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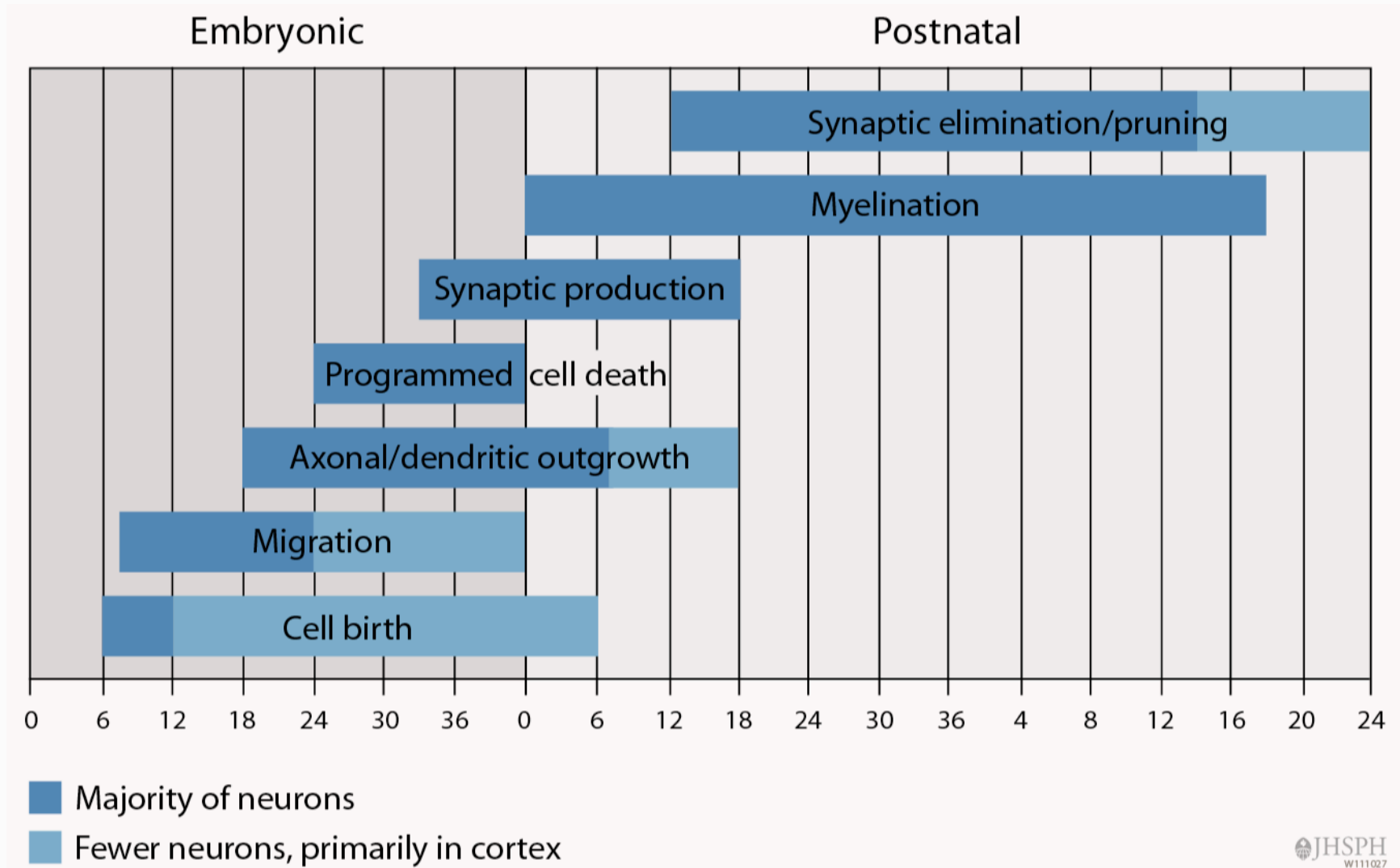
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## Section B

