DNAbling Parents

*Genetics technology brings both hope and excruciating personal decisions to patients who use it.*

by Lisa Sweetingham

On a Sunday morning in late November 2000, Karen McGuire went to Mass with a special request for God. As she walked up the aisle to take Holy Communion, she thought about her secret—a recent home pregnancy test had confirmed that she was pregnant. As the priest placed the wafer on her tongue, she swallowed it and prayed that her developing baby would grow up healthy and strong.

A month later the thirty-seven-year-old human resources manager and her husband, Gerry, thirty-four, a graduate student in history, traveled from their Long Island apartment to Karen’s brother’s house in Boston. At bedtime she followed her thirty-six-year-old brother Scott as he powered himself by electric wheelchair into his room. She helped him to the bed, undressed him, and followed him into the bathroom where she laid him back into the shower on a reclining seat made of netting and plastic pipes. She bathed him, washed his hair twice (how he likes it), brushed his teeth, and helped him back to bed. As she placed pillows behind his neck and set up the ventilator that helps him breathe at night, she looked lovingly into the eyes of the man who had once been the little boy she helped raise. And she hoped and prayed that the child growing inside her would not share his affliction—Duchenne’s muscular dystrophy (DMD).

DMD occurs in about one of every 3,500 boys born worldwide, causing increased muscle weakness as their bodies grow. Until they hit kindergarten, there’s usually no indication that anything is wrong. Survival is rare beyond the late twenties. Pneumonia or a stopped heart are the two most common ways that someone with muscular dystrophy dies. There is no cure.

Technology And Hope

Karen and Gerry shared with me the story of their quest for a healthy baby when I was a journalism student at Columbia University working on an article about assisted reproductive technology. When I first met the McGuires, they had already spent two years and more than $20,000 on preimplantation genetic diagnosis, or PGD, in an attempt to guarantee that their

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first child would be healthy. If that attempt had worked (it did not—in the end, Karen's pregnancy was accomplished without technology), the McGuire baby would have joined an estimated 1,000 PGD infants born worldwide since 1989, according to the Genetics and Public Policy Center. The process, which is not as simple as it sounds, begins with in vitro fertilization (IVF). When each blastocyst is about eight cells old, a single cell is tested for the specific genetic mutation that one or both partners may carry. Only those testing negative are transferred to the mother's womb. Nine months later, if all else goes well, a healthy baby is born. Testing is available for more than fifty genetic disorders including Tay-Sachs, cystic fibrosis, Huntington's, and hemophilia. PGD’s use is increasing steadily among parents who want to ensure that their lethal genes will not be passed on.

I was trained to approach all issues with fairness and skepticism, and the morality of choices that PGD permits gave me plenty to be skeptical about. I pictured the day when ambitious parents could drop into their doctor's office and choose a tall, perfectly formed baby boy with a chart-popping IQ. While I dug deeper into the science and ethics behind PGD, Karen's story of two failed PGD attempts followed by a jittery natural pregnancy unfolded before me. Her experience reveals what life was like before PGD for couples with familial genetic disorders who must endure ten to fifteen weeks of high anxiety as they wait for a chorionic villus sampling (CVS) or amniocentesis result. If tests determine that their baby has the family disease, they are forced to consider having a very sick child or a second-trimester abortion. In fact, from my interviews with genetic counselors and physicians, I learned that many parents turn to PGD in terrible grief only after the loss of a first child from a disease they didn't even know was in their genes.

