

The Blondefire Genome

by Sean McMullen

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Megan walked home from school. She knew the bus would be full of kids talking about the Blondefire television special from the night before. Walking let her escape from hearing how well Jackie Cassall had danced and sung, and how great the local all-blonde girl group had been. Nobody had been watching the science program Quantum. Not her science teacher, or her maths teacher, not a single student in the entire school. Megan had been on Quantum.

Blondefire's latest hit was second on the Australian charts, ninth in Britain and fourteenth in the USA. They were going to make a series of video clips. The five girls who made up the group went to Megan's school, and everyone in the school was proud of them. Everyone except Megan.

Nobody who knew Megan had seen her appear on Quantum as for seven whole minutes she described her experiments with growing plants in a centrifuge at three times normal gravity. She had no tape of it. Her older brother, Alex, had cleared her timer setting on the family VCR to record the Blondefire special. Her mother had been on night shift at the medical laboratory and had missed the show. Her father was in England doing contract work.

Megan had told nobody beforehand: her television appearance was meant to be a surprise. Just as well, she thought. They probably would have watched Blondefire anyway.

She arrived home and looked into her sunroom-greenhouse, staring at the spinning wheel of transparent plastic that induced three times the Earth's gravity for the plants inside.

"They don't even know you exist, but one day your seeds will fly into space," she told the plants. She walked upstairs to her attic laboratory and there, with the door locked behind her she finally broke down and sobbed with frustration and disappointment.

Megan's interest in genetics had begun a year earlier, when her father had sent her a DNA kit for schools as a birthday present. She had used the reagents and instruments to extract DNA from the cells of plants, cut it up with enzymes, and then examined the pieces using electrophoresis. Soon she hit on the idea of growing wheat in a homemade centrifuge under high gravity and looking for genetic changes in each generation. With Alex's help, she had built a centrifuge: a tube of industrial plastic, fifteen centimetres in diameter, taped to a bicycle wheel rim and spun by an electric motor. It had spun almost continuously for months while several generations of wheat grew. Megan had painted the NASA logo on the outer rim. It was her ticket to space.

The DNA-ram, a version of the type invented at Cornell University in 1983, was all her own work. A starter's pistol was clamped into one of two tubes welded into an old pressure cooker, and a hand-operated vacuum pump was connected to the other tube. When the pistol fired its blank, the blast was diverted into a pressure tube to shoot a hollow plastic cylinder down another tube until it hit a plate with a tiny hole at the centre. A mixture of powdered tungsten and DNA sprayed through the hole and into the evacuated pressure cooker, which contained a dish of ryegrass stem cells. It was a rough, random process, but some of the DNA was rammed into the cells on the tungsten particles, and their genetic makeup was altered forever.

Experimental work helped to ease Megan's pain at the way her appearance on national television the night before had been ignored. She had extracted DNA from wattle leaves some days earlier using an ethanol precipitation method and now she mixed the raw DNA with a pinch of tungsten powder. Preparing the target ryegrass stem cells took time, as did pumping air out of the pressure cooker with the hand pump.

Three hours passed as if they had been moments. Megan heard Alex come in and immediately start

playing the video of the Blondefire special. She raised her hands to her ears, then forced them down again. She loaded a blank cartridge into the starter's pistol.

"This is for you, Blondefire," she said as she squeezed the trigger.

A muffled thud rammed the tungsten and DNA mixture into the target cells. Megan broke the seal on the pressure cooker and lifted out the dish of cells. The tissue culture process to make the enhanced cells of ryegrass grow was a difficult one, and it would keep her mind off Blondefire for the evening.

When she went downstairs to microwave a pizza for dinner Alex was still watching Blondefire. Jackie Cassall was all legs, lycra and billowing, bushy hair, singing "Saturday to Sunday" and looking wholesome, winsome and dynamic. Her face was wonderfully clear and smooth, while Megan was conscious that her own was ravaged by acne. She looked down at the pizza that she was carrying and imagined her face in the disk.

"I'm fifteen, acne happens around fifteen," she muttered to herself.

"Sorry, what was that?" asked Alex.

"Ah, Jackie Cassall's skin. I just can't believe skin as good as that," she replied.

"Yeah, she's great. Hey, sorry about not recording Quantum last night. What was on, did you ring the studio?"

