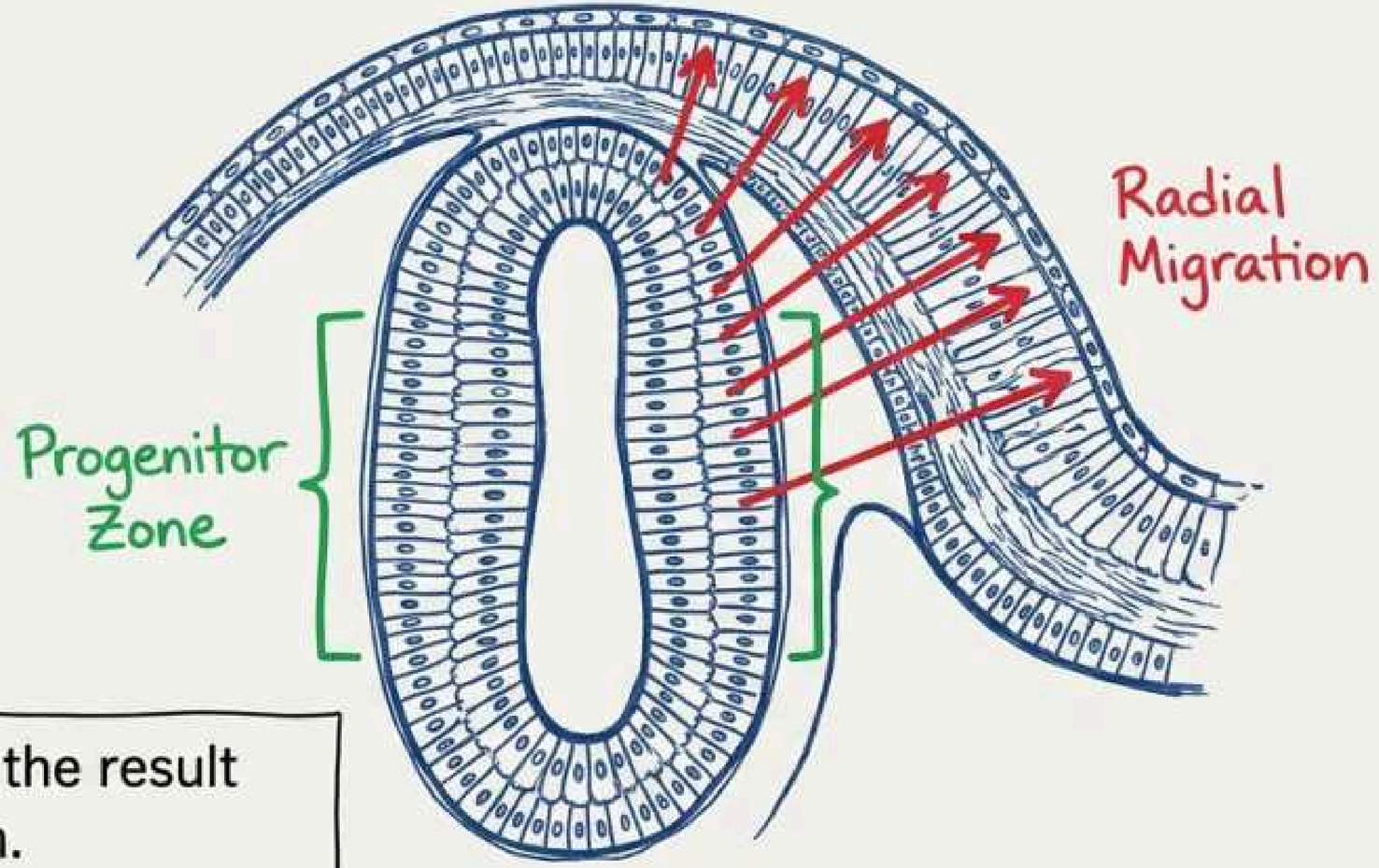
MED 513 B - Lecture 6: Development, Memory and Mind