I spent almost six months interviewing the McGuires. Karen said she hoped that by sharing her experience with me, others would understand what an arduous process PGD is. She wants people to know that it is filled with failures and physical trials that make it a highly undesirable route for healthy parents who simply want to “design a baby.” I also began to think more about my own extended family's genetic history. No fatal childhood diseases plague our brood, but there’s a raging predisposition toward alcoholism and depression in both sets of grandparents that skipped over me and my brothers but has rendered a number of aunts and uncles in perpetual states of self-destruction. If genetic markers for these ills could be tested for one day, would I attempt to save my own children from such hardship? Despite the intrinsic environmental influences on diseases such as alcoholism and mental illness, I am certain that advances in human genome research will deliver the keys to unlock many of the mysteries of human nature. Personally, when it comes to non-fatal traits, I prefer the mystery. But witnessing the McGuire’s ordeal has made me keenly aware of PGD's value for eliminating fatal genetic disease, which far outweighs the technology's potential for misuse.
Mission: Healthy Baby

Karen's reasons for trying technology to better her chances of having a healthy baby were rooted in her childhood. When she was twelve years old, her doctors warned her that one day having kids of her own would be like playing Russian roulette. As a DMD carrier, she has a 50 percent chance of giving the disease to a son and of passing the carrier trait to a daughter. Still, she said, by her mid-thirties, with babies on the brain, her first impulse was to think, “I have good luck, my husband has good luck, we'll be okay.” But Gerry wasn't satisfied with their odds and didn't want to have to face the abortion question should their dare with nature backfire. “My Catholicism was kicking in, and I felt guilty,” he said. “I saw what Karen's brother goes through just to breathe, and I saw Karen having to live with that her whole life. I couldn't imagine having to watch my own kid go through the same thing.” The McGuires also decided against adoption and agreed that PGD seemed like their best hope for a healthy family.

In fall 1999 Karen had her first appointment with a specialist in infertility and reproductive surgery at Cornell University's Weill Medical College in New York City. Here she learned the basics: One try at a healthy baby would include a series of drug cycles (about $5,000) prior to egg retrieval surgery ($8,900), PGD testing (free at the time because it was covered by an experimental research protocol, but most centers charge between $1,000 and $5,000), then transfer of the preselected blastocysts. Karen also learned that her odds of conception were about 46 percent.

Over the next few weeks Karen's body was prepped for egg retrieval. Doctors took blood samples, x-rayed her fallopian tubes, and prescribed drugs to induce maximum egg production. Gerry learned how to give Karen daily injections of these “psycho drugs,” as he affectionately called them, which wreaked havoc with her hormones, making her feel irritable and out of control. “The process really consumes your whole life,” she recalled. “You can't go anywhere because you have to plan to be home for your shots.” Karen also began to obsess over her late childbearing age of thirty-seven and how it affected her odds of conception.

“Congratulations, you're pregnant,” a Cornell nurse reported to Karen by phone in March 2000. A few days earlier, doctors had transferred two DMD-free embryos to Karen's womb. She was elated. “I got that first phone call, and I just didn't know any better,” she said. What she didn't understand was that at this stage it was simply a chemical pregnancy in which her levels of HCG (human chorionic gonadotropin) had risen and all maternal signals were a “go,” but the embryo had failed. Karen got her period soon after and was left with nothing. She wanted to try PGD again, right away, but Gerry needed a break. So they waited until August
to begin a second cycle of drugs, write a second batch of checks, and try IVF and PGD again. “It was going to be my thirty-seventh birthday in a couple of days,” Karen said. “I was hoping this was gonna be my birthday present.” Karen’s birthday passed with no gift from modern medicine, barren as before.

Frustrated, the McGuire’s decided to bring the business of baby-making back into their bedroom, letting the genetic chips fall where they may. Their third attempt at conception—in their own home, unassisted, free of needles, drugs, and doctors—was a natural success but constituted a huge risk.

**Big Gamble**

Karen’s pregnancy was a dream fulfilled, yet she anguished over the potential consequences of what she’d done. She agonized over the possibility of having an abortion if her fetus carried her brother’s disease. At the same time, she was quietly angry with abortion critics who often stood next to her at church. “I just want to say to them, ‘You’ve never walked in my shoes; you didn’t help me raise my brother; you didn’t have twenty years of nightmares about how your brother’s going to die.’ ” She prayed for a healthy baby.

