



On the first day of her second week, Claire made her way through the deserted, pre-dawn building. The patrolling night-shift security gorillas, thank goodness, had finally stopped challenging her. She keyed her way into the lab, flipping on the lights to reveal the brooding beast: dormant but purring almost imperceptibly in standby mode.

“It’s all your fault,” Claire reminded the Interactrex as she switched on its main power. “I’m only here because of you.”

It chirped back, unrepentant: the server starting its lengthy boot-up process.

After donning a pair of gloves, she took a few plastic dishes from the incubator and looked down the microscope at the cells she’d seeded before the weekend.

“They look good,” she called over to the Raison. “You ready for breakfast?”

Right on cue, the Interactrex’s air filters began their self-cleansing routine, the flow of bubbles gurgling deep inside its main module.

Talking to herself already, Claire thought. Not good.

She put one of the plastic dishes under the Raison’s main microscope lens, sat down and flicked on the computer screen. After a twiddling of the focus knob, faintly warm and smooth against her fingertips, the mouse brain cells appeared on the screen, gossamer forms scattered across the clear surface of the plastic dish—dark-dwelling entities that were never meant to have been exposed to the light of day. A trick of the optics made them glow with their own internal illumination, margins shimmering in white-hot lines. They looked like mutant starfish, with a round middle and a wild sunburst of too many spindly arms stretching outward. Or fireworks, in the act of exploding.

*Bright star, would I were steadfast as thou art/ Not in lone splendour hung aloft the night.*

Claire could still remember the first time she saw living cells under the microscope, in her introductory undergraduate biology practical. Textbook photos had not prepared her for the reality. How could this strange carpet of luminous bubble-wrap equate to the smooth surface of someone’s skin, or the curve of a heart or the cornea of an eye? It was as if she’d walked on the featureless expanse of the beach for years before bothering to kneel down and notice that the sand was actually a chaotic mix of impossibly tiny rocks and shells and bits of organic matter, as rugged as a boulder scree to an insect struggling across it. It was this

miracle of *scale* that had grabbed her by both shoulders, shaken the sense out of her and made her fall in love with biology. With the vast and unknowable beauty of life, if she was honest. Corny and romantic, perhaps, but she didn't care.

Further practical work with the cells in the classroom lab had only increased her zeal. It was like presiding over an orphanage of helpless babies that split into two once every eighteen hours. You had to feed them pink fluid, remove their wastes and put them in a new plastic dish when they outgrew their old one. You had to keep them warm in the incubator and, if you neglected them, they drew in their outstretched baby arms, shrunk to tiny bright balls and died. Those classroom cells were a strain that had been growing for more than fifty years, derived from the tumour of a woman who'd died before her parents had been born. *Immortalized*, the professor had called them. Miraculous, more like.

Not taking her eyes off the mouse cells, Claire manipulated the joystick until a needle appeared in the corner of the screen. She chose a cell and began to stalk it, moving closer and closer until—*zap!* She hit the collection button and the needle harpooned into the cell, pierced its membrane and sucked up a tiny sample of the fluid inside. The cell, unconcerned with this invasion, sealed up as if nothing had happened.

An invisible droplet, a billionth of the size of one raindrop but packed, Claire knew, with hundreds of proteins. Proteins, another miracle of *scale*, as small to a cell as a cell was to a person, invisible Legos which, in intricate, infinite combinations, seemed to be able to construct absolutely anything: a claw, a hair, a toenail, a leaf, an ear of corn, a blue whale. Proteins, which were currently streaming through the Raison's hungry gullet, transported from needle through tubing into the main routing area, whizzing around tight curves and loop-de-looping on a wild roller-coaster ride. The Interactrex was designed to find pairs of proteins, to shunt these up for identification while letting the solo proteins go by. It was able to make the decision—*shunt pairs or discards solos*—in a fraction of a second. Before Maxwell's invention, this sort of analysis could have taken a seasoned biochemist months—missing many of the most fleeting pairings in the process.