"Just a live show, some kids with their science projects," Megan replied coldly.

She took the pizza to her bedroom and lay on her bed, eating the slices and examining her face in a mirror. Her skin was seldom without a spot or two, but something had brought on a particularly bad case of acne six weeks ago. What had caused the zits? Some new food? Her flu shots? Her diary might have a clue.

She leafed through the pages, looking over her plant experiment notes and personal entries. She was fanatically careful about experimental records, and she had documented her acne right down to an entry for each pimple. She booted up her mother's PC and ran Statistica, then entered her acne count for each day over three months.

"A base rate of two or three zits per week. Annoying, but not the end of the world," she told the figures on the screen. The count had risen abruptly to fifteen per week, then peaked at twenty-one before trailing down to the present seven.

The rise was sharp, so it had to be something new and obvious: food, perhaps, or makeup? Some manufacturer might have changed an ingredient, added something that had caused an allergy. Laboratory chemicals were another suspect. Her experiments involved some exotic compounds, and she had documented those in the diary, too.

She typed in the figures on when she had begun using different chemicals, along with what she could piece together on food and makeup. On the screen the lines of the graphs remained stubbornly smooth and consistent near the date where her acne had suddenly erupted. There was nothing else in her diary but a note about the pollination of ryegrass variety CG-47.

Megan sat back and closed her eyes. Pollen! Ryegrass pollen induced hay fever and allergies in some people, but this ryegrass had been genetically hacked with wattle DNA. Could it unbalance oil levels in her skin? Zitgrass. Ryegrass pollen that caused zits. But the makeshift greenhouse was in the sunroom, so why weren't her mother and Alex affected? Perhaps it was related to teenage hormone levels. Alex was twenty, her mother forty-five.

Almost as if he had been given a telepathic cue, Alex turned up the television's sound. "And now Blondefire's first big hit, Blondefire, My Desire," cried the compere.

Something inside Megan slipped free from its chain. An image of creamy white skin spotted with angry red eruptions appeared in her mind. Hardly aware of what she was doing, she opened her battered filing cabinet full of seed envelopes. She retrieved the envelope marked RYE/WATTLE CG-47 and poured a few seeds into her palm. Blondefire sang on from the living room. Megan stared at her genetic creations, then went to the sunroom-greenhouse.

"Blondefire made me vanish. I might as well never have been on Quantum," she told the seeds as she sprinkled them into a tray of seedling mix. "Now I'll make Blondefire vanish."

Under artificial lighting and heating, the seeds sprouted and the seedlings flourished. Megan collected

every seed from the mature plants, avoiding contact with the pollen by breathing through a long tube running outside the greenhouse. By the time several generations of plants had passed, she had thousands of seeds.

Spring came. The ryegrass that sprouted in gardens and vacant blocks near where the Blondefire singers lived was quite normal to look at, but the local chemists noticed a sudden increase in demand for acne creams and lotions from teenagers. With forced detachment Megan observed thick, carefully applied makeup appearing on Jackie Cassall's face with increasing frequency.

One morning there was anxious talk around the school. Jackie was leaving Blondefire. Jackie had zits. Jackie had been asked to go. The lead singer took it bravely, and said that it was not all bad, because now she would be free to study for her exams.

Another member of the group, Josie Allen, was next. She had been saved from the first sowing of zitgrass by the industrious gardeners who lived in her street, but Megan had also scattered seeds in a vacant lot beside her bus stop and these seeds had sprouted more slowly in the less fertile soil there.

Soon there was another Blondefire scandal as Josie was ejected. She did not go quietly. The manager wanted her to retire and concentrate on writing lyrics for Blondefire songs, but Josie refused. It was full performer status or nothing. All the remaining girls were true albinos rather than just being naturally blonde, and there was something in the biochemistry of their skin that made them immune to the zitgrass pollen. When Josie's parents threatened to sue over the use of the Blondefire name they re-formed as Whitefire, but with the lead singer, songwriter and name gone, the group struggled on for only a few months before disbanding. Megan was surprised by the speed with which Jackie and Josie had been dumped, but it confirmed her worst fears about personal loyalties in show business.

The plague of acne struck dozens of others in the school, always those between twelve and seventeen. Megan noticed that although Jackie's face was a mess, she remained as sociable as ever while taking far more interest in schoolwork. Years of balancing study against Blondefire commitments had left her with average grades, but within two months of the zit plague she was getting A for everything.