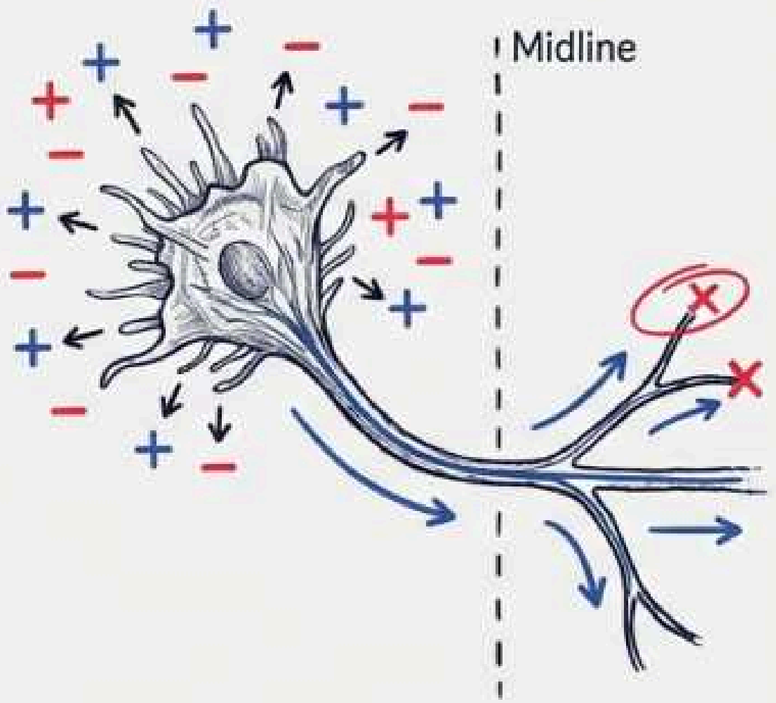
¶ 6.1



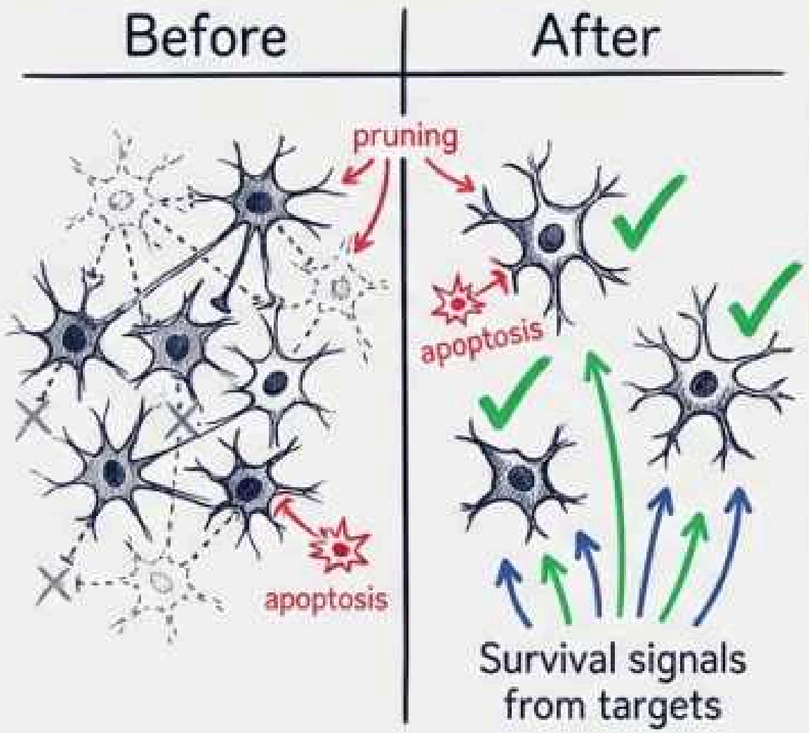
The anatomical map is the result of a timed construction.
Cell fate + Migration = Adult Cortex.
Errors in this timeline result in structural malformations.