Almost everything that happened in the human body involved, at some moment or another, the pairing and communication of proteins. Including the body gone wrong: disease. With the optimism of youth, Claire felt it was only a matter of time before the protein pairings of stroke disease gave up their secrets to the Raison's hungry innards.



Later, Claire opened up her laptop with the intention of downloading all the papers that the company had published on stroke diseases. Five minutes of searching the public databases brought her to a dead end—there weren't any. The work was either too preliminary to publish, or too shrouded in corporate secrecy.

What she really should have done next was to look up the most recent papers published by other labs on the biochemistry of stroke diseases, to give herself the edge that only wide knowledge can impart. Instead, she got distracted by a review article about Alzheimer's disease.

Nearly thirty million people worldwide, she read, suffered from dementia, and this was caused by Alzheimer's in more than half of all cases. So-called 'senile plaques' showed up on scans many years before people started to slide away, dark lesions stamped across the brain in ominous foreshadowing. The plaques were made up of a protein called amyloid beta—an imposing word, Claire thought, appropriately sinister. *Attack of the Amyloids—in full Technicolour*. A normal protein gone rogue, scrambled together like an egg and coating the brain in nonsensical gunk.

The review article referred to 'seminal research' first published by Fallengale *et al.*—Alan, she realized, and colleagues. Studying the bibliography, she looked up the list of articles that Alan and Ramon had published on Alzheimer's over the years, eventually tapping her way through the crucial experiments that had revealed the Universal Aggregation Principle. Such a simple idea: a common way that proteins involved in human senility diseases stuck together to form those plaques. A beautiful idea that had eventually given birth to the Zapper. An idea, in short, that might end up curing Alzheimer's. What must it feel like to be the originator of such a powerful discovery?

"This is so cool," Claire said wistfully, inspecting yet another graph on the screen.

The Raison's standby light caught her eye with a petulant blink.

"I know," Claire replied. "And ten times more suited to your talents than boring old stroke." Nobody was ever going to respect her unless she came up with some interesting experimental results. But interesting meant Alzheimer's—which was strictly off-limits.

Or was it? At that moment Claire remembered Alan Fallengale's suggestion of an illicit collaboration. The problem was, she had no idea how to go about it practically. No doubt he expected her to come up with

some brilliant idea for how the Interactrex could be used to learn more about Alzheimer's and bring it to his attention. But despite having spent more than an hour reading up on the topic, her mind was, as usual, a blank canvas.

This was ridiculous. Alan wanted her help, and someone that arrogant wasn't likely to want to take her advice anyway. What she really needed to do was just go upstairs and ask him straight out if he was still interested, let him take the lead. But her memories of the intensity of his patronizing scorn at their first meeting still burnt like a scalded finger.

Resolute, she went up the stairs to the Home of the Zapper. But just before she reached the door to Alan's office, she was alerted by angry voices and stopped herself just in time.

"—impossible now. We're stuck with it—and *her*." Alan, unmistakably.

"You shouldn't be so bloody-minded, *hombre*." This from Ramon, his reasonable tone only thinly covering a core of irritation. "I can't believe how impatient and intolerant you're getting in your old age."

"If we'd bought those arrays, we'd have the answer by now. Instead, that . . . unreliable *machine* is propping up Bannerman—for all the good it will do. You mark my words, the whole venture will be one big, money-sucking black hole that won't make a blind bit of difference."

Alan, she realized, was talking about *her*. Her and the Raison. He didn't want her help—he didn't believe it was worth it. The offer had just been a pleasantry, a game. She turned and sped back the way she'd come, only just picking up Ramon's rejoinder as she sped out of range:

"*Por favor!* How on earth do you expect a biotech company to survive with just one drug? We'll be dead in five years if we don't diversify into. . ."

Back in her lab, seething with humiliation, she regarded the Raison, placid and patient before her. She'd come up with a brilliant idea, then show them all what her money-sucking black hole could really do.