

Natural selection has helped the Bajau people hold their breath while diving

By Nicola Davis, The Guardian, adapted by Newsela staff on 04.25.18

Word Count **877**

Level **1060L**



Image 1. A Bajau diver hunting fish on the reef. Photo by: Melissa Ilardo

The Bajau people in Southeast Asia are known for their amazing ability to hold their breath for long periods of time while diving to hunt fish. Scientists have finally figured out how they do it. The secret is evolution.

The Bajau people are able to dive up to 200 feet underwater with no conventional diving aids. Instead they rely on weights, handmade wooden goggles and a single breath of air.

While the Bajau people's talents have long been known, the reason for their amazing skill was unclear. The skill could be the result of practice. It could also be the result of adaptations which have their roots in the Bajau people's DNA. DNA is found in the cells of our bodies.

Sequences of DNA, called genes, tell our bodies how to grow and operate. DNA contains the instructions for how each part of the body works. Because DNA is passed from parent to child, it can tell scientists how a species or group within a species changes over time.

The Bajau people have undergone natural selection, the process by which organisms that are better suited to their environment survive, while others do not. Natural selection has resulted in certain versions of genes becoming widespread among the Bajau people.

Measuring Spleens Of Bajau People

Many of the adaptations are linked to biological changes, including having a larger spleen. These changes help the Bajau to hold their breath underwater for many minutes at a time.

Dr. Melissa Ilardo is an author of the study about the Bajau people. She worked at the University of Copenhagen at the time of the research. She said that the Bajau people have a lot to teach us about how the human body reacts to a lack of oxygen, which is an important medical issue.



Doctors could use the research to figure out new ways to help patients. Some people are more at risk than others when they experience a lack of oxygen. This can happen, for instance, during surgery. Understanding how the Bajau people can survive for longer periods of time without oxygen is very useful information for doctors.

Writing in the journal *Cell*, the scientists reveal how they solved the mystery following a clue from previous research. Certain species of seals can dive for longer amounts of time. It turns out that these seals have larger-than-expected spleens. The spleen is an organ which, among its purposes, can store oxygen-carrying red blood cells.

Ultrasound devices use sound waves to create images of the inside of the body. The team of scientists used an ultrasound device to measure the spleen in 43 Bajau people. They also measured 33 people from a neighboring group of farming people, the Saluan.

Large Spleen Helps With Underwater Diving

Professor Eske Willerslev is a co-author of the study from the University of Cambridge. The Bajau people's spleens were about 50 percent larger than the Saluan people's spleens, which is a very extreme difference, he said.

The team notes the trend held regardless of whether the Bajau individual was themselves a diver. It even held when factors such as age, sex and height were taken into account.

DNA tests revealed that certain versions of genes are more commonly found in Bajau people than would be expected. Many of these genes seem linked to biological changes that could help individuals handle low-oxygen conditions.

Among them is a form of a gene linked to an increased spleen size. This is important for diving. People, like other mammals, experience something called the "diving reflex" when our heads are underwater. The diving reflex causes the spleen to get shorter and tighter. A large spleen means even more oxygen-carrying red blood cells can be pumped into the circulatory system during this process, allowing individuals to stay underwater for longer.

Genes Did Not Develop By Accident

Another gene commonly found in Bajau people is linked to a different feature of the diving reflex. It sends less blood to the hands and feet, leaving more for organs such as the brain, heart and lungs.

Further analysis by the team also discovered that these helpful genetic traits are not the result of chance. They are evolutionary adaptations arising from natural selection.

Stephen Stearns is a scientist at Yale University who was not involved in the research. He said the study adds to evidence for recent natural selection on certain genes in human populations. Previous examples include genes for lactose tolerance that cropped up with the beginning of domestication of dairy animals. Another example would be genes for adaptation to high altitude among people who live in Tibet and Native Americans in the Andes mountains in South America.

"What we lack at this point, and badly need, are samples large enough to allow us to infer when the selection [in the Bajau] started to happen," he said. "We know that the Bajau have been leading this lifestyle for at least a thousand years, but we do not know when they started it – perhaps much earlier."