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The Death and Life of Cell Culture

On April 10, 1951, three weeks after Henrietta started radiation therapy, George Gey appeared on WAAM television in Baltimore for a special show devoted to his work. With dramatic music in the background, the announcer said, "Tonight we will learn why scientists believe that cancer can be conquered."

The camera flashed to Gey, sitting at a desk in front of a wall covered with pictures of cells. His face was long and handsome, with a pointed nose, black plastic bifocals, and a Charlie Chaplin mustache. He sat stiff and straight-backed, tweed suit perfectly pressed, white handkerchief in his breast pocket, hair slicked. His eyes darted off screen, then back to the camera as he drummed his fingers on the desk, his face expressionless.

"The normal cells which make up our bodies are tiny objects, five thousand of which would fit on the head of a pin," he said, his voice a bit too loud and stilted. "How the normal cells become cancerous is still a mystery."

He gave viewers a basic overview of cell structure and cancer using diagrams and a long wooden pointer. He showed films of cells

moving across the screen, their edges inching further and further into the empty space around them. And he zoomed in on one cancer cell, its edges round and smooth until it began to quiver and shake violently, exploding into five cancer cells.

At one point he said, "Now let me show you a bottle in which we have grown massive quantities of cancer cells." He picked up a clear glass pint-sized bottle, most likely full of Henrietta's cells, and rocked it in his hands as he explained that his lab was using those cells to find ways to stop cancer. He said, "It is quite possible that from fundamental studies such as these that we will be able to learn a way by which cancer cells can be damaged or completely wiped out."

To help make that happen, Gey began sending Henrietta's cells to any scientist who might use them for cancer research. Shipping live cells in the mail—a common practice today—wasn't done at the time. Instead, Gey sent them via plane in tubes with a few drops of culture medium, just enough to keep them alive for a short time. Sometimes pilots or stewards tucked the tubes in their shirt pockets, to keep the cells at body temperature as if they were still in an incubator. Other times, when the cells had to ride in the cargo hold, Gey tucked them into holes carved in blocks of ice to keep them from overheating, then packed the ice in cardboard boxes filled with sawdust. When shipments were ready to go, Gey would warn recipients that the cells were about to "metastasize" to their cities, so they could stand ready to fetch the shipment and rush back to their labs. If all went well, the cells survived. If not, Gey packaged up another batch and tried again.

He sent shipments of HeLa cells to researchers in Texas, India, New York, Amsterdam, and many places between. Those researchers gave them to more researchers, who gave them to more still. Henrietta's cells rode into the mountains of Chile in the saddlebags of pack mules. As Gey flew from one lab to another, demonstrating his culturing techniques and helping to set up new laboratories, he always flew with tubes of Henrietta's cells in his breast pocket. And when scientists visited Gey's lab to learn his techniques, he usually sent

them home with a vial or two of HeLa. In letters, Gey and some of his colleagues began referring to the cells as his "precious babies."

The reason Henrietta's cells were so precious was because they allowed scientists to perform experiments that would have been impossible with a living human. They cut HeLa cells apart and exposed them to endless toxins, radiation, and infections. They bombarded them with drugs, hoping to find one that would kill malignant cells without destroying normal ones. They studied immune suppression and cancer growth by injecting HeLa cells into immune-compromised rats, which developed malignant tumors much like Henrietta's. If the cells died in the process, it didn't matter—scientists could just go back to their eternally growing HeLa stock and start over again.

Despite the spread of HeLa and the flurry of new research that followed, there were no news stories about the birth of the amazing HeLa cell line and how it might help stop cancer. In Gey's one appearance on television, he didn't mention Henrietta or her cells by name, so the general public knew nothing of HeLa. But even if they had known, they probably wouldn't have paid it much mind. For decades the press had been reporting that cell culture was going to save the world from disease and make man immortal, but by 1951 the general public had stopped buying it. Cell culture had become less a medical miracle than something out of a scary science-fiction movie.

It all started on January 17, 1912, when Alexis Carrel, a French surgeon at the Rockefeller Institute, grew his "immortal chicken heart."

Scientists had been trying to grow living cells since before the turn of the century, but their samples had always died. As a result, many researchers believed it was impossible to keep tissues alive outside the body. But Carrel set out to prove them wrong. At age thirty-nine he'd already invented the first technique for suturing blood vessels together, and had used it to perform the first coronary bypass and develop

methods for transplanting organs. He hoped someday to grow whole organs in the laboratory, filling massive vaults with lungs, livers, kidneys, and tissues he could ship through the mail for transplantation. As a first step, he'd tried to grow a sliver of chicken-heart tissue in culture, and to everyone's amazement, it worked. Those heart cells kept beating as if they were still in the chicken's body.