Is there anything she can't do? Megan wondered nervously. Now there was another contender for the title of school genius. She stared at a poster of the space shuttle on the classroom wall. It was captioned 'To Jackie, from your fans in space' and was signed by three astronauts.

I taught you about shallow friends, Megan thought, and refused to feel guilty.

* * *

Megan's final year at school began badly. Her father ran out of contract work in England, and could send no money home. The strain of paying Megan's school fees meant that her mother had little money to spare for her daughter's experiments. Megan suspended most of her work and decided that she would 'discover' zitgrass growing wild once she was at university, and had access to proper laboratories. Her centrifuge spun on, however, the excess electricity draining most of her allowance. It was her ticket to space, it was everything. When she got to university she would meet scientists who knew people at NASA. They would help to get her 3G seeds onto the space shuttle.

For Megan, the school year could not end too quickly. Jackie's grades continued to improve, and Megan often noticed that Jackie and her circle of friends were watching her. She became withdrawn, because she found it difficult to make small talk with classmates who were obviously talking about her behind her back. Jackie handled assignments and assessment tasks as easily as a letter of thanks for a birthday present. Finally the ultimate nightmare happened: Jackie scored an A++ in a minor physics assignment, while Megan could manage only A+. Megan had not come second to anyone in a science subject in five years.

Once more Megan shunned the bus and walked home. "Now I know what she's been saying," she told to herself. "She's been saying I'm not as good as everyone thought, that she's better. Well stuff them all, I only study for myself, I don't care what her results are!"

She resolved not even to check the results of her assignments from now on. Soon she would be at university, free of jealous classmates whispering behind her back, free of the huge blue eyes that stared at

her out of Jackie's scarred and mottled face. She checked the plants in her centrifuge, then booted up her mother's PC and accessed a file. It was a proposal to NASA that she had been crafting for months: how would the seeds of plants grown for several generations at 3G grow in weightless conditions? It would be such a simple experiment to fly on a space shuttle.

Alex's voice echoed from the living-room.

"Hey Meg, come and watch this!"

"I'm studying, Lex."

"Stuff the study. You'll want to see this."

"...Great discovery!" The words caught her attention as she approached the living-room. Alex was watching *Rockin' and Ravin'*, a live studio show.

"This is a pop music show for kids," Megan objected.

"Just listen, it'll blow you away."

"And now for something way, way different that you just won't believe," bawled Danny Donohue the compere.

"Who is this flatliner?" sneered Megan.

"Shush, just listen."

"Remember Jackie Cassall? Well after she split with *Blondefire* she got into science! And whadaya think happened? Schoolgirl scientist Jackie Cassall has discovered a type of ryegrass that causes zits! Here she is now to tell us about zitgrass-- "

Megan gasped so hard that she had a coughing fit. *Her* discovery-- and *her name* for it as well! By the time she had her breath back under control Jackie was speaking.

"I got a really bad case of zits last spring, bad like you wouldn't believe. I had to leave *Blondefire*, I couldn't go on camera with a face like the surface of the moon. I decided to work out just why I'd suddenly got so many zits, so I began to study up on science a lot more."

"How long did it take to spot the cause?"

"Months. I doorknocked every house in the neighbourhood and asked the kids to tell me if they'd had a bad case of zits lately. I did a scatter map of what I found, and sure enough there were hot spots. I lived right at the centre of one. That made me think that it might be caused by something in the air, a chemical or something. I checked with the Environmental Protection Agency on chemical spills, but no luck. Then I wondered if some rare plant had become trendy with the local gardeners, so I doorknocked again. Eventually I narrowed the cause down to ryegrass."

Jackie had discovered zitgrass growing wild! Although she was gearing her language to a pop music audience, it was obvious that there was a sharp mind behind the words. She said that university scientists had agreed to let her use their laboratory free.

Megan closed her eyes, but forced herself to stay and listen.

"So, airhead to egghead in one year?" said the compere, with a wink for the camera.

"Oh no, I've always liked science. When the zits got me I realised that as a member of *Blondefire* I had nothing more than a great face and voice, and now the face was gone. So I began studying really hard."

The compere smiled smugly. "Hey, but who cares if a few kids in a rich country have zits? Why didn't you work on ways to feed the kids in Africa?"

