 壳核：8%~12%；(正常人：0.5%)
 - 尾核：4%~6%；（正常人：0.7%）
 - 早期每年壳核摄取下降快于中晚期
 - 晚期不对称性趋于消失





DTBZ-PET



$[^{18}\text{F}]\text{FDG}$ 脑代谢联合 $[^{11}\text{C}]\text{CFT}$ 脑多巴胺转运体 PET 显像对帕金森病的临床研究

中国临床神经科学 2014 年第 22 卷第 5 期

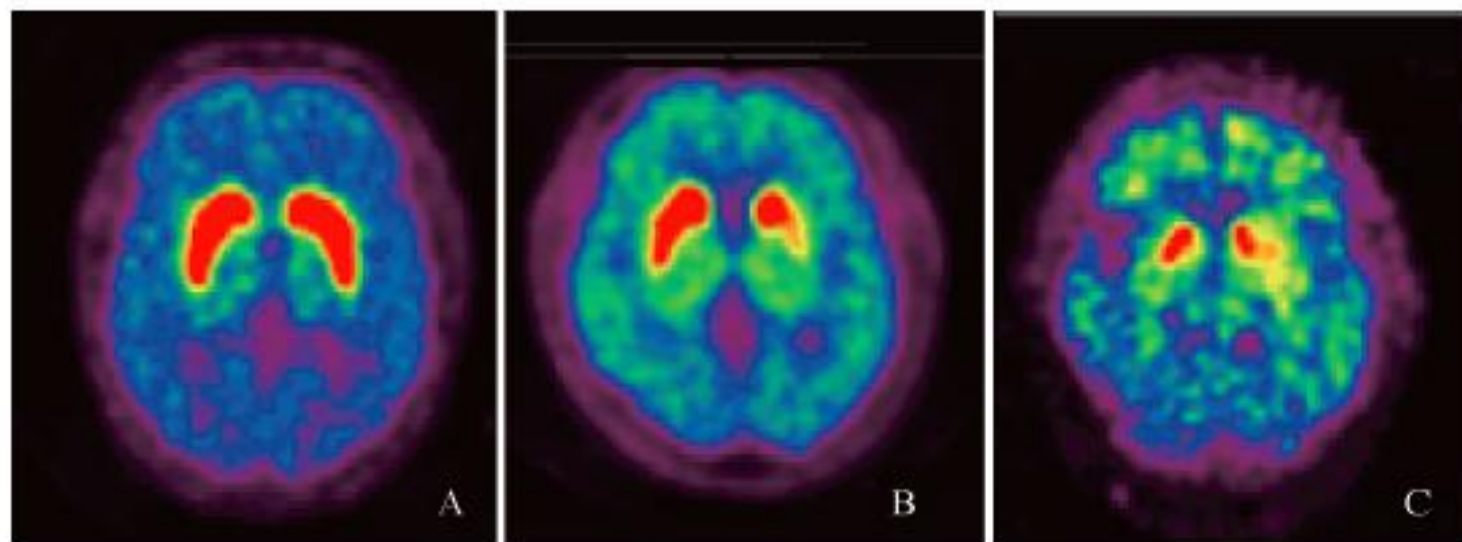
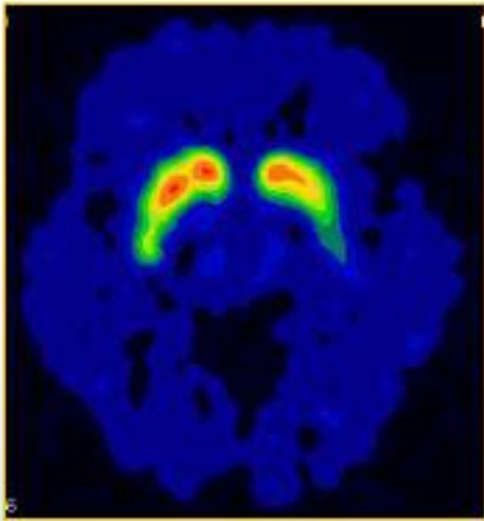


图 2 PD 组与对照组 $[^{11}\text{C}]\text{CFT}$ PET 显像

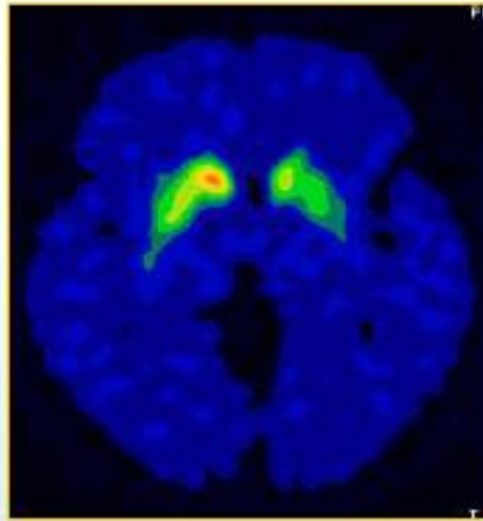
Fig 2 Images of $[^{11}\text{C}]\text{CFT}$ PET in Parkinson's disease and the control group

注：A：对照组；B：H-Y 1 级 PD 组；C：H-Y 4 级 PD 组

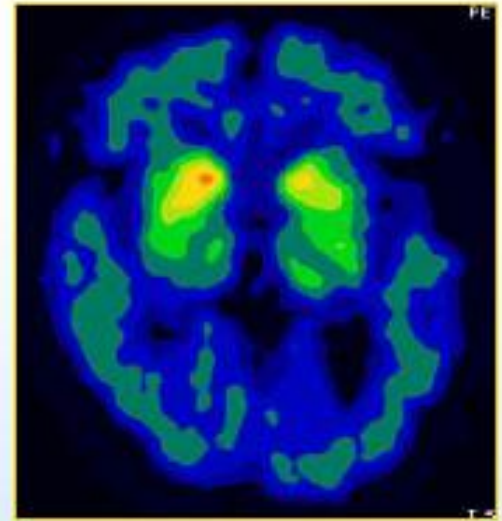
Notes: A. Healthy control group; B. PD group with H-Y stage 1; C. PD group with H-Y stage 4



iPD



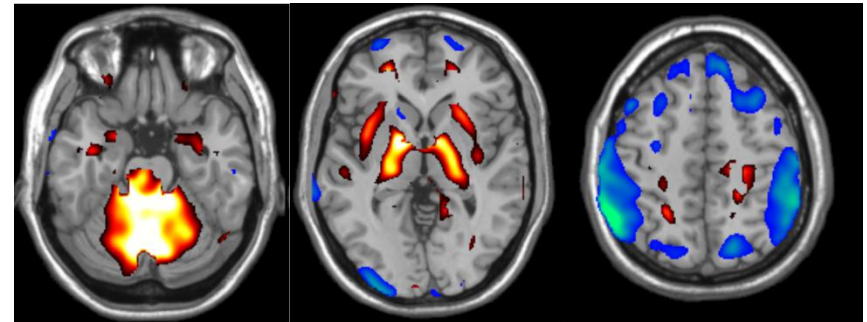
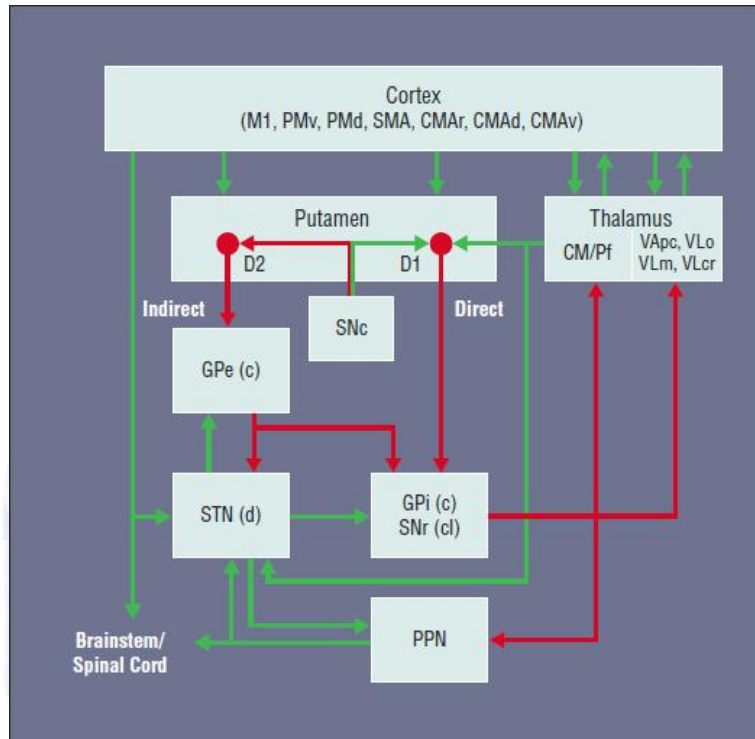
MSA-P



