

Brain Development

- I. The Developing Brain
 - A. Continues to develop through life till 20's
 - B. Dramatic in first 2 years of life
- II. What Develops: Major Areas
 - A. Neurons connected and communicating to each other
 - B. Significant increase in Myelin
 - C. Cerebral Cortex makes up more than 90% of brain
 - D. Neurons in the white matter has myelin around it and over first two years, this myelin develops
 1. Myelin makes sure the signal goes though in one direction, and allows neuron to send the signal much faster, insulates and protects the neuron
 2. Myelin depolarizes at once all of neuron is myelinated
 3. Faster processing is more efficient
- III. Brain Maturation
 - A. 2 months, there is a significant increase in dendritic branching
 - B. This increase continues all through development in different parts of the brain
 - C. Has to "wire up"
 1. Under genetic control
- IV. CNS Development
 - A. Why is there an excess?
 1. There is an overproduction of dendrites and axons which results in subsequent elimination or "pruning"
 - a) Depends on the aspearance setting up how the baby's brain will be wired for its remainder life
 - b) This is what convinced people to spend big bucks on early "headstart", got excited about convention
 - B. What connections get pruned or eliminated?
 1. Premature baby, biology that connects the brain for language is interferred with even though the genes say connect this to this - can't work because of the environment
 - a) Genes over connect the areas (PA to CA)
 - b) Find two connections to keep what is functional and get rid of stuff not used much for high efficiency -- > pruning In order for pruning to occur, child only has to be in a relatively normal environment
 - C. Small differences among normal environments will not affect pruning
 1. Subtle environment differences affect the chemistry of the brain not its basic structure
 2. Fallacy - What type of experiences effect pruning?
 - (1) Flash cards? If parents read to children at night or not
 - (a) Has no impact on pruning
 - i) No difference in pruning between active and quiet environment
 - (b) Extreme environmental things only affect pruning
 - i) In visual cortex: ex. pruned correctly in a normal visual environment = brain will become abnormal
3. Synapse
 - a) Redistributes/redirecting the signal

- b) This learning have nothing to do with the structure of the brain
- c) Kid who never learned how to read, and now they are five they still don't know how to read compared to a kid who was taught
 - (1) "Early headstart" is learning - it is possible to teach the kid who was not taught on how to read just as equally as the kid taught previously