¶ 6.2

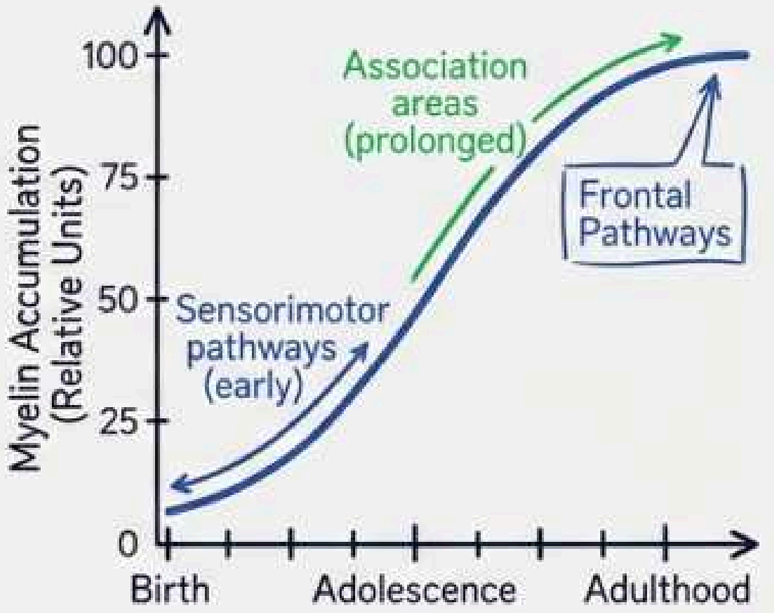
Guidance



Pruning

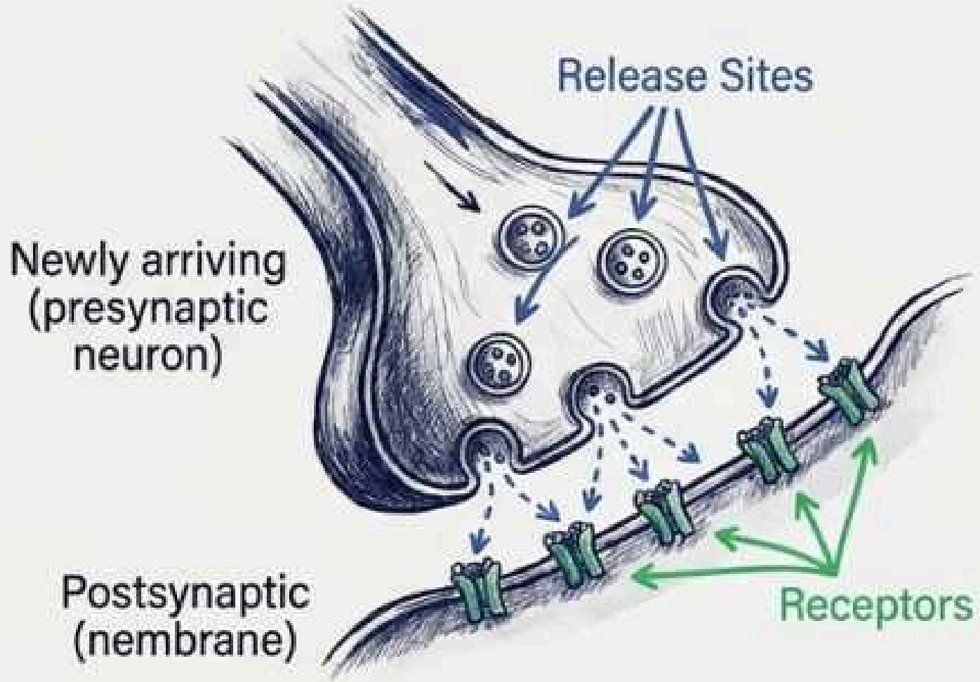


Myelination Timeline



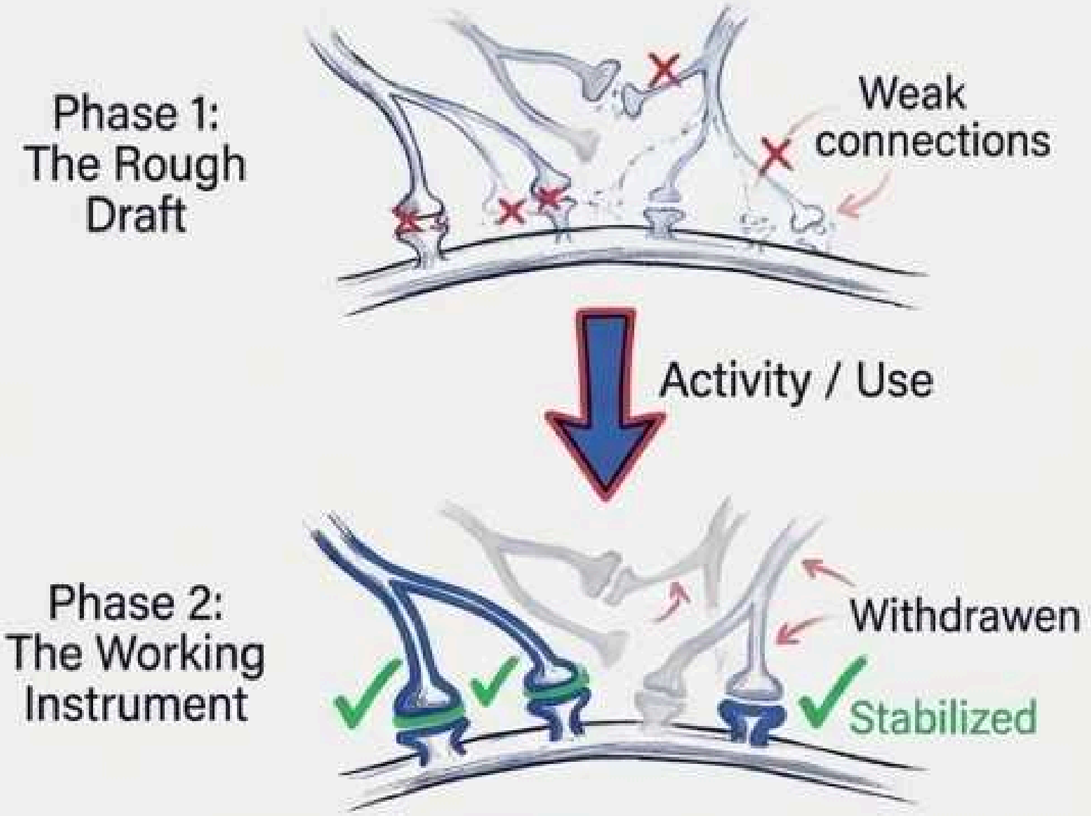
¶ 6.3

The Assembly



Mechanical assembly of the cleft.

