Fresh fossil evidence of eye forerunner uncovered

Ancient armoured fish fossils from Australia present some of the first definite fossil evidence of a forerunner to the human eye, a scientist from The Australian National University says.

Dr Gavin Young from the Department of Earth and Marine Sciences at ANU has analysed fossilised remains of 400-million-year-old Devonian placoderms – jawed ancestors of modern fish whose bodies were protected by thick bony armour. His findings are published in the latest edition of *Biology Letters*, a journal of the Royal Society, London.

“The ancient limestone reefs exposed around Lake Burrinjuck in New South Wales have produced exceptionally well preserved placoderm specimens with the braincase intact,” Dr Young said.

The palaeobiologist discovered that unlike all living vertebrate animals – which includes everything from the jawless lamprey fish to humans – placoderms had a different arrangement of muscles and nerves supporting the eyeball – evidence of an “intermediate stage” between the evolution of jawless and jawed vertebrates.

“The vertebrate eye is the best example of structural perfection – as used by proponents of intelligent design to claim that something so complex couldn’t possibly have evolved,” Dr Young said.

“Part of the trouble in tracing the evolution of the eye is that soft tissues don’t tend to fossilise. But the eye cavities in the braincase of these 400 million-year-old fossil fish were lined with a delicate layer of very thin bone. All the details of the nerve canals and muscle insertions inside the eye socket are preserved – the first definite fossil evidence demonstrating an intermediate stage in the evolution of our most complex sensory organ.

“These extinct placoderms had the eyeball still connected to the braincase by cartilage, as in modern sharks, and a primitive eye muscle arrangement as in living jawless fish.” Dr Young said that this anatomical arrangement is different from all modern vertebrates, in which there is a consistent pattern of tiny muscles for rotating each eyeball.

The placoderm fossils were analysed using computer X-ray tomography at ANU, a scanning technique that creates a three-dimensional image of complex organic structures. “What this research shows is that 400 million years ago there was already a complex eye, and one that was an intermediate form between jawless and jawed vertebrates,” Dr Young says. “This means that we’re able to add one more piece to the puzzle of how the human eye came to be.”

Source: Australian National University