To swim or to crawl: For the worm it's a no brainer (w/Video)

March 31 2009

A study at the University of Leeds has shown, for the first time, that C. elegans worms crawl and swim using the same gait, overturning the widely accepted belief that these two behaviours are completely different.

The findings have important implications for biologists and geneticists using *C. elegans* for their research. Until recently scientists have largely limited their observations of the worm to crawling on solids, but this discovery suggests that it is just as important to consider a range of environments when studying the behaviour of the worm.

Lead researcher Dr Netta Cohen, Reader in the School of Computing, says: "Our discovery suggests that it's important to study the function of the worm's nervous system in a range of environments, where the mode of operation of the nervous system and the specific role of individual genes may be more apparent."

C. elegans, a tiny free-living worm, was the very first animal species to be completely genetically sequenced and operates with many of the same genes that are found in human beings. It is used by scientists as a model system to gain a fundamental understanding of the basic principles of life.

C. elegans is so simple it doesn't have a brain, only a minimal nervous system of 302 nerve cells (as opposed to the 100 billion or so in the human brain). This 1mm long worm exhibits a wide range of behaviour,

including foraging, learning, memory and even social behaviour. Scientists are fascinated with this tiny worm, anticipating that this will be the first animal species to be completely understood.

In its natural habitat, *C. elegans* can encounter a range of environments where its motion can be quite varied - from muddy water and moist surfaces in dry ground to the centre of rotten fruit, where it will find a plentiful supply of food. The worm's swimming and crawling observed in different environments look so distinct, there's a long-held consensus that these are separate gaits - as with horses, where galloping and trotting are entirely different motions.

Using a combination of experimental laboratory work and computer simulations, the research team has shown that swimming, crawling - and everything in between - represents one locomotion gait that is generated and controlled with a single underlying nervous system mechanism.

Dr Cohen says: "We raised the question of how such a minimal nervous system can exhibit different behaviours and instantly switch between them. Our finding is the first unified description of a whole range of behaviours and should hopefully make the modeling of this animal more accessible."

Source: University of Leeds (news : web)