Jackie took an inhaler from her coat pocket. "See this? It looks like an asthma inhaler, but I charged it with zitgrass pollen before coming here," she said to the compere. Then she faced the audience. "He says zits are okay!" she shouted.

The audience hissed loudly in reply.

"Brace yourself Danny, here come the zits!" Jackie walked towards the compere, who panicked and ran. She chased him to the edge of the stage with the inhaler. He blundered into some props and went sprawling, then scrambled out of sight.

The teenage audience cheered and hooted its approval as Jackie swaggered back to stage centre.

She tossed the inhaler in the air and caught it. "Actually this really is only an asthma inhaler, it's safe. I gave myself asthma sniffing hundreds of types of pollen for six months. Danny might think smart kids are

nerds, but where his precious skin is concerned, he listens to what nerds say."

"She's a knockout!" said Alex.

"Shuddup!" snapped Megan.

"Everyone out there, but especially you Melbourne kids between ten and twenty kilometres south of the Yarra, get out there and rip out the ryegrass next spring. Send samples in to the CSIRO so we can work out just how far this new type of zitgrass has spread. And remember: scientists have all the fun-- "

A commercial cut her short.

"So *that's* why she chose a pop music show on prime time," Megan said. "She's recruiting a huge team of free research assistants."

"Wasn't she great, wasn't she just great?" babbled Alex. "D'you know her from school? Could you tell her you have this real spunk of a brother who's into science?"

"I could, Lex, but I'd be lying."

The commercials ended, and Rockin' and Ravin' went straight into a video clip. Megan shambled off to her room. A year ago she had crushed Blondefire like a beetle underfoot, but now she lurked in the shadows, defeated, while Jackie was a triumphant hero.

She sat on the edge of her bed. Jackie Cassall, teenage scientist. I made her what she is, she thought. I created her. She's already ahead of me. How long before she realises that gene hacking created zitgrass? I'm the first one she would check in the hunt for a gene hacker, what I did probably breaches the Geneva Convention on Germ Warfare. Megan shuddered, then stood up. She had not allowed herself to think of the consequences when she had been preparing the zitgrass plague. Jackie had to be stopped before she learned the truth, if it was not already too late. She went to the attic and took her DNA-ram apart, then returned downstairs with the starter's pistol.

"I have to go out for a while, Lex. Can I borrow your bike and your helmet?"

"No problem."

"Before I forget, here's your starter's pistol back."

"What? Oh, that. Are you sure?"

"I'm sure."

"What about your experiment?"

"It's finished. It was... disappointing."

Megan packed maps, diagrams, chromatograph charts and seeds into a large envelope, then scribbled a note.

Jackie, this enclosed info may help you. I created zitgrass in an amateur genetic engineering experiment. I must have had pollen and seeds on my clothing, and spread them when I went jogging. When the zit plague started I panicked and tried to cover up. I am truly sorry for what happened to you and everyone else, and I accept full blame. Congrats on your scientific investigation, it was brilliant.
Megan Warnall.

She hated to accuse herself of incompetence, but that was better than confessing the truth and risking a jail term for bio-terrorism. There was still one last reparation to be made: dizzy with anguish, she printed out the draft of her letter to NASA about the 3G seeds.

When she reached Jackie's place the lights were on. Good: her parents were there to take the package. She couldn't be back from the studio yet.

But Jackie answered the doorbell.

"Megan!" she exclaimed.

"I didn't expect you to be home. The-- ah, television show."

"You mean Rockin' and Ravin'?" laughed Jackie. "Danny locked himself in a toilet and refused to come out while I was still there. The studio hands bundled me into a taxi while the commercials were on and had me driven home."

Megan clutched the envelope and stared down at the doormat. This was not the way she had wanted it.

"These are maps of zitgrass distribution that I've compiled," she said, thrusting the envelope into Jackie's hands.

"Zitgrass!" Jackie exclaimed. She looked inside. "You-- but there's so much in here."

"It might make your work easier. There's chromatograph data and other stuff that might help too, and-- I'd better go."

"No, wait," cried Jackie, following Megan down the path. "How long have you known about zitgrass?"

"Ten months."

"Ten-- so you discovered it first!"

"But you published first."

"Rockin' and Ravin' is hardly publication."

