



How much can a coma patient understand?

Pretty much everything according to Salvatore Crisafulli, a 38-year-old Italian man who has recently awoken after a two-year coma following a road accident in 2003. In comments relayed through his brother, he claims to have “understood everything and cried in desperation” while trapped inside his body. But Ronald Cranford, a neurologist at the Centre for Bioethics at the University of Minnesota in the US, who testified in the case of Terri Schiavo – the brain damaged Florida woman who died in March when her feeding tube was removed – is not convinced. “Until this man’s recovery is verified by doctors, this story seems to be a first person account of a ‘miracle recovery’,” he says.

David Bates, a professor of clinical neurology at the Royal Infirmary in Newcastle, thinks that it is more likely that Mr Crisafulli was suffering from “locked-in syndrome”. “This is a condition where all the information going into the brain continues as normal, but all the information coming out stops. The patient can hear, feel, see and understand, but they can do nothing, except open and close their eyes,” he explains. To differentiate between patients in locked-in syndrome and those in a coma, doctors ask the patient to open or close their eyes. Patients with locked-in syndrome will be able to open and close their eyes voluntarily and respond to the doctor’s command.

It is unlikely that Mr Crisafulli’s case alone will alter the way doctors diagnose and treat unconscious patients. “Unless the facts are verified medically this case does not change my mind about the reliability of making diagnoses of permanent vegetative state,” says Mr Cranford. But as the Terri Schiavo court case



Salvatore Crisafulli and his mother Photograph: Reuters/Antonio Parrinello

revealed, it is not just experts such as Mr Cranford who need convincing; families also need to be sure that there is no hope of recovery. In the US and Italy religious groups campaign for obligatory care for unconscious patients – even those who had said they did not want extraordinary measures to keep them alive. “Passing a bill in Italy mandating treatment of all comatose patients would just be brutal, inhumane and unspeakable,” says Mr Cranford. **Kate Ravilious**

What is the point of a robotic fish?

You mean it’s not enough that three carp-shaped robots, with built-in artificial intelligence systems and the ability to control themselves autonomously, will be swimming around the London Aquarium? The robots’ inventor, Huosheng Hu of Essex University, said



there were two aims for his creation. “My intention is to bring robots closer to the public to demonstrate what robots can do,” he said. “For real-world applications, it could be used for seabed exploration and sealife investigation.”

But the ocean beds are already being explored by mini-submarines, you might argue. Why do we need new robots? “You have to have some kind of umbilical connection,” said Prof Hu. “We need some onboard intelligence so they can make their own decisions and take any actions necessary to preserve themselves ... We need sensor-based control and navigation.”

Prof Hu’s robotic fish took three years to develop and is the first one to move without the need for remote controls. It has 10 sensors detecting things such as heat, voltage and distance from the nearest obstacle. These, along with a gyroscope to help the fish determine its orientation, feed information to four computers. Some of these computers are equipped with artificial intelligence programmes that can make decisions about what to do.

The resulting robot has the speed of a tuna, the acceleration of a pike and the navigating skill of an eel, according to Prof Hu. “At the next stage what we try to do is make our robots find the charge station to charge themselves – then you need a map,” said Prof Hu. **Alok Jha**

Is UK science going down the drain?

Both this year and last were pretty dismal for Brits, with not one British scientist scooping a Nobel prize. And over the last 15 years, nine have been similarly devoid of prizes. So is British science going down the drain?

Not at all, according to the Royal Society. “The Nobel prizes cover only a narrow range of disciplines from science, engineering and technology. UK scien-

tists have a similarly successful record in the other international science prizes,” says a Royal Society spokesperson.

And the statistics appear to back this up. Of the 17 winners of the Fields medal – the most prestigious mathematics prize, awarded only every four years – three have been British. Out of the 29 recipients of the Crafoord Prize – The Royal Swedish Academy’s award for research in mathematics, astronomy, the biosciences, the geosciences and polyarthritis – 10 have been British. A UK government review revealed that, with 1% of the world’s population, the UK is responsible for 5% of world science and publishes almost 13% of papers with the highest impact.

“It is clear that the UK continues to punch above its weight in science, and is second only to the USA overall,” says a Royal Society spokesperson.

But hidden behind these statistics is the fact that many of these award-winning British scientists work in the USA, where salaries are bigger and scientists seem more respected.

For example, of the 11 British scientists awarded a Nobel prize since 1990, five work in the USA.

This “brain drain” has not escaped the attention of the fertility expert and television presenter Professor Robert Winston, from Imperial College London and California Institute of Technology (Caltech). In an address to the House of Lords last year, Lord Winston said: “The truth is that British universities are in dire trouble ... each department in [Caltech] ... has been supported very largely by an influx of British scientists.”

The lack of the last Nobel prizes in science over the last couple of years is probably just a blip. Britain is still producing many excellent scientists, who are capable of winning prizes; the only quirk is that most of them are living in the USA. **Kate Ravilious**