Descending Pathways

- Pyramidal system
- Extrapyramidal system
  - basal ganglia
  - red nucleus
  - subthalamic nuclei
  - substantia nigra
  - reticular formation
  - vestibulo-spinal?
  - tecto-spinal?
  - cerebellum?

Pyramidal Tracts

- Pyramidal cells in the primary motor cortex
- A major tract in primates
- Larger than its function
- Mainly for fine motor control
- Homunculus in primary motor cortex

Myelinated Fibres Can be seen clearly

Cranial Motor Nuclei
**Reflexes**

**Upper and Lower Motor Neurones**
- A clinically useful term, not really an anatomical term.
- **UMN**
  - disinhibition
  - hyper-reflexia
  - spasticity
  - clonus
  - paresis or paralysis
- **LMN**
  - hypo-reflexia or areflexia
  - fibrillation
  - muscle wasting
  - hypotonia
  - paresis or paralysis

**Vestibulo-spinal**
- To cervical levels
- Important for balance

**Extra-pyramidal tracts**
- Tegmento-spinal(7)
- Rubro-spinal(8)
- Medial long. Fasc.(10)
- Tecto-spinal(9)
- Reticulo-spinal(6,5)
- Vestibulo-spinal(4)

**Basal Ganglia**
“Striatum”

Caudate

Putamen

Globus pallidus

Basal ganglia = striatum + amygdala (+claustrum?)

Lenticular nucleus = Globus pallidus + putamen

Cerebellar Movement Disorders

- Dysmetria - over-reaching (test by touching your nose) DISTANCE
- Disdiadochokinesia - disjointed movement, poor timing (touch fingers in order) TIMING
- Dyssynergia - disjointed force (touch examiner’s finger) FORCE
- Ataxia - poor coordination (all the above)
- Clonus - contraction in response to stretch
- Paresis - weakness, partial paralysis

Involved in feedback loops

Cortex

Thalamus

Brain Stem

Muscle

Spinal Cord

Cerebellum

Basal Ganglia

Cerebellar Movement Disorders

- Involuntary movement at rest
- Hypokinesia
- A “mask” like face
- Rigidity

- Typical of Parkinson’s disease
- Treated by L-Dopa
- Experimentally by foetal grafts
- Caudate lesions

Basal ganglia problems

That’s All Folks!