Learn about baby's brain development in the first three years

SPHINGOMYELIN IN MILK

ARTICLE

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For growing children, the parents' responses to their cooing or singing to them may help develop their ability to think, create memories, and work their imagination.

It's not just a baby's physical development that parents marvel at, their intellectual evolution is astounding too. One day you're faced with a tiny human who depends on you for practically everything; soon after, this little person starts doing things that impress you on an almost daily basis.

Your baby's brain development unfolds at a rapid pace in their early years. The brain doubles in size in the first year and, by the time they turn three, babies' brains have reached 80% of its adult volume. The pace of brain growth may be radical at the outset, but it follows a predictable set of brain development stages. Read on to find out what to expect.

The first eight weeks: building brain connections

Your baby's brain starts developing in utero, giving them the skills they need for basic survival (sleep, cry, suckle) by the time they're born. And that’s just the beginning: when your baby stares at you while you talk and starts to recognise your voice, that’s just an outward sign of their brains’ neurons creating a connection with you.

Neurons are specialised nerve cells that communicate with one another to process information, using electrical and chemical signals. These signals form the basis of learning and memory.[1]

Babies are born with almost all of the neurons in the brain they will have for the rest of their lives.

Month three to 12: motor and language skills

During the first eight weeks, all of your baby's movements are reflexes – they don't actually have conscious control over their movements yet.[2] That adorable moment when your baby grips your finger? That's a sign of their brains developing fine motor skills, so encourage that by playing with them.

Brain development picks up speed from month three; by then, they're learning new concepts on an almost-daily basis. For instance, when they do things over and over again, it strengthens the neural circuits in their brain, which eventually allows them to pick up more complicated skills.[3]

The temporal lobe of the brain is responsible for their language skills and facial expressions. As the temporal lobe's neural connections get stronger over time, your baby will engage even more with people around them.[4]

What can parents do to help in the first year

On average, parents don't need to do anything outlandish to encourage brain development at this point. Something simple, like hanging a mobile above their cot, teaches babies about colour and the concept of movement.
When they coo and you respond to them, it helps to develop their ability to think, create memories and work their imagination. Encourage them to move in different ways by alternating placing them on their back and tummy. Improve their communication skills by talking and singing to them; reciting nursery rhymes helps too.

Myelination is the process where the neurons are coated with a sphingomyelin-rich myelin sheath, in order to improve the signals between neurons. This allows for more complex cognitive and motor functions to be developed, and helps them to perform mental operations faster.

Improving memory, intelligence and language skills depend on the myelination process. Most of the myelination process is completed by the age of two.[5]

To ensure your child gets all the nutrients necessary for this process to take place,

look for a formula milk that contains sphingomyelin, a phospholipid that is an integral component of the myelin sheath, which will give your baby a head start.

Years one to three: pruning unnecessary circuits

Long after their first birthday, your toddler's brain is still busy forming new connections between nerve cells, which leads to them picking up more complicated skills.

The connections in the brain get stronger with every new skill they learn. This development of new connections only starts slowing down around the age of two; their brain cuts back on the connections that aren't being used.
At the age of three, they'll have around 1,000 trillion brain connections. This number gets pruned by more than half as they grow older, down to around 500 trillion by adolescence.[6]

Drastic changes in a toddler’s brain

Your baby's memory will have improved drastically by their first year, thanks to the process of myelination – after turning one, they'll be able to recognise familiar people and objects. The process will be almost complete by the age of two, apart from in some regions of the brain that are responsible for more complex thoughts.

The cerebellum (the part of the brain responsible for co-ordination and balance) undergoes a development spurt during these years. This primes your toddler for complex movements like throwing a ball.

Their prefrontal cortex (the brain component that determines personality, decision-making and social social behaviour) will also develop rapidly, with the number of synaptic connections in the prefrontal cortex reaching a peak by their third birthday. As a result, they’ll begin to understand cause and effect better; and learn to interpret the present based on recalled past events.[7]

The part of the brain linked to language has more synaptic connections during this time, as your child learns to talk and understand more words. And, the more words they learn, the more these synaptic connections are strengthened.

Toddler tantrums are common in the first and second year of life, as your child hasn't learnt how to communicate their feelings. But these will lessen as the parts of their brain that control their emotions/impulses and self-control – the limbic system and prefrontal cortex, respectively – gradually develop.

What can parents do in the toddler years

Doing activities like finger painting helps to develop the muscles in their hands and fingers. Introduce new words and phrases to them often so that they'll expand their vocabulary.
Interacting with other children helps them to develop social skills and also learn important techniques like sharing. Feeding your toddler 'brain food' is also encouraged, such as berries, oily fish, avocado and yoghurt.

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