Striatum

Inputs to the Basal ganglia
Intrinsic circuitry and outputs of the Basal ganglia

Planning, Selection, Initiation and Adaptation of Motor Programs

- Planning: Motor Cortex
- Selection: Basal Ganglia
- Initiation: Motor Centers
- Central Motor Program
- Adaptation: Sensory Feedback, Proprioception
- Muscle
MOTOR INFRASTRUCTURE
Neuronal networks that co-ordinate different movements

Intrinsic circuitry and outputs of the Basal ganglia

NEUROSCIENCE, Fourth Edition, Figure 18.5
Neuronal circuitry in the Basal ganglia

Two different populations of Medium spiny neurons

The direct loop through the Basal ganglia: Initiates movement

Disinhibition - requires background activity!

Fig 18.6

Fig 18.8A
The indirect loop through the Basal ganglia: Stops movement

The Direct & Indirect pathways split in the Striatum

D1/SP and D2/ENK expressing neurons. Mixed population of projection neurons (MSNs), innervating the different targets.
Center-surround organization of direct and indirect pathways

**Selection of motor behaviour**

- **Cortex / pallium**
- **Striatum**
- **Pallidum**

**Thalamus**
- Sensory input

**Excitation (glut.)**
**Inhibition (GABA)**
**DA-modulation**

- **CPG**
  - **Locomotion**
  - **Posture**
  - **Saccades**

**DA**

Fig 18.8

NEUROSCIENCE, Fourth Edition, Figure 16.9

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Selection of motor behaviour

Cortex / pallium -> Striatum -> Pallidum

Thalamus

Sensory input

CPG -> DA

excitation (glut.)
Inhibition (GABA)
DA-modulation

Command: locomotion, posture, saccades

Selection of motor behaviour

Fig 18.11

Hypokinesia: Parkinson

Hyperkinesia: Huntington

Fig 18.11