PSP

— ^{18}F -FDG显像

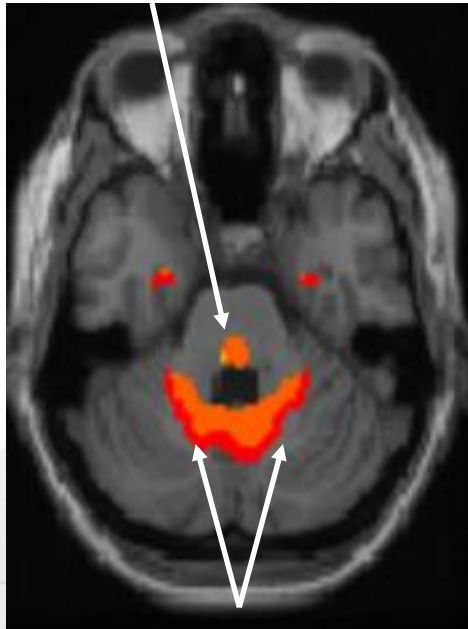
- 非选择性神经损伤-->糖代谢改变



PD患者壳核内多巴胺减少，引起间接通路过度活跃，进而引起苍白球、丘脑、运动皮层代谢改变。 ^{18}F -FDG显像可以反映局部脑区生理电活动。

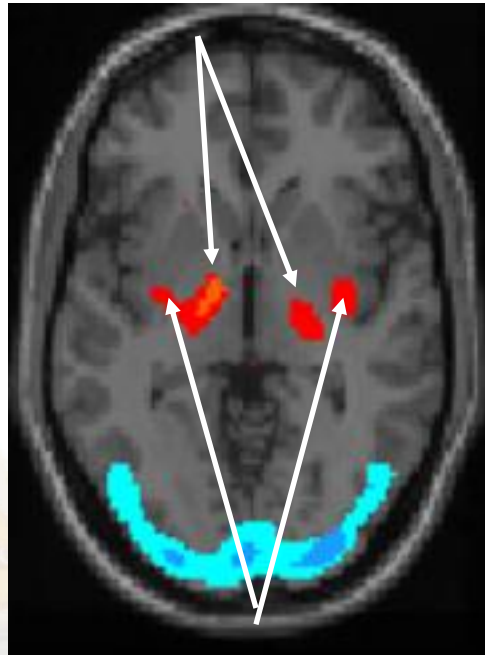
Parkinson's Disease Metabolic Network

Pon



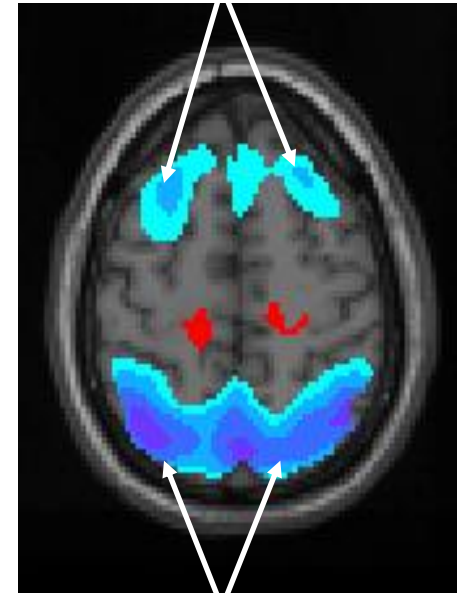
Cerebellum

Thalamus



Put/GP

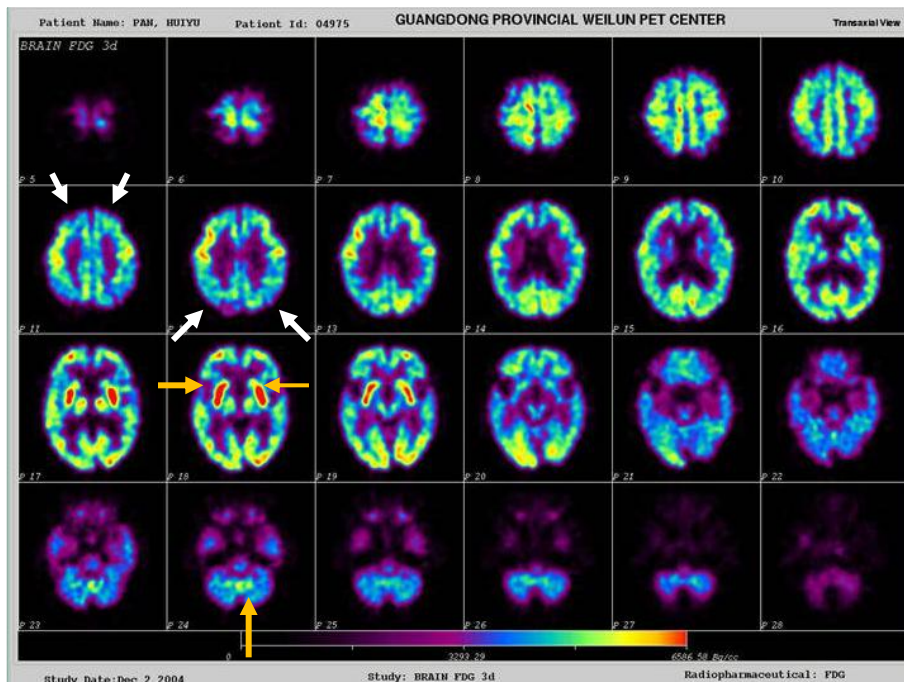
Premotor Cortex



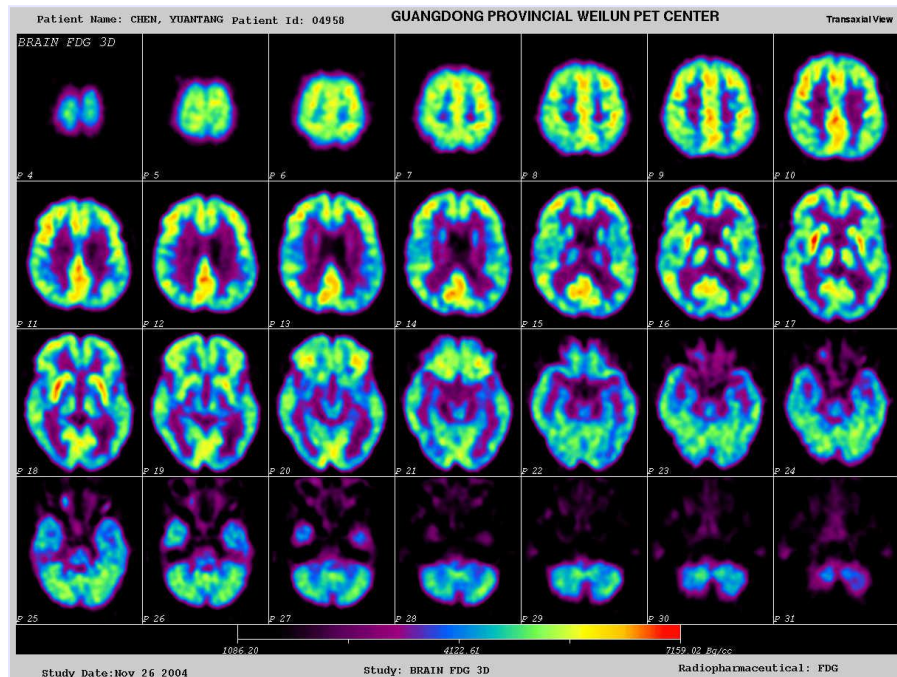
Post Parietal

SPM软件统计分析，PD代谢共变模式(PDRP)评分

^{18}F -FDG显像

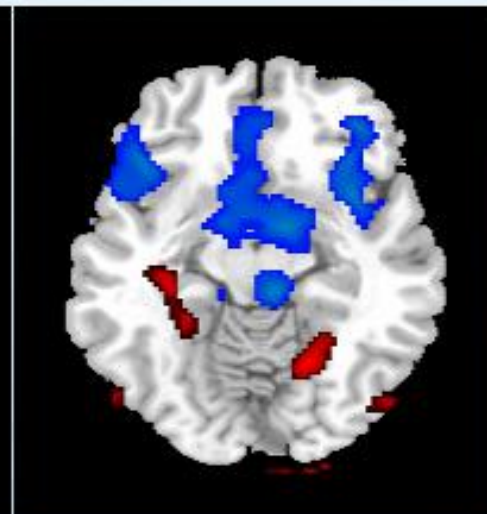
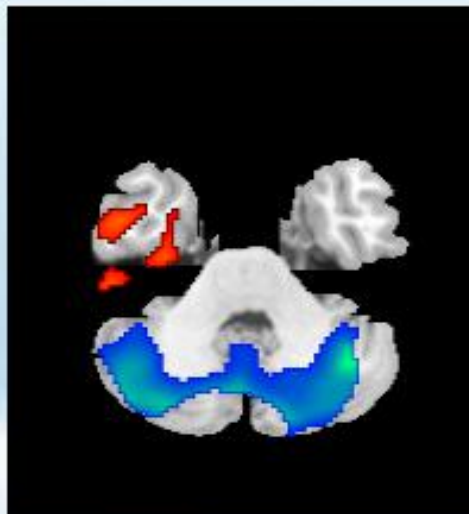
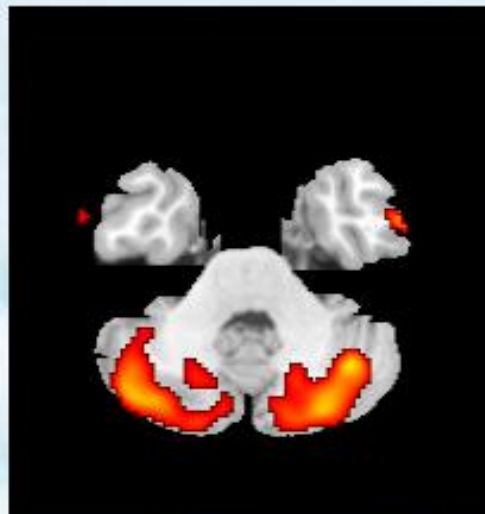
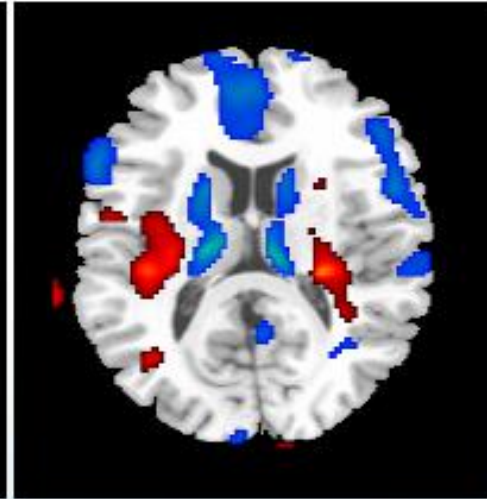
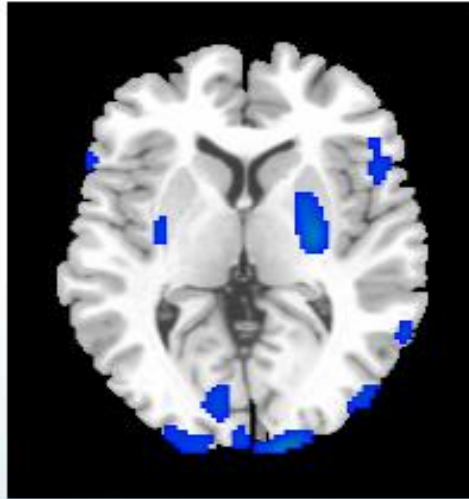
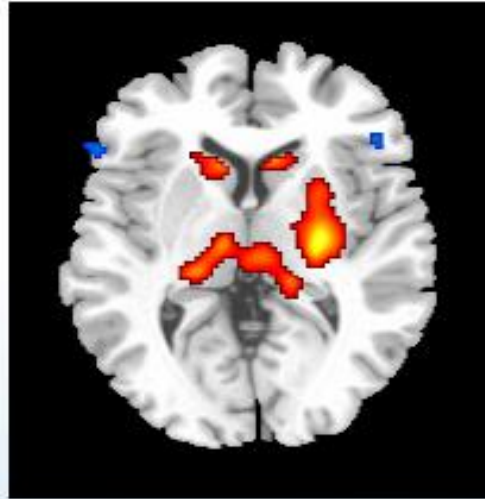


