Aside from pretty shells, quirky antenna-like eyes and glistening trails, there seems to be no real reason for putting the humble snail on our Top Ten Most Interesting Animals list. Well, actually, there is – but only when we look at what's happening inside that soft, squidgy body.

The Great Pond Snail is right at the forefront of brain research, leaving a silvery path of knowledge behind it while neuroscientists scrutinise its nervous system. But – you might ask – it doesn't seem remotely like us, so why bother? One person who can answer this question is Dr. Chris Elliott, a neurobiologist at the University of York. "The basic properties of snail brain cells are similar to human ones," he says. "They are the same shape and they have the same neurotransmitters and ions needed to pass chemical and electrical signals between them."

Dr. Elliott's most recent work, published in the European Journal of Neurobiology in April 2007, is intriguing. He exposed this snail to an environmental poison and found that it became virtually immobile, echoing the symptoms of Parkinson's disease. Parkinson's disease is a progressive and irreversible muscle disorder. Its primary characteristics are erratic movements with muscle rigidity, tremors and fatigue, where sufferers often can only move very slowly with great effort.

Twenty-five years ago, an unusual scenario revealed the first clear environmental cause of Parkinson's disease. In 1982, seven people in California were admitted to a medical clinic, where staff were shocked to see these young individuals with a disease normally found only in elderly people. These students had taken a bad batch of MPPP, a drug similar to heroin, which was contaminated with MPTP. MPTP is a toxin that poisons the brain region containing cells that make dopamine, a signalling molecule that controls muscle movements. Strangely, this region of the brain was the only part altered by MPTP, as other areas appeared to be untouched.

The phenomenon of toxins affecting specific brain cells was also seen in Dr. Elliott's research. Instead of MPTP, however, he used rotenone. Rotenone, a poison commonly used by fish farms for stock control, was found to induce similar Parkinsonian behaviour in fish. This discovery ignited concerns that rotenone may be affecting humans too, so neurobiologists began investigating whether it could cause Parkinson's disease.

Dr. Elliott knew that freshwater snails were much easier to monitor than fish and humans. One of the biggest benefits is that the brain cells are incredibly easy to see. The different cells in this simple brain are coloured various shades of red by an oxygen-carrying chemical similar to the haemoglobin in our blood. They are also so large that they can be spotted with the naked eye. Because of this, Dr. Elliott decided to use these snails to find out why rotenone was causing Parkinsonian symptoms. He and his colleagues analysed the feeding and moving behaviours of two groups of snails that lived in separate tanks of pond water, one of which had rotenone added, and were fed on lettuce. The researchers then took the snails' brains and compared their structure and function.

Their findings showed much more than they expected. "The most crucial thing," Dr. Elliott reveals, "was that the dopamine levels went down, but we could see that the brain cells were still alive and happy. The problem isn't in the death of these cells but in their decreasing ability to make dopamine, which is affecting the snail's movements." Until now, it was believed that MPTP and rotenone simply killed off the dopamine-producing cells, so the amount of dopamine was less because there were fewer cells making it. Dr. Elliott's study showed that, in fact, something else was interacting with the dopamine produced by the cells and it was not cell death causing the levels to dwindle.

This study is just the first step in the right direction, however. "What we'd like to do now is see how neural cells are affected by the breakdown of dopamine and to see what enzymes might be causing this breakdown," says Dr. Elliott. "I wouldn't know how they would make a treatment from it, but perhaps one day someone will identify a mechanism to increase the dopamine levels in patients with Parkinson's."

Seeing that a disease perceived as irreversible could eventually be reversed, it is clear that we shouldn't be so hasty in snubbing the small, slow creatures lurking in our gardens. After all, considering how such a simple brain is solving one of the most complex medical enigmas, perhaps it should be given the top spot on our list.