

Brain Health From Birth

Nurturing Brain Development
During Pregnancy
& the First Year



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For Emily

Brain Health from Birth
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PART 1

Brain Health &
Why It Matters

Introduction

During pregnancy and the first few months of life, a baby produces new brain cells at an astonishing rate. On average, the brain grows by more than 250,000 nerve cells *per minute* during pregnancy, to form a total of more than 100 billion neurons by the time a baby is born. Even then, the building process continues—during the first three months, a baby’s brain is still increasing in size by 1 percent per day.

Over the next six months of babyhood, the focus shifts from producing new brain cells to connecting them together. This process builds the extraordinarily complex network of pathways that will carry thoughts, memories, and emotions for life.

As you might expect, building a brain from scratch is a delicate process that can be easily disrupted. For instance, some babies that are born extremely premature will have critical areas of the brain that are much smaller than normal, a difference that remains even as these children grow older.¹ That makes preterm birth, unsurprisingly, one of the major risk factors for autism, intellectual disability, and other developmental disorders.

But premature birth is also something we can help prevent. As you will learn in this book, cutting-edge science shows that with sufficient vitamin D during pregnancy, the risk of very early preterm

birth plummets.² It follows that supplementing with vitamin D is one way to give your baby the best opportunity to develop a healthy brain. Yet there are also many other ways to minimize the chances of premature birth and protect the delicate brain-building process.

If you are currently trying to conceive, are pregnant, or have a new baby, you have a golden opportunity to provide a safe and nurturing environment for this extraordinary process to take place, uninterrupted. By providing enough of the key nutrients needed for brain building, reducing the odds of preterm birth, and avoiding certain toxins, you can go a long way toward removing many of the major risk factors for autism and ADHD, two conditions that are becoming more common with each passing year.

Doing so will have many other benefits too. That is because the same factors that influence the risk of autism and ADHD can also cause more subtle neurological changes in all children. By protecting your baby's brain when it is most vulnerable, you will not only reduce the risk of significant developmental disorders but may also help nurture a healthy brain that will one day be capable of extraordinary things.

My Story

My fascination with exactly how the brain works runs deep. Long before studying cellular neuroscience as part of my degree in biochemistry and molecular biology at the University of Sydney, I vividly remember peppering my father with questions about neurons and nerve signaling on family walks when I was five years old.

To give some context to this rather unusual behavior, I grew up knowing that my grandfather, Dr. Paul Fatt, had contributed to key discoveries about how brain cells communicate with each other (discoveries for which several of his research partners were awarded the Nobel Prize). My grandfather's obituary in the journal *Nature*

Neuroscience describes him as “one of the founders of modern cellular neuroscience” and “among the most distinguished neuroscientists and biophysicists of the twentieth century.”³

Growing up with an awareness of neurons and neurotransmitters has profoundly shaped my worldview. Yes, the human brain is more than the sum of its parts, but first and foremost it is a biological structure. How we think, feel, communicate, and experience the world is really the product of cells, chemicals, physics, and biology. This book explores the forces that influence your baby’s brain from that perspective.

Although I have always been fascinated with the biology of the brain, I became particularly interested in autism and ADHD once I found out my husband and I were expecting a baby boy and learned of the troubling statistics. In the United States, boys born today face at least a 3 to 4 percent chance of developing autism.⁴ My son probably had much worse odds, looking at the laundry list of factors that seem to be associated with autism risk. In particular, my family history of several autoimmune diseases and my husband’s age were working against us.

During the time our surrogate was pregnant with my first son, I was also deep into researching and writing my first book, *It Starts with the Egg*. The book describes how common toxins such as BPA and phthalates negatively influence fertility and may contribute to miscarriages. In the course of conducting research for that book, I came across troubling data that linked the same toxins to compromised brain development in children.

Fortunately, it is relatively easy to avoid many of these toxins once you know how. Our surrogate was on board with replacing plastic kitchenware with stainless steel or glass and switching to fragrance-free cleaning and skin-care products. She was also happy to adopt other measures suggested by the research, such as adding a daily omega-3 supplement.