重度PD



轻度PD

帕金森病代谢共变模式

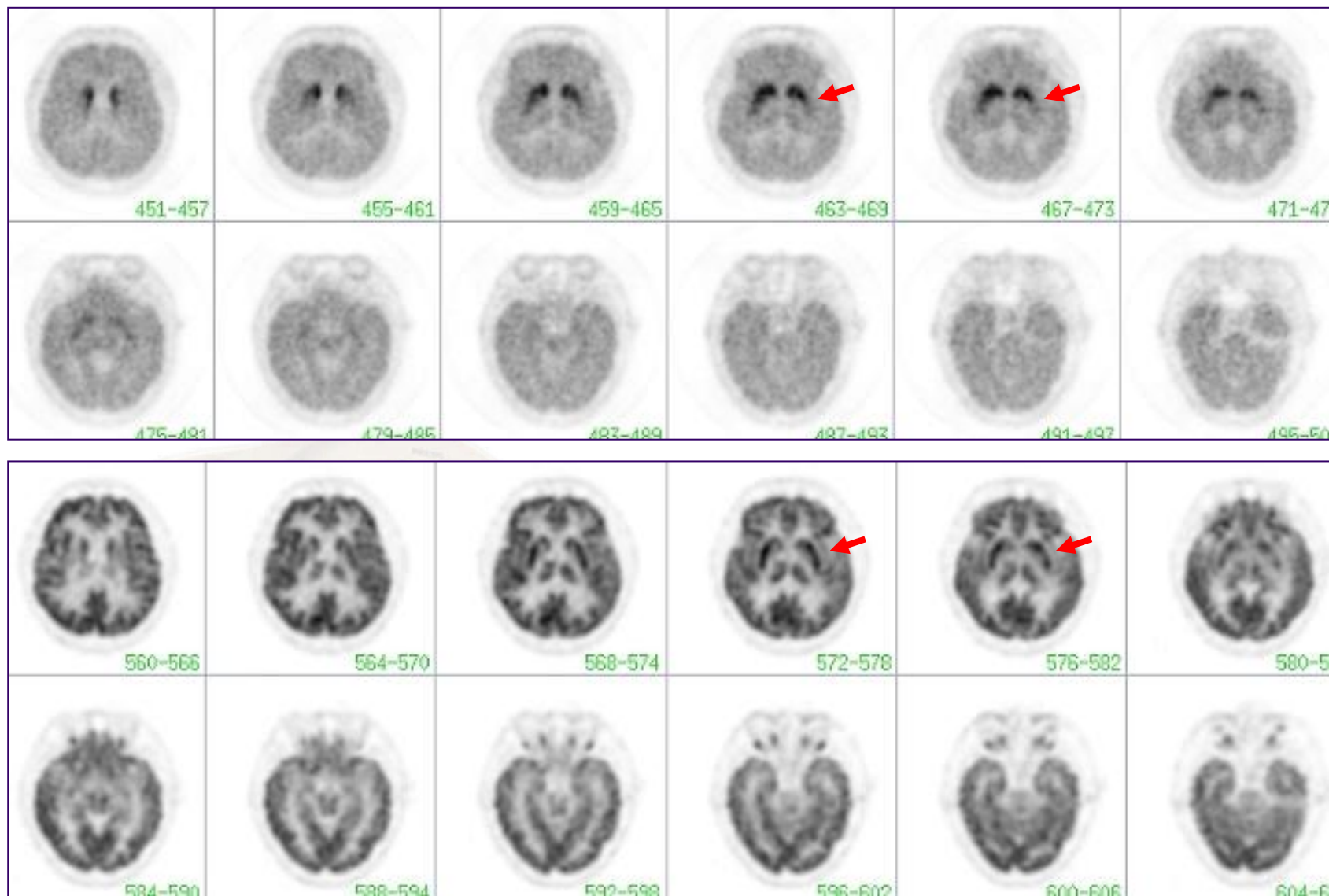


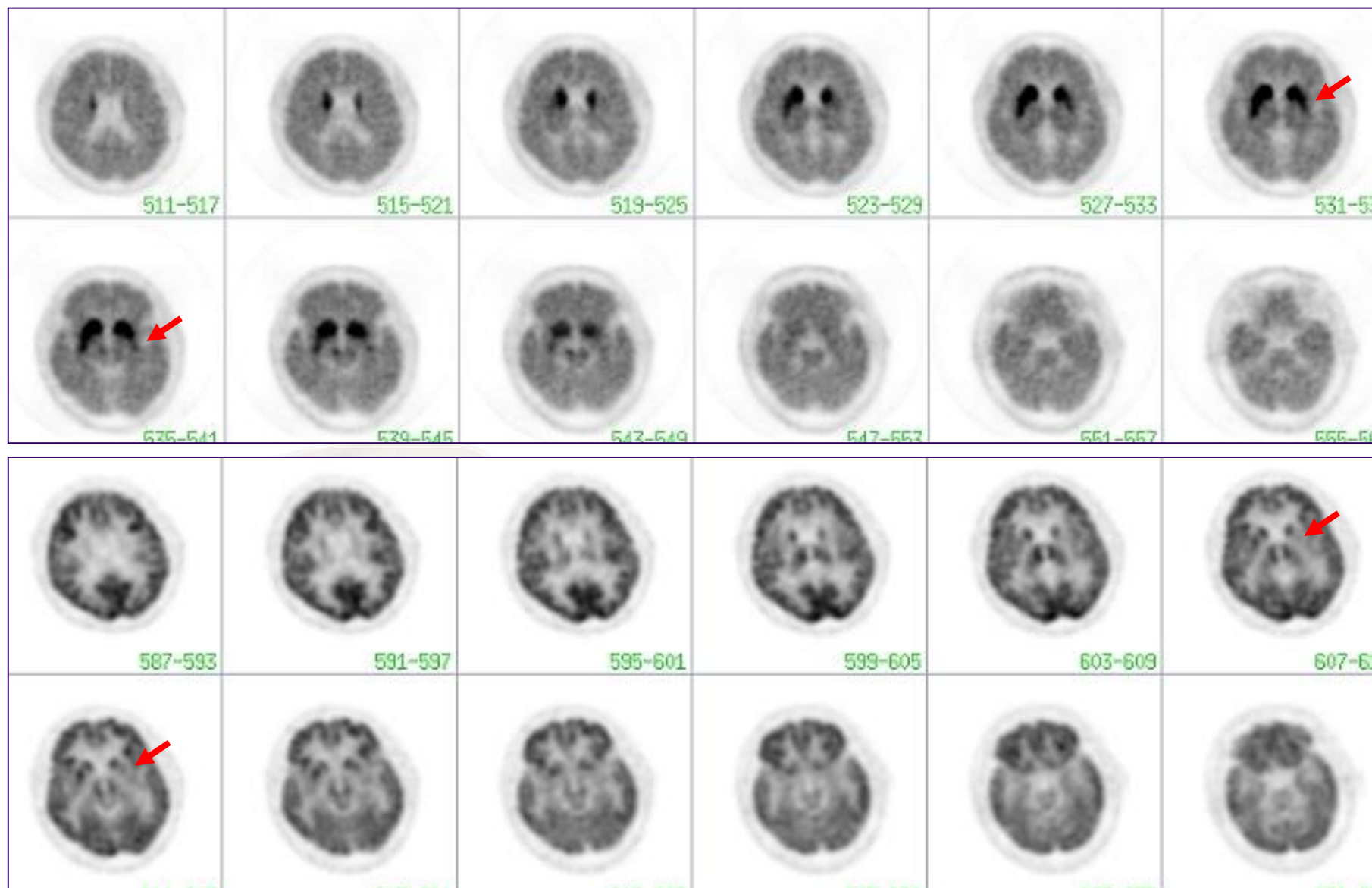
iPD

MSA-P

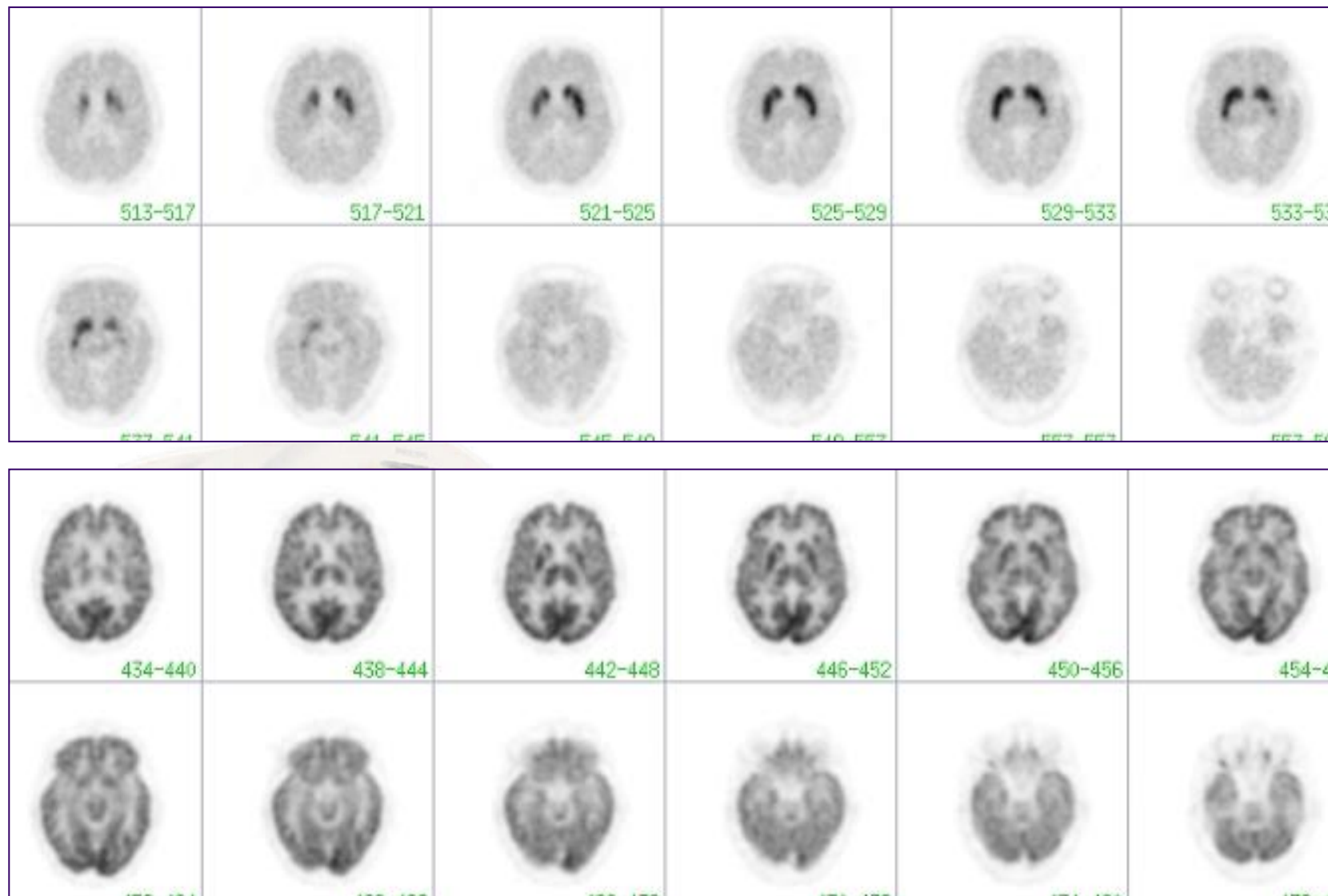
PSP

PD

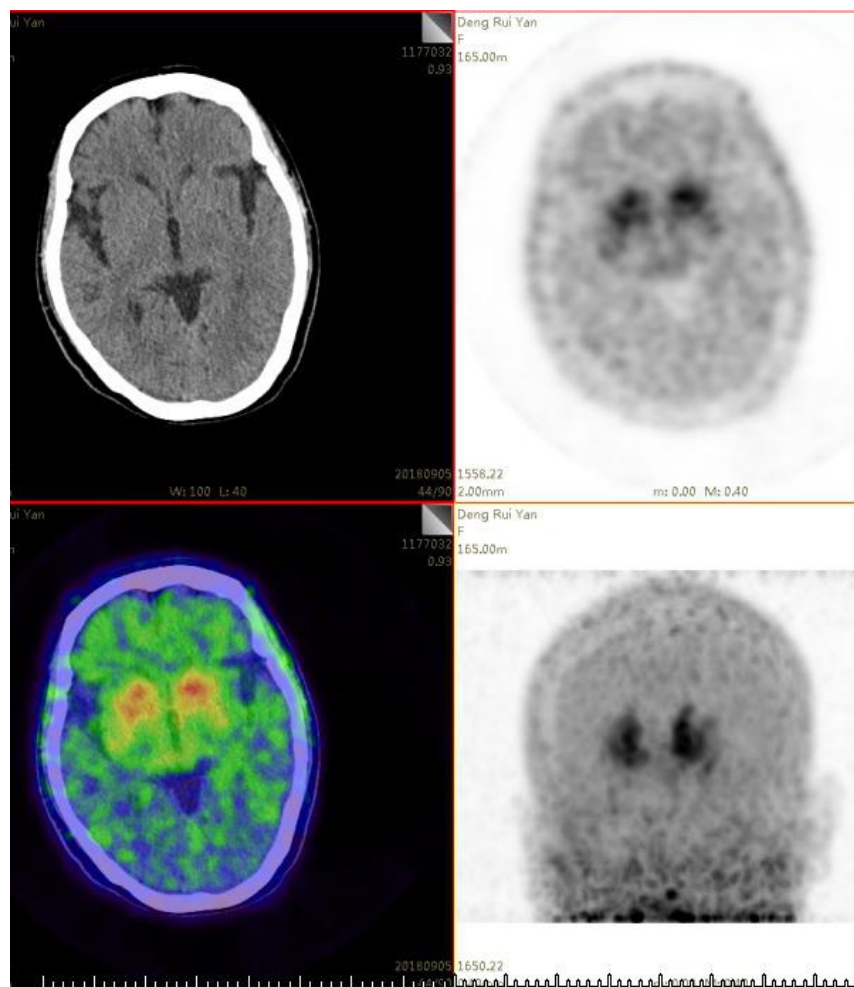




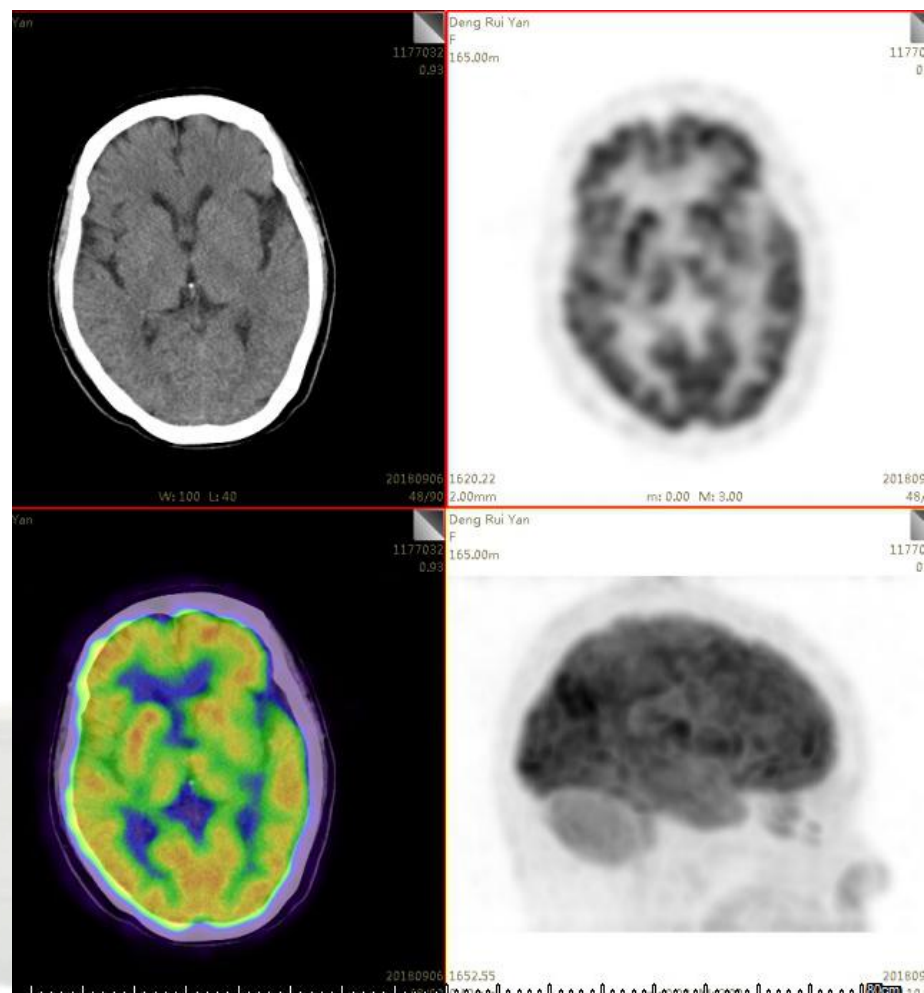
