

Ventromedial Notes

Frontal lobe

Prefrontal cortex

1. dorsolateral cortex

Last to myelinate

Sleep deprivation

Executive functions

Working memory

Cognitive flexibility

Planning

2. Orbitofrontal cortex

Controls

social adjustment

responsibility

mood

drive

Gambling strategies

Alzheimer's tangles

Drug addiction

3. Ventromedial cortex

Anatomically no difference between orbitofrontal and ventromedial

Only differ in connections

Processes risk & fear

Decision making

Inhibition of emotional responses

Rapidly develops during adolescence and young adulthood

Bilateral lesions

difficulty choosing between options with uncertain outcomes

severely impairs in personal and social decision making

choose immediate rewards; blind to future consequences

impairs learning from mistakes

make same decisions again & again

even if have negative consequences

retain intelligence

Connects with amygdala

Less associated with social functions

More with emotion regulation

Involved with

risk

ambiguity

Right hemisphere vmPFC

Detecting irony, sarcasm, and deception

If damaged:

Easily influenced by misleading advertising

"False tagging mechanism"

False Tagging Theory

All idea initially believed

Doubt occur when prefrontal cortex "tags" it as false

Provides doubt and skepticism

Suppresses emotional responses to negative emotional signals

social emotions

compassion, shame & guilt

anger & frustration tolerance

moral values

Regulates interaction of cognition and affect

Orbitofrontal prefrontal cortex regulates pleasure responses

Ventromedial prefrontal cortex regulates preference judgement

PTSD

reactivating past emotional associations and events

Left vs Right

Right

intellectualization, emotional isolation

Left

projection, splitting, verbal denial, and fantasy

Gender Social Cues

gender stereotypes

categorize gender-specific names, attributes, and attitudes

Damage

consciously make hypothetical moral judgments without error

not in real life

make decisions inconsistent with professed moral values

Ventromedial includes

Anterior cingulate cortex

Wraps around corpus collosum

Left and Right Hemispheres

Each controls contralateral side

Except taste & smell

Uncrossed; own side of tongue

Left and Right hemispheres work together

Control trunk & facial muscles

Corpus Callosum

Connects L & R hemispheres; exchange information

Set of axons interconnect hemispheres

Wide, flat bundle of neural fibers

Located under cortex

Largest white matter structure

200–250 million axons

Fast transmission (myelinated)

Genu = anterior (knee)

Thin axons

Connect prefrontal cortex

Larger in musicians

Truncus = middle (body)

Thick axons

Connect motor cortex

M1, premotor & supp. motor

Splenium = posterior portion

Soatosensory info

Parietal lobes

Visual cortex

Sexual Dimorphism

Different size in men & women? No

Larger in left-handed? Yes, 11%

Dyslexic children have smaller CC

Childhood

Gradually thickens as grow

Slow growth til about age 10

Eventually develop adult patterns

Young children behavior similar to split-brain people

Fabric identification task

Three-year olds

90% more errors w/ two hands

Five-year olds

Equally well w/ one or two hand

Epilepsy

Seizures = excessively synched neural activity

Most treated with drugs (90%)

More severe, tissue ablation

Neural activity rebounds between
prolongs seizures

Extreme cases, severe CC

Called split-brain people

Split-Brain People

Present input of object to L field

Info goes to R hem (noses cross)

Independence

Draw circles, one with each hand, one hand going faster

Split-Brain people show independence

Present input of object to L field

Info goes to R hem (noses cross)

L hand controlled by R hem

Can point to it with L hand

Can't do it with right hand

Present object input to R field

Info to L hem (noses cross)

Can name or describe what see

Language in L hem (95%; 80%)

Multitask

For a few weeks, feels like two people in one body

Competition vs Cooperation

Take item off grocery shelf with L

Return them with R

Normal

Cooperation

Flash different word to each visual field at same time

Report combined concept

Toad to left

Stool to right

Eventually lessens some

Brain uses smaller connection routes to avoid conflicts

CC not the only path, just the biggest

HM

Henry Molaison (1926-2008)

1 generalized seizure a week, began bilaterally

medial aspects of both temporal lobes

Removed both of H.M.'s medial temporal lobes (in 1953)

Included most of

hippocampus

amygdala

adjacent temporal cortex

Post-surgery symptoms

Major seizures almost completely eliminated

Minor seizures down to 1-2 day

IQ increased (104 to 118)

Normal short-term memory

Moderate retrograde amnesia (loss for events shortly before)

Amnesia

retrograde amnesia = before

anterograde amnesia = after

Severe anterograde amnesia

memory loss for events after

can't transfer anything to LTM

everything is forgotten when attention shifts

impaired ability to form LTM

underestimate his own age by 10+ years

can't form episodic memories

HM's Implicit Memory

Mirror Drawing

First to show improvement in HM

Rotating Disc

Keep pen on target (rotating disk)

Improved over 7-day period

Each time saw task, claimed he had never seen it before

Hippocampus

if damaged, amnesia

not remember accident or around it

remember before & after accident

Consolidation memory

hippocampus must work to put into long term

Reproduces patterns during sleep

Encodes patterns

Sparse representations (non-overlapping)

allows quick learning

trains cortex, repeats pattern over time

Compositional encoding

efficient; good for generalization