No sunglasses required for fish supper

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Fishermen are always looking for a tasty catch - but it is the fish that have a natural advantage when it comes to spotting dinner, according to new research from The University of Manchester.

In a paper published on Wednesday 17 October 2007 in the *Biophysical Journal*, Dr Nicholas Roberts from The University's Photon Science Institute and the School of Physics and Astronomy reports how individual light sensitive cells within the retina of goldfish are able to detect polarised light.

It's believed this type of polarisation vision improves visual contrast and can help an animal catch its prey more easily.

Researchers say this latest research is important because it is the first direct experimental evidence of a polarisation detection mechanism in any normal vertebrate eye.

They believe that discovering how single cells work as polarisation detectors may lead to new developments in man-made microscopic detection or information display technologies.

Dr Roberts says: "Vision is the primary sense of many animals and the way they see their world is of fundamental importance to understanding aspects of their behaviour.

"Numerous animals have amazing visual abilities, which allow them to see the world in very different ways. One such ability is polarisation

vision.

"Just as fishermen wear Polaroid sunglasses to help improve contrast, many different animals - including fish - have evolved to do the very same thing without the need of sunglasses. It is a surprisingly common ability throughout the animal kingdom."

For the study Dr Roberts used 'laser tweezers' to manipulate the cells in three dimensions. This meant that for the first time, the absorption of single photoreceptors could be studied in the same orientation they are in the retina.

The research team stress they have so far only investigated one of the three colour channels known to play a role in polarisation vision.

Dr Roberts adds: "This is just the first step in understanding the full mechanism that allows vertebrates to see polarised light, but we see these initial results as extremely encouraging.

"We are now examining in much greater detail the underlying biochemical properties that make only some photoreceptor cells polarisation detectors.

"The real challenge is building an integrated picture of vertebrate vision. We are aiming to discover how both the biochemical and biophysical aspects of visual cell function link to the way polarisation information is first analysed, processed and then relayed to the brain."

Citation: 'A Mechanism of Polarized Light Sensitivity in Cone Photoreceptors of the Goldfish Carassius auratu' is published in the November 2007 edition of the *Biophysics Journal* (Volume 93).

Source: University of Manchester