特发性震颤



多系统萎缩

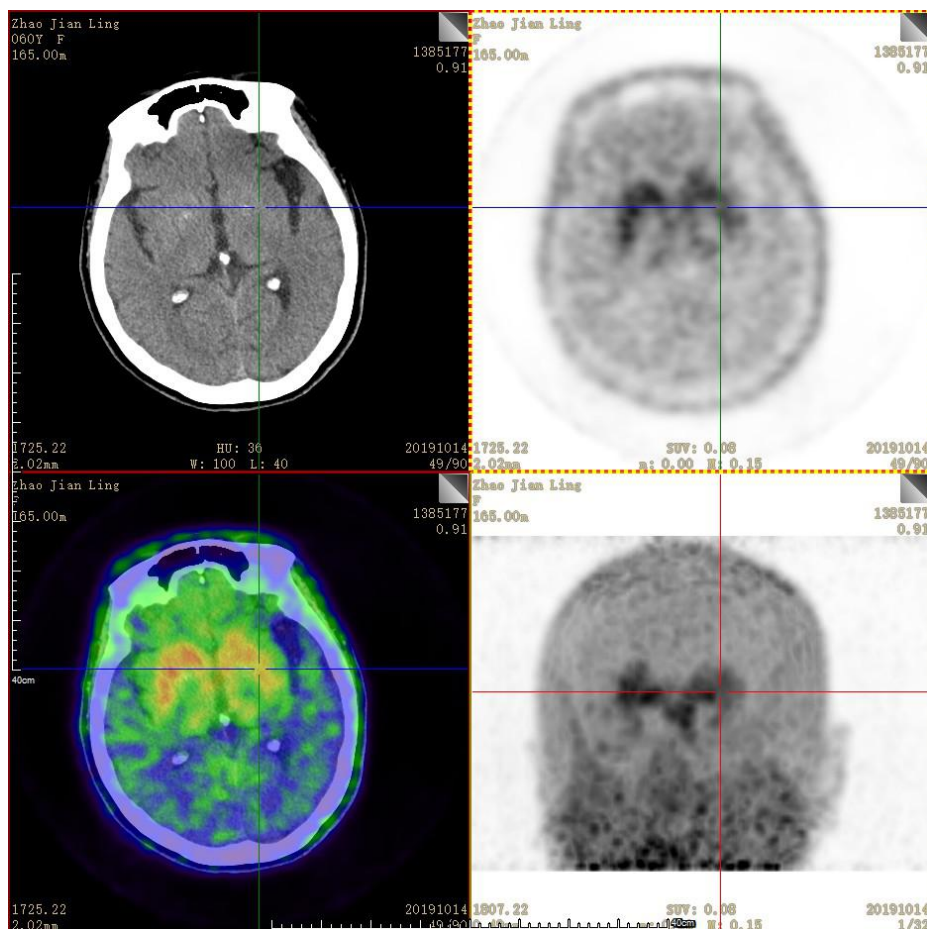


^{18}F -DOPA

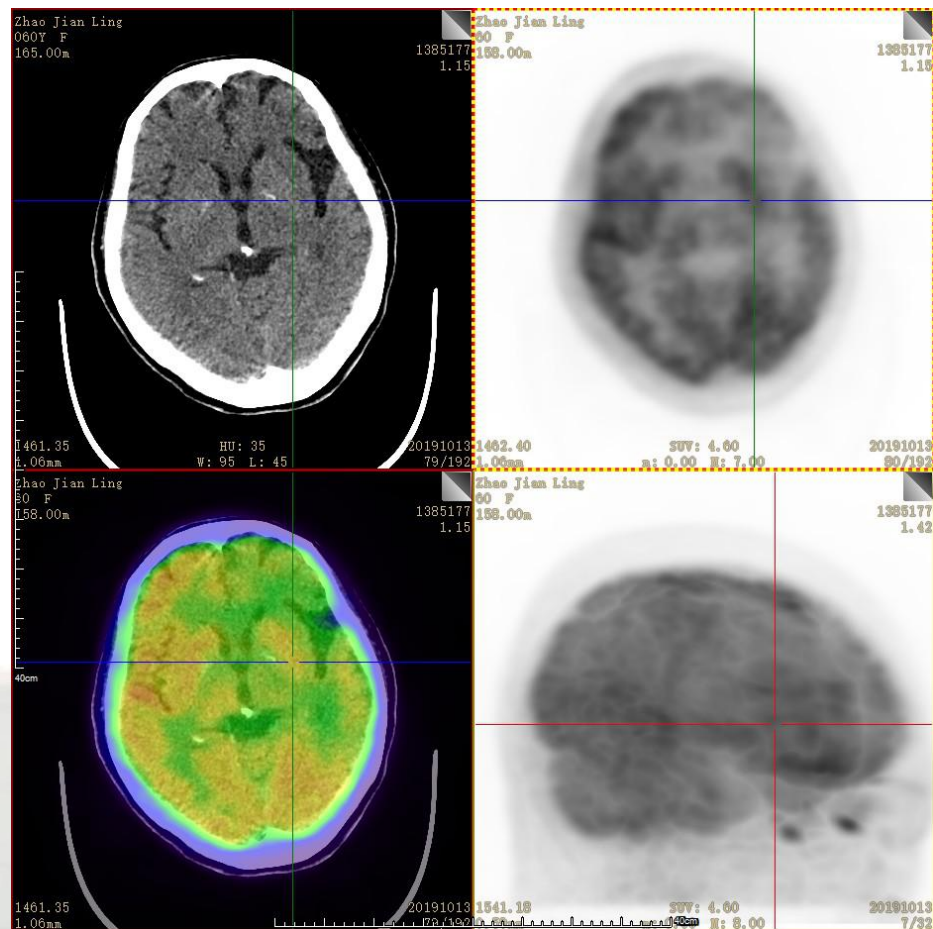


^{18}F -FDG

皮质基底节变性

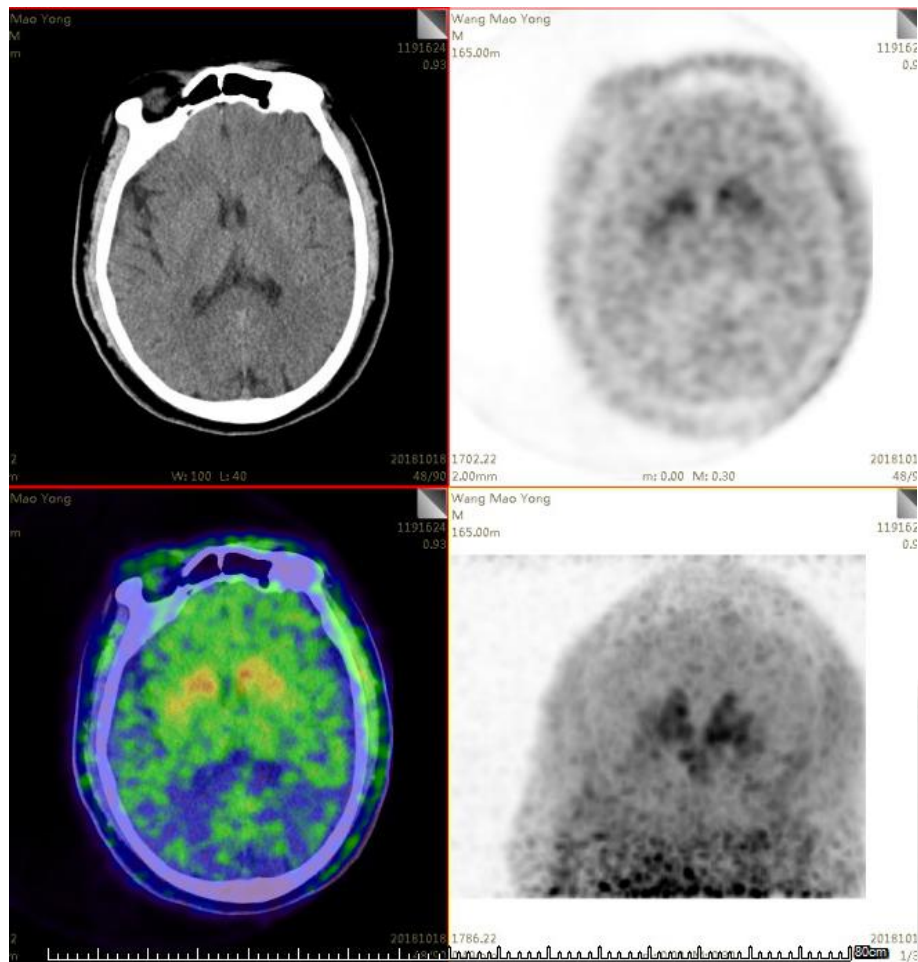


18F-DOPA

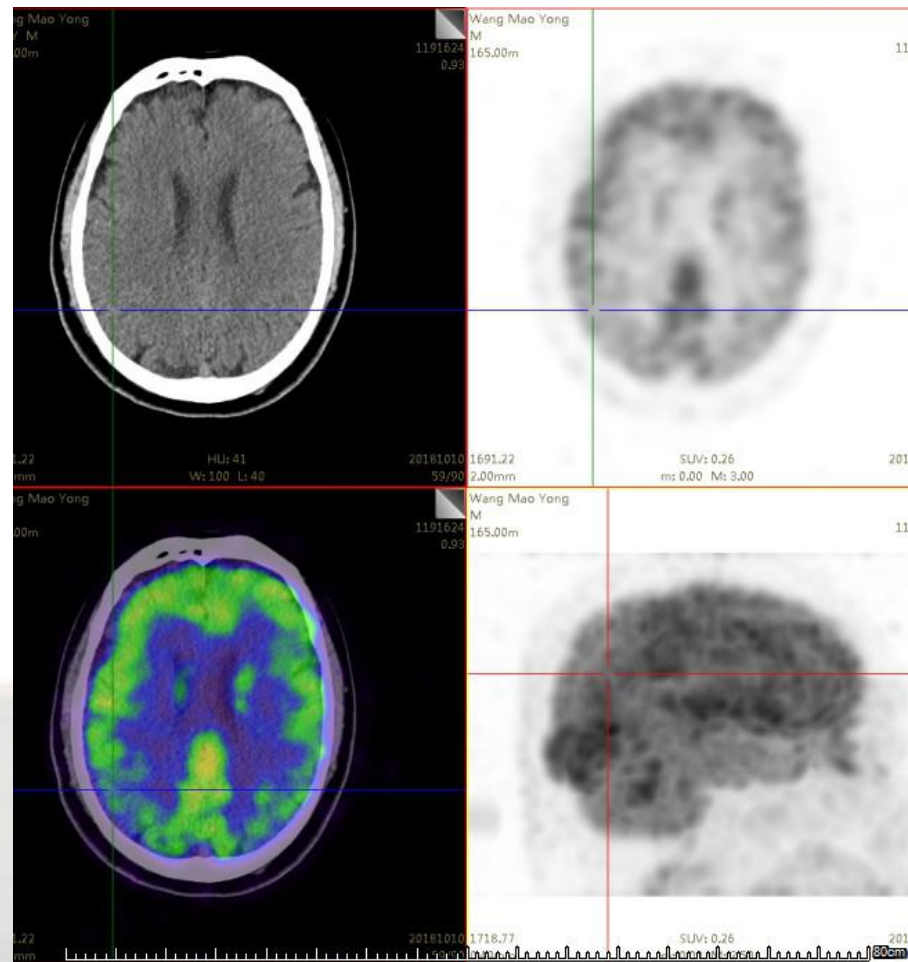