Megan took a deep breath and reached into the envelope. "This note explains everything. Read it."

"We'll have to-- "

"Read it! Please!"

Megan could not stop the tears of humiliation that ran down her cheeks.

"I've been a prize idiot and a coward too, Jackie. What can I say? Sorry I trashed your career?"

Jackie finished reading the note and looked up, eyes wide and unblinking. "This is unreal," she said. "You hacked a genome, you created a new species. That's fantastic."

"It's also morally indefensible," Megan said miserably. That's odd, she thought. She hasn't done a total meltdown yet. She seems to admire me for creating what ruined her face.

"What is in this note would confirm some people's worst fears about science," Jackie said slowly "Loud, stupid people like Danny." She put a hand on Megan's shoulder. "Besides, why punish you for an accident? Let's burn the note and forget what you did."

I don't believe this, thought Megan. How could anyone forgive as easily as that? "I should have concentrated on my 3G plants," she mumbled.

"Yes, I know about your centrifuge. I saw you on Quantum last year, it was unreal-- "

"What!" Megan dropped Alex's helmet in surprise. "How-- I mean, it clashed with the Blondefire show."

"I set the timer on my VCR. I never miss Quantum."

"I thought nobody from school had seen it. My brain-dead brother reset our VCR to record the Blondefire special, so I never saw the show either."

"Come inside," said Jackie. "I'll play you the tape. I've already shown it to my friends at school. Do you drink coffee?"

Megan did not, but she accepted a mug of milk coffee anyway. So that's what the whispering at school was about, she realised. They actually admired her!

"When you... broke up with Blondefire I was, well, so sorry for you, and it was all my fault."

Jackie shook her head and grinned ruefully. "Show business is cruel and crazy. Image is everything. I couldn't have a boyfriend because some fans might get jealous. I couldn't get high grades because some fans might be intimidated."

"Then why stay with it?"

"When you're very good at something it's hard to stop, even if you really don't give a stuff. Don't get me wrong, though. When the zits hit me, I cried for days. Then my father pointed out that while my IQ score was at the top of the measurable range, my grades were only so-so. I took the point and threw everything into my study. Hey, don't look so guilty. I'm happy now."

Not good enough, Megan thought. I deliberately hurt her, then I lied about it, and now I get off the hook for free. Not good enough, Megan Warnall.

"Jackie, what are you working on now besides zitgrass?"

"Just study. I want to get into university."

"You have fans at NASA, don't you?"

"That's right. They're nice people."

Two years of work! a horrified voice screamed inside Megan. The greatest achievement of your life, she has no right to share it, this project is yours, all yours! Megan took out her letter to NASA.

"Get on to your NASA contacts, send them this proposal for a space shuttle project. It's to fly seeds

from my plants grown in 3G for two years. Tell them you want to see how they grow when weightless. They'll buy it for sure."

"Take your work? I couldn't-- "

"Yes you could. You can handle publicity, I can't."

"I'd rather just be friends with you, I don't want to rob your work."

"No Jackie-- look, you recruited a team tonight to fight zitgrass. Team up with me as well. Both of our names will go into space with those seeds. I'm not just trying to make up for killing Blondefire, I really need you."

"But I haven't even seen your laboratory and I've got another media interview tomorrow."

"Well come back to my place now."

"What about the Quantum video?"

"Bring it with you."

* * *

Alex was asleep in front of a replay of Terminator 2 when Megan got home. She dropped his helmet beside him.

"Wake up Lex, I've made a great scientific discovery."

"So Zitgrass is a Martian plot?" he yawned.

Close, thought Megan. "No, I've learned that science only works as a team effort."

"Whoopee-do."

"I'm forming a team to get my 3G seeds into space. Interested?"

"What's in it for me?"

"Jackie Cassall is my other recruit. She's outside, chaining up her bike-- "

Alex gasped and sprang up, knocking his chair over as he scrambled out to the bathroom and turned on the shower. Megan smirked as she straightened the chair. Jackie came in, holding the Quantum video cassette.

"The greenhouse and centrifuge are through this door," said Megan, taking out a key. "The rest is upstairs."

"What about this?" asked Jackie, holding up the cassette.

Megan shrugged. Somehow her first television appearance had become something unimportant in the distant past. "It can wait," she said as she unlocked the door. "Let's look at the real thing first."

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