

Science Writing Competition 2016 – Winning entry

Below is the winning entry in the '17 and under' category for the 2016 international Science Writing Competition organised by the University of the West of England's [Science Communication Unit](#), [BBC Focus magazine](#) and [Royal Institution](#).

Winner: 17 and under

The Cells That Make Us Human?

Leonie Robinson, aged 15

For many years, complex emotions were thought to be unique to humans. Animals did not seem to be capable of these sophisticated feelings, such as love, grief and happiness. However, after researching further into certain behaviours, particularly in aquatic mammals, such as whales and dolphins, the discovery of spindle cells being abundant in their brains could prove that this is not so.

So what are spindle cells? Spindle cells are long thin cells with a large spindle-shaped body tapered at one end. Unlike other neurons, spindle cells only have one axon and one dendrite (parts of the cell that send and receive signals). Spindle cells are an adaptation found mainly in species with larger brains, such as humans, apes, some whales and elephants. Spindle cells are rare compared to other neurons, although they are abundant in large brains, especially those of grey whales and killer whales.

Spindle cells are larger than many other neurons and allow rapid communication across large brains. They are responsible for many things including emotion, social interaction and 'gut reactions'. They are especially useful in social interaction as they allow messages to be carried across the brain quickly. They are found in the dorsolateral prefrontal cortex, an area towards the front of the brain.

When spindle cells were first discovered in the early 1900s, they were believed to be the cells that make us human. Found at the front of the brain, these cells handle emotion and social interaction. They were thought to be unique to humans and some other primates, until recent studies proved otherwise.

It is a widely known fact that whales and dolphins show a range of social behaviours; from teamwork while hunting, to youngsters playing, and even cooperative behaviour between dolphins and fishermen. The reason behind this behaviour: spindle cells.

It is widely accepted that humans are not alone in these complex behaviours caused by complex emotions such as grief, empathy and even love. In fact, many species of whales and dolphins have spindle cells, and lots of them. Species with large brains compared to their body mass may have over three times as many spindle cells as humans, and began to develop them millions of years before us.

The discovery of these cells in whales could have a huge impact on scientific records. Now we know of the presence of spindle cells in whales and dolphins, we can finally begin to understand their complex behaviours. Spindle cells could be the reason for the highly social behaviour of marine mammals.

Until recently, scientists were baffled by trying to figure out why dolphins will play catch with a piece of seaweed, or what impulse caused a pod of killer whales to adopt an injured individual from another group as one of their own.

With our new-found knowledge of those extraordinary cells, scientists can begin to answer these questions, and finally begin to truly understand what is going on inside a whale's head.

The Impacts of Spindle Cells

If used correctly, the discovery of spindle cells could lead to huge breakthroughs. If some individuals of whales and dolphins show unusual behaviours, similar to autism or Alzheimer's in humans, it could be down to spindle cells. If this possibility were to be confirmed, advancements could be made towards finding a cure for these neurological disorders, as scientists would know to focus on looking for abnormalities in spindle cells.

However, the impacts of this discovery don't stop at new scientific breakthroughs. Spindle cells could well be the deciding factor to settle the debate over whale hunting.

Now the scientific community knows that whales are capable of complex, human-like emotions, those opposed to whale hunting have a strong argument against this practice. Not only would the whale being hunted be put through great stress and trauma, but those in its pod will experience a strong grief for the loss of a member of their pod.

To conclude, the discovery of spindle cells in other animals could explain complex behaviour, lead to new breakthroughs, solve long debates and could perhaps show that humans aren't as unique as we like to think.