

Early warning system: The eyes have it

Despite studying the neural workings of vision for over a century, neuroscientists are still making surprising discoveries. The brain 'sees' in different ways, but if you don't know where to look, you'll miss important information.

A tiny region in the brain called prostriata does something special. In work published in the journal *Current Biology*, Professor Marcello Rosa and his team from the Department of Physiology have discovered that prostriata devotes most of its resources on what is happening out of the corner of the eye, allowing us to respond rapidly to potential danger in our environment.

"This finding is completely unexpected as it violates a major principle of vision neuroscience," says lead author Dr Hsin-Hao Yu.

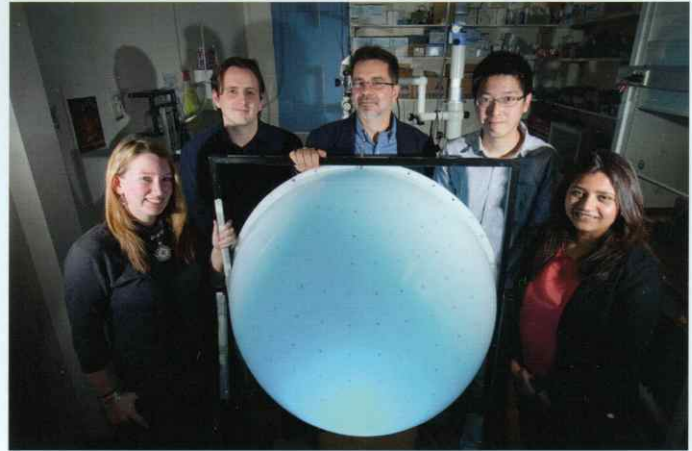
"Prostriata is the first brain structure identified that is specialised for peripheral vision. This visual information

is then broadcast directly and rapidly to areas related to emotion, attention and decision making.

"This contrasts with the traditional view that central vision is most important, where you constantly move your eyes to get sharp, clear pictures of different parts of a scene. This type of visual information is analysed by an elaborate network of brain areas."

Prostriata is evolutionarily more ancient. During the early history of mammalian evolution, it was probably more important to monitor what was happening in the periphery. Since then, we have developed a more sophisticated visual system to read and recognise complex objects such as faces directly in front of us, in high resolution.

But before we discount the importance of peripheral vision in humans, previous research has shown a link to agoraphobia, where affected people become anxious in environments that are unfamiliar



From left to right: Amanda Davies, Tristan Chaplin, Professor Marcello Rosa, Dr Hsin-Hao Yu and Dr Richa Verma.

or where they perceive that they have little control.

"You wouldn't think this is a visual issue, but it is," Dr Yu says.

"People with agoraphobia seem to have more sensitive peripheral vision than the general population and it appears that these two things are related."

Dr Yu hopes to collaborate with colleagues to study the significance of peripheral vision in humans using functional Magnetic

Resonance Imaging before testing if the prostriata is directly involved in agoraphobia.

He is also mapping how neurons in the prostriata receive and send information to other parts of the brain in animal models, a technically challenging task.

"We suspect there is a new visual pathway in the brain that hasn't been discovered before and we are using tracing methods to reveal this visual processing network," Dr Yu says.