Yet after my son was born, the autism concern remained. It

quickly became clear that my tiny baby had a propensity toward gastrointestinal problems and inflammation. By three months old, he had severe eczema and could not hold down any formula we tried. He cried in pain for six to eight hours per day from what we could only guess was severe reflux, although the medication we gave him seemed to make no difference. For reasons that are not fully understood, inflammation, gastrointestinal problems, and autism seem to go hand in hand. Everything about my son indicated he was beginning down a worrying path.

With that backdrop, I did everything I could to further reduce the burden of chemicals on his system, support his immune system, and reduce inflammation. Given the benefit of hindsight (and the new research discussed in this book), it is clear there is even more I could have done, but in the end, the basic steps I took were enough to turn his health around.

I am incredibly grateful that my son is now a bright, thriving, and healthy little boy. I know that many of the strategies I adopted to lower his overall level of inflammation probably helped nurture his developing brain too, such as giving him specific infant probiotics and avoiding chemicals in our home. I followed the same approach when my second child was born and thankfully now have two healthy boys who show all the characteristic signs of having had an optimal environment during pregnancy and early childhood. These signs include a long attention span, the ability to remain calm and focused, and early language development.

I attribute these positive characteristics to the steps we took to avoid certain toxins and ensure adequate nutrients during pregnancy. This is not just wild conjecture. The latest research clearly shows the effects of toxins such as BPA and phthalates on infant brain development, along with the many other measures discussed in this book. I feel compelled to share this science with as many parents and future parents as possible, so our children can all reach their full potential.

I feel a particular responsibility to ease the path for those who are becoming parents after reading *It Starts with the Egg*. I know that for many people, reading the book created a sense that there was finally something positive to do in the world of infertility, where everything normally feels helpless and beyond our control. But for others, the new information on BPA, phthalates, and other toxins became a source of worry.

It is not my goal to scare you about toxic chemicals lurking around every corner. If you read *It Starts with the Egg*, you are probably already concerned enough. Instead, this book offers practical advice on how to carry a nontoxic lifestyle through pregnancy and parenting, based on the latest scientific research linking common chemicals to impacts on childhood development. I would like this book to be your guide to what matters most during this extraordinary time, explaining what to focus on and what you can let slide without guilt.

I also want to ease any anxiety you may have about the new epidemic of autism and ADHD. The odds are truly cause for concern, but if we pay attention to the science, it is clear that there is so much we can do to protect our children's developing minds. That is particularly true if we take action during the time they are most vulnerable.

Doing so will not only reduce the risk of autism and other significant developmental problems but will also help protect cognitive function. In practical terms, this means preserving all the abilities needed for a child to form strong social bonds and live a happy and productive life.

Protecting Cognitive Function

In our modern world, where far too many children are affected by significant developmental disorders such as autism or ADHD, any discussion of brain health will naturally focus on what is causing these disorders and what we can do to prevent them. But the concept of brain

health is actually much broader. The ultimate goal is not just to prevent the most serious problems but to give your child the best start in life.

By taking steps to nurture your baby's brain health during pregnancy and early infancy, you will help safeguard all the abilities that fall under the broad umbrella of "cognitive development." This term refers to factors such as

- IQ
- attention span
- memory
- creativity
- language development
- nonverbal communication skills
- impulse control
- emotional regulation

When considering all of these facets, it is clear that the outcomes from nurturing brain health go far beyond boosting a child's future academic success. The implications for a child's life are much greater.

Studies consistently show that one of the most important factors that determine long-term happiness is having positive relationships with friends and family.⁵ Studies also show that the ability to form these important bonds depends largely on cognitive function.⁶ More specifically, it hinges on the capacity to express our thoughts, interpret nonverbal cues, empathize, and regulate our emotional state. These skills are all considered to be reflections of "executive function" within the overall umbrella of cognitive function.

Communication skills and other executive functions are no doubt heavily influenced by what children experience after they are born. How we interact with our children clearly shapes the development of their brain. This is particularly true when it comes to how much

time parents spend talking to their child, teaching them to recognize and regulate their own emotional state, and encouraging imaginative play and social interaction with other children. (For more on this topic, see the excellent books *Brain Rules for Baby* by John Medina and *The Whole Brain Child* by Daniel Siegel.)

Clearly, the learning experiences we provide to babies and toddlers are important, but they can only go so far. Based on the biology of their brains, children will innately have differing potential to develop cognitive skills.