18F-FDG

路易体痴呆

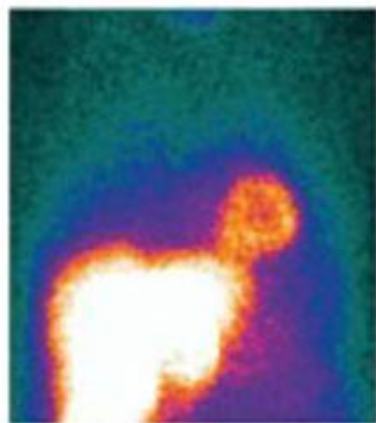


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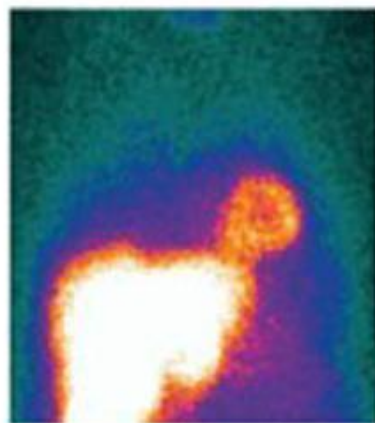


18F-FDG

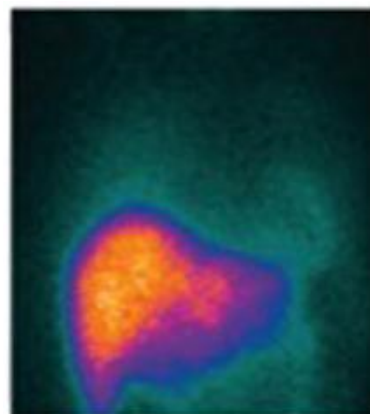
心脏去交感神经支配



