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The Birth of HeLa

Gey's twenty-one-year-old assistant, Mary Kubicek, sat eating a tuna-salad sandwich at a long stone culture bench that doubled as a break table. She and Margaret and the other women in the Gey lab spent countless hours there, all in nearly identical cat-eye-glasses with fat dark frames and thick lenses, their hair pulled back in tight buns.

At first glance, the room could have been an industrial kitchen. There were gallon-sized tin coffee cans full of utensils and glassware; powdered creamer, sugar, spoons, and soda bottles on the table; huge metal freezers lining one wall; and deep sinks Gey made by hand using stones he collected from a nearby quarry. But the teapot sat next to a Bunsen burner, and the freezers were filled with blood, placentas, tumor samples, and dead mice (plus at least one duck Gey kept frozen in the lab for more than twenty years after a hunting trip, since it wouldn't fit in his freezer at home). Gey had lined one wall with cages full of squealing rabbits, rats, and guinea pigs; on one side of the table where Mary sat eating her lunch, he'd built shelves holding cages full of mice, their bodies filled with tumors. Mary always stared at them

while she ate, just as she was doing when Gey walked into the lab carrying the pieces of Henrietta's cervix.

"I'm putting a new sample in your cubicle," he told her.

Mary pretended not to notice. *Not again,* she thought, and kept eating her sandwich. *It can wait till I'm done.*

Mary knew she shouldn't wait—every moment those cells sat in the dish made it more likely they'd die. But she was tired of cell culture, tired of meticulously cutting away dead tissue like gristle from a steak, tired of having cells die after hours of work.

Why bother? she thought.

Gey hired Mary for her hands. She was fresh out of college with a physiology degree when her adviser sent her for an interview. Gey asked Mary to pick up a pen from the table and write a few sentences. Now pick up that knife, he said. Cut this piece of paper. Twirl this pipette.

Mary didn't realize until months later that he'd been studying her hands, checking their dexterity and strength to see how they'd stand up to hours of delicate cutting, scraping, tweezing, and pipetting.

By the time Henrietta walked into Hopkins, Mary was handling most of the tissue samples that came through the door, and so far all samples from TeLinde's patients had died.

At that point, there were many obstacles to growing cells successfully. For starters, no one knew exactly what nutrients they needed to survive, or how best to supply them. Many researchers, including the Geys, had been trying for years to develop the perfect culture medium—the liquid used for feeding cells. The recipes for Gey Culture Medium evolved constantly as George and Margaret added and removed ingredients, searching for the perfect balance. But they all sounded like witches' brews: the plasma of chickens, purée of calf fetuses, special salts, and blood from human umbilical cords. George had rigged a bell and cable from the window of his lab across a courtyard to the Hopkins maternity ward, so nurses could ring anytime a

baby was born, and Margaret or Mary would run over and collect umbilical cord blood.

The other ingredients weren't so easy to come by: George visited local slaughterhouses at least once a week to collect cow fetuses and chicken blood. He'd drive there in his rusted-out old Chevy, its left fender flapping against the pavement, shooting sparks. Well before dawn, in a rundown wooden building with a sawdust floor and wide gaps in the walls, Gey would grab a screaming chicken by the legs, yank it upside down from its cage, and wrestle it to its back on a butcher block. He'd hold its feet in one hand and pin its neck motionless to the wood with his elbow. With his free hand, he'd squirt the bird's chest with alcohol, and plunge a syringe needle into the chicken's heart to draw blood. Then he'd stand the bird upright, saying, "Sorry, old fella," and put it back in its cage. Every once in a while, when a chicken dropped dead from the stress, George took it home so Margaret could fry it for dinner.

Like many procedures in their lab, the Gey Chicken Bleeding Technique was Margaret's creation. She worked out the method step-by-step, taught it to George, and wrote detailed instructions for the many other researchers who wanted to learn it.

