

Humans have a bit of shark in them

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Some 450 million years ago, sharks and humans shared a common ancestor, making sharks our distant cousins.

And according to recent research, this kinship is evident in our DNA, as at least one shark species possesses several genes that are nearly identical to those in humans.

The elephant shark's genome is so similar to ours that we wind up having more in common with it, genetically speaking, than with other species, such as teleost (bony skeleton) fishes, which are nearer to us on the evolutionary tree.

"This was a surprising finding, since teleost fish and humans are more closely related than the elephant shark is to humans," says lead author Associate Professor Byrappa Venkatesh.

Venkatesh, principal investigator at the [Institute of Molecular and Cell Biology](http://www.imcb.a-star.edu.sg/) (<http://www.imcb.a-star.edu.sg/>) in Singapore, and his team determined that sets of genes on chromosomes, as well as actual genetic sequences, are "highly similar in the elephant shark and human genomes".

The researchers not only analysed the elephant shark genome, but also the genes for other animals including puffer fish, chickens, mice and dogs.

Their findings were recently published in the journal *PLoS Biology* (<http://biology.plosjournals.org/>) .

The researchers identified 154 genes in humans that have comparable matches in mice, dogs and elephant sharks.

The similarities between people, mice and dogs were expected, given that they are all mammals.

But sharks are cartilaginous fish that seem to bear little physical resemblance to mammals.

Upon closer examination, sharks and humans do share certain physiological and biochemical processes.

One is sex.

"A common feature between the elephant sharks, other sharks and humans is that in all, the fertilisation occurs internally, whereas in teleost fishes, fertilisation occurs externally," Venkatesh says.

Many of the comparable genes between elephant sharks and humans are involved in the production of sperm. Both species produce sperm that appears to have receptors on the tip that allow fusion with a female egg. Bony fish do not have such receptors. Their sperm instead enters eggs through a pore called a micropyle, which sharks and humans lack.



Sharks and humans share certain physiological processes, like the way they have sex and how they protect their bodies from disease. Now scientists say they share common genes (*Image: iStockphoto*) (*Source: iStockphoto*)

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Immune system genes

The researchers also found that shark and human immune systems are very similar, since sharks have all four types white blood cells found in mammals.

Sean Van Sommeran, executive director of the [Pelagic Shark Research Foundation](http://www.pelagic.org/) (<http://www.pelagic.org/>) in California, says that he was not entirely surprised to learn about the shark-human links.

"The field of genetics is a Pandora's box," Van Sommeran says.

"Sharks copulate like mammals and females give birth to live young, so sharks do have features in common with mammals. It makes sense that these would show up in the genome."

Venkatesh says future studies on the elephant shark genome, which is relatively small and easy to study, could reveal information about human genes, such as how the immune system develops.

Since sharks are the oldest living jawed creatures with a backbone, studies on them may even uncover how humans and other mammals evolved.

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