

Brain Development in Early Childhood & Brain Research

Video to watch: <https://youtu.be/VNNsN9lJkws> Brain Architecture

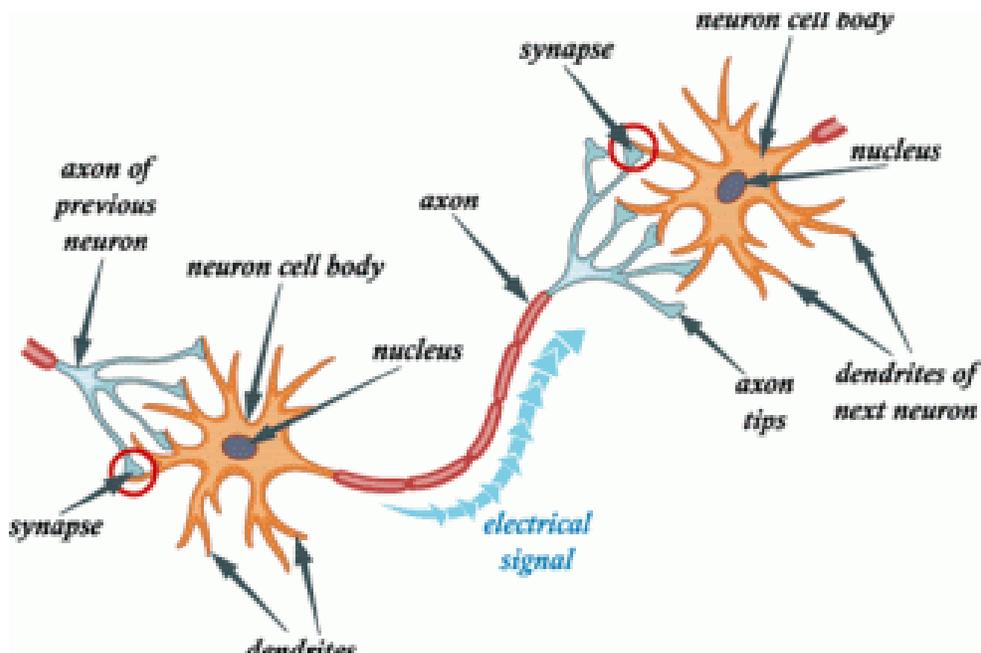
Video to watch: https://youtu.be/m_5u8-QSh6A Serve and Return with babies

How a brain develops hinges on a complex relationship between the genes you are born with and the experiences you have. Early experiences have a critical impact on the construction of the brain, and on the extent of future adult abilities. Early experiences do not just create a framework for future skills; they directly affect the way the brain is wired.

Babies are born with all the nerve cells (neurons) their brain will ever have; they don't get new muscles either. Just as babies need to use their muscles to grow stronger, they must also use their nerve cells in order to make new connections (synapses) between brain cells (neurons).

Children's brains are like sponges, soaking up new information all the time. If they do not use this information, it will be pruned (lost).

Synaptic density refers to the number of synapses per area. The brain transmits electrical signals across these synapses -- building pathways that support motor skills, emotions, behavioral control, language, logic, and memory.



Synapse = new connections (pathways) between nerve cells.
The more connections made, the faster the brain works.

These connections are made through experiences (seeing, smelling, hearing, touching and especially tasting) then strengthened through repeated use. When synapses are not used, they get pruned and go away. As we grow older, fewer synapses form, repetition helps decide which connections are kept and which are pruned.

Pruning helps the synapses pass information quickly through the brain. Think of it like cleaning out your closet, you can get ready faster in the morning when you do not need to look through clothes that are too small, out of season or you don't like. Pruning allows that the remaining synapses to become faster, stronger and resilient.

Why is brain science important to us and to the families we serve? We are not brain scientists. It's important to acknowledge that we are not experts, and this is a very brief and simplified overview. In the library we are uniquely positioned to share information with parents/caregivers and to model how to put the information into practice at home. Knowing something about how the brain develops helps us understand how children learn and how adults can help.

Brain science helps us understand what children learn at each developmental stage, and how they learn it.

The Center on the Developing Child at Harvard University highlights some key concepts, including:

- Early experiences affect the development of brain architecture, which provides the foundation for all future learning, behavior, and health. That is what we are talking about with synaptic density and pruning.
- Serve and return interactions shape brain architecture. When an infant or young child babbles, gestures, or cries, and an adult responds appropriately with eye contact, words, or a hug, neural connections are built and strengthened in the child's brain that support the development of communication and social skills.

You can learn more about these and other key scientific concepts in child development by going to the ORTR website and selecting "Research and Advocacy". The ORTR Facebook page frequently highlights new research in child development, with an emphasis on easy-to-understand reports and practical applications.

Ohio Ready to Read: Research: <https://ohreadytoread.org/research>

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