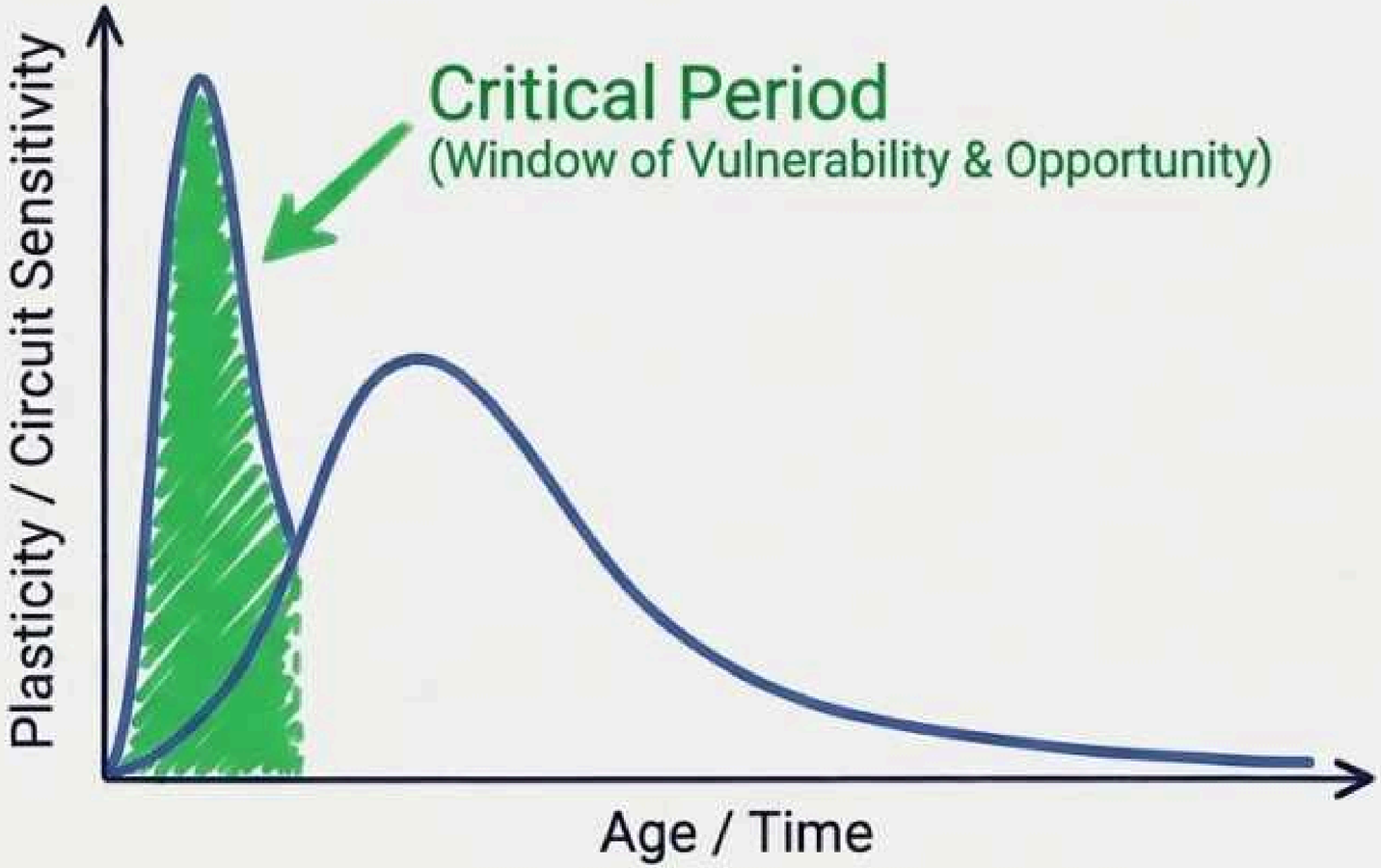
The Refinement



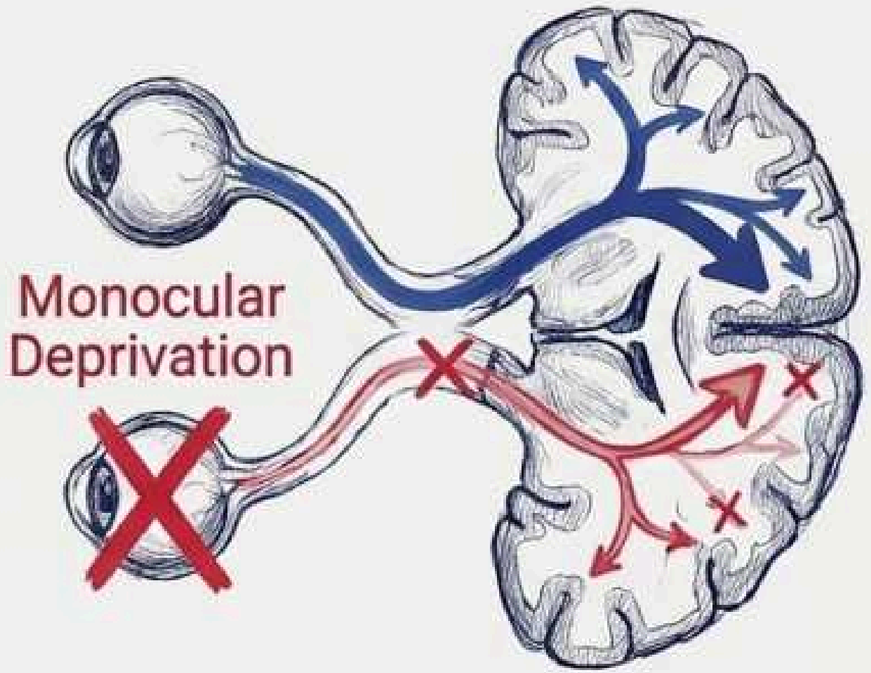
The synapse has a biography. Building begins before conscious memory; remodeling is driven by vigorous early activity.

