

Tibet is a challenging environment to inhabit. Not only is the air thin, but the climate is cold and the terrain jagged and icy.



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# Tibetans Set Evolution Record

**▶ life** BERKELEY, Calif.—The people of Tibet didn't enter any athletes in the Winter Olympics or the World Cup this year. Still, Tibet came out on top in an unofficial global competition. The people of Tibet appear to have evolved faster than any other group on Earth.

Tibetans are among the most physically extraordinary Earthlings. They live and thrive at an altitude of about 4,000 meters (13,120 feet) where the atmosphere contains a third less oxygen than it does at sea level. The body's cells need plenty of oxygen for *respiration*, a chemical process in which nutrients are

broken down to release energy for the body.

If you were to travel to Tibet, you would experience the nausea, dizziness, and headaches of *hypoxia*, or oxygen deprivation. Eventually, your body would adapt by making more *hemoglobin*, a protein in red blood cells that transports oxygen through the bloodstream. That adaptation would come at a cost, though. Elevated hemoglobin levels would thicken your blood, making it harder for your heart to pump. Your heart and lungs would swell.

Tibetans experience no such difficulties. Their bodies have

evolved over time so that they don't need to make more hemoglobin to take in enough oxygen. Their bodies also contain higher levels of nitric oxide, a compound that *dilates* (enlarges) blood vessels and doubles the amount of blood flowing through their systems.

Those abilities stem from a difference in genetic structure. A study by Chinese and U.S. scientists has found about 30 mutated genes that are common in Tibetans and rare among other humans. Many of the mutations are involved in the body's use of oxygen.

"We made a list of the genes that change the most, and what was fascinating was that—*bing!*—at the top of the list was a gene that had changed very strongly, and it was related to the responses to oxygen," says Rasmus Nielsen. He is a biologist at the University of California, Berkeley.

Throughout most of history, human beings have stuck close to the world's low-lying regions. The scientists estimate that Tibet was settled by people from China starting about 3,000 years ago. The subsequent change in Tibetan genes is the fastest known case of genetic evolution, they say. ■