Neuropsychological Disorders

Lecture 20

4/13/11

Phrenology

Franz Joseph Gall (1758 – 1828)

Skull anatomy is related to behavioral capacities

Causes of human brain damage

- Ischemia or hemorrhage, bullet wounds, brain surgery
Causes of human brain damage

- Ischemia or hemorrhage, bullet wounds
- First wave of cells dies shortly after injury
- Then, a second wave of cells dies due to the release of chemicals by the dying neurons (this stage can be controlled with drugs)

Subcortical lesions

- Spinal cord and peripheral nerves: hemiplegia, deafferentation
- Pons/medulla lesions: death, “locked-in” syndrome

Visual disorders

- Anopia: Cortical blindness (V1) (blindsight?)

Hemianopia
Quadrantanopia

Blindsight

Visual disorders

- Anopia: cortical blindness (blindsight?)
- Motion blindness (MT)
Visual disorders

- Anopia: cortical blindness (blindsight?)
- Motion blindness (MT)
- Color blindness (V4)
- Visual agnosia (IT)

Visual agnosia

- Anopia: cortical blindness (V1) (blindsight?)
- Motion blindness (area MT)
- Color blindness (area V4)
- Visual agnosia (area IT)
- Prosopagnosia (area IT)
Prosopagnosia

Motor disorders

• Hemiplegia (M1, spinal cord)
  – Loss of voluntary movements (contralateral control)

• Optic ataxia (superior parietal)

• Apraxia (left parietal or bilateral frontal)

• Loss of coordination (cerebellum)

Optic ataxia

Motor disorders

• Hemiplegia (M1, spinal cord)
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• Optic ataxia (superior parietal)
  – Trouble reaching accurately (basic movements)

• Apraxia (left parietal or bilateral frontal)
  – Trouble doing learned purposeful movements
Motor disorders

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- Loss of coordination (cerebellum)
  - Trouble with coordination & finger to nose task

Cerebellar lesion

Anterior Apraxia: action production
Posterior Apraxia: action production and perception
Other cognitive disorders

- Frontal lesions: inability to judge social context, also planning problems

- Orbital lesions: inability to assess consequences of one’s actions
Other cognitive disorders

- Frontal lesions: inability to judge social context, also planning problems
- Orbital lesions: inability to assess consequences of one’s actions
- Left temporal/parietal: inability to count, acalculia

Recovery

- Better in young people
- Learn to compensate
- Functions taken over by other structures
- Diaschisis: surviving neurons fire less
- Regrowth, sprouting, map plasticity