The Development Activation Curve

¶ 6.4



Applied Example



Activity sculpts structure. Unusual sensitivity at specific ages dictates lasting functional balance (e.g., early hearing, early vision, aspects of language).

¶ 6.5

The Excitotoxicity Cascade

Loss of Blood Flow
(Drop in O2 & Glucose)

↓

Glutamate Surge
(Excess excitatory transmitter)

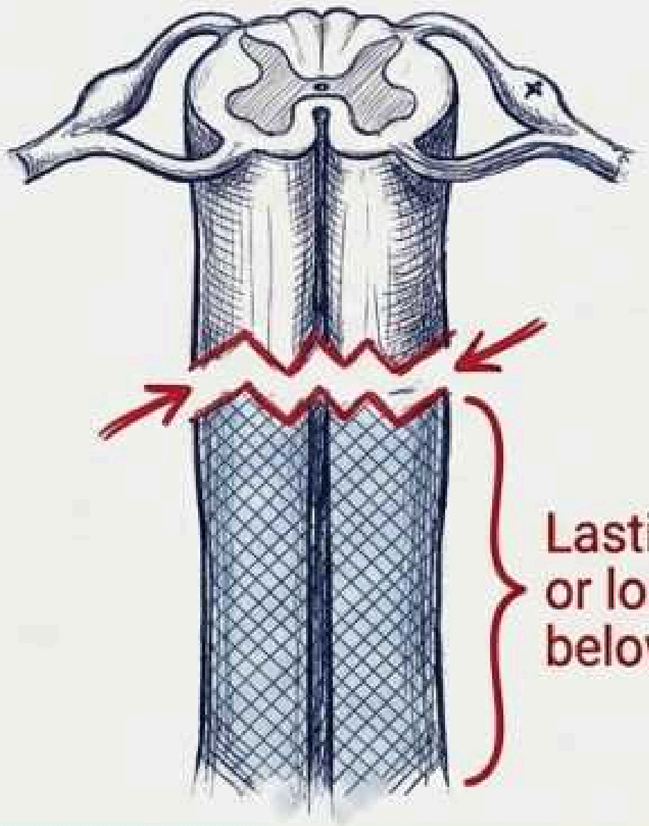
↓

Over-excitation
(Harmful wave across neighboring cells)

↓

Lasting Tissue Injury / Death

Spinal Cord
(Neurological 'Highway')



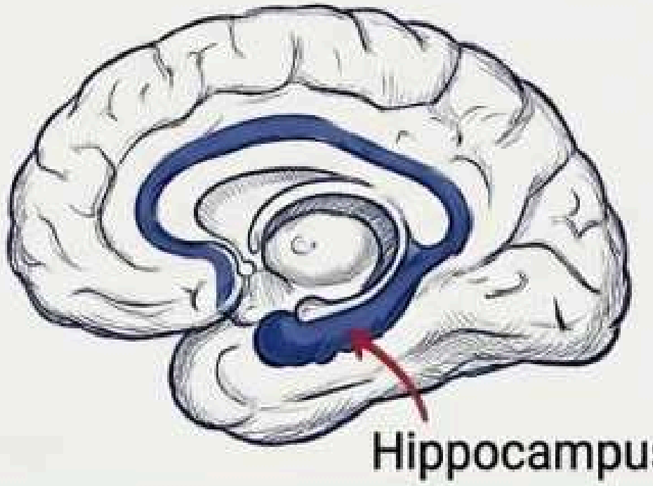
Time is part of the injury. Signs of stroke require immediate emergency help. No promised procedures for complete recovery.

The Memory Diagnostic Matrix

¶ 6.6

Declarative / Explicit

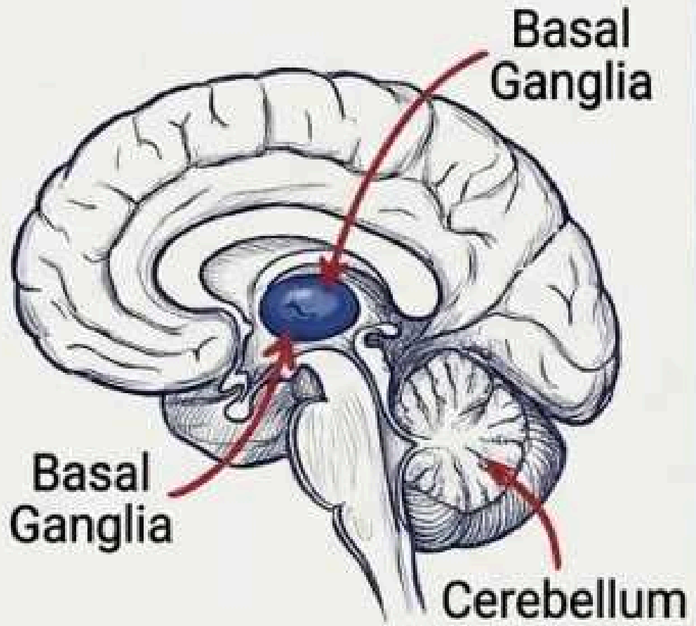
Function: New facts and events.