Autism is one example of this phenomenon, where there is a biological influence at play that affects key aspects of cognitive function. Yet it is important to recognize that all children will fall somewhere within a broad range when it comes to their natural capacity to learn new words, interpret nonverbal cues, and express themselves. The same is true for many other aspects of cognitive function, including IQ and the ability to regulate emotions and maintain focused attention.

Your child's potential to develop these abilities is partly genetic, but biological and chemical influences during pregnancy and early infancy have a powerful impact too. These influences include pre-term birth, toxin exposures, nutritional deficiencies, and hormone disruptions. As you will learn throughout this book, these factors can leave lasting effects on children's IQ scores, behavior, attention span, and learning ability.

Closing the Gap Between Scientific Research and Real Life

The sheer volume of research on early brain development is staggering, but that allows us to cast a skeptical eye on scientific findings. There is now a vast amount of data on factors during pregnancy and infancy that can compromise brain health and raise the risk of autism, ADHD, or developmental delays. On the flip side, there is also a vast amount of data showing the ways we can positively influence

our baby's brain development, including providing key hormones and nutrients that are often overlooked.

As a result, we are no longer left clutching at straws or extrapolating from isolated animal studies. The advice in this book is based on research findings that have been replicated again and again, in a variety of different contexts (with citations provided so you can read the actual studies for yourself). You will learn about clear patterns seen in large observational studies and then confirmed in randomized controlled trials, where researchers divide pregnant women into two groups, change some factor in one group, and then follow the development of their children for many years.

In autism research in particular, the urgent need for answers causes many people to rush to judgment on the basis of isolated research findings. We have all seen the dramatic headlines claiming that something causes autism, only to read another headline six months later suggesting the exact opposite. This book will cut through the noise, weighing all the evidence and allowing you to make your own informed decisions on the major controversies such as vaccines, ultrasounds, Tylenol, and folic acid supplements.

You will also hear from several pioneering obstetricians and pediatricians who have changed the way they practice in light of the new evidence on baby brain health. One of these pioneers is Dr. Elisa Song, a Stanford-, NYU-, and UCSF-trained pediatrician with one of the most highly regarded holistic pediatrics practices in the country. I am honored to give you the benefit of her many years of experience.

In an ideal world, we would all have a knowledgeable doctor guiding us through the important decisions we encounter as new parents. Perhaps you do, and you can use this book as a tool to provide background information for your conversations with your obstetrician and pediatrician. But most doctors do not have the time to stay up to date on all of the latest research or delve deeply into issues as soon as a red flag is raised by new studies.

The unfortunate reality is that we simply cannot rely on standard medical advice to keep our baby's brains safe. As just one example, new studies are beginning to suggest a possible link between autism and the use of acetaminophen (also known as Tylenol) during pregnancy or infancy. Even though we do not yet have a clear answer on the issue, the research that has been done so far is enough to raise a red flag. Any pediatrician who claims there is no risk in giving babies acetaminophen is simply not paying attention to this research. As noted by Dr. William Parker of Duke University School of Medicine, "Even the best-trained pediatricians are generally unaware that the long-term effects of acetaminophen were never tested in children in controlled trials."⁷

I also firmly believe that it is important to approach scientific studies with the right dose of skepticism, but that we should still be willing to take action as soon as the evidence becomes sufficiently persuasive. In conventional medical practice, it is typical to wait for decades of incontrovertible proof before the standard advice changes. When it comes to addressing the epidemic of developmental disabilities affecting children today, any delay is a profound disservice to the babies that will be born this year and next. We simply have to act on the best available evidence before it is too late.

The goal of this book is to allow you to do just that, by bringing together all of the latest findings in the scientific literature and translating complex science into plain English, to provide evidence-based guidance on supporting your baby's brain development when it matters most.

To some extent, the biological and chemical influences on your child's cognitive abilities will continue their whole childhood. Factors such as nutrition, physical activity, and even continued exposure to toxins will always have some degree of impact. But at no time will the external world influence your baby's brain as much as during pregnancy and the first few months of life.

We know, for example, that very low blood sugar in the first few

days of life is still evident in cognitive abilities seven years later (as chapter 13 explains). Blood sugar disruptions in older babies, however, have little to no long-term impact on brain function. External factors during early life have an outsized impact on brain function because the brain is growing and changing so rapidly during this time.

