Tyrosine → Tyrosine → Amphetamine → Reserpine → Tetrabenazine

\[ ^{[18F]} \text{FDOPA} \]

\[ ^{[123I]} \beta\text{CIT, FPCIT} \]

\[ ^{[11C]} \text{cocaine, d-threo-methylphenidate} \]

DAT → D1, D2

DOPAC → HVA

\[ ^{[18F]} \text{FPCIT/PET} \]

18F-FPCIT Binding Reductions in PD
H&Y Stage I

Sham surgery
FDOPA / PET

Preop. Postop.

Normal

Fetal mesencephalic cell implant

Preop. Postop.

Fetal Dopamine Cell Transplant

FDOPA/PET: SPM Analysis (p<0.001)
Parkinson’s Disease  
H&Y I

18F-FPCIT  
18F-FDG

PD-related Metabolic Network: Voxel Analysis

Cerebellum

Pu / GP

Parietal

(z = -30mm)

(z = 54mm)

PC1 (20.7% VAF) from analysis of 20 PD and 20 Controls

Network Activity Discriminates PD and Controls

Subject Score (PDRP)

PD  Normal

p < 0.0001

Levodopa Infusion

PDRP SCORE

OFF  ON

* p = 0.01

Implantation: Two year Follow-up

preoperative  1 yr postop  2 yr postop
MRI-PET Fusion Image
Pallidotomy

18 F-FDG/PET
63 yrs man rt. pallidotomy

Pre  Post

mg/100g/min
**Task Subtractions**

<table>
<thead>
<tr>
<th>Subtraction</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>52 mm</td>
<td>SMA</td>
</tr>
<tr>
<td>40 mm</td>
<td>PMC</td>
</tr>
<tr>
<td>8 mm</td>
<td>PreSMA</td>
</tr>
<tr>
<td>-36 mm</td>
<td>PMC</td>
</tr>
<tr>
<td>-8 mm</td>
<td>Sensorimotor</td>
</tr>
</tbody>
</table>

Threshold p=0.001

**Effect of GPi stimulation on motor task**

Activation ON > Activation OFF

Threshold p=0.01 (within motor activation mask)

**Effect on Brain Glucose Metabolism**

(p < 0.001)