Clinical Case: Patient H.M. (Henry Molaison)
- Bilateral removal resulted in inability to build new lasting memories.

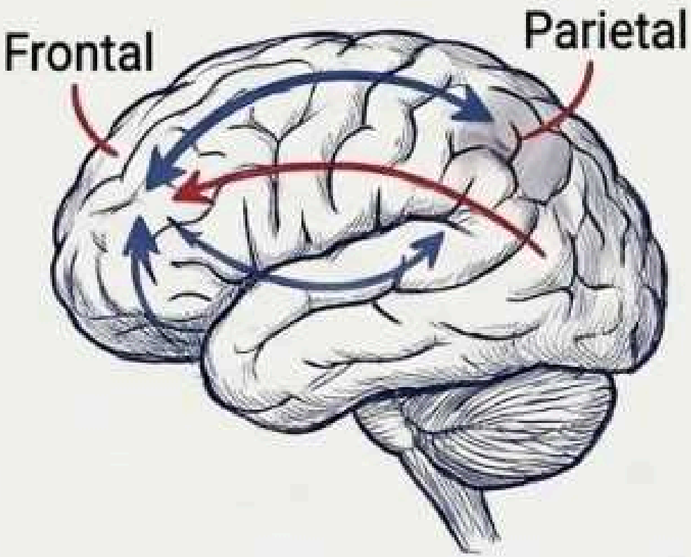
Procedural

Function: Skills and habits.



Working Memory

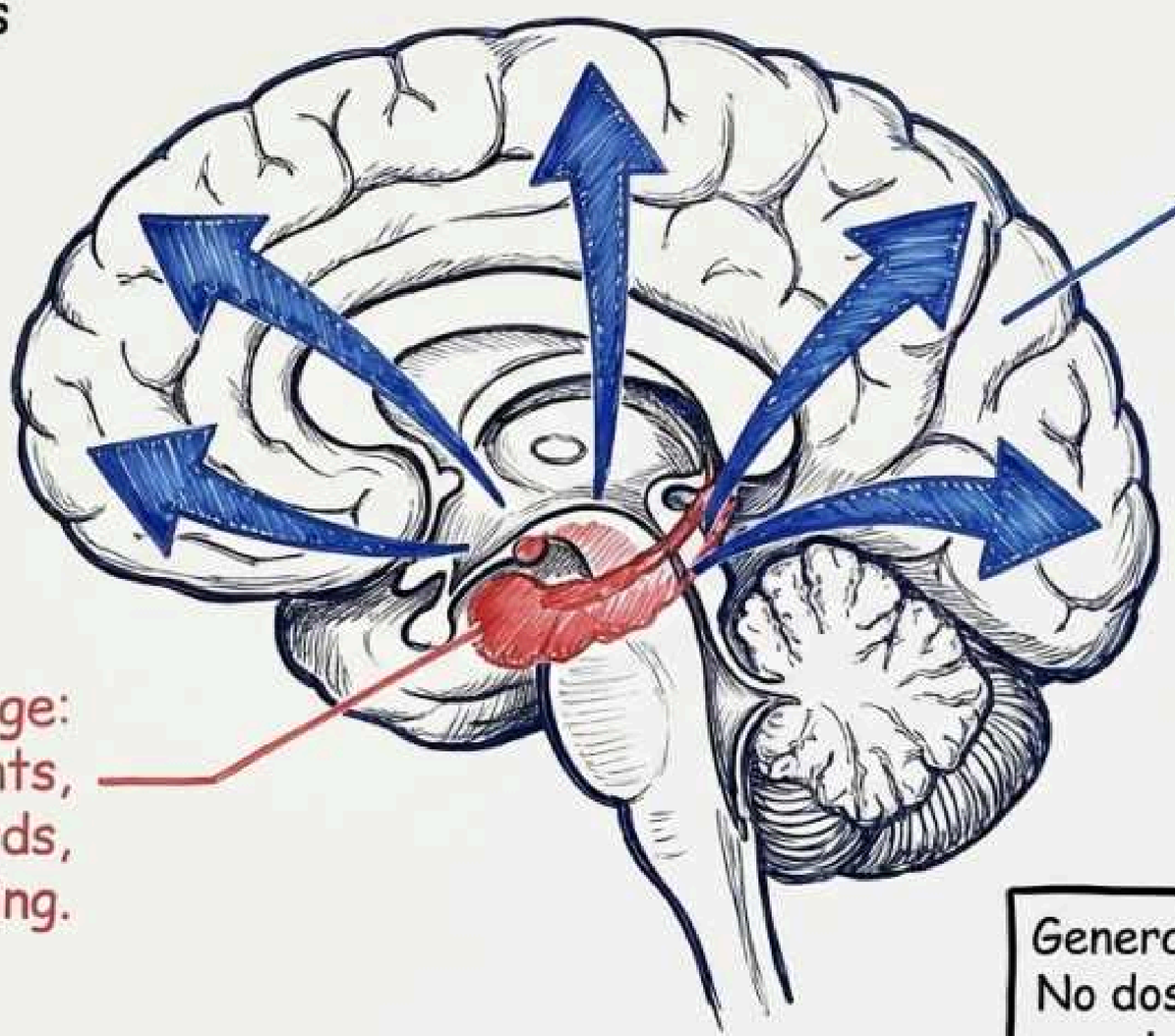
Function: Brief holding and manipulation in the present moment.



