Anatomy in Parkinson’s: What can we see with MRI?
Substantia Nigra: Inversion Recovery

• SN notoriously difficult to visualize on conventional T1-weighted images
• Techniques employed (with varying success)
  – Pulse sequences sensitive to iron deposition
  – Width of SNpc on T2-weighted images
  – Indirect measures of DA in striatum (PET & SPECT)
  – No ideal MRI-based method
• Inversion recovery (Hutchinson & Raff, 1999; 2000)
  – One pulse to suppress white matter another to suppress gray matter
  – Signal change seen in both images
  – Use ratio of images to increase sensitivity
  – ROI-based analyses → within Ss ratio of lateral:medial signal intensity
• May be useful for staging of disease or detecting presymptomatic cases
Area of SN in PD

![Graph showing the area of SN in PD with age as the x-axis and area as the y-axis. The graph compares PD and Control groups.](image)

Figure by MIT OCW.

Substantia Inominata

- Region that includes nucleus basalis of Meynert (cholinergic)
- Visible on T2-W MRI
- Atrophic in Alzheimer’s
- Thickness measured in PD
  - Controls, non-demented PD, & PD w/ mild dementia (MMSE < 23)
Correlations with SI Thickness

**MMSE**

- Thickness of SI (mm)
- (P < 0.05, r = 0.36)

**Age**

- PD (r = -0.66, P < 0.01)
- Control (r = -0.37, NS)

Figure by MIT OCW.