MONKEY SEE, MONKEY DO? FIRST EVIDENCE OF HUMAN-ONLY BRAIN STRUCTURES.

Many people, myself included, are fascinated with the human mind. How do we really decide on our likes and dislikes? Our moods, emotions, and motivations? If you've had pets, you will know that they sometimes share personality quirks with us – my dog, like many people, will not go anywhere near broccoli. Things get even more interesting, when we begin to compare ourselves with more closely related animals – the great apes and old world monkeys. In many respects we look strikingly similar, particularly in the face. I recall once a trip to the zoo where I heard a man tell his wife that her mother looked just like the orangutan! This similarity in appearance can often lead to us to wonder just how much like one another we are in other ways too.

Scientists wondered this too, and looked first for genetic differences. Several years ago when the chimpanzee genome (all the DNA from an organism) was sequenced, it was compared to the human genome. This comparison allowed scientists to pinpoint exactly how our DNA was different from our closest primate relatives, and many researchers believed that these differences would provide clear genetic proof for our human-ness. This exercise was hugely successful in many ways. But perhaps most surprisingly, researchers found that the chimpanzee and human genomes are remarkably similar – there are no really obvious genetic differences that could easily explain why ape and human behaviours are so different. So what gives? Could it be possible that very similar genetic information can give rise to very different brains?

New collaborative research from the United States, Belgium and Italy has now looked at the problem from a different angle. They asked: If we stimulate the brain (by showing movies to human and monkey subjects), whilst simultaneously recording brain activity, can we find places in the brain that respond differently in humans and monkeys? Such evidence may suggest that monkey and human brains process and respond differently to their environment due to differences in brain structure. By using a special type of brain scanner, called a functional MRI (fMRI) – one that we hope to get very soon at Otago – researchers were able to recorded brain activity, and to pinpoint the exact places in the brain that were active. Most of the monkey and human brain activity was similar – just like their genome DNA. Remarkably, researchers also found two entirely new brain networks that process information in humans, but which are completely absent in monkeys. That's right – two places in the human brain that simply do not exist in the monkey brain. The fascinating task now will be to unravel how very similar genetic information can give rise to very different brains.

REFERENCE: Mantini et al. (2013) "Evolutionary-Novel Functional Networks in the Human Brain?" *The Journal of Neuroscience*.