[Memory is a distributed map, not a single storehouse with one lock.]

¶6.7

Described by Alois Alzheimer, 1906.



Later stage: Broader cognitive decline across the cortical map.

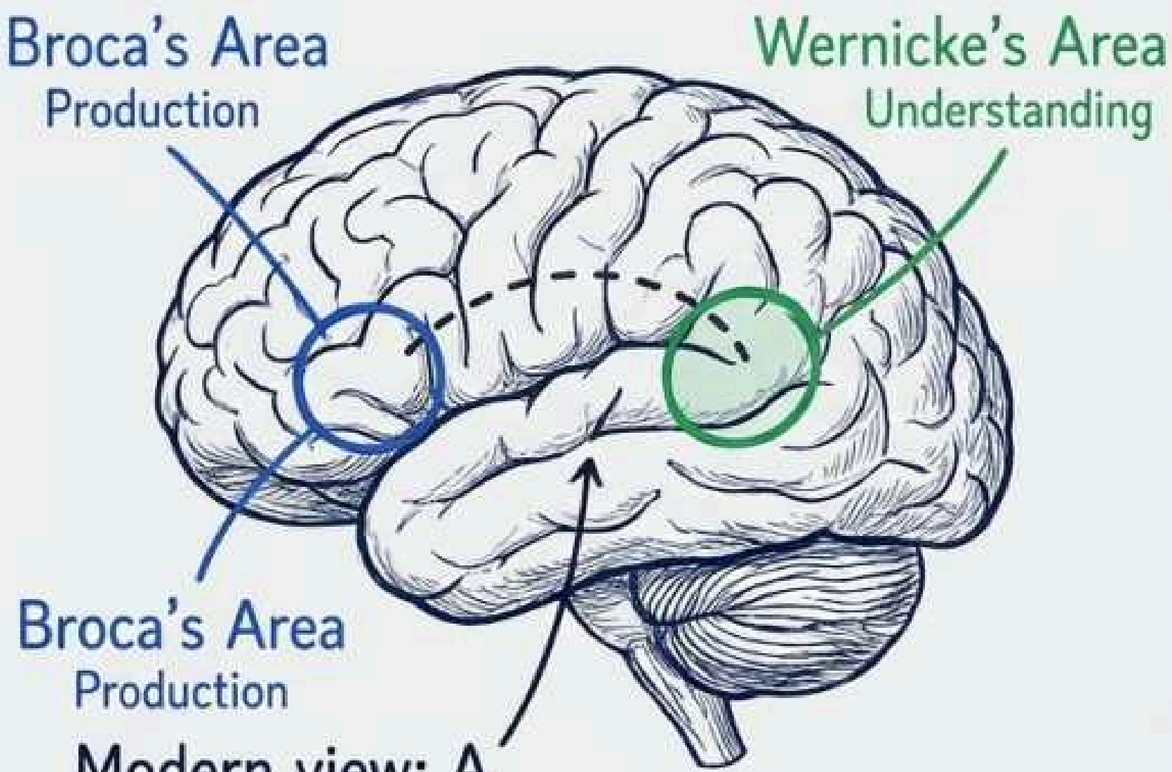
Early stage: Recent events, finding words, way-finding.

General encyclopedic overview only. No doses, no procedures. Diagnosis requires evaluation by a qualified clinician, not a textbook.

Human vs. Animal Models of Language

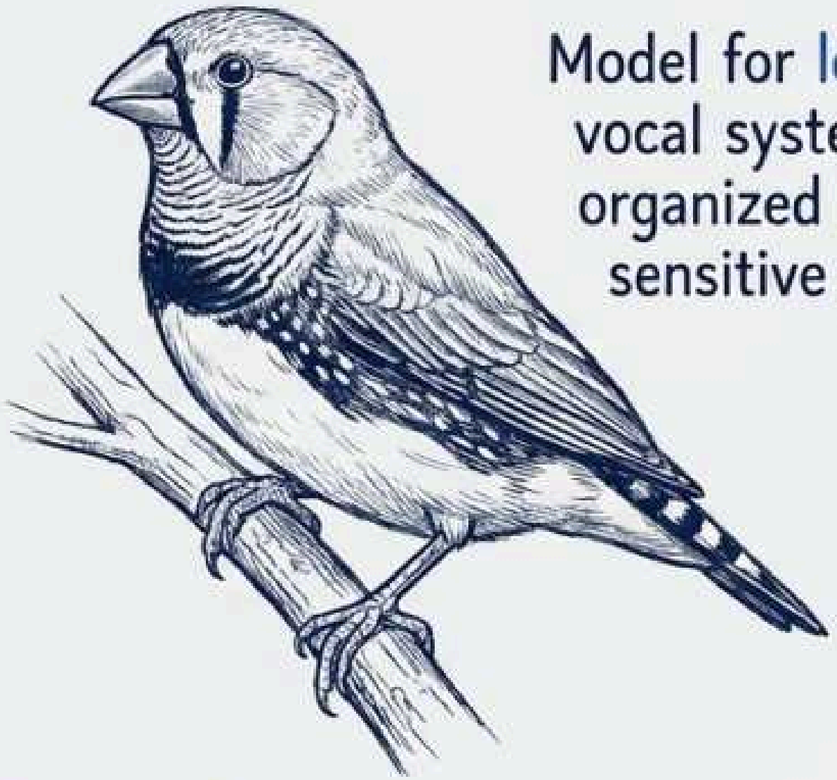
¶ 6.8

Human Network



Modern view: A distributed network (typically left-dominant)