Finding the perfect medium was an ongoing experiment, but the biggest problem facing cell culture was contamination. Bacteria and a host of other microorganisms could find their way into cultures from people's unwashed hands, their breath, and dust particles floating through the air, and destroy them. But Margaret had been trained as a surgical nurse, which meant sterility was her specialty—it was key to preventing deadly infections in patients in the operating room. Many would later say that Margaret's surgical training was the only reason the Gey lab was able to grow cells at all. Most culturists, like George, were biologists; they knew nothing about preventing contamination.

Margaret taught George everything he knew about keeping cultures sterile, and she did the same with every technician, grad student, and scientist who came to work or study in the lab. She hired a local woman named Minnie whose sole job was washing the laboratory

glassware using the only product Margaret would allow: Gold Dust Twins soap. Margaret was so serious about that soap, when she heard a rumor that the company might go out of business, she bought an entire boxcar full of it.

Margaret patrolled the lab, arms crossed, and leaned over Minnie's shoulder as she worked, towering nearly a foot above her. If Margaret ever smiled, no one could have seen it through her ever-present surgical mask. She inspected all the glassware for spots or smudges, and when she found them—which was often—she'd scream, "MINNIE!" so loud that Mary cringed.

Mary followed Margaret's sterilizing rules meticulously to avoid her wrath. After finishing her lunch, and before touching Henrietta's sample, Mary covered herself with a clean white gown, surgical cap, and mask, and then walked to her cubicle, one of four airtight rooms George had built by hand in the center of the lab. The cubicles were small, only five feet in any direction, with doors that sealed like a freezer's to prevent contaminated air from getting inside. Mary turned on the sterilizing system and watched from outside as her cubicle filled with hot steam to kill anything that might damage the cells. When the steam cleared, she stepped inside and sealed the door behind her, then hosed the cubicle's cement floor with water and scoured her workbench with alcohol. The air inside was filtered and piped in through a vent on the ceiling. Once she'd sterilized the cubicle, she lit a Bunsen burner and used its flame to sterilize test tubes and a used scalpel blade, since the Gey lab couldn't afford new ones for each sample.

Only then did she pick up the pieces of Henrietta's cervix—forceps in one hand, scalpel in the other—and carefully slice them into one-millimeter squares. She sucked each square into a pipette, and dropped them one at a time onto chicken-blood clots she'd placed at the bottom of dozens of test tubes. She covered each clot with several drops of culture medium, plugged the tubes with rubber stoppers, and labeled each one as she'd labeled most cultures they grew: using the first two letters of the patient's first and last names.

After writing "HeLa," for *Henrietta* and *Lacks,* in big black letters

on the side of each tube, Mary carried them to the incubator room that Gey had built just like he'd built everything else in the lab: by hand and mostly from junkyard scraps, a skill he'd learned from a lifetime of making do with nothing.

George Gey was born in 1899 and raised on a Pittsburgh hillside overlooking a steel mill. Soot from the smokestacks made his parents' small white house look like it had been permanently charred by fire and left the afternoon sky dark. His mother worked the garden and fed her family from nothing but the food she raised. As a child, George dug a small coal mine in the hill behind his parents' house. He'd crawl through the damp tunnel each morning with a pick, filling buckets for his family and neighbors so they could keep their houses warm and stoves burning.

Gey paid his way through a biology degree at the University of Pittsburgh by working as a carpenter and mason, and he could make nearly anything for cheap or free. During his second year in medical school, he rigged a microscope with a time-lapse motion picture camera to capture live cells on film. It was a Frankensteinish mishmash of microscope parts, glass, and 16-millimeter camera equipment from who knows where, plus metal scraps, and old motors from Shapiro's junkyard. He built it in a hole he'd blasted in the foundation of Hopkins, right below the morgue, its base entirely underground and surrounded by a thick wall of cork to keep it from jiggling when streetcars passed. At night, a Lithuanian lab assistant slept next to the camera on a cot, listening to its constant tick, making sure it stayed stable through the night, waking every hour to refocus it. With that camera, Gey and his mentor, Warren Lewis, filmed the growth of cells, a process so slow—like the growth of a flower—the naked eye couldn't see it. They played the film at high speed so they could watch cell division on the screen in one smooth motion, like a story unfolding in a flip book.