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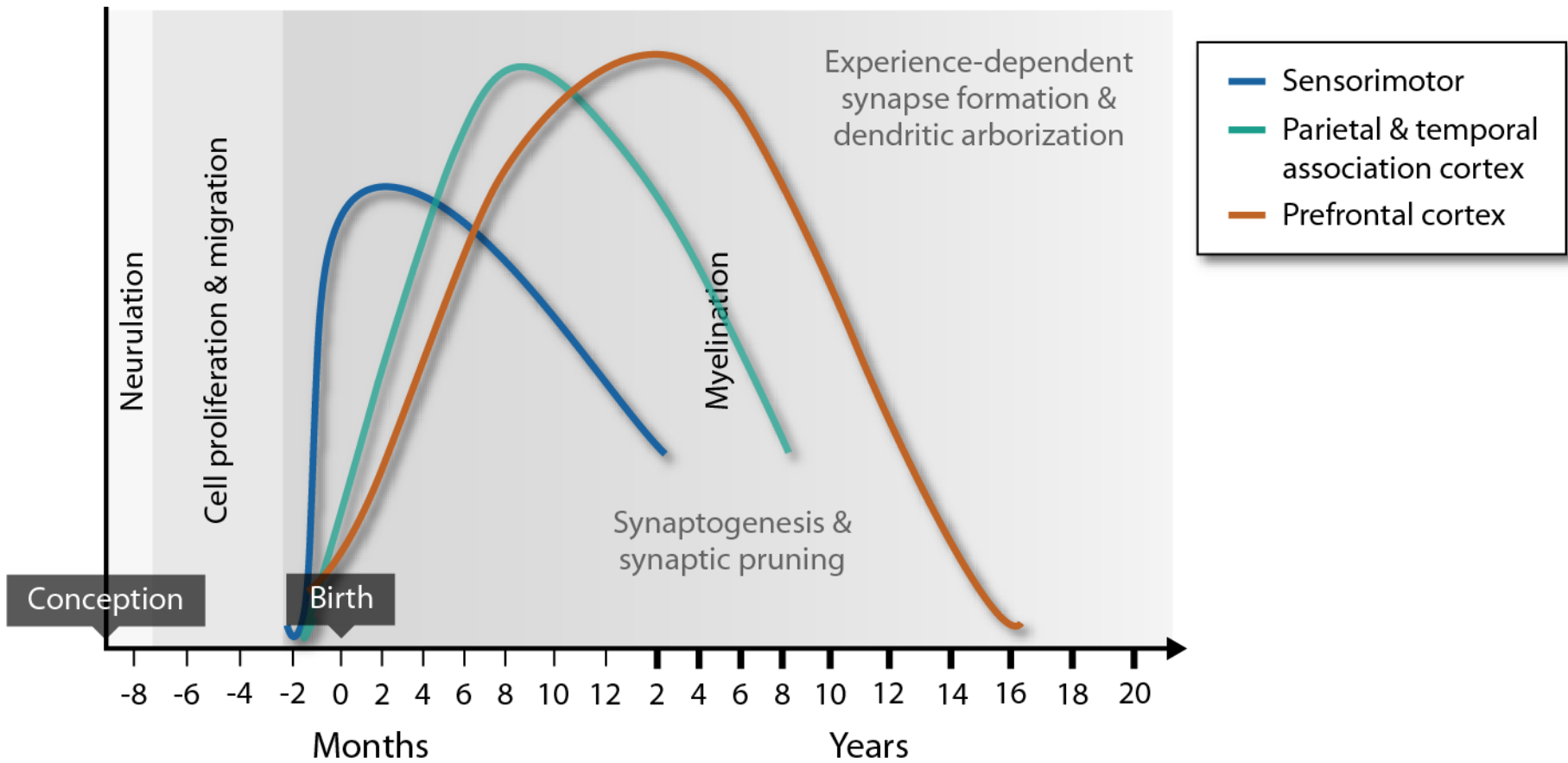
### Timeline of Brain Development

# Timeline of Brain Development



# Brain Maturation

## Developmental Course of Human Brain Development



Adapted by CTLT from Casey (2005).

# Plasticity

- **Plasticity:** the ability of the brain to adapt to changes in environment
- **Experience expectant plasticity:** connections generated by stimuli and experiences which members of a species expect to encounter
- **Experience dependent plasticity:** development generates experiences which create conditions for further development (e.g., learning)

# Plasticity

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# The Biology of Brain Development

- Brain development is experience dependent
- Experiences are brain development dependent

## Brain Development ...

- ... and cognitive, social, and emotional development are highly interrelated
- The sequence in which the cortex of the brain develops parallels cognitive milestones
- Behavior shapes brain development as brain development shapes behavior



# Experience and Brain Development

- Normal experiences support normal brain development
  - Good nutrition
  - Patterned visual information
- Abnormal experiences can lead to abnormal neural and therefore behavioral development
  - Prenatal alcohol exposure
  - Occluded vision

# Pattern of Brain Maturation: Posterior to Anterior

- **Posterior lobe:** sensory and motor functions (e.g., vision)
- **Temporal and parietal:** language and spatial attention
- **Frontal:** higher cognitive and executive functions

# Sensory Stimulation in Infancy

- Sensory stimulation in infancy may enhance brain development
- Rats raised in three cages after weaning:
  - Complex cages with a lot of stimuli (toys and other animals)
  - Average cages
  - Sensory deprivation cages
- As adults the rats raised in complex cages outperformed others, had more mature synaptic structure, more dendrites, more synapses per neuron, and more capillaries that enhanced blood flow and oxygen