

Building Baby's Brain

The Basics

The early years are critical for later life. For years, scientists have known that what happens – or doesn't happen – during the first few years makes a big difference in a child's later life, and that babies who do not get enough love and attention in infancy are less likely to be well-adjusted adults.



Today, scientists are continuing to learn more about how important the early years can be. Thanks to brain imaging technologies, we now have a clearer understanding of how the brain functions, both before and after birth.

► Wiring the Brain

A baby is born with about 100 billion neurons, the basic brain cells responsible for all major functions that happen in the body. Neurons exist throughout the central nervous system. Thinking, feeling, breathing, walking, and all other functions in the brain happen because these cells communicate. During pregnancy, the fetus develops more neurons than will eventually be needed as a safety measure, but most of the extra neurons are eliminated before birth. The number of neurons remains fairly constant from birth on, but the number and complexity of connections among neurons changes dramatically throughout the child's life.

During the first year or two, neurons make many more connections than the baby will use. The developing brain is a little like a fertile garden. When we plant a garden, we plant more seeds than needed to ensure that some of them grow and thrive. When too many seeds sprout, there is not enough room for the healthiest plants to thrive. By weeding out some plants, we allow more room for the crops to grow.

The brain has a similar "weeding" process, called pruning. Pruning is a normal part of brain development that creates more space for the most important networks of connections to expand and helps the brain conduct signals more efficiently. Different areas of the brain undergo pruning during different sensitive periods. Some pruning begins during pregnancy, but the most rapid pruning happens between ages 3 and 16. When pruning does not occur, developmental disorders may result. The most common of these is Fragile X syndrome, a genetic disorder that causes severe cognitive delays, especially in boys.

► The Importance of Experience

From the moment a baby is born, every experience taken in by the five senses helps strengthen the connections that guide development. No two brains are alike! Each child's brain creates individual pathways of connections based on specific experiences. A child with normal hearing builds complex networks of connections related to oral language; in contrast, the brain of a child with a hearing disability does not get the experience needed to strengthen those pathways. Similarly, a child who learns to play baseball will develop networks of brain connections that a child who never plays baseball may not have.

The kind of care a child receives plays a big role in how the brain chooses to wire itself. Parents who talk and read to their babies are helping them strengthen important language connections, and parents who respond sensitively to their baby's cries are building the emotional connections that lead to healthier relationships.



► What Can You Do?

Parents and other caregivers can help nurture positive brain development. Here are some important ways you can help your baby's brain develop:

- **Remember that brain development begins before birth.** Nutrition provides the foundation for brain development even before the baby is born. Women who are pregnant should eat nutritious foods, avoid alcohol, tobacco, and other drugs, and have regular prenatal checkups to help ensure that their babies are born healthy.
- **Make sure your baby's world is safe and secure.** A baby feels stress when the environment is dangerous or when caregivers do not respond to him, and that stress can slow brain development.
- **Remove any safety hazards from the environment.** Respond lovingly and consistently to your baby's cries. Give her attention.
- **Talk to your baby.** When he makes a sound, repeat it. Smile at him. Talk about the things you're doing together. Interacting face-to-face builds the brain connections needed for both language skills and a healthy emotional bond.
- **Read to your baby beginning at birth.** Hearing adults read helps the brain develop language connections. It also gives parents and babies a chance to spend time together. And reading aloud helps your baby start building a lifelong love of books.
- **If you use child care, ensure that it is high quality.** Babies need sensitive, loving care and stimulating experiences, in child care as well as at home, to ensure healthy development. Choose a child care provider who will interact warmly with your baby one-on-one. Look for a safe and clean environment, a low baby-to-adult ratio, a caregiver who understands how children grow and develop, and a rich variety of age-appropriate toys.
- **Get the information you need.** If you have questions about your baby's development, there are many places you can go for answers. Ask your doctor questions during check-ups. Have your librarian recommend good books on child development.

Contact the Family and Consumer Sciences agent in your county Extension office for more information on parenting. Check out the Better Brains for Babies website (bbbgeorgia.org) for more information on supporting healthy brain development.



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For more information about brain development, visit www.bbbgeorgia.org