It took Gey eight years to get through medical school because he

kept dropping out to work construction and save for another year's tuition. After he graduated, he and Margaret built their first lab in a janitor's quarters at Hopkins—they spent weeks wiring, painting, plumbing, building counters and cabinets, paying for much of it with their own money.

Margaret was cautious and stable, the backbone of the lab. George was an enormous, mischievous, grown-up kid. At work he was dapper, but at home he lived in flannels, khakis, and suspenders. He moved boulders around his yard on weekends, ate twelve ears of corn in one sitting, and kept barrels full of oysters in his garage so he could shuck and eat them anytime he wanted. He had the body of a retired linebacker, six feet four inches tall and 215 pounds, his back unnaturally stiff and upright from having his spine fused so he'd stop throwing it out. When his basement wine-making factory exploded on a Sunday, sending a flood of sparkling burgundy through his garage and into the street, Gey just washed the wine into a storm drain, waving at his neighbors as they walked to church.

Gey was a reckless visionary—spontaneous, quick to start dozens of projects at once, filling the lab and his basement at home with half-built machines, partial discoveries, and piles of junkyard scraps only he could imagine using in a lab. Whenever an idea hit him, he sat wherever he was—at his desk, kitchen table, a bar, or behind the wheel of his car—gnawing on his ever-present cigar and scribbling diagrams on napkins or the backs of torn-off bottle labels. That's how he came up with the roller-tube culturing technique, his most important invention.

It involved a large wooden roller drum, a cylinder with holes for special test tubes called roller tubes. The drum, which Gey called the "whirligig," turned like a cement mixer twenty-four hours a day, rotating so slowly it made only two full turns an hour, sometimes less. For Gey, the rotation was crucial: he believed that culture medium needed to be in constant motion, like blood and fluids in the body, which flow around cells, transporting waste and nutrients.

When Mary finally finished cutting the samples of Henrietta's

cervix and dropping them in dozens of roller tubes, she walked into the incubator room, slid the tubes one at a time into the drum, and turned it on. Then she watched as Gey's machine began churning slowly.

Henrietta spent the next two days in the hospital, recovering from her first radium treatment. Doctors examined her inside and out, pressing on her stomach, inserting new catheters into her bladder, fingers into her vagina and anus, needles into her veins. They wrote notes in her chart saying, "30 year-old colored female lying quietly in no evident distress," and "Patient feels quite well tonight. Morale is good and she is ready to go home."

Before Henrietta left the hospital, a doctor put her feet in the stirrups again and removed the radium. He sent her home with instructions to call the clinic if she had problems, and to come back for a second dose of radium in two and a half weeks.

Meanwhile, each morning after putting Henrietta's cells in culture, Mary started her days with the usual sterilization drill. She peered into the tubes, laughing to herself and thinking, *Nothing's happening. Big surprise.* Then, two days after Henrietta went home from the hospital, Mary saw what looked like little rings of fried egg white around the clots at the bottoms of each tube. The cells were growing, but Mary didn't think much of it—other cells had survived for a while in the lab.

But Henrietta's cells weren't merely surviving, they were growing with mythological intensity. By the next morning they'd doubled. Mary divided the contents of each tube into two, giving them room to grow, and within twenty-four hours, they'd doubled again. Soon she was dividing them into four tubes, then six. Henrietta's cells grew to fill as much space as Mary gave them.

Still, Gey wasn't ready to celebrate. "The cells could die any minute," he told Mary.

But they didn't. They kept growing like nothing anyone had seen,

doubling their numbers every twenty-four hours, stacking hundreds on top of hundreds, accumulating by the millions. "Spreading like crabgrass!" Margaret said. They grew twenty times faster than Henrietta's normal cells, which died only a few days after Mary put them in culture. As long as they had food and warmth, Henrietta's cancer cells seemed unstoppable.

Soon, George told a few of his closest colleagues that he thought his lab might have grown the first immortal human cells.

To which they replied, Can I have some? And George said yes.