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Time to convince the public

Junk medicine: synthetic biology

Mark Henderson

James Watson, forced home after his ill-considered remarks about race and intelligence, was not the only outspoken American geneticist touring Britain this week. Craig Venter, the scientist who led private efforts to map the human genome, made no inflammatory comments while visiting to promote his autobiography. Yet he is, in many ways, the more controversial of the two.

While Watson's musings on Africa deservedly brought opprobrium from his peers, they were easily discounted. There is little genuine scientific debate over race and intelligence, and thus no real controversy.

Venter's work is a different matter. For the past few years he has been trying to create the first synthetic lifeform – a microbe with a genetic code written wholly by human beings. This is not only possible, it is imminent: Venter's team has already accomplished most of the necessary precursor work and the success of the final step is expected to be announced soon. It is a worthy topic for scientific and ethical debate.

Synthetic biology, or SynBio, has considerable promise. It means that bacteria could be engineered from scratch to make new antibiotics, or hydrogen for clean fuel. Their genomes would work like the software written for computers, with a specific purpose in mind.

Yet it also raises concerns. Some people worry that the technology could lead to new and lethal germs, by accident or by design of bioterrorists. Other critics, particularly those of a religious mindset, see moral problems in creating new life in this way.

To Venter's credit, he has anticipated ethical issues. Before he started his project in 1999 he commissioned an independent bioethics group that cleared his proposals and last week a second expert review recommended safeguards for SynBio technology. Companies supplying DNA could be required to screen orders for potentially harmful sequences, it advised, while chemicals and machines for synthesising DNA could be sold only to licenced scientists.

These are sensible precautions, and many criticisms of SynBio do not pass muster. Terrorists, for example, have little need for it. Hundreds of labs keep deadly pathogens, which can be stolen, and anthrax can be obtained from farms. Even if they were to develop the considerable technical expertise needed for SynBio, there will be simpler options.

As for "bioerror", molecular biologists have been modifying the genetic code of bacteria for decades, without a single notable accident. As with these experimental organisms, synthetic microbes can be designed so that they cannot survive outside the laboratory. Any risks are very remote. The unexpected is, of course, possible, as is deliberate abuse, and both must be minimised with appropriate regulation. Neither hazard, though, is sufficient to justify a ban or moratorium on legitimate research that could have great benefits.

That said, Venter would do well to pause before pressing on. If SynBio is to deliver it will need broad public support and that will require much more engagement than has happened to date.

Professional ethicists may approve, but one lesson of issues such as GM crops is that ordinary people do not always think like philosophers, especially on subjects as sensitive as the creation of life. A backlash may be irrational, but it could still threaten a promising field.

Scientists can win public backing for such difficult and emotive research, as Britain's recent experiences with inter-species embryos, stem cells and nanotechnology have shown. But to do so they have to take the time to raise awareness and reassure. Bioethical reviews are all very well – indeed, they are probably an essential part

of this process – but they are not enough by themselves.

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