Months later, Carrel won a Nobel Prize for his blood-vessel-suturing technique and his contributions to organ transplantation, and he became an instant celebrity. The prize had nothing to do with the chicken heart, but articles about his award conflated the immortal chicken-heart cells with his transplantation work, and suddenly it sounded like he'd found the fountain of youth. Headlines around the world read:

CARREL'S NEW MIRACLE POINTS WAY TO AVERT OLD AGE! . . .
SCIENTISTS GROW IMMORTAL CHICKEN HEART . . .
DEATH PERHAPS NOT INEVITABLE

Scientists said Carrel's chicken-heart cells were one of the most important advances of the century, and that cell culture would uncover the secrets behind everything from eating and sex to "the music of Bach, the poems of Milton, [and] the genius of Michelangelo." Carrel was a scientific messiah. Magazines called his culture medium "an elixir of youth" and claimed that bathing in it might make a person live forever.

But Carrel wasn't interested in immortality for the masses. He was a eugenicist: organ transplantation and life extension were ways to preserve what he saw as the superior white race, which he believed was being polluted by less intelligent and inferior stock, namely the poor, uneducated, and nonwhite. He dreamed of never-ending life for those he deemed worthy, and death or forced sterilization for everyone else. He'd later praise Hitler for the "energetic measures" he took in that direction.

Carrel's eccentricities fed into the media frenzy about his work. He was a stout, fast-talking Frenchman with mismatched eyes—one brown, the other blue—who rarely went out without his surgeon's cap. He wrongly believed that light could kill cell cultures, so his laboratory looked like the photo negative of a Ku Klux Klan rally, where technicians worked in long black robes, heads covered in black hoods with small slits cut for their eyes. They sat on black stools at black tables in a shadowless room with floors, ceilings, and walls painted black. The only illumination came from a small, dust-covered skylight.

Carrel was a mystic who believed in telepathy and clairvoyance, and thought it was possible for humans to live several centuries through the use of suspended animation. Eventually he turned his apartment into a chapel, began giving lectures on medical miracles, and told reporters he dreamed of moving to South America and becoming a dictator. Other researchers distanced themselves, criticizing him for being unscientific, but much of white America embraced his ideas and saw him as a spiritual adviser and a genius.

Reader's Digest ran articles by Carrel advising women that a "husband should not be induced by an oversexed wife to perform a sexual act," since sex drained the mind. In his best-selling book, *Man, the Unknown,* he proposed fixing what he believed was "an error" in the U.S. Constitution that promised equality for all people. "The feeble-minded and the man of genius should not be equal before the law," he wrote. "The stupid, the unintelligent, those who are dispersed, incapable of attention, of effort, have no right to a higher education."

His book sold more than two million copies and was translated into twenty languages. Thousands showed up for Carrel's talks, sometimes requiring police in riot gear to keep order as buildings filled to capacity and fans had to be turned away.

Through all of this, the press and public remained obsessed with Carrel's immortal chicken heart. Each year on New Year's Day, the *New York World Telegram* called Carrel to check on the cells; and every January 17 for decades, when Carrel and his assistants lined up

in their black suits to sing "Happy Birthday" to the cells, some newspaper or magazine retold the same story again and again:

CHICKEN HEART CELLS ALIVE TEN YEARS . . .
FOURTEEN YEARS . . . TWENTY . . .

Each time, the stories promised the cells would change the face of medicine, but they never did. Meanwhile, Carrel's claims about the cells grew more fantastical.

At one point he said the cells "would reach a volume greater than that of the solar system." *The Literary Digest* reported that the cells could have already "covered the earth," and a British tabloid said they could "form a rooster . . . big enough today to cross the Atlantic in a single stride, [a bird] so monstrous that when perched on this mundane sphere, the world, it would look like a weathercock." A string of best-selling books warned of the dangers of tissue culture: one predicted that 70 percent of babies would soon be grown in culture; another imagined tissue culture producing giant "Negroes" and two-headed toads.

But the fear of tissue culture truly found its way into American living rooms in an episode of *Lights Out,* a 1930s radio horror show that told the story of a fictional Dr. Alberts who'd created an immortal chicken heart in his lab. It grew out of control, filling the city streets like The Blob, consuming everyone and everything in its path. In only two weeks it destroyed the entire country.

The real chicken-heart cells didn't fare so well. In fact, it turned out that the original cells had probably never survived long at all. Years after Carrel died awaiting trial for collaborating with the Nazis, scientist Leonard Hayflick grew suspicious of the chicken heart. No one had ever been able to replicate Carrel's work, and the cells seemed to defy a basic rule of biology: that normal cells can only divide a finite number of times before dying. Hayflick investigated them and concluded that the original chicken-heart cells had actually died soon after Carrel put them in culture, and that, intentionally or not, Carrel