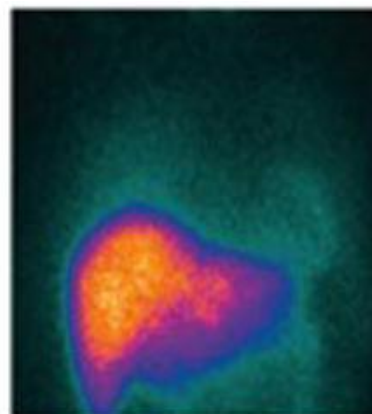
No parkinsonism



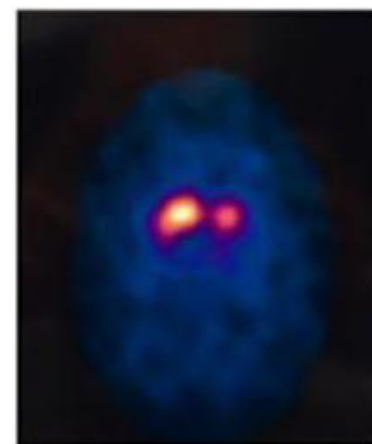
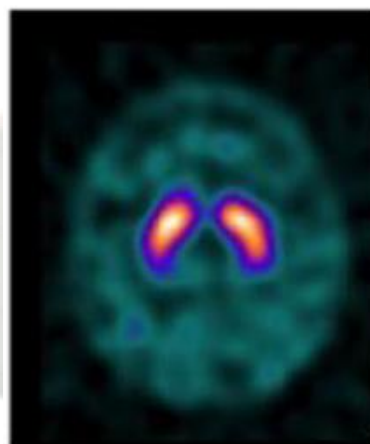
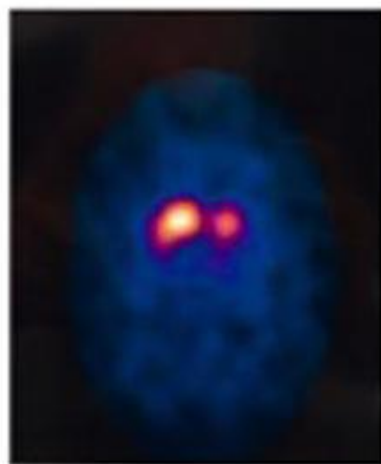
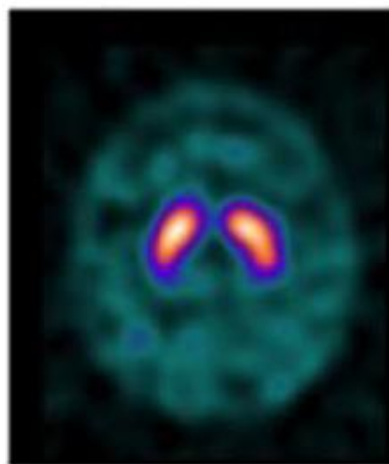
Atypical parkinsonism