The stage from conception through the first year is undoubtedly the most critical window to ensure lifelong brain health. During this time, our goal is not just to avoid the extreme disruptions to infant brain development that are reflected in autism and ADHD, but to nurture the ability to focus, remember, communicate, and regulate emotions. All of these mental processes are crucial to your child's ability to form strong social bonds and live a happy and productive life.

Overview of Chapters

Before exploring the practical steps to support your baby's growing brain, it is helpful to see the broader picture and understand the problem we are facing as modern parents. To that end, chapter 1 provides an overview of the epidemic of developmental disorders we are currently facing and explains the common thread linking various risk factors.

Chapters 2 to 9 then guide you through the steps to take during pregnancy to nurture and protect your baby's developing brain, including

- how to ensure you are providing the nutrients that are key to infant brain development, such as choline, vitamin D, and omega-3 fatty acids.
- the importance of testing for thyroid function and anemia during pregnancy.
- the latest science on the potential risks posed by prolonged use of acetaminophen.

- why you should feel comfortable with prenatal vaccines and ultrasounds.

If your baby has already arrived, you may choose to skip over chapters 2 through 9 and pick up with chapter 10, which provides guidance on how to create a nontoxic home by minimizing chemicals with the potential to compromise brain development.

The next step is setting up the baby's nursery. Chapters 11 and 12 help you choose the safest crib mattress, furniture, diapers, bottles, skin-care, and other gear, before discussing whether it is really worth spending more for organic bedding and clothing.

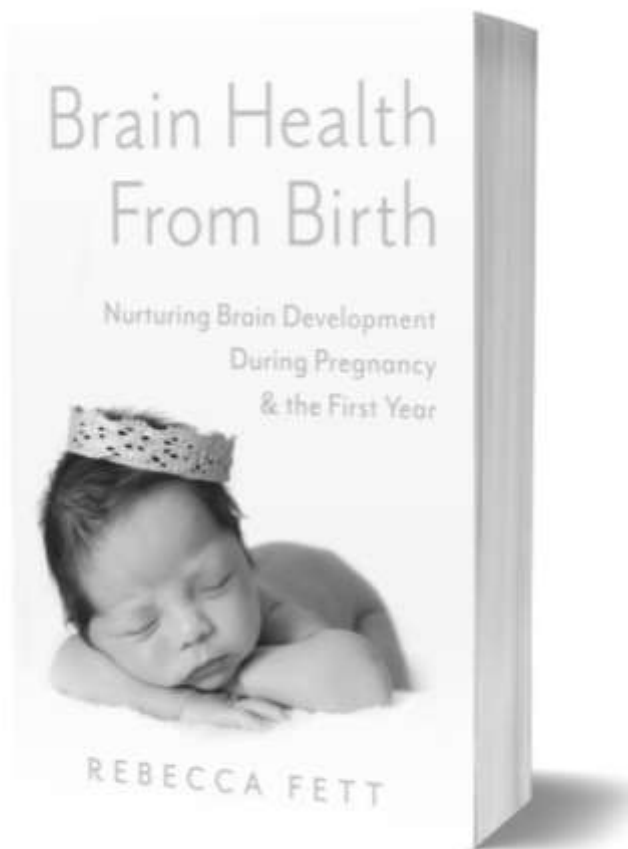
Chapters 13 and 14 guide you through the current science on formula feeding, explaining why aggressive efforts in hospitals to promote breastfeeding can sometimes backfire, along with detailed advice on how to choose the best formula.

Chapters 15 through 16 address the other crucial matters you will face in the first few months with your baby, such as infant vaccines, antibiotics, and pain medication. Chapter 17 then explores the links between the beneficial gut microbes, the immune system, and brain health, explaining simple ways to support your newborn's microbiome.

By the end of the book, you will have learned about many small changes that can have a big impact on the health of your child's brain. You will be armed with all the knowledge you need to make truly informed decisions, to give your child the best possible start in life.

Brain Health from Birth will be released on Amazon and other retailers on August 28th, 2019.

Preorder the Kindle version by August 27th for \$0.99,
a saving of 90% off the retail price.



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