Animal Model

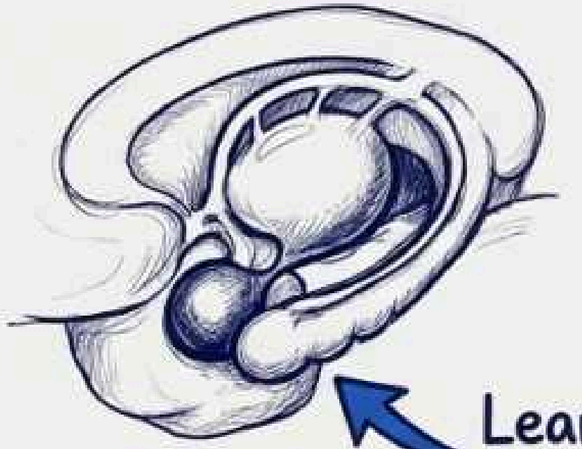


Model for learned vocal systems organized during sensitive periods

Human Language (rich grammar/meaning) ≠ Birdsong

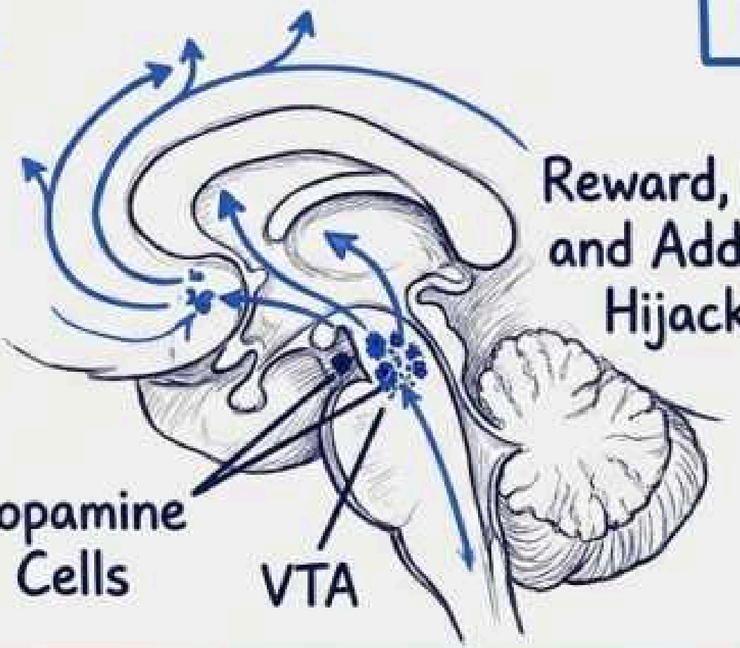
The Limbic Map

¶ 6.9





Mood & Motivation

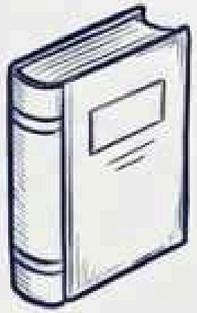


Help is available NOW for severe depression, overwhelming fear/anxiety, suicide thoughts, or addiction crisis.

US: Call/Text 988 (Suicide and Crisis Lifeline) or nearest ED.
Outside US: Use local emergency number.

Roadmap to Resources

¶6.10



Grokipedia Articles & OpenCourseWare pages
(Memory, Hippocampus, H.M., Alzheimer's,
Stroke, Fear, Amygdala, Addiction)

Next Steps

Eric R. Kandel: In Search of Memory
(A personal scientific narrative)

Med 505 B (Tissue Injury)
Med 511 B (Mechanisms of Medicine)

Crisis Support: 988lifeline.org

Closing block of the model course. This framework sets the stage for advanced exploration without prescribing clinical action.

The Capstone Synthesis Matrix

¶6.11

Lecture 1: Machinery (Neurons, glia, resting membranes, gated channels, myelin).	Lecture 2: Transmitters (Chemical synapses, integration, fast signaling vs. slow modulation).	Lecture 3: Anatomy (Spinal cord to cortex, limbic structures, blood supply).
Lecture 4: Sensation (Transduction to construction: retina and hair cell to	Lecture 5: Movement (Hierarchical motor systems, Parkinson's, motor neuron disease).	Lecture 6: Mind & Time (Development sculpting, vulnerability, memory, language, fear).

Help for mood, fear, or addiction is to be sought now, not inferred from a book.

Questions/Feedback:
garyanderson@mail.grokbot.com | X: @garyanderson