Pre-motor PD



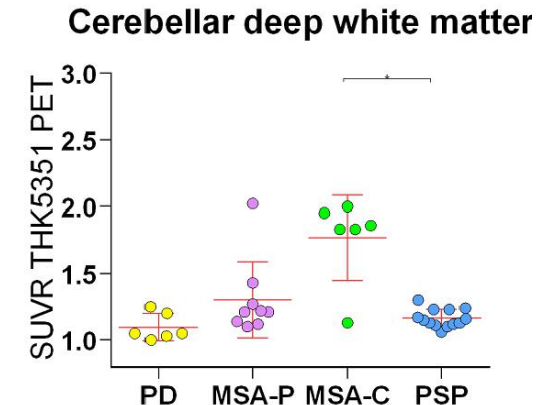
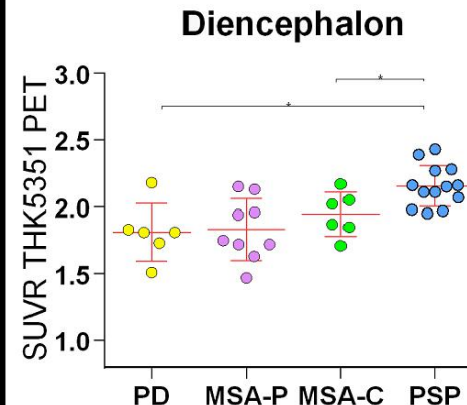
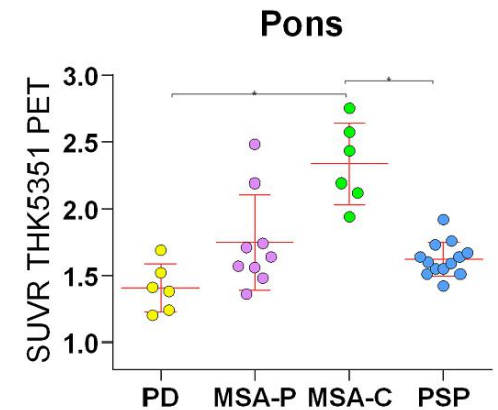
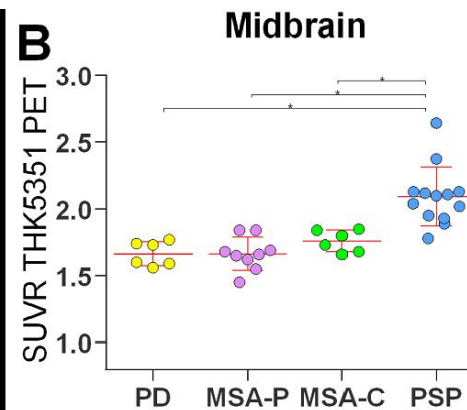
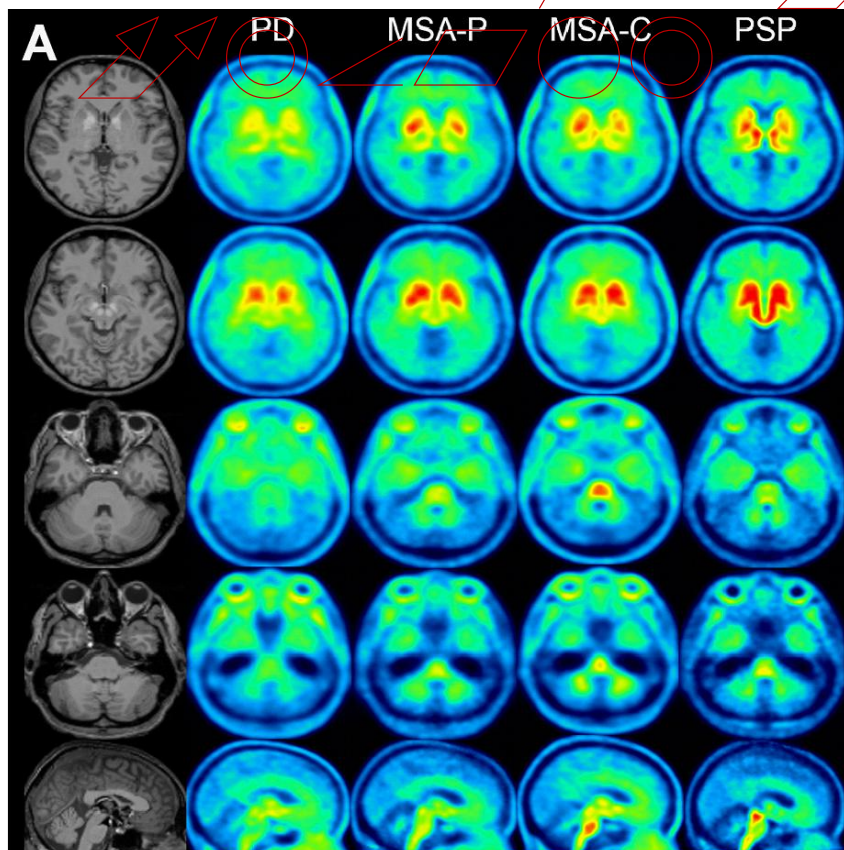
Idiopathic PD



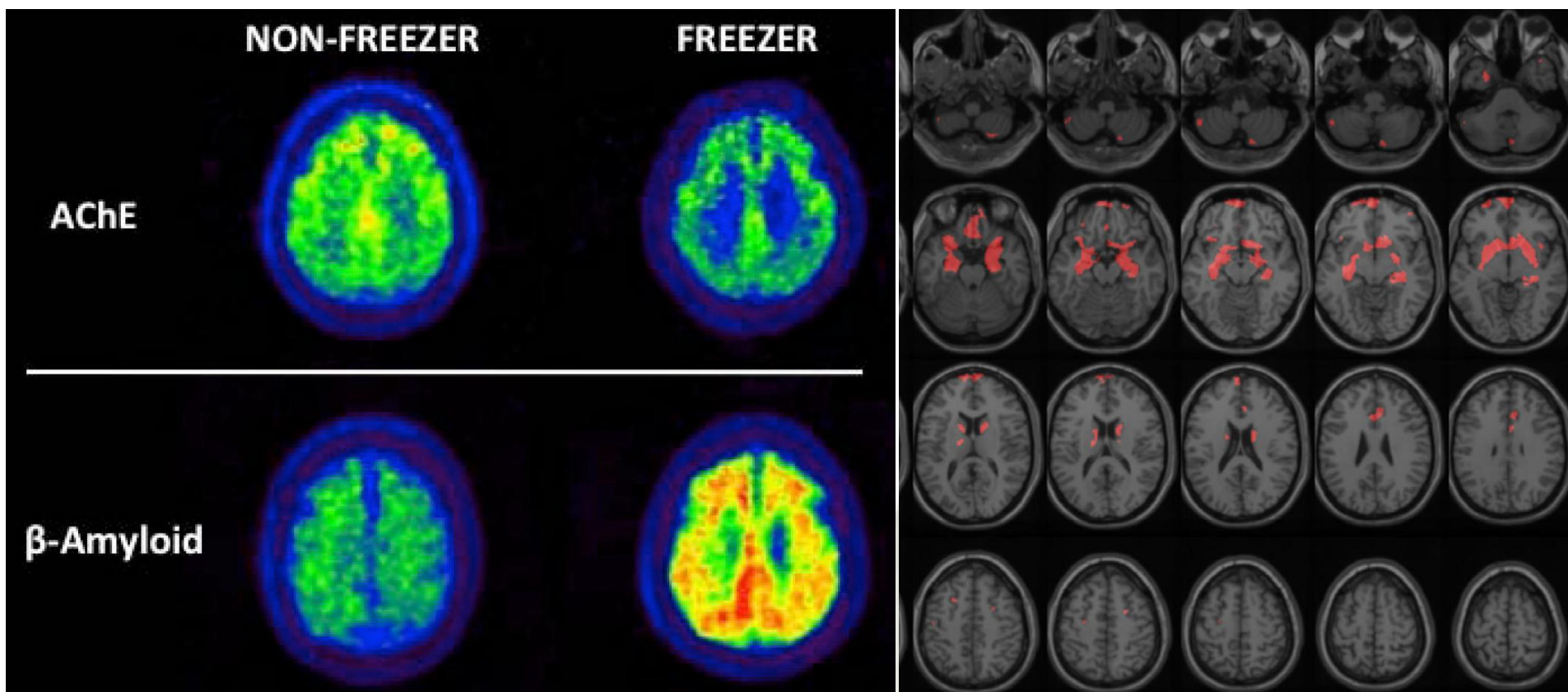
PET Imaging of Astrogliosis and Tau Facilitates Diagnosis of Parkinsonian Syndromes

^{18}F -THK5351: 