In February 2001, at nineteen weeks, amniocentesis revealed that she was carrying a boy—who had a fifty-fifty chance of developing DMD. “I could’ve walked out that day and begun enjoying the pregnancy if they’d told me it was a girl,” she recalled. Karen’s father, a senior technician at a genetics research lab in Massachusetts, had helped to create the test for the specific type of Duchenne’s that the family carried (an endeavor inspired by his son’s affliction). He was the one she trusted most to perform the next crucial step: DNA testing that would tell them definitively if her baby was affected.

Now, their main unknown was the genetic mystery of the baby’s DNA. Karen’s father would shepherd the testing but wouldn’t have an answer for two tortuous weeks. To prepare for bad news, Karen asked her family doctor on Long Island about abortion options. He described a termination that could be scheduled on a day’s notice. “That week was the worst,” Karen said. “Gerry was in the middle of papers and tests. We’d come home at night and just look at each other and cry.”

Meanwhile, her belly was growing, but the joys of motherhood eluded her. Her clothes no longer fit, so she went to the shopping mall. “I was so depressed,” she said. “There was a motherhood store, but it didn’t make sense for me to go in there yet.” A friend who mourned the loss of her own aborted baby after learning that it would have had a fatal genetic disease advised Karen that naming it and having a funeral ultimately gave her closure. “She said her only regret was not having held it in her arms,” Karen recalled. “She said, ‘You’re parents right now, and this will be the first decision as parents that you’re making about your baby.’ ” When Karen came home with information on baby cemetery plots, Gerry said he didn’t think he could go through with aborting, naming, and then burying their baby.
On a Friday in March, Karen went to church after work. “I didn't know how I was going to get through the weekend,” she said. She found herself asking less that her baby be safe, and more “please help me to deal with whatever I’m gonna have to go through.” At the same time, in a research lab in Boston, Karen's father was putting her baby’s cells through a DNA-sequencing machine. He labeled his grandson's cells SM for “Shane, male.” Karen had told him of her fondness for the Irish name Shane, which, she was told, in Hebrew means “gracious gift from God.”

DNA sequencing on Shane’s cells was complete at 4:30 a.m. on Saturday. Karen's father was so nervous about the results that he couldn't sleep. He drove back to the lab, bracing himself for the answer. “He called me at 7:30 a.m.; I didn't hear anything when I answered, and I thought it was a crank call,” Karen said. “But then I heard him say my name, and I knew everything was OK.” She reached over to Gerry, who was just waking, and sobbed, “Everything’s OK.” Her dad was crying on the other end of the phone. “He was so excited,” she said. “He told me, ‘I've been crying for fifteen minutes and had to pull myself together before I called.’”

Shane McGuire made a healthy arrival on July 24, 2001, at 5:16 a.m.—the same day as Gerry’s father’s birthday. “Gerry’s dad passed away when Gerry was thirteen,” Karen said. “No wonder Shane was so lucky; he's got a very special guardian angel.” The McGuires would like to have another child, but they are no longer willing to rely on their luck and are certain they will give PGD another try.

Troubling Personal Choices

As the number and type of genetic tests available increase, more couples like the McGuires will turn to PGD to eliminate genetic diseases. The McGuires discovered that PGD may hold great promise but is not simple; nor is its success guaranteed. A new future through genetic technology is still an uncertain, emotional, expensive, and physically draining roller coaster ride. Ability to pay for procedures can be a formidable obstacle for many: Karen and Gerry handed over their life savings—money intended for a down payment on a first home—to cover the cost of two attempts at IVF and PGD. But beyond cost, in this brave new age of genetic technology, people who use it must be willing to accept the pitfalls and failures ahead and to face the consequences of decisions made during very trying times.

My skepticism about PGD still lingers. The technique is ethically troubling. I am uneasy about its nontherapeutic uses such as for sex selection by healthy couples. I am hopeful that some parents, if well informed, will decide against PGD should their alternatives seem less daunting. However, having observed the McGuires’ experience up close, I believe that decisions about whether to use PGD belong only to the people involved. As Karen said, “Someone at work told Gerry, ‘What’s the big deal? Karen’s taken care of a handicapped kid before, she can do it again.’ It makes me crazy. How dare someone presume what it’s like for us?”