MAO-B 



Cholinergic System Changes of Falls and Freezing of Gait in Parkinson's Disease

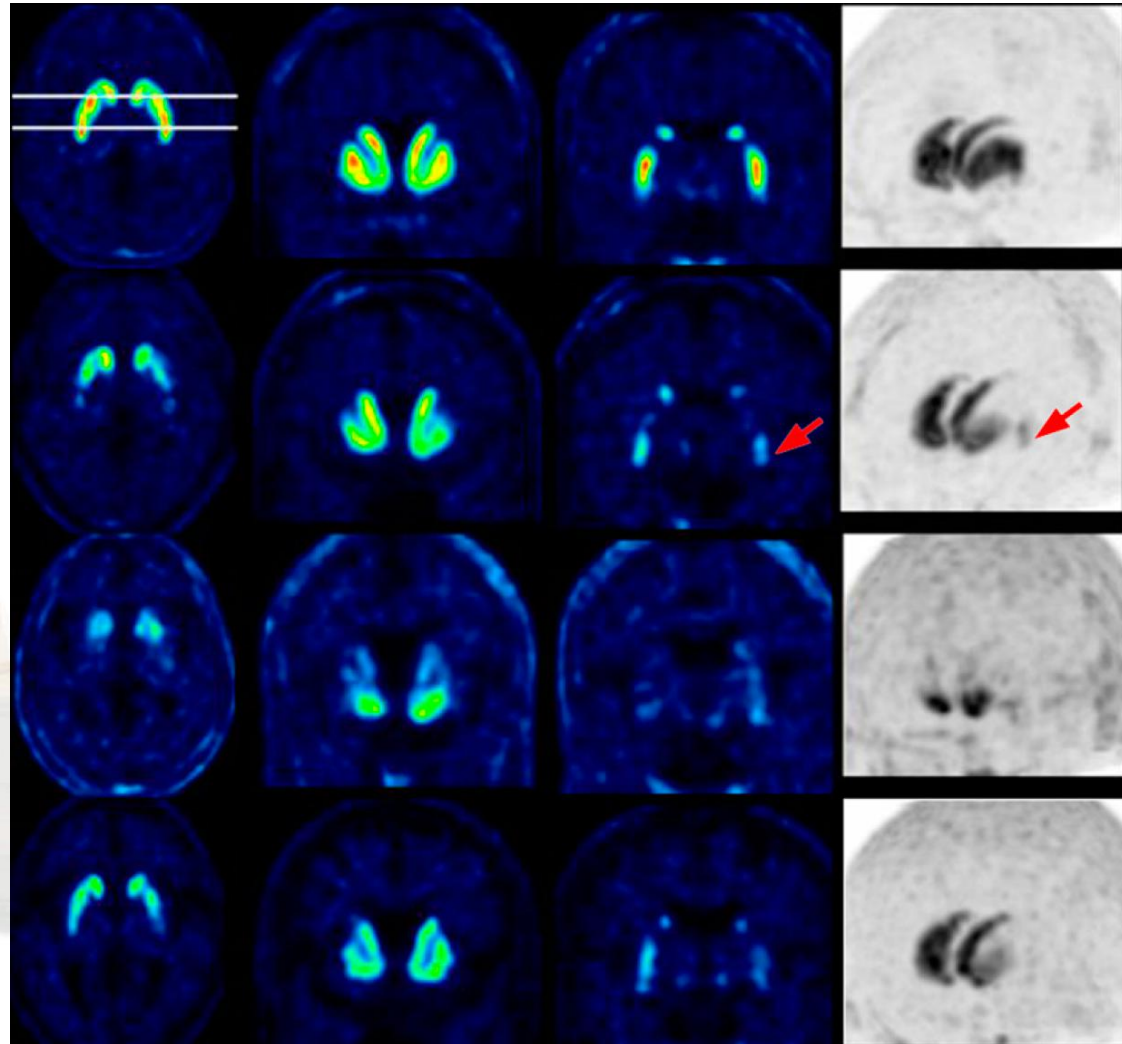
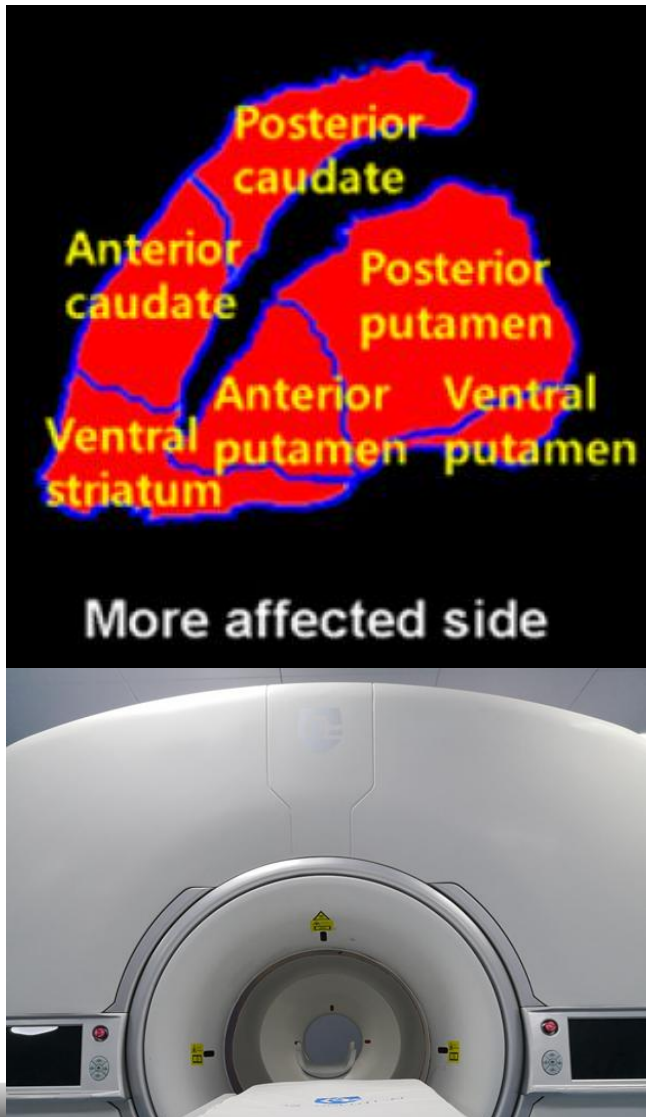


Mov Disord. 2014 August ; 29(9): 1118–1124.

ANN NEUROL 2019;85:538–549

Subregional Patterns of Preferential Striatal Dopamine Transporter Loss Differ in Parkinson Disease, Progressive Supranuclear Palsy, and Multiple-System Atrophy

附属第一医院
Sun Yat-sen University

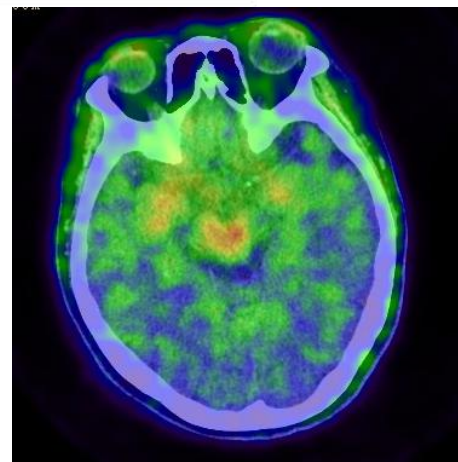
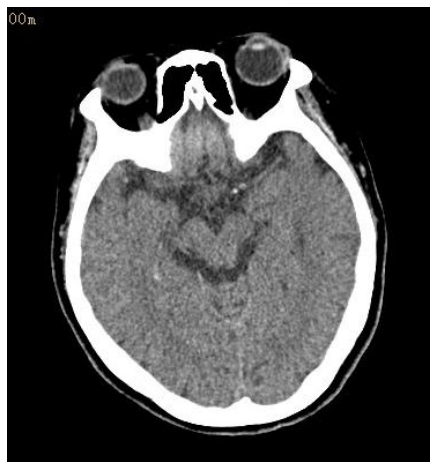


脑专用PET研究

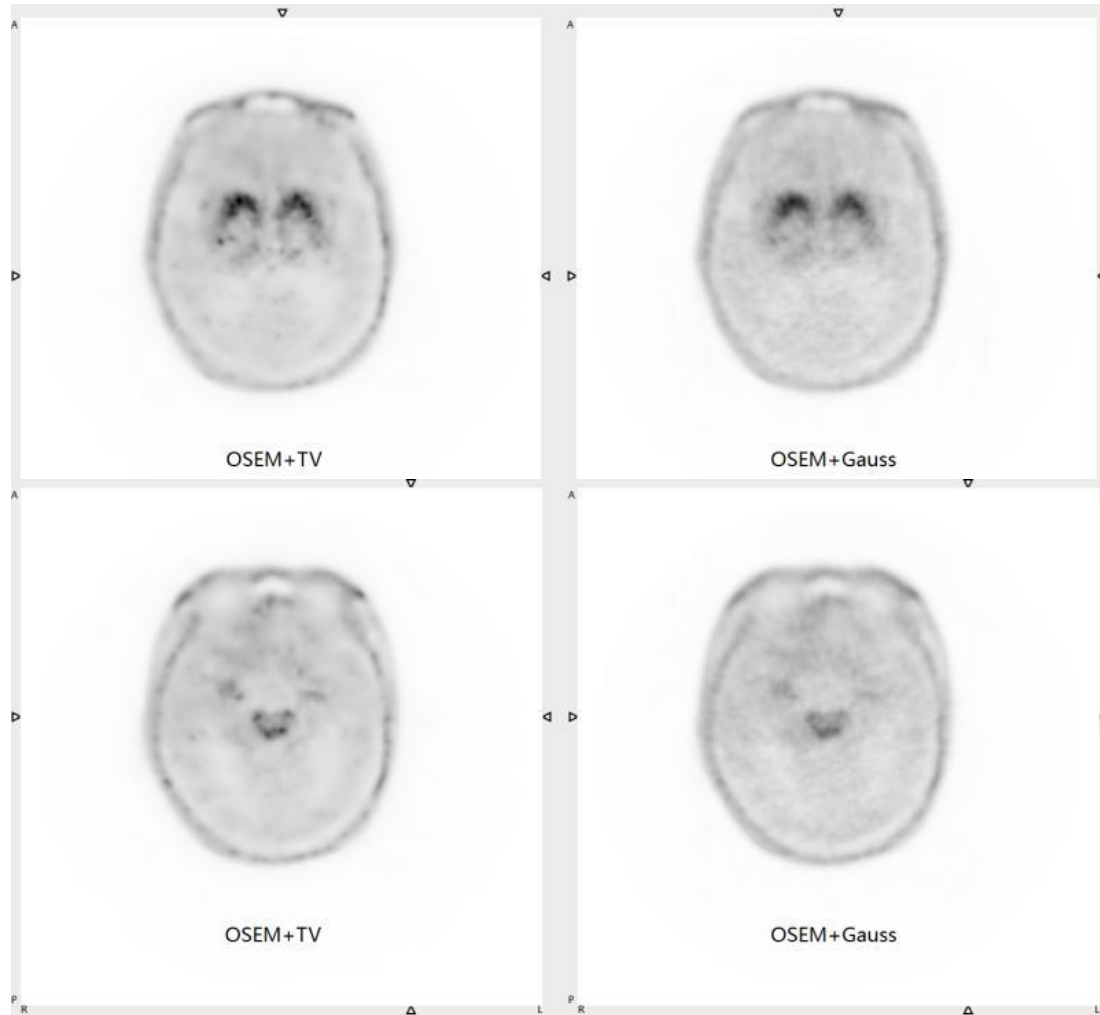
- 超高的空间分辨率、灵敏度和时间分辨率
- 微小结构、微小病变
- 神经递质、物质代谢等动力学变化
- 减少辐射剂量
- 便携、可移动、可穿戴
- 自由走动状态、术中PET
- 减少设备成本
- 脑专科医院



附图 中脑中央灰质亚核分区



第一代脑数字PET更清晰显示中脑亚核结构



Thanks for your attention!

